Dorchester County
Maryland

2022

All-Hazard Mitigation Plan

Dorchester County Emergency Services
829 Fieldcrest Road
Cambridge, MD 21613

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SECTION 1

Chapter 1 Introduction

Introduction & Purpose

The All-Hazard Mitigation Plan forms the foundation for Dorchester County and its municipalities' long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. The purpose of this plan is to identify, plan, and implement cost-effective hazard mitigation measures through a comprehensive approach known as hazard mitigation planning. The Federal Emergency Management Agency (FEMA) requires hazard mitigation plans to be updated every five years. To that end, Dorchester County and its nine municipalities present the **2022 Dorchester County Hazard Mitigation Plan Update**.

Dorchester County Department of Emergency Services (DES) was awarded a FEMA Hazard Mitigation Assistance Planning Grant to update the **2017 Dorchester County Hazard Mitigation Plan Update**. DES was the lead agency for this plan update. In January of 2021, Smith Planning and Design (SP&D) was contracted to develop the **2022 Dorchester County All-Hazard Mitigation Plan Update**, in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000, and 44 CFR Part 201-Hazard Mitigation Planning.

Hazard mitigation grant programs are authorized by the following laws.

- 1968: National Flood Insurance Act
- 1979: Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Stafford Act)
- 2000: Disaster Mitigation Act of 2000
- 2018: Disaster Recovery Reform Act (DRRA)
    - This amended the Stafford Act and expanded the grant-eligible mitigation activities for FEMA's grant programs including HMGP Post Fire and Building Resilient Infrastructure and Communities.

The County is comprised of mainly rural communities. The nine (9) incorporated municipalities within Dorchester County includes: the City of Cambridge and the Towns of Brookview, Church Creek, East New Market, Eldorado, Galestown, Hurlock, Secretary, and Vienna. All nine (9) incorporated municipalities participated in the plan update. Representative(s) from each municipality provided information, reviewed draft plan elements, and completed questionnaires.

Organization of the Plan

The **2022 Dorchester County All-Hazard Mitigation Plan** update is comprised of three sections: Section 1 Introduction, Section 2 Hazard Analysis, and Section 3 Mitigation Strategies. Each section is comprised of Chapters that specifically corresponds to that particular Section. Section 1 includes Chapter 1 Introduction, Chapter 2 County Profile, Chapter 3 Planning Process and Chapter 4 Planning Initiatives and Integration. Section 2 provides specific information, such as Hazard Identification and Ranking, Hazard Profiles, Vulnerability Analysis and Loss Estimations, on each identified hazard and is comprised of Chapters 5-13. Section 3 includes Chapter 14 detailing the Goals and Objectives of the Plan, Chapter 15 listing Mitigation Strategies and Chapter 16 Plan Maintenance and Implementation. Appendices include the following:

- Appendix A: Hazard Risk & Identification Assessment Methodology
- Appendix B: 2017 Mitigation Action Items Status Report
- Appendix C: Critical & Public Facilities
- Appendix D: 2022 Mitigation Action Items
- Appendix E: Core Planning Team & Small Group Meeting Notes
- Appendix F: Municipal Input
- Appendix G: Public Outreach Documentation
- Appendix H: Funding Sources
- Appendix I: Plan Sources
- Appendix J: Region 3 Hazard Mitigation Plan Guidance Checking in on the NFIP – Community Worksheets
- Appendix K: NFIP & CRS **Official Use Only**

2022 Plan Update Highlights

Following the review of the 2017 Dorchester County Hazard Mitigation Plan, a workplan was developed to address update items and the integration of new plan elements. New plan elements have been highlighted below:

- A new project website www.dorchestermdhazardplans.org was developed and new content was periodically added over the course of the plan update. The public launch of the website occurred on June 21, 2021.

- A new Hazard Risk Online Survey was provided to Core Planning Team members in May 2021 and the public in June 2021 on the project website.

- A new Hazard Identification Risk Assessment (HIRA) was completed. The HIRA included ten (10) natural hazards. The new HIRA results, data tables, and methodology has been included in Appendix A, Chapter 5, and as applicable throughout the plan update document. In addition to natural hazards, man-made hazards (Major Fire & Explosion, On-Site HazMat Incident, Transportation HazMat Incident, Dam Failure) identified in the previous plan version have been updated.

- In addition to the HIRA, the 2021 Maryland State Hazard Mitigation Plan's hazard ranking results for Dorchester County, along with the public hazard survey results were integrated into the plan update.

- A Mitigation Status Report was completed using a Fillable PDF populated by Core Planning Team members. The full report has been included in Appendix B.

- Pandemic was identified in the previous planning and developed into a new standalone chapter, Chapter 12 Pandemic and Emerging Infectious Disease, for the plan update.

- Chapter 13 Climate Change was added as a new hazard for this planning cycle.

- New to the plan update, the Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) for Dorchester County. The SVI was reviewed in relation to each identified hazard that included a geographic risk area.

- Hazard impact tables were developed and included each hazard chapter. Hazard impacts tables identify possible impacts to the following categories:

    - Public Health & Safety
    - Social Vulnerability
    - Economic Stability
    - Infrastructure
    - Environment

- In addition to the larger stakeholder, Core Planning Team meetings and topical small group meetings were held throughout the plan update. These topical small group meetings included public health, floodplain management, and social vulnerability.

Planning resources reviewed and integrated into the 2022 plan update included, but not limited to the following:

- 2017 Dorchester County Hazard Mitigation Plan Update
- 2018 Dorchester County Historic & Cultural Resources Hazard Mitigation & Risk Plan
- 2021 Dorchester County Comprehensive Plan
- Building Codes
- 2015 Floodplain Ordinance
- 2019 Dorchester County Flood Risk Report
- US Climate Resilience Toolkit
- 2016 Maryland Coastal Resiliency
- National Integrated Drought Information System
- 2017 Dorchester County Land Preservation Park and Recreation Plan
- 2020 Dorchester County Health Department (DCHD) Emerging Infectious Disease (EID)/Infectious Disease Response Plan (IDRP)
- EPA's 2021 Climate Change and Social Vulnerability in the United States
- 2018 Sea Level Projections for Maryland
- WHO's Climate Change and Infectious Diseases
- 2021 Maryland State Hazard Mitigation Plan

Please see *Appendix I Plan Sources* for additional documents referenced throughout the plan.

Chapter 2 Planning Process

Hazard Mitigation Plan

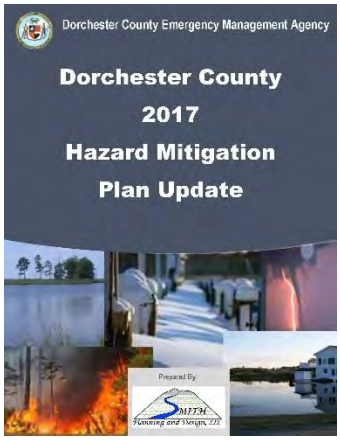
Reason for Plan

In response to continuing large-scale federal outlays of disaster funds to states and communities during the decade of 1990, Congress passed the Disaster Mitigation Act of 2000. Section 322 of this Act requires that all states and local jurisdictions develop and submit Mitigation Plans designed to meet the criteria set forth in 44 CFR Part 201-Hazard Mitigation Planning. Beginning in 2002, states were provided funding under this act to carry out the planning process.

Additional funding was made available to counties to develop Hazard Mitigation Plans for local communities. Each incorporated community has the option of joining its county government in the preparation of this plan. As an incentive for State and local governments to develop hazard mitigation plans, the federal government requires mitigation planning as a condition of eligibility for hazard mitigation project funding. This requirement reinforces the importance of proactive mitigation planning and emphasizes planning for disasters before they occur. The 2015 Hazard Mitigation Assistance Unified Guidance, produced by the Federal Emergency Management Agency (FEMA), states that mitigation plans are the foundation for effective hazard mitigation. As such, local jurisdictions must have a FEMA-approved local hazard mitigation plan at the time of obligation of grant funds to be eligible for grant funding under the unified Hazard Mitigation Assistance (HMA) programs.

Approved and locally adopted hazard mitigation plans are necessary for specific FEMA grant project funding eligibility.

- Hazard Mitigation Grant Program (HMGP);
- Flood Mitigation Assistance Grant Program (FMAG);
- Building Resilient Infrastructure and Communities (BRIC); and,
- Rehabilitation of High Hazard Potential Dam (HHPD) Grant Program.



The 2022 Dorchester County All-Hazards Mitigation Plan is an update of the previous plan document approved by FEMA and adopted by the County in 2017. In addition, the City of Cambridge, and the Towns of Brookview, Church Creek, East New Market, Eldorado, Galestown, Hurlock, Secretary, and Vienna adopted the plan.

The 2017 Dorchester County Hazard Mitigation Plan Update was available throughout the previous planning cycle for review on the County website under the Department of Emergency Services – Emergency Management Division. Updated draft plan chapters were uploaded to project website as they were developed for public review and comment during the planning process. Updates to the 2017 plan along with new plan elements were detailed on each chapter cover sheet herein.

THE PURPOSE OF THE HAZARD MITIGATION PLAN IS TO PREVENT OR REDUCE LOSS OF LIFE AND INJURY AS WELL AS LIMIT DAMAGE COSTS FROM VARIOUS HAZARDS THROUGH THE DEVELOPMENT OF MITIGATION METHODS WHICH LESSEN OR ELIMINATE FUTURE DAMAGE. THIS IS ACCOMPLISHED BY REVIEWING, ASSESSING AND UPDATING THE COUNTY'S VULNERABILITIES TO NATURAL HAZARDS. THE RESULT OF THE ASSESSMENT WILL BE SHORT-TERM AND LONG-TERM STRATEGIES THAT ADDRESS HAZARDS IDENTIFIED IN THE PLAN. THESE STRATEGIES ARE AN EFFORT TO PREVENT FUTURE DAMAGE AND LOSS OF LIFE OF DORCHESTER COUNTY RESIDENTS.

Plan Requirements

Local Mitigation Plans follow a planning methodology that includes public involvement, a risk assessment for various hazards, an inventory of critical facilities and other at-risk structures, a mitigation strategy for high-risk hazards, and a method to maintain and update the Plan. Therefore, the requirements of a local hazard mitigation plan include the development of a hazard identification and risk assessment which leads to the development of a comprehensive mitigation planning strategy for reducing risks to life and property. Additionally, the mitigation strategy section identifies a range of specific mitigation actions and projects that reduce the risks to new and existing buildings and infrastructure. The mitigation strategy also includes an action plan describing how identified mitigation activities will be prioritized, implemented, and administered.

The mitigation plan belongs to the local community. While FEMA has the authority to approve plans for local governments to apply for mitigation project funding, there is no required format for the plan's organization. The following guiding principles informed this plan update.

Focus on the mitigation strategy- The mitigation strategy is the plan's primary purpose. All other sections contribute to and inform the mitigation strategy and specific hazard mitigation actions. A total of fifty-three mitigation actions were developed for this plan update. These action items are identified at the end of each hazard specific plan chapter and in *Appendix D 2022 Mitigation Action Items*. In addition, mitigation action items prioritized during this plan update were further developed into projects sheets which are included in Chapter 15 Mitigation Strategies.

Process is as important as the plan itself- In mitigation planning, as with most other planning efforts, the plan is only as good as the process and people involved in its development. The plan should serve as the written record, or documentation of the planning process. In addition to the plan document, a project website was developed. Content was added to the project website throughout the plan update process. The website served as a hub for public outreach materials, initiatives, and meeting information. Social media was used throughout the plan update process to direct people to the project website, online public survey, and outreach events.

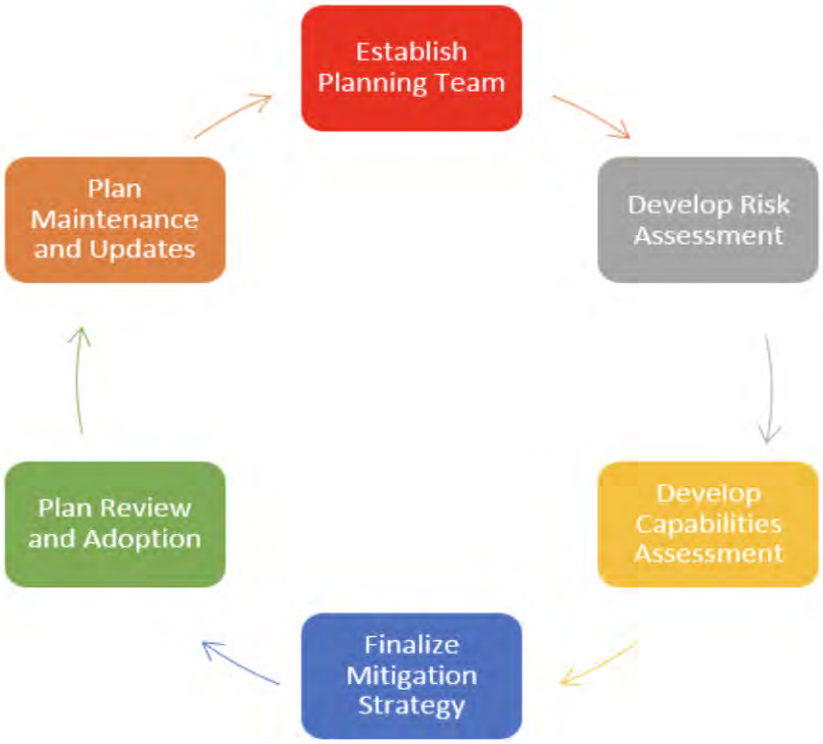
This is our community's plan- To have value, the plan represents the current needs and values of the community and is useful for local officials and stakeholders serving our community's purpose and people.

Plan Process

The planning process is as important as the plan itself. It creates a framework for risk-based decision making to reduce damages and improve resiliency.

The **six phases of the planning process** are essential to the successful update of the Hazard Mitigation Plan.

Figure 2-1



Phase 1- Establish a Planning Team

The first step required the County to form a planning committee, expanding on the planning committee used in the previous 2017 HMP, which ensured adequate technical assistance, expertise, and community representation. As a result, Dorchester County formed a Core Planning Team (CPT), comprised of representatives from various County and municipal agencies, including Emergency Services, Planning, Public Works, GIS, Health, Emergency Medical Services, Utilities, Roads, Fire and Police, and Education. Additionally, community organizations were invited to participate in the planning process, resulting in representatives from the Fire Chiefs Committee, Dorchester Erosion Group, Heart of Chesapeake Country Heritage Area, Dorchester VF Association, Twin Point Cove Group, a Hoopersville Group, Shore Rivers Choptank Riverkeeper, and the Eastern Shore Land Conservancy being included within the CPT. Finally, several state agencies as well as Salisbury University participated. The Dorchester County Department of Emergency Services served as the lead agency for the Plan update process and technical support was provided by Smith Planning and Design.

The Core Planning Team (CPT) was tasked with assisting in the completion of the Plan update. The following listing includes the members of the committee and the agencies they represent:

Table 2-1

Core Planning Team Members			
Member	Agency/Department	Member	Agency/Department
Donna Lane	County Council	Bruce Jones	Town of Hurlock
Dozia Rahilly	Emergency Services	Ron James	Town of Galestown
Troi Faith	Emergency Services	Pam Travers	Town of Vienna
James Windsor	Emergency Services	Cynthia McFarlene	Town of Vienna
Steve Garvin	Emergency Services	Karen Tolley	Town of Church Creek
Herve Hamon	County Planning & Zoning	Gary L. Burkey	Town of Secretary
Jason Boothe	County Planning & Zoning	Steve Tolley	Town of East New Market
Brandon Vermillion	County Planning & Zoning	Rob Sturla	Town of Eldorado
Susan Webb	County Planning & Zoning	Clint Falduto	Town of Brookview
Roger Short	County Planning & Zoning	Adam Pritchett	Dorchester VF Association
Dave Edwards	County Public Works	Bruce Coulson	Dorchester Erosion Group
Stephanie Newcomb	County Public Works	John Sandkuhler	Twin Point Cove Group
Sonny Willey	County Public Works	Gary McQuitty	Hoopersville Group
John Stichberry	Dorchester County Sheriff's Office	Chris Hauge	Board of Education
Hayley Effland	County Finance	Bill Christopher	Chamber of Commerce
Mike Spears	County Finance	Christy Miller Hesed	UM Anthropology
Susan Banks	County Economic Development	Don Bradley	Circuit Rider
Amanda Fenstermaker	Heart of Chesapeake Country Heritage Area	Kate McClure	Maryland Extension
Roger Harrell	Health Department	Jen Dindinger	Maryland Extension
Brice Strang	Health Department	Matt Pluta	ShoreRivers Choptank Riverkeeper
Hannah Mayhew	Health Department	Jenifer Dubosq	Department of Social Services
Gregory North	Health Department	Tyrique Henry	Department of Social Services
Kimberly Keene	Environmental Health	Nick Kovach	DC Emergency Communications Division Chief
Bill Forlifer	Environmental Health	Patti Tieder	Taylors Island Volunteer Fire Department
Bill Hildebrand	Maryland Department Emergency Management	KD Applegarth	Sanitary District
Patrick Comiskey	City of Cambridge	Erin Silva	Salisbury University
George Hyde	City of Cambridge Public Works	Deborah Herr Cornwell	Maryland Department of Planning
Larry White	City of Cambridge	Tracey Gordy	Maryland Department of Planning
John Avery	Town of Hurlock	Keith Lackie	Maryland Department of Planning

Members of the Core Planning Team listed above participated in at least two or more of the following activities over the course of the plan update.

Table 2-2

Core Planning Team (CPT) Opportunities for Participation		
Meetings	Surveys & Questionnaires	Draft Plan Review
• CPT Meeting #1 June 2, 2021 • Small Group Meeting- SLR and Coastal Flooding Impacts on Development July 19, 2021 • Small Group Meeting- Emerging Infectious Disease July 22, 2021 • CPT Meeting #2 Sept. 8, 2021 • Small Group Meeting- NFIP & CRS October 6, 2021 • Small Group Meeting- DES & DPZ January 20, 2022 • CPT Meeting #3 Mitigation Action Workshop March 10, 2022 • Flood Risk Reduction Community Workshop March 22, 2022	• Hazard Risk Online Survey initiated in July 2021 • 2017 Mitigation Status Questionnaire • HMP Municipal Questionnaire • County NFIP Questionnaire • Municipal NFIP Questionnaire Town of Secretary & the City Cambridge	• Project Website Review & Comment by CPT prior to public launch- June 2021 • Draft Chapter-11 July 2021 • Appendix G- NFIP/CS- October 2021 • Hazard Chapter distribution - See Table 2-3 • Development and Review of Mitigation Ideas • Review and Comment of cohesive Draft by CPT April 2022

CPT and small group meetings were scheduled to coincide with key phases of the planning process. The first meeting was introductory in nature, to explain the overall process being used in developing the plan. This meeting also allowed planning team members an opportunity to review hazards and their impacts to the County. The second meeting was designed to review and discuss hazard rankings, hazard profiles, hazard vulnerability, and provide an updated status of the 2017 mitigation actions. The third meeting, or Mitigation Action Item Workshop, provided participants an opportunity to review and discuss mitigation action items for inclusion in the 2022 Plan Update.

CPT meeting notes were uploaded on the project website following each meeting and are included in *Appendix E Core Planning Team Meeting Notes*.

Phase 2- Develop a Risk Assessment

As part of the plan update process for Dorchester County, a Hazard Identification Risk Assessment (HIRA) was completed for Dorchester County, Maryland. Results from the Hazard Risk Survey completed by stakeholders were integrated into the updated HIRA.

Ten (10) natural hazards were identified, and a hazard risk was assigned to each. Only natural hazards are included in this assessment as they lend themselves better to data collection related to geographic extent than technological and man-made hazards. A separate risk assessment was conducted for the technological and man-made hazards (i.e., transportation accident, hazardous material incident, dam failure, fire and explosion, mass power outage) identified in the previous plan version.

To assess the hazard risk for the ten (10) natural hazards identified in this Plan Update a composite score method was undertaken. The composite score method was based on a blend of quantitative and qualitative factors extracted from the National Centers for Environmental Information (NCEI), stakeholder survey, and other available data sources. These included:

- Historical impacts, in terms of human lives and property;
- Geographic extent;
- Historical occurrence;
- Future probability, and;
- Community perspective.

Hazards that have the potential to impact Dorchester County are listed below. These hazards have been ranked by Stakeholder members, as follows: **High**, **Medium-High**, **Medium**, and **Low**.

NATURAL HAZARD IDENTIFICATION AND RISK ASSESSMENT RANKING RESULTS

Hazards	2017 Hazard Ranking	2021 Hazard Ranking
Coastal Events	High	High
Thunderstorm	Medium-High	High
Riverine Flood	High	Medium-High
High Wind	Medium-High	Medium-High
Tornado	Medium	Medium-High
Extreme Heat	Medium High	Medium-High
Drought	Medium	Medium
Winter Storm	Medium-High	Medium
Wildfire	Medium	Medium
Earthquake	Low	Low

Hazard Rankings were determined using a composite score method which included variables such as: (1) injuries, (2) deaths, (3) property damage, (4) crop damage, (5) geographic extent, (6) total annualized events, (7) future probability, and (8) community perspective. In order to compute the HIRA composite score for each hazard the following equation is used.

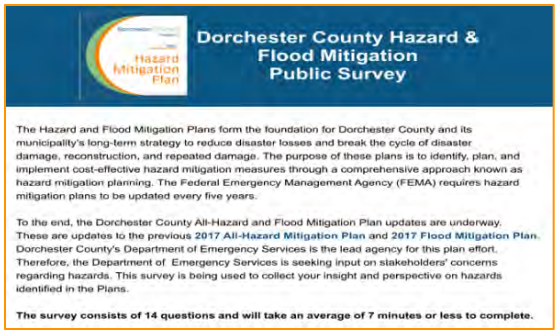
Equation: Composite Score = IN + DT + PD + CD + (GE*1.5) + EV + FP + (CP*1.5)

HIRA results and methodology have been included in *Appendix A Hazard Identification & Risk Assessment.*

Additional stakeholder survey results informed technological and man-made hazards:

- Major Fire & Explosion: Concerned
- On-Site HazMat Incident: Somewhat Concerned
- Transportation HazMat Incident: Somewhat Concerned
- Epidemic: Somewhat Concerned
- Dam Failure: Not Concerned

NOTE: Epidemic was changed to Emerging Infectious Disease and is now a new standalone chapter in the Plan Update.



In addition to the hazard perspective survey completed by the CPT, a public online survey was available on the project website and offered throughout the plan update process. The survey focused on the nineteen (19) hazards identified for the Plan Update, fourteen (14) of which are natural hazards. FEMA requires natural hazards be identified and assessed.

The survey was used to collect the public's insight and perspective on hazards identified in the Plan. Survey results were integrated into each hazard plan chapter and are included in *Appendix G Public Outreach Documentation*.

Dorchester County All-Hazard & Flood Mitigation Planning, Training, and Outreach Initiatives				
Date	Meeting, Training, or Outreach Activity	Target Audience	Materials Provided	Comments/Input
21-Jun-21	Website Link on County Website & New Release	Public	Link to Project Website & News Release	Public Survey
6-Jul-21	Social Media Post on Facebook	Public	Project Webiste	Emergency Services posted the website link on their Facebook page
7-Jul-21	Social Media Post on Facebook	Public	Public Survey	Emergency Services posted the public survey link on their Facebook page
12-Jul-21	Social Media Post on Facebook	Public	Project Website & Public Survey	DC Health Department posted the link to the project website and public survey on their Facebook page
13-Jul-21	Social Media Post on Facebook	Public	Public Survey	Emergency Services posted the public survey link on their Facebook page
28-Jul-21	Press Release for Star Democrat	Public	Project Website & Public Survey	Notice about the All-Hazard Mitigation Plan Update and provided the project website and public survey link.
4-Aug-21	Social Media Post on Facebook	Public	Public Survey	Emergency Services posted the public survey link on their Facebook page
16-Sep-21	Social Media Post on Facebook	Public	Public Survey	DC Health Department posted the link to the public survey on their Facebook page
30-Sep-21	DC Economic Development - Dorchester Currents	Public	Public Survey Promotion	Public Survey promoted in Dorchester Currents. Currents is the e-newsletter of the Dorchester Economic Development Office.
18-Oct-21	Social Media Post on Facebook - County Manager	Public	Project Website	Notice about the All-Hazard Mitigation Plan Update and provided the project website.
15-Nov-21	Social Media Post on Facebook	Public	Project Website	Emergency Services posted the project website link on their Facebook page. This link has been pinned to the top of their page.

Various social media postings were launched throughout the plan update process to encourage public participation. Core Planning Team members were encouraged to post links to the project website and survey on their social media outlets.

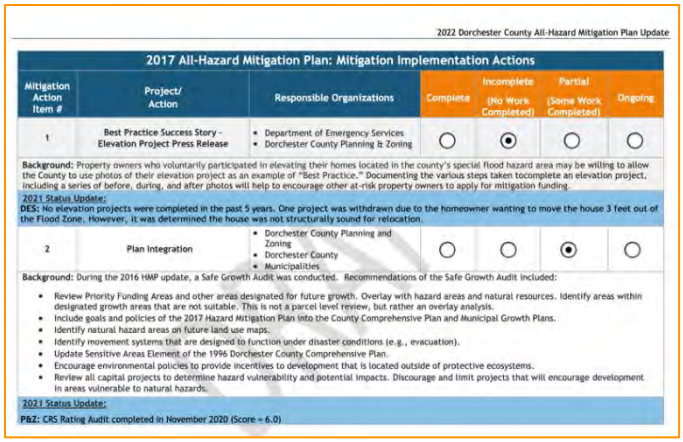
Phase 3- Develop a Capability Assessment

Policy and regulatory information from each of the communities and the County was collected. This included comprehensive plans including the water resources elements and municipal growth elements, as well as zoning ordinances, development ordinances, and building codes and other relevant documents.

Information was collected from public works, planning, emergency management, and GIS departments. Additionally, information from each municipality was requested: Hazard Risk Survey, Permit Data, Capabilities, and Local Repetitive Flood Locations. Furthermore, data and information from several State and Federal agencies was obtained including the Maryland Emergency Management Agency, Maryland Department of Natural Resources, the Federal Emergency Management Agency, Maryland Department of the Environment, and the U.S. Army Corps of Engineers. A listing of resources gathered and utilized throughout the Plan can be found in *Appendix J: Plan Sources*.

Chapter 4 Community Capabilities and Plan Integration includes the results from data collection efforts conducted during this plan update for both the County and its municipalities.

Phase 4- Finalize Mitigation Strategy



2022 Dorchester County All-Hazard Mitigation Plan Update

2017 All-Hazard Mitigation Plan: Mitigation Implementation Actions

Mitigation Action Item #	Project/ Action	Responsible Organizations	Complete	Incomplete (No Work Completed)	Partial (Some Work Completed)	Ongoing
1	Best Practice Success Story - Elevation Project Press Release	• Department of Emergency Services • Dorchester County Planning & Zoning	○	◉	○	○
	Background: Property owners who voluntarily participated in elevating their homes located in the county's special flood hazard area may be willing to allow the County to use photos of their elevation project as an example of "Best Practice." Documenting the various steps taken tocomplete an elevation project, including a series of before, during, and after photos will help to encourage other at-risk property owners to apply for mitigation funding.					
	2021 Status Update: **DES:** No elevation projects were completed in the past 5 years. One project was withdrawn due to the homeowner wanting to move the house 3 feet out of the Flood Zone. However, it was determined the house was not structurally sound for relocation.					
2	Plan Integration	• Dorchester County Planning and Zoning • Dorchester County • Municipalities	○	○	◉	○
	Background: During the 2016 HMP update, a Safe Growth Audit was conducted. Recommendations of the Safe Growth Audit included: • Review Priority Funding Areas and other areas designated for future growth. Overlay with hazard areas and natural resources. Identify areas within designated growth areas that are not suitable. This is not a parcel level review, but rather an overlay analysis. • Include goals and policies of the 2017 Hazard Mitigation Plan into the County Comprehensive Plan and Municipal Growth Plans. • Identify natural hazard areas on future land use maps. • Identify movement systems that are designed to function under disaster conditions (e.g., evacuation). • Update Sensitive Areas Element of the 1996 Dorchester County Comprehensive Plan. • Encourage environmental policies to provide incentives to development that is located outside of protective ecosystems. • Review all capital projects to determine hazard vulnerability and potential impacts. Discourage and limit projects that will encourage development in areas vulnerable to natural hazards.					
	2021 Status Update: **P&Z:** CRS Rating Audit completed in November 2020 (Score = 6.0)					

In order to determine where we are going, an assessment of the status of mitigation actions listed in the previous plan was conducted. Status updates were completed by the 2022 Core Planning Team.

Results indicated that 50% of the 2017 mitigation actions are either complete or in-process, while the remaining 50% are incomplete. A Mitigation Status Report has been included in Appendix B.
New mitigation action items were developed during the plan update process. Additionally, mitigation action items that were designated as incomplete were carried over from the 2017 HMP. A total of 53 mitigation action items have been included in the Plan Update.

During the **Mitigation Action Item Workshop**, mitigation action items were reviewed and prioritized by the Core Planning Team (CPT). CPT members were lead through a three-step process, which included both individual and group work discussion. At the end of the process, CPT members identified eleven (11) mitigation action items that were deemed a priority for completion during the next five-year planning cycle.

Project sheets have been developed for the 11 action items (attached). The following topics are included on the project sheets.

- Hazard
- Location
- Project Title & Mitigation Action Item
- Background/Issue
- Ideas for Integration
- Responsible Agency
- Partners
- Potential Funding
- Cost Estimate
- Benefits (losses avoided)
- Timeline
- Goals and Objectives

After reviewing the mitigation projects sheets, CPT members were provided with a link to the Prioritization Survey. This online survey was used as a tool for ranking purposes by CPT members. A series of yes/no questions, six (6) questions, were asked per project.
The basis for the online project priority survey method is the STAPLEE evaluation method which uses seven criteria for evaluating a mitigation action: Social, Technical, Administrative, Political, Legal, Economic, and Environmental. A top five (5) priority project listing resulted from the prioritization multi-step process.

Phase 5- Review of the Plan & Plan Revisions

Each of the natural hazards identified in the plan was updated and sent to Core Planning Team (CPT) members for review. Data, text, vulnerability assessments, and mapping were updated with the best available data. Two (2) new chapters (highlighted in orange) were developed for the plan update.

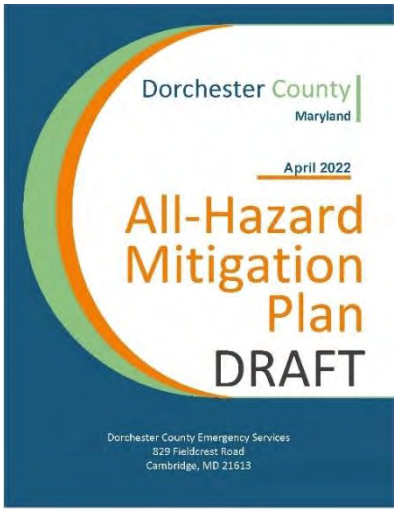
- Coastal Hazards
- Riverine Flooding
- Winter Weather
- Thunderstorm, Hail, Wind & Tornado
- Extreme Heat, Drought & Wildfire
- Human Impacted Hazards
- Emerging Infectious Diseases
- Climate Change

Plan chapters were available for public review on the project website under the "Public Plan Review & Comment" tab.

Table 2-3

Dorchester County All-Hazard Mitigation Plan Update Schedule	
Chapter	Date Draft Submitted to CPT & Project Website for Review
Coastal Hazards	2/24/2022
Riverine Flooding	2/24/2022
Winter Weather	11/30/2021
Thunderstorm, Hail, Wind & Tornado	11/30/2021
Extreme Heat, Drought & Wildfire	12/8/2021
Human Impacted Hazards	12/8/2021
Emerging Infectious Diseases	9/13/2021
Climate Change	3/1/2022
Goals & Objectives	3/16/2022
Mitigation Strategies	3/25/2022
Plan Maintenance & Implementation	4/2/2022
Hazard Risk & Identification Assessment Methodology	6/4/2021
2017 Mitigation Action Items Status Report	7/7/2021

Plan Review & Adoption



The cohesive draft plan was distributed to the CPT members in April of 2022, which was essentially a second opportunity for committee review and comment.

In addition, the public was able to review and comment on the Draft Plan Update in April of 2022. The draft plan update was uploaded to the project website along with the review and comment form.

Comments from both the CPT members and Public were integrated into the Plan Update prior to submittal to the Maryland Department of Emergency Management (MDEM). MDEM review comments were addressed prior to submittal to

the Federal Emergency Management Agency (FEMA) in June of 2022. *Note: The MDEM serves as the State review agency and clearing house*.

Following the integration of FEMA review comments, an "Approved Pending Adoption" letter was issued in August 2022 by FEMA to Dorchester County. A public meeting was held in January of 2023. The plan was formally adopted at the January meeting.

Phase 6- Plan Maintenance and Updates

Since the 2017 adoption of the plan, the Local Emergency Planning Committee annually reviewed the mitigation actions and provided status updates, as available. In addition, annual requests for mitigation action status updates were requested by the Department of Emergency Services to responsible entities including municipalities. The Mitigation Status Report completed during this plan update has been included in Appendix B.

Plan maintenance and implementation was discussed at the Core Planning Team Meeting in March of 2022. Questions were posed regarding who is responsible to ensure that the plan is being maintained and that actions items and/or projects are being reviewed for status updates. The Department of Emergency Services will continue to be the lead agency for coordinating the hazard mitigation plan maintenance and implementation. However, the establishment of a formalized group will occur by Fall 2023. This group will be in addition to the Local Emergency Planning Committee (LEPC), who reviewed and maintained the plan during previous planning cycles. The new group will be designated by the County Council and will meet, at a minimum, two times per year. DES staff will schedule and facilitate all plan review and maintenance meetings. Information for the annual review will be compiled and results distributed.

Finally, Dorchester County is currently working on a Plan Update of the 2017 Flood Mitigation Plan. The Flood Mitigation Plan, upon completion, will be adopted as an addendum to the **2022 Dorchester County All-Hazard Mitigation Plan**.

Municipal Participation

The nine county municipalities, which all participated in the previous planning process, were invited again to participate in the update planning process and have their mitigation concerns made part of the County Plan. These municipalities include Cambridge, Brookview, Church Creek, East New Market, Eldorado, Galestown, Hurlock, Secretary and Vienna. Data collection and municipal input was sought throughout the planning process. Municipalities were invited to various CPT meetings and municipal outreach materials were distributed to all municipalities.

Municipalities provided hazard rankings, capabilities, municipal level data and perspective. This participation culminated into municipal mitigation action items and projects. Various plan elements and working draft chapters were distributed to the municipal representatives for review throughout the plan update process. Upon completion of all plan chapters, a cohesive draft plan was distributed for final review and comment by municipal representatives in April of 2022.

Municipal representatives participated in two or more of plan update activities. Examples of municipal plan update activities are included in *Appendix F Municipal Input*.

Table 2-4

Documentation of Municipal Plan Update Activities		
Municipality	Documentation Example #1	Documentation Example #2
City of Cambridge	Attended Meetings 1 & 2	Participated in the Municipal Survey
Town of Church Creek	Participated in the Municipal Survey	Completed Municipal Questionnaire
Town of East New Market	Completed Municipal Questionnaire	Participated in the Municipal Survey
Town of Eldorado	Completed Municipal Questionnaire	Participated in the Municipal Survey
Town of Galestown	Completed Municipal Questionnaire	Participated in the Municipal Survey
Town of Hurlock	Participated in the Municipal Survey	Completed NFIP Survey
Town of Secretary	Completed Municipal Questionnaire	Completed NFIP Survey
Town of Vienna	Completed Municipal Questionnaire	Participated in the Municipal Survey

Regional Collaboration

Opportunities for neighboring communities, local and regional agencies involvement in the hazard mitigation plan update were provided throughout the planning process. For example, members of the Dorchester County All-Hazards Core Planning Team (CPT) served as steering committee members on the Cambridge Flood Mitigation & Resilience planning project. Information was shared and integrated into each of the plan documents, as applicable. Dorchester County co-hosted the Flood Risk Reduction Community Workshop with the City of Cambridge further demonstrating the coloration between the two planning projects.

Other examples of collaboration included Salisbury University, Hoopersville, and the Twin Point Cover community. Specifically, during CPT Meeting #2, three presentations were included:

- Eastern Shore Economic Recovery Project - Erin Silva, Salisbury University
  - The project website is: https://recovery.delmarvaindex.org/.
- Cambridge Shoreline Resilience Plan - Larry White, Project Manager
  - The project website is: https://www.makecambridgeresilient.org/.
- Coastal Community Resiliency Studies for Hoopersville, Twin Points Cove & Hurst Creek - Herve Hamon, Dorchester County Director of Planning & Zoning
- Matt Pluta, ShoreRivers Choptank Riverkeeper, participated in the plan update process serving as a CPT member. Also, Mr. Pluta presented at the Flood Risk Reduction Community Workshop hosted by both Dorchester County and the City of Cambridge.

Regional planners from the Maryland Department of Planning (MDP), Deborah Herr Cornwell and Tracey Gordy, along with William Hildebrand, Regional Liaison for the Eastern Shore, from the Maryland Department of Emergency Management (MDEM) attended CPT meetings and provided insight into hazard related planning and initiatives undertaken by adjacent jurisdictions.

In addition, Dorchester County Department of Emergency Services attended the Eastern Shore Planners Meeting on April 22, 2022. The Eastern Shore Planners Meeting discussed the mitigation planning, Red Cross Trailers, Incident Management Team Membership and included a jurisdictional round table in which Dorchester County discussed their hazard mitigation plan.

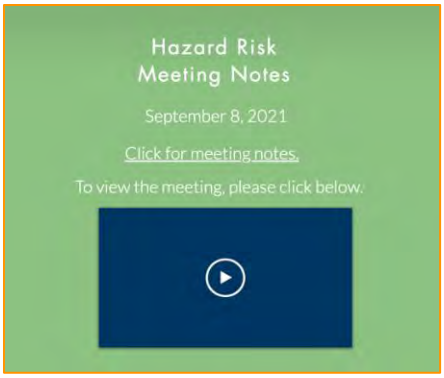
Public Involvement

To conduct a robust planning process, stakeholder and public involvement throughout the update process was crucial. As this planning process commenced during the COVID-19 pandemic, the planning team decided to develop a project website at www.dorchestermdhazardplams.org.

This planning project aimed to ensure the County is prepared for various hazards. The Department of Emergency Services placed special emphasis on understanding citizens' concerns regarding hazards. Community input was deemed incredibly valuable. To that end the, a public survey was added to the project website and links to the survey were distributed using social media throughout the plan update process.

Dorchester County All-Hazard & Flood Mitigation Planning, Training, and Outreach Initiatives				
Date	**Meeting, Training, or Outreach Activity**	**Target Audience**	**Materials Provided**	**Comments/Input**
4-Jun-21	Website Update	Public	Project Website "Hazard Risk Assessment" tab update	Appendix A Hazard Risk & Identification Assessment Methodology was added to "Hazard Risk Assessment" for public reivew.
13-Sep-21	Website Update	Public	Project Website	A new tab titled "Public Plan Review & Comment" was added. This tab provides the public an opportunity to comment on working draft plan chapters.
13-Sep-21	Website Update	Public	Project Website	New draft Chapter 12 was added to "Public Plan Review & Comment" for public reivew.
27-Sep-21	Website Update	Public	Project Website "Prevention & Adaptation" tab update	The 2017 Mitigation Action Status Update Report was added to the Prevention & Adaptation tab.
30-Nov-21	Website Update	Public	Project Website	New draft Chapters 8 & 9 were added to "Public Plan Review & Comment" for public reivew.
8-Dec-21	Website Update	Public	Project Website	New draft Chapters 10 &11 were added to "Public Plan Review & Comment" for public reivew.
25-Feb-22	Website Update	Public	Project Website	New draft Chapters 6 & 7 were added to "Public Plan Review & Comment" for public reivew.
1-Mar-22	Website Update	Public	Project Website	New draft chapter added to "Public Plan Review & Comment" for public reivew.

Core Planning Team (CPT) meetings were advertised on the project website. Meeting notes and recordings were uploaded to the website following each meeting for public review. A "Contact Us" sign-up form was included on the project website.



Draft plan chapters were uploaded along with a comment form for public review and comment throughout the plan update process. Each hazard chapter included a listing of highlights and updates to assist the reader. At the end of each working draft chapter, conclusions, and recommendations to lessen the impacts of hazards are presented. The public was requested to review and provide any additional comments and/or risk reduction ideas using the online comment form.

In addition, the public was requested to provide hazard impacts to inform new hazard impact tables that were added to each hazard chapter during this plan update.

In April 2022, the Draft Plan Update in its entirety was uploaded to the project website for public review and comment.

Finally, media releases were disturbed via the Dorchester Star and The Star Democrat. An article in the Dorchester Star was released on August2, 2021. The article discussed the plan update purpose, project website, and provided a link to the public survey.

Dorchester updating All-Hazard Mitigation Plan

Aug 2, 2021

CAMBRIDGE — Dorchester County is engaged in updating the All-Hazard Mitigation Plan. This effort will result in the development of both short-term and long-term strategies to address hazards that impact Dorchester County both today and tomorrow.

Source: Dorchester Star

Planning and Training Initiatives

Planning, training, and outreach initiatives were documented throughout the plan development process and included the following examples.

On December 2, 2021, the Maryland Department of the Environment and Maryland Insurance Administration conducted a webinar open to the public. During the presentation, the public learned where to can find flood maps, how to can use Maryland Flood Maps, and the importance of understanding the flood risks. The webinar also provided ways for the public to protect their property from flood damage.

On March 22, 2022, Dorchester County cohosted the Flood Risk Reduction Community Workshop. An All-Hazard Mitigation Plan station was available to the public to learn more about the plan and participate in the public survey. The project website was also available for the public to review. The website link was made readily accessible via a QR code.

Flood Risk Reduction Community Workshop
March 22, 2022

A compilation of all planning, training, and outreach initiatives in provided in the table below.

Dorchester County All-Hazard & Flood Mitigation Planning, Training, and Outreach Initiatives				
Date	Meeting, Training, or Outreach Activity	Target Audience	Materials Provided	Comments/Input
10-Feb-21	Project Kick-Off Mtg.	Project Manager	Project SOW & Timeline	Discussed outreach strategy and development of project website. HMP & FMP Core Planning Team listing review and update will be completed.
9-Mar-21	Cambridge Shoreline Resilience Plan	Stakeholder Meeting	Agenda & Meeting Notes	Steve Garvin represented Dorchester DES and conveyed information about county all-hazards and flood mitigation planning efforts.
19-Mar-21	Cambridge Shoreline Resilience Plan	Stakeholder	Survey	Steve Garvin provided input for Dorchester DES
13-Apr-21	Cambridge Shoreline Resilience Plan	Stakeholder Meeting	Agenda & Meeting Notes	Steve Garvin provided input for Dorchester DES and status updated of county all-hazards and flood mitigation planning efforts.
13-Apr-21	GIS Data Coordination	GIS Specialist	Dropbox Link	GIS Data Transfer Established
25-May-21	Cambridge Shoreline Resilience Plan	Stakeholder Field Visit	Project Site (5) Fact Sheets & Presentation	Steve Garvin provided input for Dorchester DES and potential opportunities for collaboration with the county all-hazards and flood mitigation planning efforts.
2-Jun-21	Draft Website Content	Core Planning Team & Public	Flood Specific Content	Hazard Vulnerability Tab - Flood Risk Report & Map & Hazard Resources Tab
2-Jun-21	Core Planning Team Meeting #1	Core Planning Team	Webex Meeting-Agenda	Meeting Notes, Community Perspective Survey & Project Website Preview
3-Jun-21	Draft Website Content	Core Planning Team & Public	Added Business Resources	New content added as result of discussion with Core Planning Team during Meeting #1.
4-Jun-21	Core Planning Team Website Review	Core Planning Team	Link to Project Website	Website Review & Feedback
4-Jun-21	Draft Chapter Review	Core Planning Team	Draft Appendix A Hazard Risk & Identification Assessment Methodology	Draft Appendix A was provided for review and comment.
4-Jun-21	Website Update	Public	Project Website "Hazard Risk Assessment" tab update	Appendix A Hazard Risk & Identification Assessment Methodology was added to "Hazard Risk Assessment" for public review.

Date	Meeting, Training, or Outreach Activity	Target Audience	Materials Provided	Comments/Input
7-Jun-21	Incorporating Business Preparedness & Midshore Recovery Website	Economic Development & Project Manager	Midshore Recovery Draft Website	Midshore Recovery website will be included on the September Core Planning Team meeting agenda & linked to project website.
21-Jun-21	Website Link on County Website & News Release	Public	Link to Project Website & News Release	Public Survey
6-Jul-21	Social Media Post on Facebook	Public	Project Website	Emergency Services posted the website link on their Facebook page
7-Jul-21	Social Media Post on Facebook	Public	Public Survey	Emergency Services posted the public survey link on their Facebook page
7-Jul-21	Draft Chapter Review	Core Planning Team	Draft Appendix B 2017 Mitigation Action Items Status Report	Draft Appendix B was provided for review and comment.
12-Jul-21	Social Media Post on Facebook	Public	Project Website & Public Survey	DC Health Department posted the link to the project website and public survey on their Facebook page
13-Jul-21	Social Media Post on Facebook	Public	Public Survey	Emergency Services posted the public survey link on their Facebook page
19-Jul-21	SLR and Coastal Flooding Impacts on Development	Small Group Discussion	Discussion Questions	Meeting Notes
22-Jul-21	Emerging Infectious Disease Chapter Review/Small Group Meeting	Dorchester County Health Department	Draft Chapter 11 Emerging Infectious Disease	Draft chapter reviewed and discussed with emphasis on mitigation strategies.
28-Jul-21	Press Release for Star Democrat	Public	Project Website & Public Survey	Notice about the All-Hazard Mitigation Plan Update and provided the project website and public survey link.
28-Jul-21	Website Update	Public	Project Website "Hazard Resources" and "Hazards & Risk Assessment" tab updates	"Know Your Risk" Infographics, MyCoast "How to Use App" Infographic, "Protect Against A Flood" and NFIP information and infographic included on the "Hazard Resources" tab. "Know How Deep Water Is" infographic included on "Hazards & Risk Assessment" tab.

Date	Meeting, Training, or Outreach Activity	Target Audience	Materials Provided	Comments/Input
2-Aug-21	Newspaper Article	Public	Dorchester Star Article	The Dorchester Star posted an article about the update of the Hazard Mitigation Plan, the project website, and provided the link to the public survey. https://www.myeasternshoremd.com/dorchester_star/news/dorchester-updating-all-hazard-mitigation-plan/article_7f4ac249-3122-5490-9318-6bbe86a1f315.html
4-Aug-21	Social Media Post on Facebook	Public	Public Survey	Emergency Services posted the public survey link on their Facebook page
8-Sep-21	Core Planning Team Meeting #2	Core Planning Team	Webex Meeting-Agenda	Presentations, Small Group Meetings, Working Draft Chapter, Appendix B & Project Website/Social Media Outreach
9-Sep-21	Website Update	Public	Project Website "Get Involved - Meetings" tab updates	Meeting Notes and Recording were added to the September 8th Meeting block
13-Sep-21	Draft Chapter Review	Core Planning Team	Draft Chapter 12 Emerging Infectious Diseases & Hazard Impact Table	Draft Chapter 13 was provided for review and comment. CPT also was requested to complete a hazard impact table.
13-Sep-21	Website Update	Public	Project Website	A new tab titled "Public Plan Review & Comment" was added. This tab provides the public an opportunity to comment on working draft plan chapters.
13-Sep-21	Website Update	Public	Project Website	New draft Chapter 12 was added to "Public Plan Review & Comment" for public review.
16-Sep-21	Social Media Post on Facebook	Public	Public Survey	DC Health Department posted the link to the public survey on their Facebook page
27-Sep-21	Website Update	Public	Project Website "Plan Overview" tab update	Flood Mitigation Plan was added to the Plan Overview page.
27-Sep-21	Website Update	Public	Project Website "Prevention & Adaptation" tab update	The 2017 Mitigation Action Status Update Report was added to the Prevention & Adaptation tab.
30-Sep-21	DC Economic Development - Dorchester Currents	Public	Public Survey Promotion	Public Survey promoted in Dorchester Currents. Currents is the e-newsletter of the Dorchester Economic Development Office.

Date	Meeting, Training, or Outreach Activity	Target Audience	Materials Provided	Comments/Input
6-Oct-21	Appendix G: CRS/NFIP Review/Small Group Meeting	Department of Planning & Zoning	Appendix G: CRS/NFIP	Discussed Community Service Rating - current status and goals for the next five years.
18-Oct-21	Website Update	Public	Project Website "Hazard Vulnerability" tab update	The Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) for Dorchester County was added to the Hazard Vulnerability tab.
18-Oct-21	Website Update	Public	Project Website "Prevention & Adaptation" tab update	The Maryland Historical Trust Hazard Mitigation Planning for historic and cultural resources was added to the Prevention & Adaption tab.
18-Oct-21	Website Update	Public	Project Website "Hazard Resources" tab update	The University of Maryland Center for Environmental Science (UMCES) public seminars were added to the Hazard Resources tab.
18-Oct-21	Social Media Post on Facebook - County Manager	Public	Project Website	Notice about the All-Hazard Mitigation Plan Update and provided the project website.
9-Nov-21	Cambridge Shoreline Resilience Plan	Stakeholder Meeting	Agenda & Meeting Notes	Dozia Rahilly, DC DES Director provided input for Dorchester DES and status updated of county all-hazards mitigation planning efforts.
15-Nov-21	Social Media Post on Facebook	Public	Project Website	Emergency Services posted the project website link on their Facebook page. This link has been pinned to the top of their page.
30-Nov-21	Draft Chapter Review	Core Planning Team	Draft Chapter 8 Winter Weather & Draft Chapter 9 Thunderstorm, Hail, Wind & Tornado & Hazard Impact Tables	Draft Chapters 8 & 9 provided for review and comment. CPT also was requested to complete a hazard impact table for each hazard chapter.
30-Nov-21	Website Update	Public	Project Website	New draft Chapters 8 & 9 were added to "Public Plan Review & Comment" for public review.
2-Dec-21	Website Update	Public	Project Website "Hazard Vulnerability" tab update	A new section under the Hazard Vulnerability tab titled "Recent Storm Events" was added. This section provides information on the recent tornado and flood events.

Date	Meeting, Training, or Outreach Activity	Target Audience	Materials Provided	Comments/Input
2-Dec-21	Webinar with Maryland Insurance Administration	Public	Flood Map Demonstration, Flood Protection Ideas	During this presentation, consumers can expect to learn where they can find flood maps, how they can use flood maps, and the importance of understanding the flood risks.
8-Dec-21	Draft Chapter Review	Core Planning Team	Draft Chapter 10: Extreme Heat, Drought & Wildfire & Draft Chapter 11: Human Impacted Hazards & Hazard Impact Tables	Draft Chapters 10 & 11 provided for review and comment. CPT also was requested to complete a hazard impact table for each hazard chapter.
8-Dec-21	Website Update	Public	Project Website	New draft Chapters 10 &11 were added to "Public Plan Review & Comment" for public review.
11-Jan-22	Cambridge Shoreline Resilience Plan	Stakeholder Meeting	Agenda & Meeting Notes	Dozia Rahilly, DC DES Director and James Windsor DES Planner provided input for Dorchester DES and status updated of county all-hazards mitigation planning efforts.
20-Jan-22	County Staff Coordination Meeting	DES Director and DPZ Director	Hazard Mitigation Plan Mitigation Workshop & Flood Risk Reduction Community Workshop	Discussion of HMP booth at the Flood Risk Reduction Community Workshop held in Cambridge and for the public. Also discussed mitigation action workshop with committee.
24-Feb-22	Draft Chapter Review	Core Planning Team	Draft Chapter 6 Coastal Hazards & Draft Chapter 7 Riverine Flooding & Hazard Impact Tables	Draft Chapters 6 & 7 provided for review and comment. CPT also was requested to complete a hazard impact table for each hazard chapter.
25-Feb-22	Website Update	Public	Project Website	New draft Chapters 6 & 7 were added to "Public Plan Review & Comment" for public review.
1-Mar-22	Draft Chapter Review	Core Planning Team	Draft Chapter 13 Climate Change & Hazard Impact Tables	Draft Chapter 13 was provided for review and comment. CPT also was requested to complete a hazard impact table.
1-Mar-22	Website Update	Public	Project Website	New draft chapter added to "Public Plan Review & Comment" for public review.

Date	Meeting, Training, or Outreach Activity	Target Audience	Materials Provided	Comments/Input
8-Mar-22	Cambridge Shoreline Resilience Plan	Stakeholder Meeting	Agenda & Meeting Notes	James Windsor DES Planner provided input for Dorchester DES and status updated of county all-hazards mitigation planning efforts. Discussed cohosting the Flood Mitigation Community Workshop.
10-Mar-22	Core Planning Team Meeting #3	Core Planning Team	Mitigation Action Item Workshop	Discussed Plan status and conducted Mitigation Action Item Workshop. Three Step Process conducted and included both individual and group work discussion.
16-Mar-22	Draft Chapter Review	Core Planning Team	Draft Chapter 14 Goals & Objectives	Draft Chapter 14 provided for review and comment.
16-Mar-22	Website Update	Public	Project Website	Mitigation Action Item Workshop Notes and advertisement for the Flood Risk Reduction Community Workshop included to the "Get Involved" tab.
22-Mar-22	Hazard Mitigation Plan Mitigation Workshop & Flood Risk Reduction Community Workshop	Public	Flood Risk Reduction Community Workshop	County & City of Cambridge held a Flood Risk Reduction Community Workshop in Cambridge for the public. A station was set up for the Hazard Mitigation Plan in order to provide information to the public about the plan and way to get involved. Surveys were available at the station for the public.
24-Mar-22	Website Update	Public	Project Website	Presentations given during the Flood Risk Reduction Community Workshop were included to the "Get Involved" tab.
24-Mar-22	Municipal NFIP Questionnaire - Phone & Email Correspondence	Town of Hurlock	NFIP Questionnaire	Discussed components of the National Flood Insurance Program Questionnaire and the Town's Floodplain Ordinance.
25-Mar-22	Draft Chapter Review	Core Planning Team	Draft Chapter 15 Mitigation Strategies	Draft Chapter 15 provided for review and comment.
28-Mar-22	Municipal Questionnaire - Phone Conversation	Town of Eldorado & Brookview	Municipal Questionnaire	Discussed the Town's participation in the Plan update process and completion of the municipal questionnaire.
2-Apr-22	Draft Chapter Review	Core Planning Team	Draft Chapter 16 Plan Maintenance & Implementation	Draft Chapter 16 provided for review and comment.

Chapter 3 County & Municipal Profile

Location

Located in the central lower portion of the eastern shore along the Chesapeake Bay and adjacent to Talbot, Caroline and Wicomico Counties in Maryland and Sussex County in Delaware, Dorchester also shares a boundary through the Chesapeake Bay with Somerset, Calvert and St. Mary's Counties. Dorchester County was named for the Earl of Dorset, a family friend of Lord Calvert, and was created prior to 1669. Dorchester is the largest of Maryland's twenty-four counties, containing over 983 square miles of land and water territory. It has the third largest land area with 558 square miles. Additionally, Dorchester County is situated between the Choptank and Nanticoke Rivers and is on the Blackwater and Transquaking Rivers, which drains into Fishing Bay and Marshyhope Creek, which drains into the Nanticoke River. Other major water bodies include the Little Choptank and Honga Rivers.

According to the 2021 Dorchester County Comprehensive Plan, the county has over 1,700 miles of shoreline and a deep channel commercial port in Cambridge. The maritime history is an essential part of the County's heritage. The County is also characterized by a rural lifestyle and its pristine, natural setting with environmental features that serve many important ecological, social, recreational, and economic benefits. The fluvial, nutrient rich soils provide some of the best agricultural lands in Maryland. The wetlands are the richest and most biodiverse regions in the nation and provide habitats for a wide diversity of plants and animals.

Dorchester County uses the slogan, "The Heart of Chesapeake Country", due to its geographical location and the heart-like shape of the County on a map. The County is comprised of mainly rural communities. The nine (9) incorporated municipalities within Dorchester County includes: the City of Cambridge and the Towns of Brookview, Church Creek, East New Market, Eldorado, Galestown, Hurlock, Secretary, and Vienna.

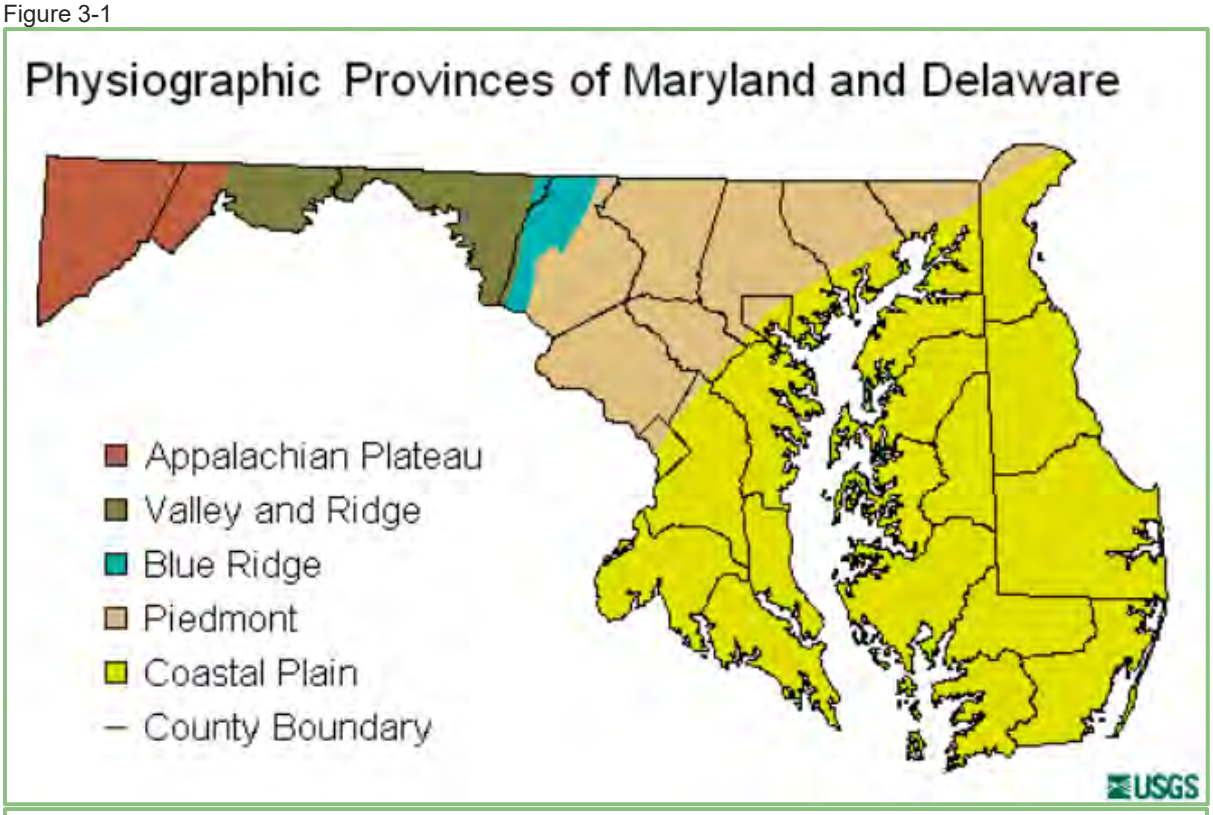
Map 3-1

Source: Smith Planning and Design and Maryland iMaps

Geology, Slope, Groundwater and Soils

Dorchester County contains 558 square miles of land, it is characterized by open, natural, agricultural and forested areas. According to the 2021 Dorchester County Comprehensive Plan, of Dorchester County's 355,000 acres of total land area, approximately 260,000 acres are protected public lands or wetlands. Dorchester County is located within the Coastal Plain Physiographic Province, Map 2-1.

Figure 3-1



Coastal Plain - The Coastal Plain is characterized by gently rolling hills and valleys. It is underlain by a southeastwardly thickening sequence of sediments that consists of sand and gravel aquifers interlayered with silt and clay confining units.

Source: Water Science for Maryland, Delaware and the District of Columbia

According to Arthur Strahler's Physical Geography text, the Chesapeake Bay is an estuary that was formerly the river valley for the Susquehanna River and its tributaries. During the peak period of glaciations, sea level was approximately 400 feet lower than today. As sea level has risen over the past 10,000 years, the Chesapeake has grown and essentially created the features associated with a shoreline of submergence. This produces a highly irregular, embayed shoreline typical of the eastern shore. In geologic terms the Bay shoreline is still in youthful form with small bays, long peninsulas and offshore islands. Eventually, as the sea level continues to rise, these bays, peninsulas and islands will be submerged, leaving a smoother, nearly straight shoreline.

Most soil types in Dorchester County are formed on unconsolidated material and are sandy in nature. The low-lying areas are poorly drained and are susceptible to erosion along the coast and in tidal estuaries. Shore erosion and land subsidence are most prevalent along the southern coastal islands where the beach front has retreated noticeably during the past 50

years. In the southern part of the County, areas inland that were once in agricultural production are now marshland.

According to the Sea Level Rise: Technical Guidance for Dorchester County, over 50% of the county's land area lies below elevation 4.9 feet above sea level, resulting in a relatively flat land surface. Two-thirds of the county is characterized by nearly level lowlands composed of loosely consolidated, windblown materials overlying alluvial and marine deposits. A significant portion of these soils support tidal and nontidal wetlands. the level lowland soils have poor surface drainage, resulting in conditions that produce hydric soils that support the growth of wetland vegetation. Nearly all of the county's tidal and nontidal wetlands are associated with its 11 hydric soils. The hydrology of these wetlands is supported by surface runoff that is unable to leave a site due to its flatness; from groundwater levels at or within two feet of its surface; from periodic riverine overflow, tidal inundation, and perched impoundments over impermeable soils in depressions. Areas that were once upland begin to convert to nontidal wetlands. As the mean high tide encroaches further inland, freshwater wetlands become infiltrated with saline water and the vegetative community changes over to high salt marsh. Salt-water intrusion is also possible when aquifers are drawn down significantly.

Climate

Due to the nearly level terrain and low elevation (sea level to approximately 57 feet), Dorchester County is susceptible to high winds and rain during summer thunderstorms and to heavy damage from storm surge and wind during the passage of hurricanes or nor'easters either on or near the eastern shore. The County is also susceptible to tornadoes that are occasionally spawned by thunderstorms or hurricanes. Precipitation averages between 40 and 48 inches annually.

Table 3-1

Average Precipitation													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Inches	3.0	3.3	3.4	3.4	3.3	4.0	3.1	3.4	3.3	4.1	4.7	3.4	42.4

Source: Maryland Department of the Environment - https://mde.maryland.gov/programs/water/waterconservation/pages/normalprecip_new.aspx

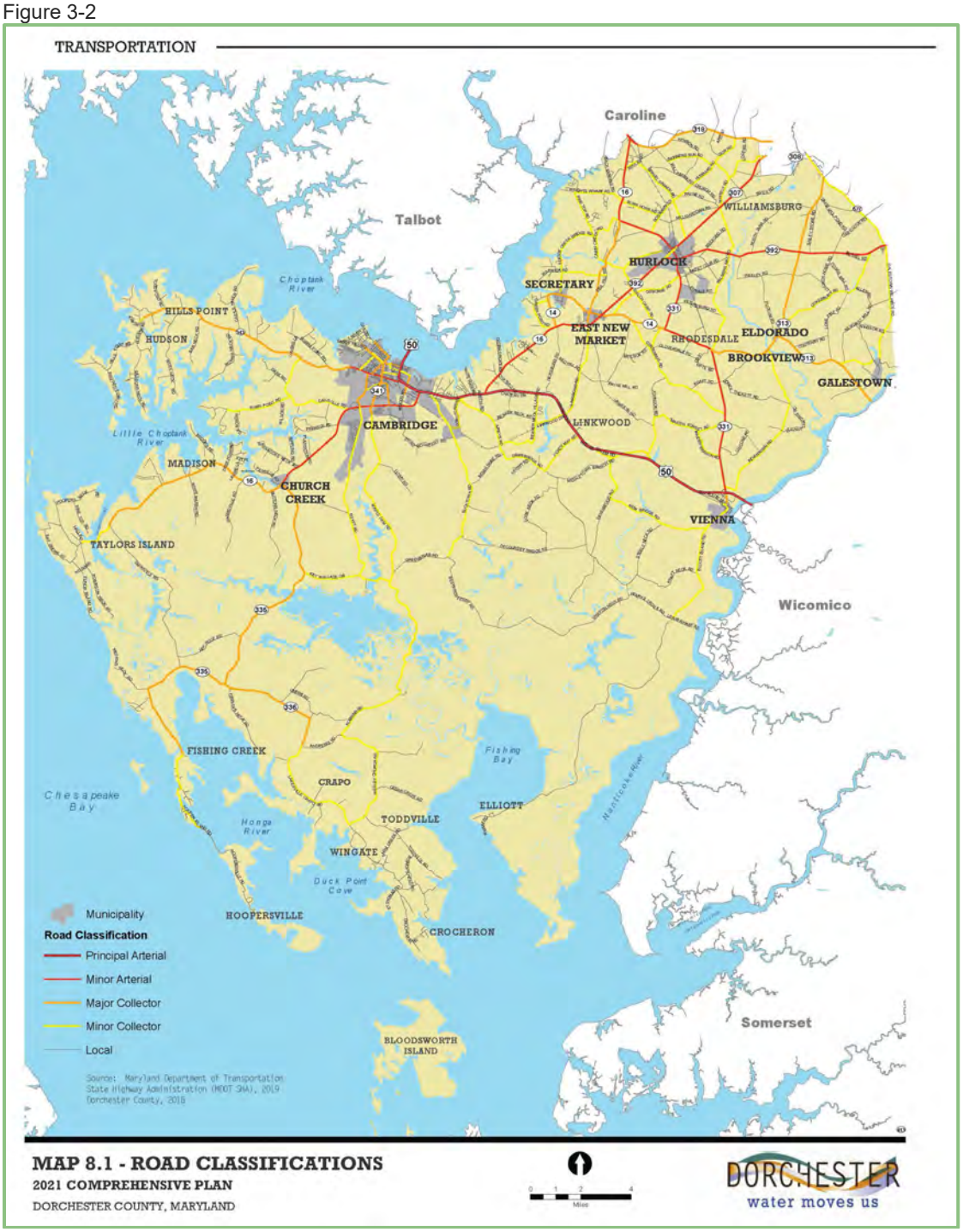
According to the Maryland Department of the Environment (MDE), Dorchester County receives and annual average rainfall of 42.4 inches, as shown above in Table 2-1. Most of this snow falls during the passage of the occasional mid-latitude winter storm. Due to its southern location and its proximity to the Atlantic Ocean, Dorchester receives less snowfall on average than counties to the north and west.

Temperatures usually average 5-10 degrees warmer in Dorchester County than on the western shore throughout the year. The average summer temperate is 77.1°, while the average winter temperatures are 38.9°. Additionally, the County has to deal with fog conditions approximately 10-15 times a year, similar to the rest of the eastern shore.

Transportation

Since the opening of the Bay Bridge in the mid-1950's, US Route 50 has served as the major east-west transportation corridor on the eastern shore. Route 50 is also the major transportation corridor through Dorchester County and is complemented by State Route 16 and several other highways that connect Cambridge with smaller communities to the north and east. The southern portion of the County is served primarily by County roads.

Figure 3-2



Source: 2021 Dorchester County Comprehensive Plan

Other transportation routes include the Maryland and Delaware Railroad Seaford Line, which runs between Seaford, Delaware, and Cambridge. The Seaford Line intersects the Delmarva Central Railroad in Seaford, Delaware and continues west towards Cambridge and passes through Federalsburg, and Hurlock.

Figure 3-3

Source: Maryland Operating Systems: https://mdot.maryland.gov/OPCP/railmap.pdf

The Cambridge-Dorchester Regional Airport is located just to the southeast of Cambridge near Route 50. The airport is a publicly-owned-public use general aviation airport owned by the Dorchester County Council. Additionally, the Delmarva Community Services' transportation division, the Delmarva Community Transit, provides public bus transportation services throughout the Eastern Shore, including Dorchester County. With Cambridge's strategic location on the Bay, it has historically been a seaport and has a 25-foot-deep channel to the bay proper. Although commercial barge and tanker traffic has been discontinued, a number of marinas operate in the Cambridge area and on other tributaries of the Choptank and Nanticoke Rivers.

Population

Population Trends

Dorchester County's population has experienced a slight decrease over the past decade from 32,618 people in 2010 to 32,531 people in 2020 according to US Census Bureau data. The City of Cambridge, the County seat, is the most populated municipality and contains slightly more than 40 percent of the County's total population (13,096 persons in 2020).

According to the 2020 US Census, an average of 51% of the County's population lived in municipalities and 49% lived in unincorporated areas. The municipality that experienced the highest population increase since 2010 was Cambridge, while there were slight declines in population for the remaining eight (8) municipalities. The unincorporated areas of the county experienced a 4% decline in population since 2010.

Table 3-2

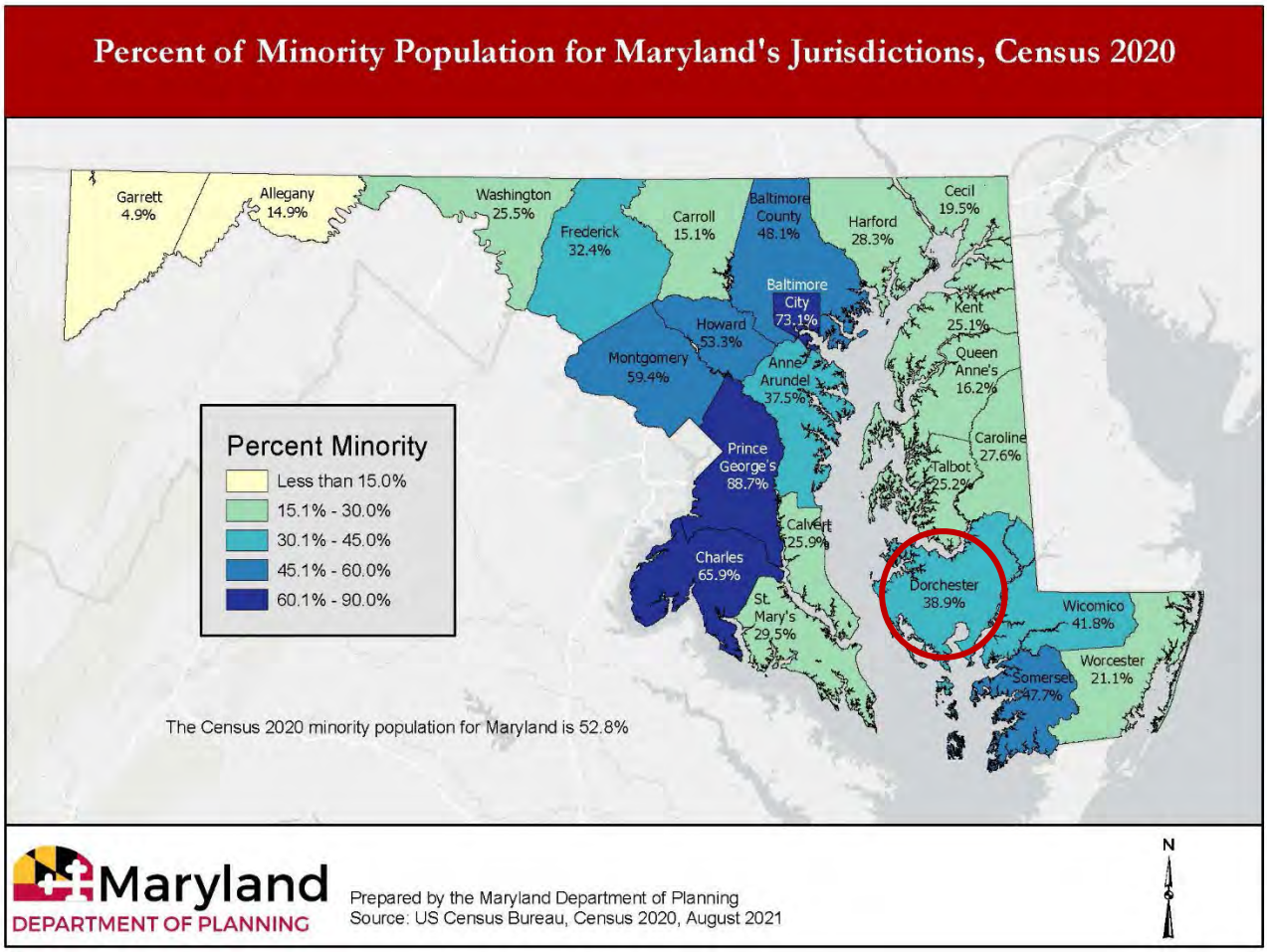
Population Trends					
	1980	1990	2000	2010	2020
Brookview	78	64	65	60	48
Cambridge	11,703	11,514	10,911	12,326	13,096
Church Creek	124	113	85	125	102
East New Market	230	153	167	400	389
Eldorado	93	49	60	59	45
Galestown	142	123	101	138	111
Hurlock	1,690	1,706	1,874	2,092	2,070
Secretary	487	528	503	535	472
Vienna	300	264	280	271	270
Unincorporated Areas	15,776	15,722	16,628	16,612	15,928
Total	30,623	30,236	30,674	32,618	32,531

Source: 2020 U.S. Census

Dorchester County has a high percentage, compared to other Maryland jurisdictions, of residents of Hispanic or Latino origin and a higher-than-average percentage of residents over the age of 65. The racial makeup of the county is 61.8% white, 28.1% African American, 8.7% Hispanic or Latino, 1% Asian, 0.4% American Indian, and 5.6% from two or more races. The Hispanic or Latino population increased from 4.9% to 8.7% over the past decade. A significant number of these residents live in the storm surge areas of the County and are considered "at risk" populations. As illustrated in Figure 2, 38.9% of Dorchester County's overall population consists of minority populations. The African American and Hispanic population is concentrated in Cambridge and the Hurlock to East New Market corridor.

According to the 2020 American Community Survey 5-year estimates, the population for this age group increased and is estimated at 6,830 persons. In 2010 the population for the age group of 65 and older was 5,771. The 65 and older population is primarily concentrated in Cambridge and Hurlock, however there is a high percentage of this population located within the vicinity of Taylors Island, Hoopers Island, Elliotts Island as well as in the Lake and Straits areas.

Figure 3-4



Population Projections

According to the 2020 Maryland Department of Planning, Dorchester County's population is projected to grow to 38,240 persons by the year 2045. Using the Maryland Department of Planning's population projects, Dorchester County is projected to gain 5,709 persons between 2020 and 2045, a 17.9% population increase. Considering the county experienced a population decrease in the past decade, the county may not be on track with the State's population projections.

Table 3-3

Population Projections										
	Census			Projections					Change: 2020-2045	
	2000	2010	2020	2025	2030	2035	2040	2045	Number	Percent
Population	30,674	32,618	32,531	33,850	35,160	36,400	37,300	38,240	5,709	17.5%

Source: Maryland Department of Planning, Projections and State Data Center, Planning Data Services, December 2020

Housing

Housing Trends

According to the US Census, the total of housing units decreased from 16,554 units in 2010 to 16,383 in 2020. According to the 2018 American Community Survey, it was estimated that 74% of the County housing units were single family detached, 16% were multi-family units, and 6% were mobile homes. Considering the risk with mobiles homes and natural hazards, it is crucial all regulations pertaining to mobile home installation are followed to ensure stability of these structures during a hazard event. Virtually, the entire housing stock in the southern portion of the County is susceptible to flooding from storm surge events. The southern portion is comprised of the following unincorporated communities: Bishops Head, Crapo, Crocheron, Fishing Creek, Hog Island, Honga, Hoopersville, Toddville and Wingate. The only unincorporated community located in the southern portion still experiencing development is Fishing Creek. The table below outlines approved permits for the unincorporated portions of Dorchester County and the municipalities. The municipalities are located in the northern portion of the County.

Table 3-4

New Housing Units Authorized for Construction by Building Permits

Year	Type	Dorchester County	Brookview	Cambridge	Church Creek	East New Market	Eldorado	Galestown	Hurlock	Secretary	Vienna
2010	Single Family	32	0	26	0	0	0	0	1	1	0
	Multi Family	0	0	96	0	0	0	0	0	0	0
2011	Single Family	32	0	18	0	1	0	0	1	0	0
	Multi Family	0	0	0	0	0	0	0	0	0	0
2012	Single Family	18	0	6	0	1	0	0	0	0	0
	Multi Family	10	0	54	0	0	0	0	0	0	0
2013	Single Family	21	0	14	0	0	0	0	0	0	1
	Multi Family	0	0	0	0	0	0	0	0	0	0
2014	Single Family	15	0	11	0	0	0	0	1	0	0
	Multi Family	0	0	0	0	0	0	0	0	0	0
2015	Single Family	30	0	2	0	0	0	0	4	0	0
	Multi Family	0	0	0	0	0	0	0	0	0	0
2016	Single Family	36	0	3	0	0	0	0	1	0	0
	Multi Family	0	0	41	0	0	0	0	0	0	0

Year	Type	Dorchester County	Brookview	Cambridge	Church Creek	East New Market	Eldorado	Galestown	Hurlock	Secretary	Vienna
2017	Single Family	30	0	9	0	0	0	0	2	0	0
	Multi Family	0	0	2	0	0	0	0	0	0	0
2018	Single Family	33	0	14	0	0	0	0	5	0	0
	Multi Family	0	0	2	0	0	0	0	0	0	0
2019	Single Family	36	0	15	0	0	0	0	3	0	0
	Multi Family	0	0	0	0	0	0	0	0	0	0
2020	Single Family	39	0	16	0	0	0	0	3	0	0
	Multi Family	0	0	0	0	0	0	0	0	0	0

Source: U. S. Department of Commerce. Bureau of the Census. Manufacturing, Mining and Construction Statistics Division. Prepared by Maryland Department of Planning. Projections and Data Analysis / State Data Center. 2010-2020 Annual Reports

Housing Projections

According to the Maryland Department of Planning, households are projected to increase 2,782 by the year 2045. This is an overall increase of 20.7% between the years 2020-2045. The projected household growth is on track with projected population growth. However, with decreases in both population and households between 2010 and 2020, these projections may not reach the 2045 projections.

Table 3-5

Household Projections										
	Census			Projections					Change: 2020-2045	
	2000	2010	2020	2025	2030	2035	2040	2045	Number	Percent
Population	12,706	13,525	13,443	14,075	14,750	15,325	15,775	16,225	2,782	20.7%

Source: Maryland Department of Planning, Projections and State Data Center, Planning Data Services, December 2020; US Census; 2020 (2000 & 2010 households): American Community Survey 5-Year Estimates (2020 households)

Municipal Perspective

The nine (9) municipalities of Dorchester County are in large part still the centers for most residential and commercial activity in the County except for the corridor between Cambridge and Hurlock. Cambridge is by far the largest municipality with 13,096 residents, while Hurlock has 2,070 residents.

Of the seven remaining municipalities, all but Church Creek and Vienna are in the northern part of the County may eventually face the same type of development pressure that is now occurring in the Cambridge-Hurlock corridor. In fact, Secretary and East New Market lie between Cambridge and Hurlock and their future is essentially tied to the two larger communities. Even though they are small in population, the other municipalities continue to serve as hubs for community activities and have commercial activities that serve the surrounding countryside. Brookview, Eldorado and Galestown are all located north of Route 50 and east of Hurlock. While Vienna is located just south of Route 50 at the Wicomico County border and Church Creek is located southwest of Cambridge on Route 16.

2021 Dorchester County Comprehensive Plan excerpt:

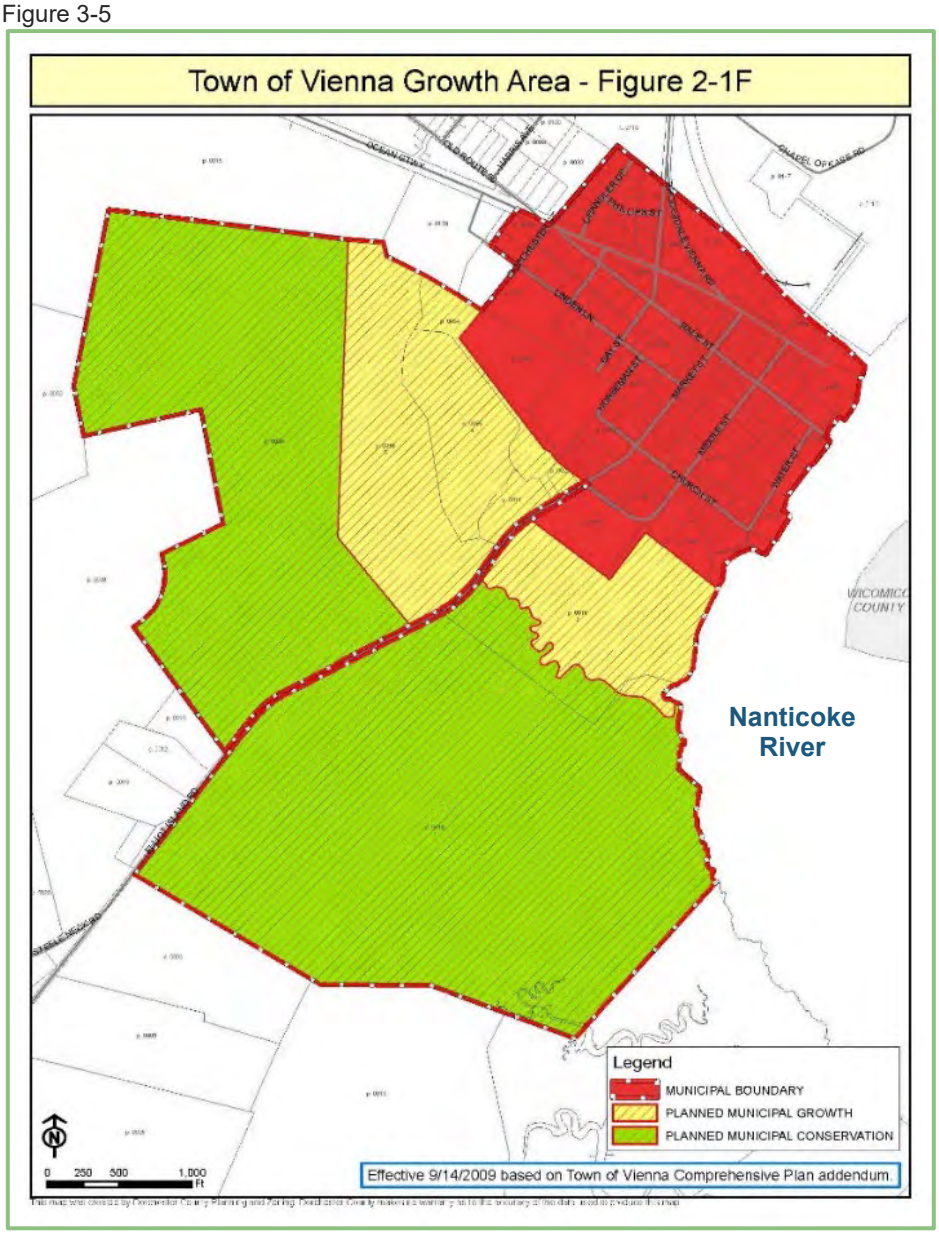
Municipalities offer opportunities for redevelopment and infill development. Municipal Growth Areas are areas that are designated for annexation in the respective municipality's comprehensive plan. Cambridge, Hurlock, East New Market and Secretary each have designated growth areas in their respective comprehensive plans. The Church Creek Comprehensive Plan includes a "Planning Area", which is intended for annexation in the long term. The future growth areas in Vienna's 2003 Comprehensive Plan have been annexed into the town. The County anticipates that future zoning should be of density and character consistent with the respective town to facilitate annexation, such that the town would not need to seek a rezoning "waiver" as part of the annexation process.6 The designation of the Municipal Growth Area is consistent with Resolution 515 adopted by the Dorchester County Council on January 17, 2012, which officially recognized these Municipal Growth Areas.

Vienna

According to the US Census, the Town of Vienna's population as of 2020 was 270 persons, a decrease of 1 person from its population of 271 at the time of the 2010 Census. The 2009 Amendment to the Vienna Municipal Growth Element projects populations of 344 in 2025 and 355 in 2030. Household projects for 2025 are 158 and 164 for 2030.

As for development, future growth is projected for two areas. Annexation is being considered for the West Vienna neighborhood and the Larmore/Phillips area south and southwest of Town. The southern portion of this area does border the Nanticoke River. It is estimated that growth, primarily through new subdivision development in annexed areas, will occur at a rate of 5-10 units, or 10-25 additional persons, per year. This assumes that the new Larmore/Phillips residential development which the Town is working on will be implemented.

Figure 3-5



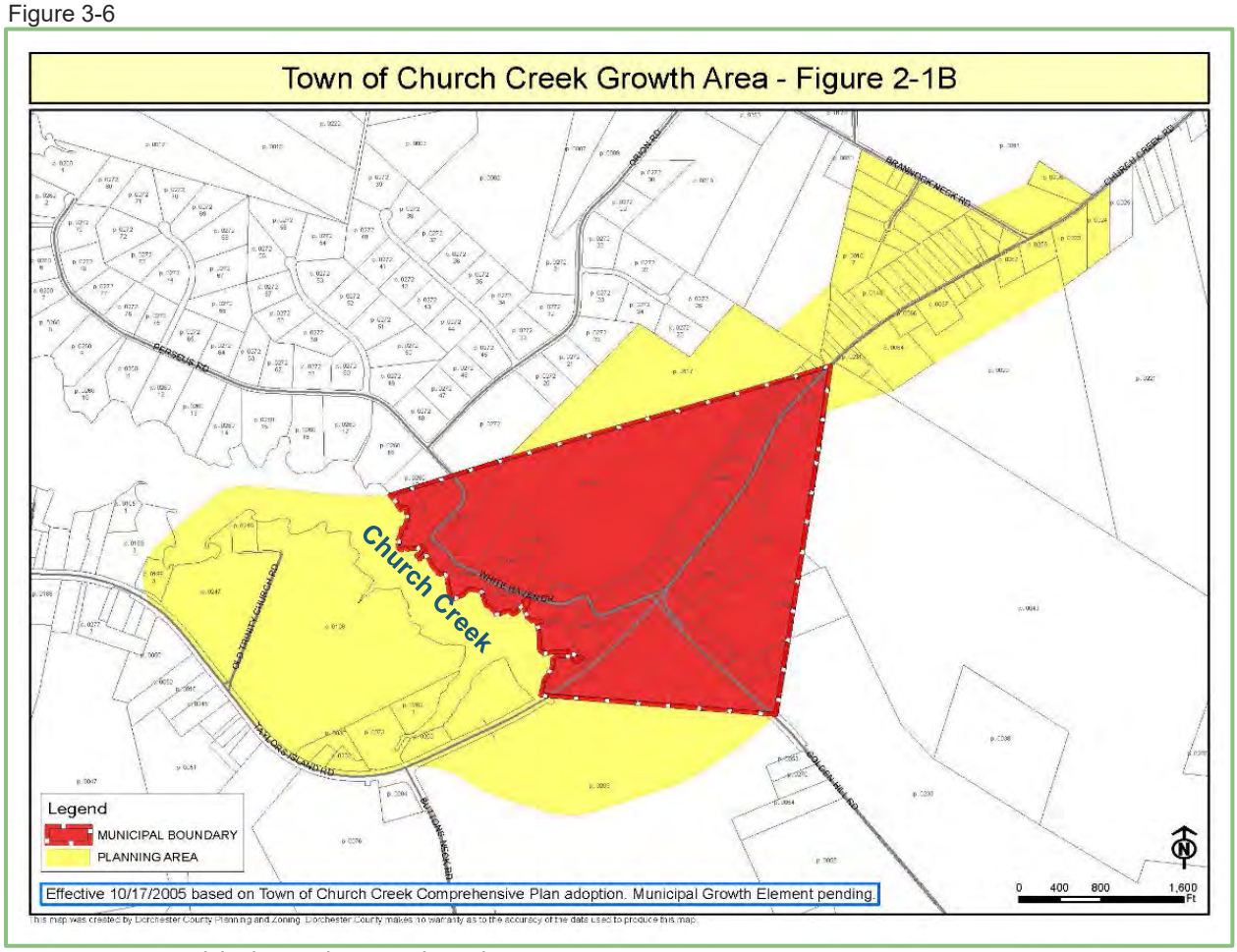
Source: 2012 Municipal Growth Map Admendment

Church Creek

According to the US Census, the Town's population has declined from 125 persons in 2010 to 102 persons in 2020. According to the 2005 Church Creek Comprehensive Development Plan, the population had been declining over the years.

As of 2020, the US Census data showed 65 housing units for the Town, while in 2010 there was a total of 67 housing units. However, the Planning Area Map, Figure 2, illustrates a projected growth to occur beyond the northeast and southwest municipal limits. A portion of the planning area is located within the Church Creek floodplain, which should be considered.

Figure 3-6



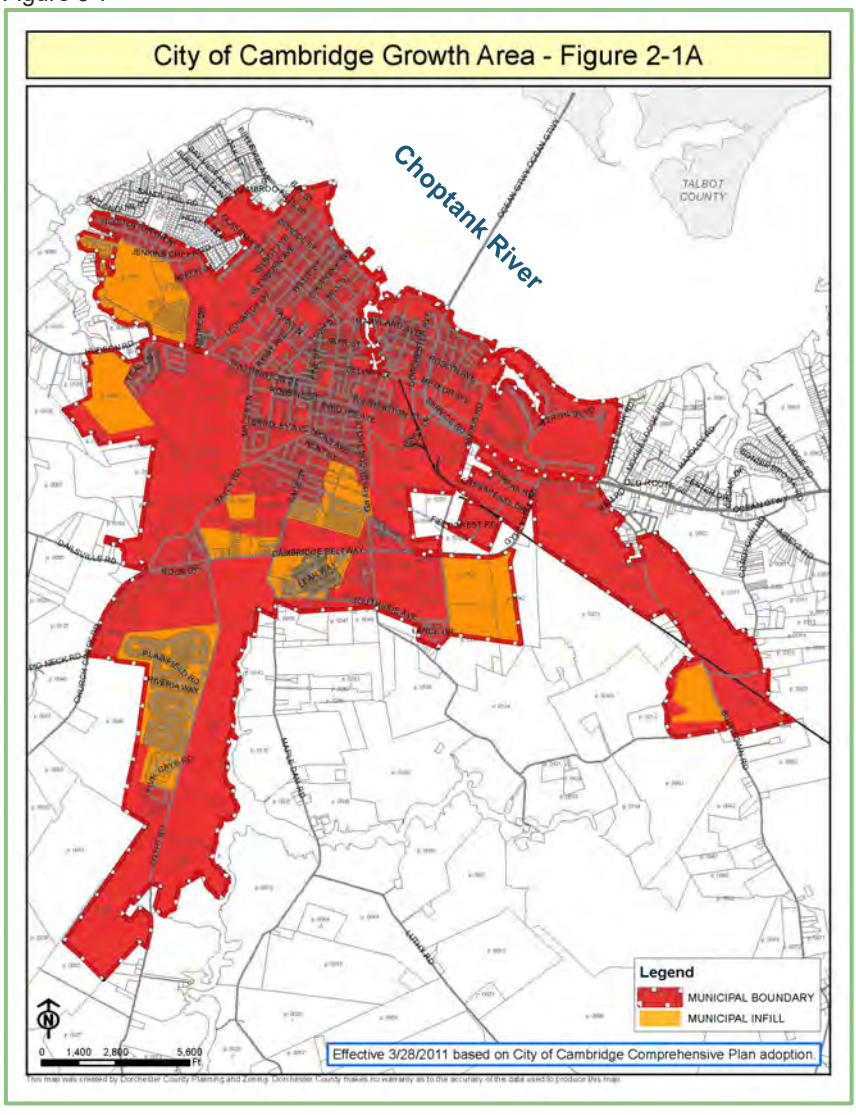
Source: 2012 Municipal Growth Map Admendment

Cambridge

According to the US Census, the City of Cambridge experienced an increase of 770 persons between 2010 and 2020. In 2010, the total population for Cambridge was 12,326 persons, while in 2020 the City's population increased to 13,096 persons. According to the 2018 Cambridge Comprehensive Plan, recent population increase mirrors an increase in jobs in Cambridge and Dorchester County.

According to the US Census, the housing units have increased to 6,464 in 2020 from 6,228 in 2010. Of these housing units, approximately 28% were constructed prior to 1940 and 60% prior to 1960.

Figure 3-7



According to the Cambridge Comprehensive Plan, the expansion of City limits is no longer needed through the foreseeable future, however there are a few exceptions. The general policy adopted and encouraged by the Comprehensive Plan is that annexations are to be discouraged and are disfavored. The Plan states that sufficient undeveloped, under-utilized or under-developed property exists within the current corporate boundaries of the City of Cambridge. However, in the event that a development opportunity arises which warrants annexation, the City retains the right to reject any request for annexation, even if the proposed annexation meets all requirements (refer to the 2011 Cambridge Comprehensive Plan for a list of all conditions).

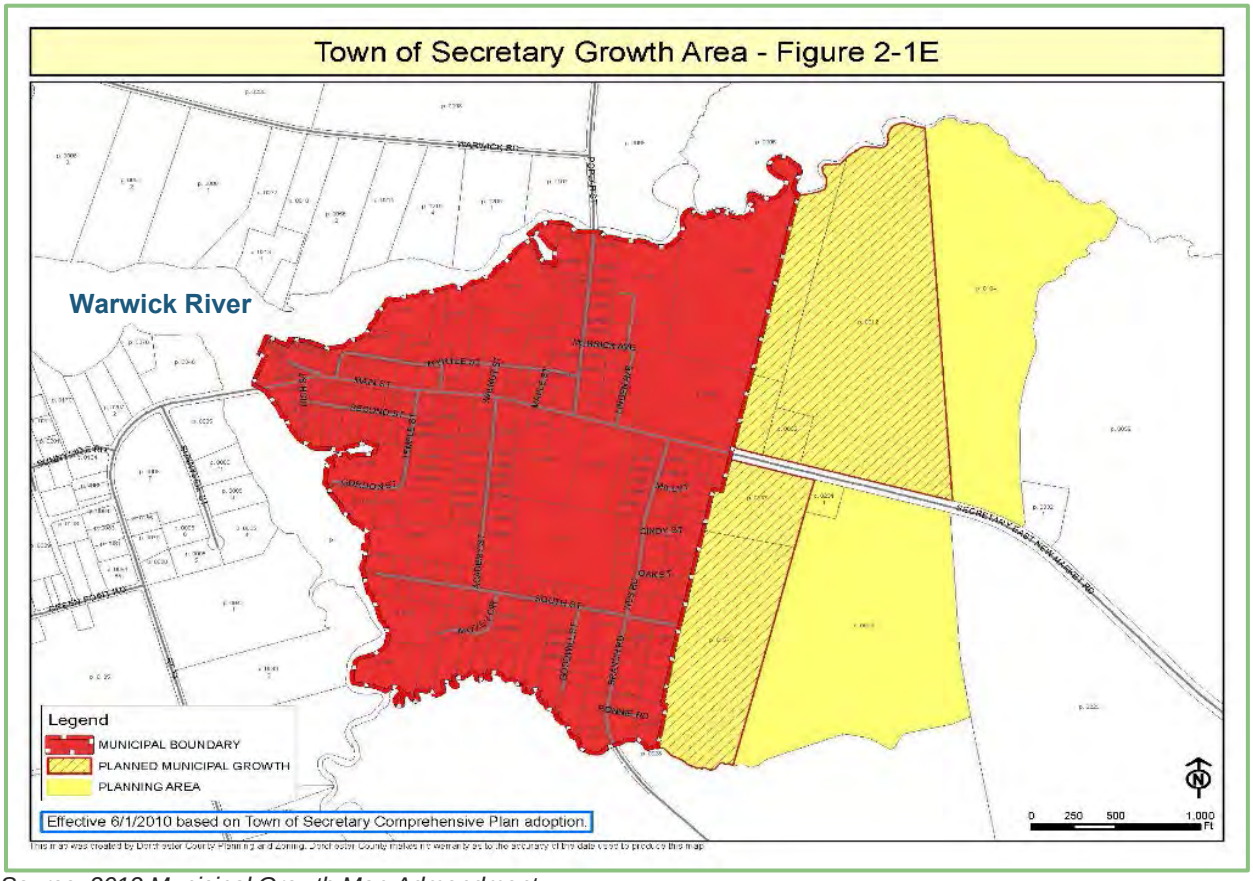
Source: 2012 Municipal Growth Map Admendment

Secretary

According to the 2020 US Census, the Town of Secretary's population has declined to 472 persons. According to the Town of Secretary: 2010 Comprehensive Plan, the Town's population had increased from 503 in 2000 to 535 in 2010. However, the population has since declined in the past decade.

Furthermore, according to the 2020 US Census, there is a total of 231 housing units in the Town, a 1% decrease since 2010. According to the Comprehensive Plan, in 2010 there were a total of 234 housing units in the Town of Secretary. Approximately 41.8% of these housing units were constructed prior to 1970. Only 18 housing units (9.1%) were built between 1990 and 2000.

Figure 3-8



Source: 2012 Municipal Growth Map Admendment

The Town of Secretary is 1.5% of the County's total population and is projected to receive a proportionate share of the County's projected growth. Therefore, the Town of Secretary is planning for three growth areas. The first growth area (GA1) is located east of the Town boundaries, while the second, GA2 is planned to occur directly north of GA1. The last growth area, GA3 would include the properties located directly adjacent to GA1 and GA2. Development in these growth areas is planned away from the Warwick River floodplain.

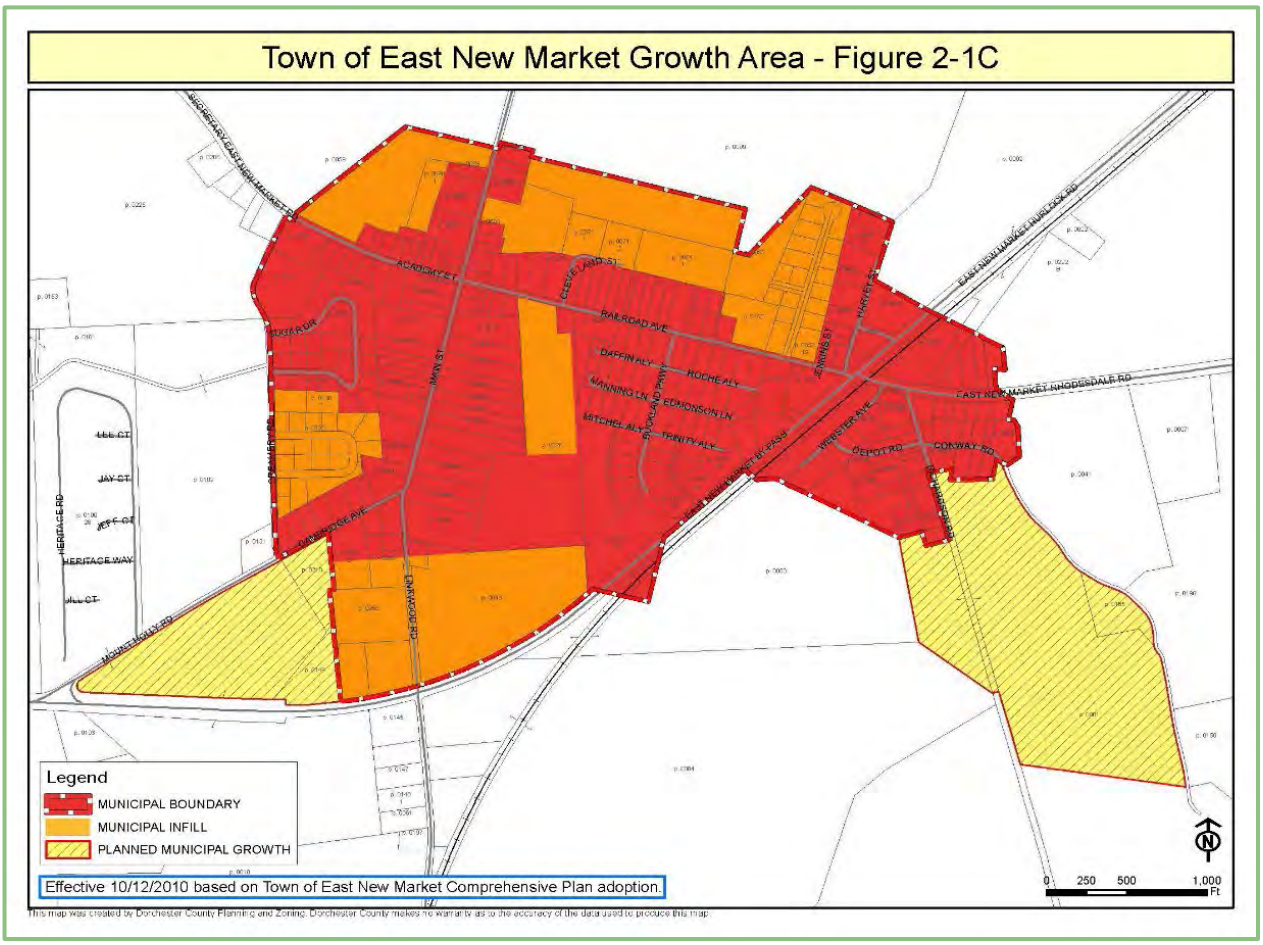
East New Market

According to the US Census, the Town's population has declined to 472 persons in 2020. According to the 2010 Comprehensive Development Plan and the 2012 Land Use Amendment for East New Market, Maryland, population in the Town had remained relatively stable for 50 years prior to 1990. In 2000 the population for the Town of East New Market had a total of 167 persons. In 2010 the population grew to 400, a 58% increase from 2000 to 2010.

According to the US Census, there was 186 housing units for the Town in 2020. This is a decrease from 2010, which had a total of 197 housing units.

The 2010 Comprehensive Development Plan estimates of land capacity within current Town boundaries were provided by the Town's consulting engineers (ARRO Engineering), as well as the Maryland Department of Planning (MDP). There is room for significant infill development within current Town boundaries. The estimates range from 100 units to a high of 327 units. Upon review of the data, the Town determined that infill capacity will be limited to a maximum of 171 equivalent dwelling units, in order to achieve consistency with the Town's Comprehensive Plan including protection of the Town's character.

Figure 3-9



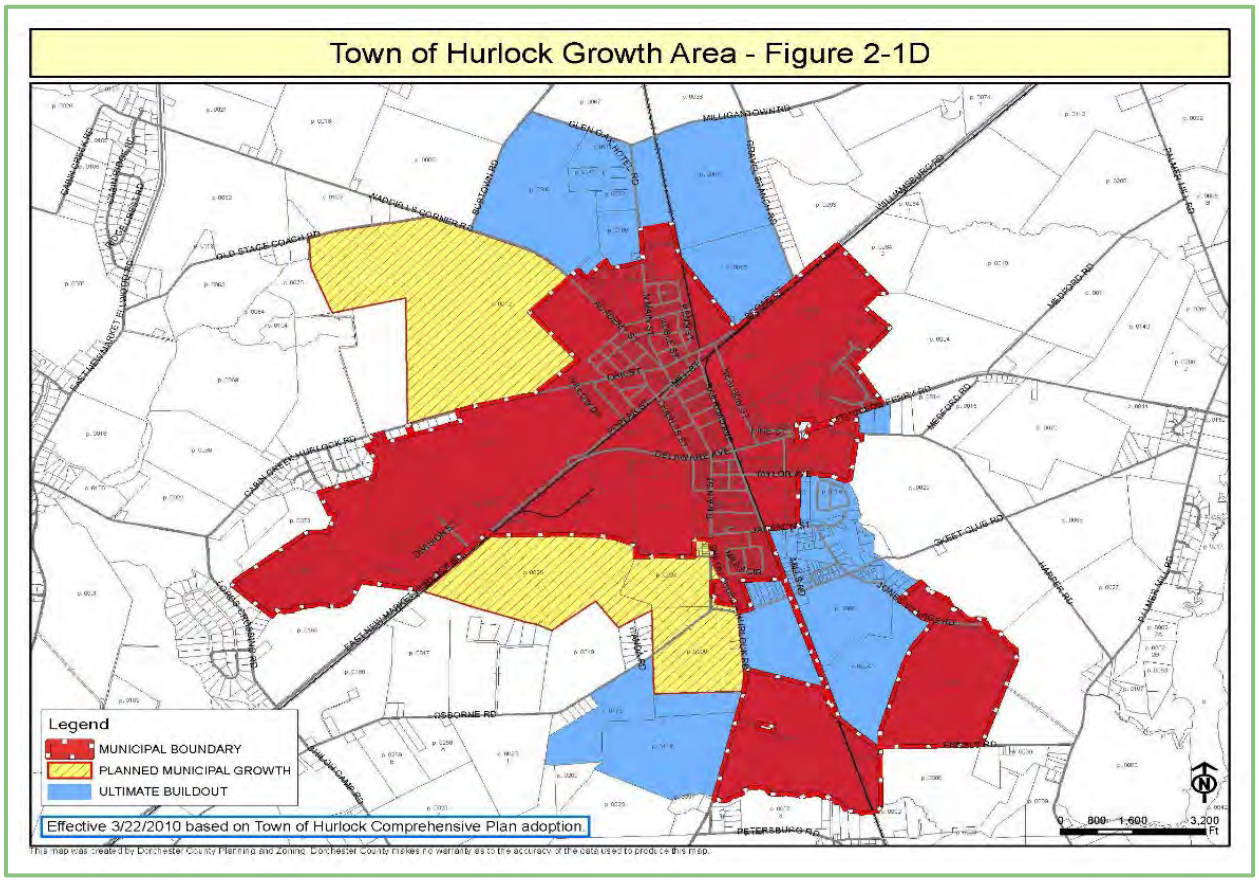
Source: 2012 Municipal Growth Map Admendment

Hurlock

According to the US Census, the population slightly declined from 2,092 persons in 2010 to 2,070 persons in 2020. In 2009, the Town of Hurlock, Maryland – Comprehensive Plan, stated the Town was experiencing an increase in population over the 30 years.

In terms of growth areas, the Town of Hurlock is considering two areas, Growth Area 1 and Growth Area 2. Growth Area 1 (GA 1) is located northwest of the municipal limit, while Growth Area 2 (GA 2) is proposed to the western and southern portions of the municipal limit.

Figure 3-10



Source: 2012 Municipal Growth Map Admendment

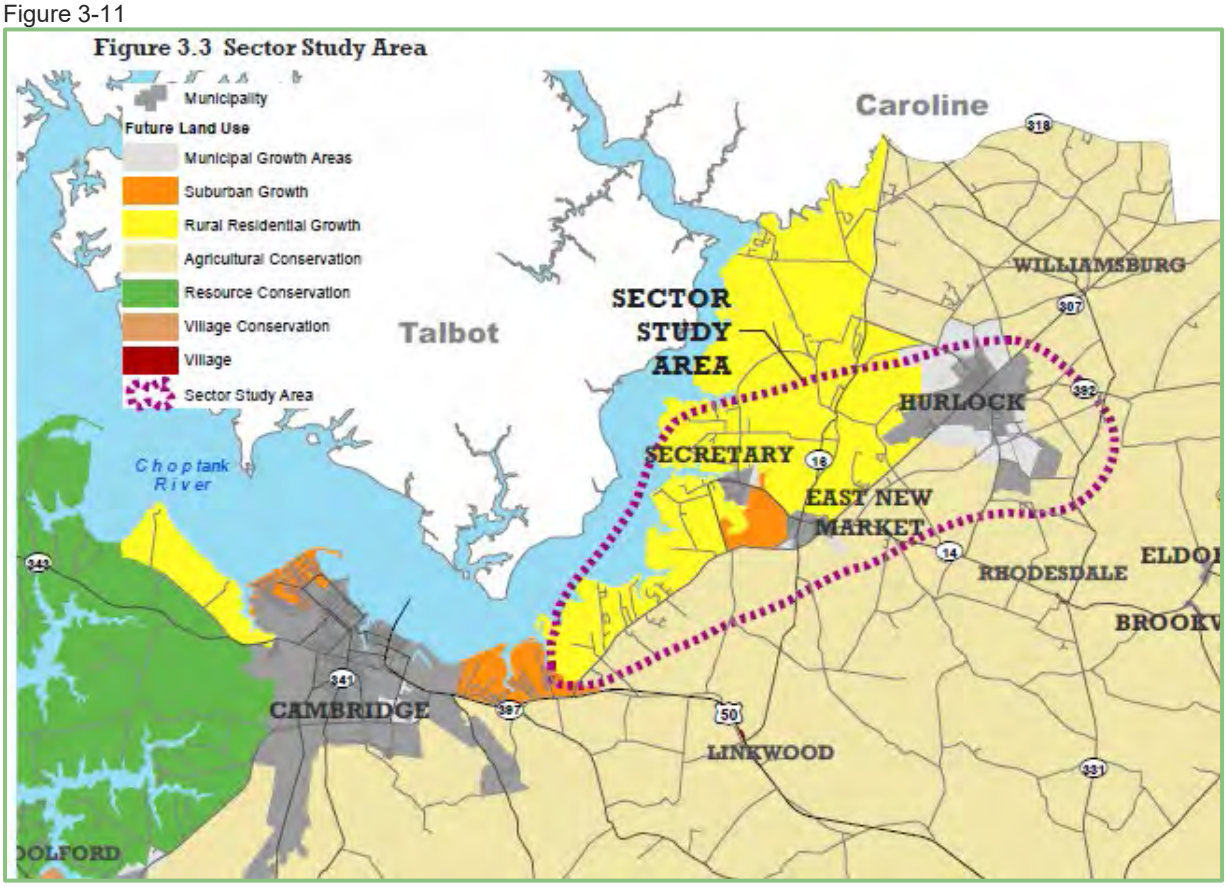
Future Development Trends

As noted earlier in Population Trends, the 2020 US Census and the Maryland Department of Planning (MDP) shows Dorchester County to have a population of 32,531 in 2020, and projects a population of 38,240 by 2045. However, the 2009 Dorchester County Comprehensive Plan Water Resources Element stated that the County projects the population total in 2020 to be approximately 37,600 persons. These projections differ from the MDP's projections due to the past rates of housing permits as well as other development interest known to the County. Therefore, with the County's significant amount of floodplain land, it is extremely important that new development not add to the County's already considerable amount of housing within storm surge areas.

The County Comprehensive Plan projects that most of the population growth and associated urban development will continue to be centered in and around designated growth areas around the Cambridge-Hurlock corridor where a large portion of the land is outside the storm surge area. However, the Cambridge-Hurlock corridor is susceptible to flooding associated with heavy rain events due to low lying areas.

The 2021 Dorchester County Comprehensive Plan states further assessing the areas between the Towns of Hurlock, Secretary and East New Market, the Sector Study Area. The County suggests further studies to consider ways to enhance these areas, establish and define development patterns, consider design criteria and ways to further allow for growth in this area of the County while protecting the rural and small-town communities.

Figure 3-11



Source: 2021 Dorchester County Comprehensive Plan

As show on Figure 3-11, the northern portion of the "Rural Residential Growth" area is located along the Choptank River. The 1 percent annual chance floodplain located in the area and near the Town of Secretary should be considered as part of the study.

According to the Maryland Department of Planning Priority Funding Area, Dorchester County has a limited amount of Priority Funding Areas (PFA). The PFA is primarily located within each municipal boundary. Small sections of the PFA are located beyond the municipal boundary for East New Market, Church Creek, Hurlock, and Cambridge. In regard to the municipalities, it is advantageous for projected growth to occur within the PFAs, however consideration needs to be taken in regard to the 100-year floodplain, storm surge areas as well as the Chesapeake Bay Critical Area.

The Town of Church Creek's projected development is to occur beyond the southwest corporate boundary, Figure 3-6. The Town is subjected to storm surge and is located within the 100-year floodplain. Also 53% of the Town is located within the Chesapeake Bay Critical Area, which regulates the development with 1,000 feet of tidal waters and all waters and land under the Chesapeake Bay and its tributaries. Therefore, the Town of Church Creek needs to be cautious of future growth areas and their proximity to natural hazards.

The City of Cambridge's projected growth area is to occur beyond the southeast corporate limit. Diverging growth toward the southeast mitigates development in the 100-year floodplain; however, development would still be impacted by storm surge.

A portion of Vienna's projected growth is to occur south and southwest of the Town. The Town borders the Nanticoke River; therefore, it is evident that the Town is within the 100-year floodplain and is also affected by storm surge. To mitigate flooding issues, the Town should consider developing toward the west or north beyond the corporate limits.

The Town of Secretary is proposing their growth areas to extend the municipal boundaries to the east. The Warwick River borders the eastern municipal boundary; therefore, by developing to the west, new structures will not be affected by the 100-year floodplain nor the storm surge areas.

The future growth boundaries for the Town of East New Market are proposed south of the municipal border. This would not be a concern considering neither the100-year floodplain or the storm surge areas occur near the Town.

The project growth for the Town of Hurlock is located beyond the northwestern municipal boundary as well as the southwestern boundary. Both growth areas would not be subjected to storm surge or the 100-year floodplain.

The Towns of Brookview, Eldorado and Galestown do not have Comprehensive Plans; therefore, future growth patterns could not be analyzed. However, population was analyzed utilizing the US Census' 2010 and 2020 data. All three Towns have a decrease in population as well as housing units over the last decade. An assumption could be made that the anticipated growth Dorchester County is expected to receive would not occur within these Towns.

Chapter 4 Community Capabilities & Plan Integration

Community Capability Overview

Through its Department of Emergency Services' Office, Dorchester County has developed a network of trained agency and volunteer personnel through the **Maryland MEMAC**, a statewide mutual aid agreement to mitigate and respond to a variety of hazards. This network includes state agencies such as the Maryland State Police, Department of Natural Resources, Department of the Environment, Department of Health and Mental Hygiene, State Highway Administration and the Maryland Department of Emergency Management. County agencies include the Highway Division, Sanitary Commission, Planning and Zoning Department, General Services, Board of Education, the Community Action Agency, the Sheriff's Office and the County HazMat team.

MDEM's authority is granted by Title 14 of the Public Safety Article within the Annotated Code of Maryland, or the Emergency Management Title. The Emergency Management Title establishes MDEM as a unit of State government within the Maryland Military Department with the primary purpose to ensure that Maryland will be adequately prepared to deal with emergencies that are beyond the capabilities of local authorities.

Beyond MDEM, the Emergency Management Title establishes local organizations for emergency management, outlines the process for a Governor-declared state of emergency, provides the Governor emergency powers to facilitate life-safety and property-preservation measures during a Governor-declared state of emergency, and legislates political subdivision liabilities for damages incurred as a result of a riot event. The Emergency Management Title also encodes Maryland's participation in the national Emergency Management Assistance Compact (EMAC), the regional National Capital Region Mutual Aid Agreement, and the in-state, interjurisdictional **Maryland Emergency Management Assistance Compact (MEMAC)**

The County has verbal mutual aid agreements with surrounding counties and has also developed working relationships with volunteer organizations including the fire and rescue units that are active in incorporated communities and in rural areas. The County has mutual agreements with the American Red Cross – Delmarva Chapter and other local response groups that may be called upon in special circumstances. In addition, the county has agreements to coordinate mitigation activities with private utility companies, including Delmarva Power, Choptank Electric and Verizon and with private transportation companies, such as the Maryland and Delaware Railroad, for rail transportation HazMat events.

Through its Planning and Zoning Department, Dorchester County has developed a system to regulate land use in sensitive areas, including 100-year floodplains, stream buffer areas, wetlands and Critical Areas. The County also has Subdivision Regulations for the creation of new lots and a zoning ordinance. Most municipalities have similar regulations that are administered locally.

Weather Related Events

Winter Storm Capability

Dorchester County receives approximately 13 inches of snow annually. The County Highway Division, the School Board and local municipalities, along with the State Highway Regional Office are equipped to deal with the occasional snowstorm. As mentioned in the County Profile, the County also has to deal with the occasional ice storm during the winter months and the occurrence of fog on days when low hanging clouds hamper visibility.

In addition to the County Highway Division and State Highway Administration, the Department of Emergency Services' Office has close ties with Delmarva Power, Choptank Electric and the Verizon Corporation which provide electrical and telephone service to the citizens of the County. These utility companies' clear dead or overhanging trees from utility rights-of-way during summer months so that ice and wind damage is lessened during winter storms.

With respect to new construction, the County's Building Code has wind and snow loading requirements for buildings and mobile homes.

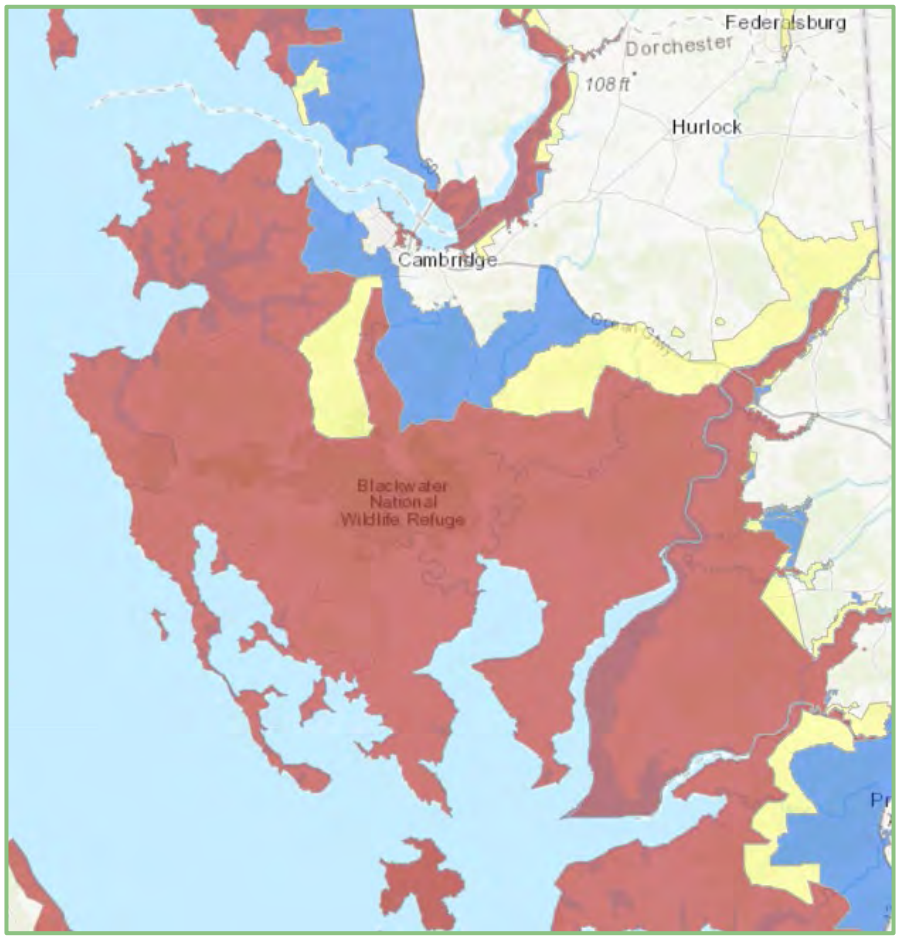
Tornado, Hurricane, Coastal and Riverine Flooding Capability

During major weather events, including thunderstorms, tornadoes and the passage of hurricanes, most of the agency and volunteer groups mentioned in the overview are called upon for assistance by the Maryland Department of Emergency Management. Dorchester County's capabilities are similar to other coastal counties that deal with hurricanes and storm surge flooding. Usually, local roads are blocked to some extent and when warranted, residents are asked to evacuate in the storm surge area. During the Hurricane Isabel event, Emergency Management Division officials decided not to attempt an evacuation during nighttime hours for fear that citizens would panic and become disoriented on roads that were partially submerged. Given the timing and height of the storm surge this was the right decision, and no one was injured or killed during the event.

Emergency Management has a plan which coordinates evacuation activities with the County's Highway Division and State Highway Administration and with local police, fire and rescue units, the Health Department and the Red Cross. While Dorchester County makes a great effort to mitigate flood events, the character of the natural environment along with the huge storm surge inundation areas, lends itself to further mitigation efforts particularly that of moving people and structures from harm's way.

Dorchester County participates in the "Know Your Zone" evacuation initiative as part of Maryland's Hurricane Evacuation Study. In the event that Dorchester County Department of Emergency Services issue evacuation orders, zones to be evacuated would be announced by various media outlets. Zones are designated A through C and provide residents with clarity on whether they should evacuate in an emergency or shelter at home, based on their physical street address and the nature of the emergency event. The three evacuation zones are from greatest to least risk of threat from wind speed, storm intensity, and storm surge. Zone A, in red, identifies the areas most at risk, Zone B, yellow, are areas with a moderate risk, and Zone C, blue, are areas least at risk. Areas further inland that are not color coded are not expected to evacuate in any storm scenario.

A local map of the Dorchester County evacuation zones can be found at www.knowyourzonemd.com.



Source: MDEM Know Your Zone

Dorchester County Department of Emergency Services Flooding Information site explains flooding in Dorchester County, mitigation ideas, and home elevation project information. The 2017 Dorchester County Flood Mitigation Plan is available on this page. This plan is currently being updated. The updated plan will be posted to https://www.dorchestermdhazardplans.org/ in both draft and the final version, upon completion.

The County also has the capability to mitigate future flood losses through its Subdivision Regulations, its Floodplain Management Ordinance, and its Building Code. The Floodplain Ordinance has been modified to require the base elevation for new structures to be 2 foot above the base flood level. The Building Code has wind loading requirements for new structures and tie-down requirements for mobile homes. Finally, the County participates in the National Flood Insurance Program to allow property owners to purchase insurance through this federally sponsored program.

During this plan update, *Appendix K Region 3 Hazard Mitigation Plan Guidance Checking in on the NFIP – Community Worksheets* were completed. These worksheets included:

- Floodplain Identification and Mapping
- Floodplain Management
- Flood Insurance

The community worksheets were completed for the County and those municipalities that have land use authority – issue floodplain permits, including:

- City of Cambridge
- Town of Secretary

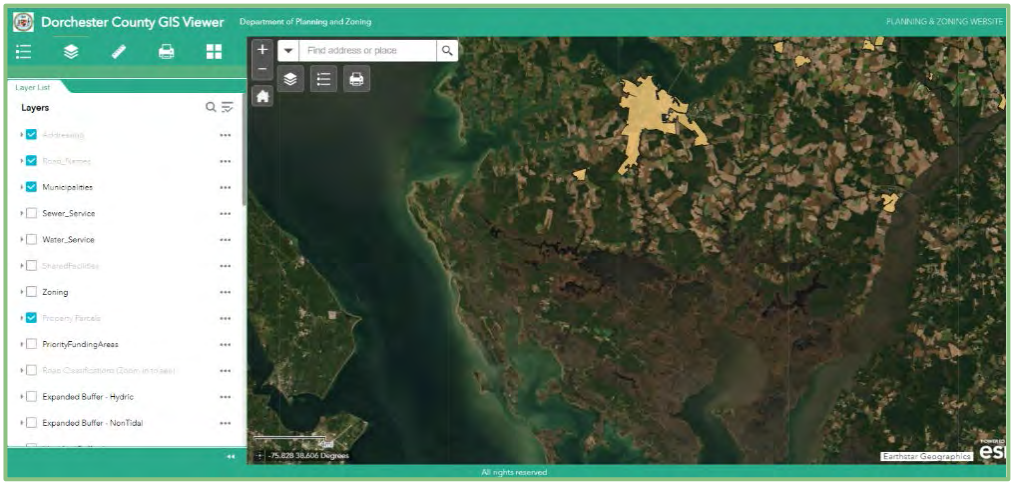
After completing the community worksheets, recommendations were identified as a result and are included in Appendix K.

The Department of Planning & Zoning website, Floodplain Information, discusses the following topics:

- National Flood Insurance Program (NFIP)
- Community Rating System (CRS)
- Property Protection Information
- What to do After the Flood
- Where to find additional information not online
- Letter of Map Change (LOMC)
- Elevation Certificates
- Additional Link

The site explains the National Flood Insurance Program and Community Rating System. Elevation certificates completed between 2011 and 2018 can be reviewed on this webpage as well. In addition, the site flood gauges located in Dorchester County: Bishop's Head, Cambridge, and Salem are provided.

Since the last plan update, the Department of Planning and Zoning has expanded their mapping capabilities to include the Map & GIS Data webpage, which provides an interactive map that contains multiple layers from various sources. The GIS Viewer includes evacuation zones, critical area zones, floodplain zones, protected lands, zoning, and parcel boundaries.



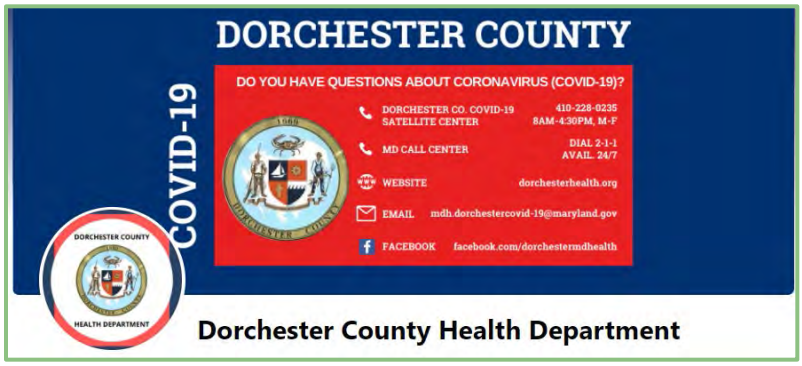
Heat and Drought Capability

As noted in the Hazard Profile, heat and drought are normally not a severe problem in Dorchester County. However, when dry conditions disrupt water service in an area of the County, the Department of Emergency Services can request the Maryland Department of Emergency Management to ask the National Guard to bring in water storage tanks for emergency use. Additionally, the Health Department – Individual Water Supply monitors well development through the building permit process and has access to well records through the Department of the Environment to monitor ground water use and replenishment. The Department of Agriculture also monitors soil moisture conditions and provides farmers with information on crop development through the Soil Conservation District during low soil moisture conditions. The Dorchester County Health Department Emergency Preparedness page provides a link to other resources. This link redirects the public to the Maryland Department of Health Office of Preparedness and Response website. This website contains weather preparedness information which includes extreme heat. The extreme heat section contains various fact sheets, definitions, and hot weather tips.

Emerging Infectious Disease Capability

As noted in the Emerging Infectious Disease Profile, the Maryland Department of Health administers the County Health Department. This administrative setup allows the full capabilities of the state to be utilized to mitigate an epidemic or other outbreak of disease in Dorchester County.

The Dorchester County Health Department provides COVID-19 statistics for the county, testing sites, and vaccination information on their website. Most up-to-date local information can also be found on the Dorchester County Health Department's Facebook page.



Technological Or Other Events

Fire or Explosion Capability

Fire prevention measures such as regulatory requirements mandated through the County's Building Code and the dissemination of public information through the State Fire Marshall's office have become routine. Citizens can subscribe to news and safety releases through the State Fire Marshalls office website or by using this link. Safety requirements for explosive materials in containers being shipped by rail or truck are enforced by the Department of Transportation.

Wildfire Capability

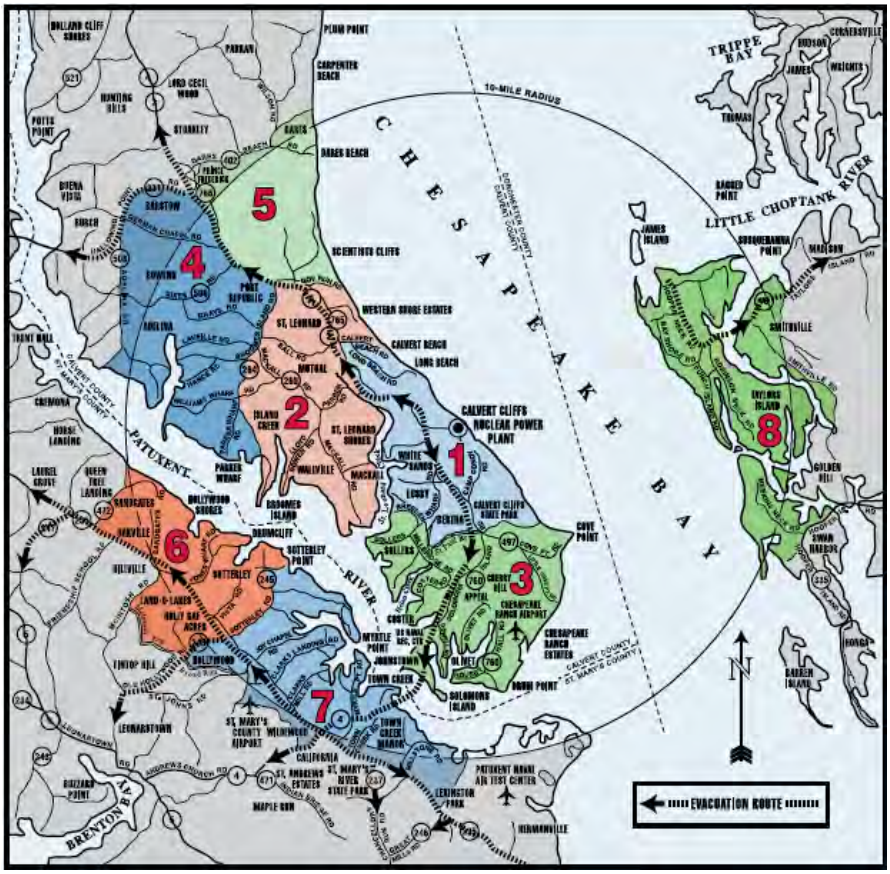
The Department of Natural Resources Forest Service is the lead agency in wildfire suppression and works with local fire departments in training related to wildfire suppression. In addition, the Department of Natural Resources and Health Department have strict requirements for burning in outdoor areas to help prevent forest and brush wildfires.

Transportation/HazMat Capability

As noted in the Hazard Profile, Dorchester County has a HazMat team that can be called upon in the event of a HazMat incident. The State Department of the Environment is also on call to assist in the cleanup of hazardous materials. The State Department of Transportation would be called upon to assist with a major transportation accident or transportation HazMat incident. In addition, the County's hazard warning system can be activated in the event of a nuclear release at the Calvert Cliffs Nuclear Power Station.

The Department of Emergency Services website also provides information on the Radiological/Calvert Cliffs Nuclear Power Plant. All of Taylor's Island, Smithville and residents on Meekins Neck Road, Smithville Road (north of Beaver Dam Creek), and Route 16 (west of Parsons Creek) are located in Zone 8.

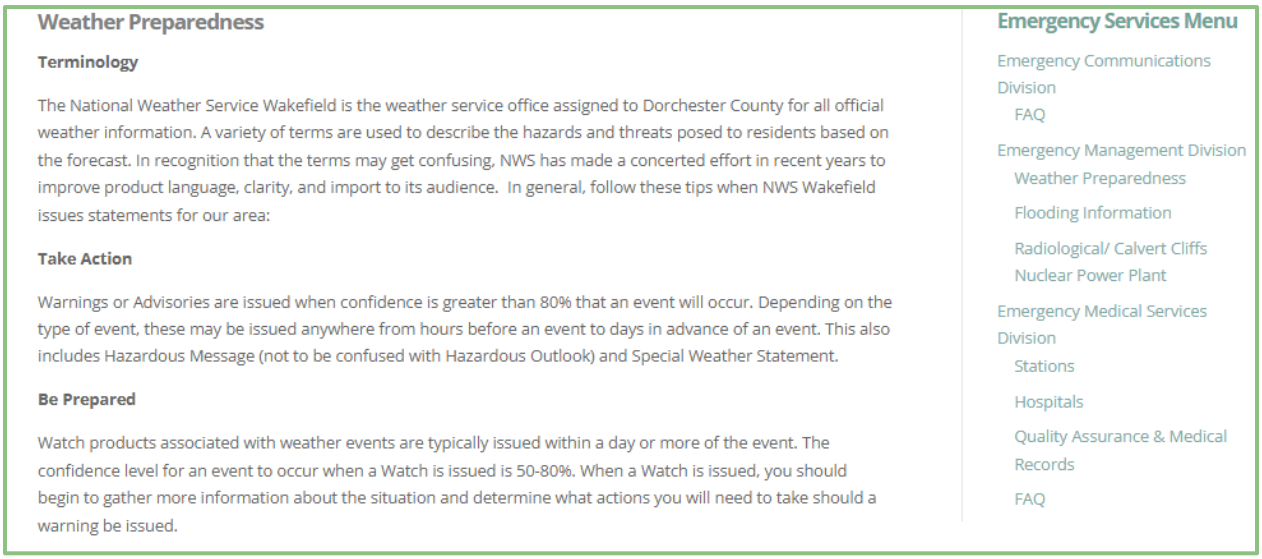
Each year Calvert Cliffs Nuclear Power Plant (CCNPP) develops an emergency planning brochure, Emergency Planning for the Calvert Cliffs Nuclear Power Plant, to assist residents with understanding the risk and how best to prepare.



Source: https://dorchestercountymd.com/radiological-calvert-cliffs-nuclear-power-plant/

All Hazard Events

The Department of Emergency Services website also discusses Weather Preparedness and provides information on being prepared, being aware and informed, and taking action. Additional resources is provided on the site as well. The National Weather Service Wakefield is the weather service office assigned to Dorchester County for all official weather information.



Weather Preparedness

Terminology

The National Weather Service Wakefield is the weather service office assigned to Dorchester County for all official weather information. A variety of terms are used to describe the hazards and threats posed to residents based on the forecast. In recognition that the terms may get confusing, NWS has made a concerted effort in recent years to improve product language, clarity, and import to its audience. In general, follow these tips when NWS Wakefield issues statements for our area:

Take Action

Warnings or Advisories are issued when confidence is greater than 80% that an event will occur. Depending on the type of event, these may be issued anywhere from hours before an event to days in advance of an event. This also includes Hazardous Message (not to be confused with Hazardous Outlook) and Special Weather Statement.

Be Prepared

Watch products associated with weather events are typically issued within a day or more of the event. The confidence level for an event to occur when a Watch is issued is 50-80%. When a Watch is issued, you should begin to gather more information about the situation and determine what actions you will need to take should a warning be issued.

Emergency Services Menu

Emergency Communications Division
- FAQ

Emergency Management Division
- Weather Preparedness
- Flooding Information
- Radiological/ Calvert Cliffs Nuclear Power Plant

Emergency Medical Services Division
- Stations
- Hospitals
- Quality Assurance & Medical Records
- FAQ

Source: Dorchester County Emergency Services – Weather Preparedness

Dorchester County Department of Emergency Services provides an Emergency Alert Program: Citizen Alert System (Everbridge). The system allows the County to provide citizens critical information quickly in a variety of situations, such as severe weather, unexpected road closures, missing persons and evacuations of buildings or neighborhoods.

In addition, the Dorchester County Emergency Services – Emergency Medical Services Division provides the listing of Emergency Medical Services Stations and information on the hospital, University of Maryland Shore Regional Health at Cambridge.

The Eastern Shore Economic Recovery website was developed in 2021 to communicate information and resources during times of economic crisis. These public facing resources are specifically targeted to the economic development community to provide decision makers with data driven tools to promote a deeper understanding of the threats, opportunities, and potential impacts to economic recovery following a short and long recovery emergency such as COVID-19.

The Dorchester County Health Department Emergency Preparedness webpage discusses how to prepare for a disaster. It also provides links to various resources such as https://www.ready.gov/.

Plan Integration

Integrating hazard mitigation planning and implementation actions into existing Dorchester County planning mechanisms (comprehensive plan, capital budget, ordinances, etc.) and vice versa is essential to building a safer and more resilient community. Integration of planning documents results in consistency and collaborative ideas within the local planning structure.

GENERALLY DESCRIBED AS THE ROUTINE CONSIDERATION AND MANAGEMENT OF HAZARD RISKS IN YOUR COMMUNITY'S EXISTING PLANNING FRAMEWORK – PLAN INTEGRATION IS THE COLLECTION OF PLANS, POLICIES, CODES, AND PROGRAMS THAT GUIDE DEVELOPMENT IN YOUR COMMUNITY, HOW THOSE ARE MAINTAINED AND IMPLEMENTED, AND THE ROLES OF PEOPLE, AGENCIES, AND DEPARTMENTS IN EVALUATING AND UPDATING THEM. EFFECTIVE INTEGRATION OF HAZARD MITIGATION OCCURS WHEN YOUR COMMUNITY'S PLANNING FRAMEWORK LEADS TO DEVELOP PATTERNS THAT DO NOT INCREASE RISKS FROM KNOWN HAZARDS OR LEADS TO REDEVELOPMENT THAT REDUCES RISK FROM KNOWN HAZARDS.

Plan document resources were reviewed and integrated throughout the plan update. Plan integration has been demonstrated through the incorporation of these planning resources. In addition, hyperlinks to various planning resources have been included throughout the plan document.

Comprehensive Plans:

- 2005 Town of Church Creek Comprehensive Development Plan
- 2009 Town of Hurlock Comprehensive Plan
- 2009 Town of Vienna Comprehensive Plan Amendments
- 2010 Town of Secretary Comprehensive Plan
- 2010 Town of East New Market Comprehensive Plan
- 2018 City of Cambridge Comprehensive Plan Update
- 2021 Dorchester County Comprehensive Plan

Flood Plans:

- Sea Level Rise: Technical Guidance for Dorchester County
- 2015 Dorchester County Floodplain Ordinance
- 2015 Dorchester County Flood Insurance Study
- 2016 Maryland Coastal Resiliency Assessment
- 2017 Dorchester County Flood Mitigation Plan
- 2019 Dorchester County Flood Risk Report (FRR)
- 2018 Sea Level Projections for Maryland
- 2020 Maryland Nuisance Flood Plan Development Guidance

Other Planning Documents:

- Dorchester County Building Codes
- 2017 Dorchester County Land Preservation Park and Recreation Plan
- 2018 Dorchester County Historic & Cultural Resources Hazard Mitigation & Risk Plan
- Maryland Forest Service Wildland Fire Program - 2020 Annual Wildland Fire Report
- 2020 Dorchester County Health Department (DCHD) Emerging Infectious Disease (EID)/Infectious Disease Response Plan (IDRP) **not available online*
- 2020 FEMA The Mass Care/Emergency Assistance Pandemic Planning Considerations
- 2021 EPA's Climate Change and Social Vulnerability in the United States
- 2021 Maryland State Hazard Mitigation Plan

Dorchester County's All-Hazard Mitigation Plan Update provides the necessary natural hazard information to incorporate into existing planning documents. The data, tables, analyses, assessments, mapping, and action items within this plan are easily applicable when updating or modifying existing planning documents. Documents and other sources used as reference or to support the plan update are made available throughout the plan as sources and within *Appendix I Plan Sources*.

The Hazard Mitigation Plan also includes eleven (11) goals with associated objectives, which include plan integration. The following goal and objectives extrapolated from Chapter 14 relate specifically to plan integration:

***GOAL 10:** Integrate plan and policies across disciplines and agencies within the County through the consideration of potential hazards and future development.*

Objective 10.1	Integrate hazard mitigation into areas such as land use, transportation, climate change, natural and cultural resource protection, water resources, and economic development.
Objective 10.2	Solicit participation and offer opportunities for various departments to work together on a regular basis.
Objective 10.3	Clearly define roles of, and improve intergovernmental coordination between planners, emergency managers, engineers, and other staff, and municipal and regional partners in improving disaster resiliency.

Additionally, each mitigation project developed during the plan update considers "Ideas for Integration." Ideas for integration identify opportunities within each mitigation project for plan integration activities related to integrating hazard mitigation into planning documents, creating new partnerships, proposed changes to code, and public outreach. The following county plans, projects, and policies were identified as plan integration opportunities:

- Flood Mitigation Plan
- Green Infrastructure Plan
- County and City Comprehensive Plans
- Capital Improvement Plan
- Nuisance Flood Plan
- Citizen Alert System

Integrating hazard mitigation planning and resiliency into the County's planning framework will lead to development patterns and redevelopment that decreases hazard risk and vulnerability. Local planning documents would benefit from integrating/continuing to integrate components from this hazard mitigation plan within future updates of respective plans.

For more information related to mitigation strategies and plan integration, please refer to Chapter 15: Mitigation Strategies.

For a complete guide to plan integration, FEMA has created a step-by-step guidebook to aid local communities. The guide is called "Plan Integration: Linking Local Planning Efforts" and was published in July 2015. The guide is available at fema.gov.

Comprehensive Planning

In terms of land use planning requirement in the State of Maryland, Land Use Article states that once the planning commission is legislatively created, the planning commission has the function and duty to prepare a comprehensive plan for its jurisdiction, and to present this plan to the local legislative or governing body for its consideration and adoption. The comprehensive plan must serve as a guide to public and private actions and decisions to ensure the development of public and private property in appropriate relationships.

With power comes responsibility, and Land Use Article outlines a number of requirements governing content and procedures that each planning commission must fulfill in the crafting of the jurisdiction's comprehensive plan. Each jurisdiction must review and, if necessary, update its comprehensive plan every ten years.

One of the main elements within jurisdictional comprehensive plans include the Sensitive Areas Element. The sensitive areas element sets goals, objectives, principles, policies, and standards to protect sensitive areas from the adverse effects of development. Land Use Article requires jurisdictions to protect streams and their buffers; the 100-year floodplain; habitats of threatened and endangered species; and steep slopes, wetlands and agricultural and forest lands intended for resource protection or conservation". Jurisdictions, of course, can identify and protect other sensitive areas as well.

The previous comprehensive plan for Dorchester County was adopted in 1996. With the recent comprehensive update of the 2021 Dorchester County Comprehensive Plan included information from the Hazard Mitigation Plan, specifically in Chapter 4 Environmental Resources and Protection - Sensitive Areas.

The **2021 Dorchester County Comprehensive Plan** contains seven major planning themes that help to form and guide the future of the County. One of the seven themes of the plan is **sea level rise**, **high hazard** and **flood mitigation areas**.

Dorchester County is currently one of the most vulnerable areas to flooding on the eastern seaboard.

Planning for the protection of sensitive areas requires an understanding of both the present day and the long-term threats. Such concerns are eroding shorelines, increasing precipitation events and intensity, expanding high tide areas and floodplains, and increasing storm surge and flood hazards. The County's land use policies generally guide growth away from flood prone areas and low-lying wetland areas, and therefore enhance the region's resilience to sea-level rise and climate change. The County will need to conduct cost/benefit analyses when planning for repetitive loss properties and when maintaining and investing in public infrastructure and facilities. A cost/benefit analysis will help to evaluate alternatives to infrastructure investment and mitigation options. There are numerous studies and plans that evaluate sea level rise vulnerabilities within Dorchester County, and that set forth adaptation strategies towards improving the area's physical, economic, and ecological resiliency. These plans are integrated and carried forward in this 2021 Comprehensive Plan. The County will need to continue to review, evaluate, update, and implement County studies/plans that address sea level rise resiliency, and coordinate with Federal, State, and non-profit organizations to ensure consistency in adaptation and mitigation efforts.

Excerpt from the 2021 Dorchester County Comprehensive Plan - Chapter 4:

100-year Floodplain and Flood Hazards

In Dorchester County, flood origins include riverine flooding from rivers, creeks and streams and coastal flooding from the Chesapeake Bay. Approximately 56% of the County lies within the 1%-annual-chance floodplain (100-year flood) area (see Map 4.1). The vast majority of this area is tidal floodplain. Residents are at risk from tidal flooding, strong winds, storm surge, heavy rains and sea level rise that can cause temporary and permanent destructive flooding in both waterfront and inland areas.

Notable recent flood events include Hurricane Isabel in 2003 and Hurricane Irene in 2011, which underscore the significance of the threat of flooding in Dorchester County. Hurricane Isabel was technically downgraded to a tropical storm by the time it hit Maryland, however, its sustained winds (combined with high tides) created a storm surge reaching over eight feet in some areas of Dorchester County. The storm caused extensive damage in Dorchester County, including major damage to the Hoopers Island bridge and approach road, and throughout most of the low-lying communities in the coastal areas of the County. The Maryland Department of Planning determined that 123 properties in Dorchester County incurred damage or loss to structures during the storm. Hurricane Irene was also downgraded to a tropical storm as it made landfall. The County Council of Dorchester County declared a state of emergency, and public shelters were made available. Dorchester County sustained massive power outages, many fallen trees, several damaged roads and a few damaged buildings. The Dorchester General Hospital in Cambridge was evacuated due to wind and water damage.

Dorchester County has participated in the National Flood Insurance Program since 1981. Dorchester County's zoning ordinance contains a supplementary Floodplain Management District (Section 155-37): a zone overlaying the area of the 100-year floodplain as shown on the Flood Insurance Rate Maps published by the Federal Emergency Management Agency (FEMA). Buildings and structures within this zone must be designed to minimize flood damage within the flood prone area. Development within the riverine floodplain is strictly controlled in the ordinance. Flood insurance is also available to Dorchester County homeowners of property located in the floodplain through the National Flood Insurance Program (NFIP). The NFIP offers flood damage protection to communities, such as Dorchester, that have worked to manage and reduce the dangers of local flooding. To this end, the County is a participant in the Community Rating System which is a flood insurance discount program that rewards higher regulatory standards, public outreach, emergency preparedness and open space preservation to reduce flooding risk and increase resiliency in the County. The program has a rating scale of 1-10, 1 being the highest, and the County is currently a Class 6 rating which equates to a 20% discount on eligible flood insurance policies. Maximizing the potential of this program in conjunction with continued land preservation practices is an integral part of the County's land use and coastal resiliency goals.

Towards addressing current hazards and mitigating future risks, the County and State have prepared numerous plans and studies. In 2017, the County prepared a Hazard Mitigation Plan (HMP) and a Flood Mitigation Plan (FMP). The FMP complements and expands upon the HMP by specifically identifying cost-effective actions that reduce or eliminate the long-term risk of flood damage. While critical facilities and general building stock were the focus of both the overall HMP and the FMP, the 2018 County Historic

and Cultural Resources Mitigation and Risk Plan specifically considered flood hazard risk and vulnerability to cultural and historic resources throughout Dorchester County.

The County's land use policies generally guide growth away from flood prone areas and low-lying wetland areas. Where development has already occurred or is unavoidable, the County has adopted techniques that minimize the adverse environmental impacts of development in the floodplain and address safety issues. The Land Use Plan in Chapter 3 guides new development and population to be centered in and around designated growth areas and out of hazard areas including storm surge areas and projected sea level rise inundation areas. However, many existing developed areas and areas in low lying areas along the coast and streams in the growth areas are susceptible to flooding associated with heavy rain events.

It is recommended that updates for municipal comprehensive plans should include information from the 2022 Dorchester County Hazard Mitigation Plan.

There are nine (9) municipalities within Dorchester County. Municipalities that exercise planning and zoning authority are denoted in blue along with their associated comprehensive plan.

Table 4-1

Comprehensive Plans	
Municipalities	Current Plan/Adoption Date
Brookview	Does not exercise planning and zoning authority
Cambridge	CMP-2011 – Update 2018
Church Creek	CMP-2005
East New Market	CMP-2010 Amendment-2012
Eldorado	Does not exercise planning and zoning authority
Galestown	Does not exercise planning and zoning authority
Hurlock	CMP-2009
Secretary	CMP-2010
Vienna	CMP-2003 MGE_WRE-2009

Source: Maryland Department of Planning – Comprehensive Plans

SECTION 2

Chapter 5 Hazard Risk & Vulnerability Assessment

Introduction

Four major steps are required to revise and update the Hazard Mitigation Plan. The four major steps are: **Hazard Identification**, Hazard Profiles, Vulnerability Assessment, and Loss Estimations. In this chapter, hazards that may affect Dorchester County are identified. A Hazard Risk and Vulnerability Assessment (HIRA) was completed and is detailed in Appendix A. Results from both the Hazard Risk Survey completed by CPT members and the Public Survey completed by members of the public have been integrated into the updated HIRA. Chapters 6-13 cover the three remaining steps, Hazard Profiles, Vulnerability Assessment, and Loss Estimations, for each hazard identified by the Core Planning Team (CPT).

Hazard Identification & Risk Assessment

The first step in the Plan update process for Dorchester County involves the identification of various hazards and the risk associated with each hazard. The hazard identification process for Dorchester County involved investigating various types of natural hazards experienced by the County over the past several decades including new information collected since the adoption of the last Plan (2017-Present).

Nine (9) natural hazards were identified by Core Planning Team (CPT) members. The CPT added two (2) new hazards during this plan update process; **Emerging Infectious Diseases** and **Climate Change**. Only natural hazards were included in this assessment, as required by 44 CFR Part 201-Hazard Mitigation Planning, as these hazards lend themselves better to data collection related to geographic extent than human impacted hazards.

During the risk assessment, coastal hazards (includes hurricane, tropical storm, and coastal flooding) and thunderstorm (includes thunderstorm wind, lightning, and hail) were rated as having the highest risks. Riverine flooding, high wind, tornado, and extreme heat were rated as "medium-high" risks, while drought, winter weather, and wildfire as "medium" risks.

Table 5-1

Natural Hazard Identification and Risk Assessment Ranking Results		
Hazard	2017 Hazard Ranking	2022 Hazard Ranking
Coastal Hazards	High	High
Thunderstorm	Medium-High	High
Riverine Flood	High	Medium-High
High Wind	Medium-High	Medium-High
Tornado	Medium	Medium-High
Extreme Heat	Medium-High	Medium-High
Drought	Medium	Medium
Winter Weather	Medium-High	Medium
Wildfire	Medium	Medium

Core Planning Team members participated in a Hazard Risk Survey to gather their perspective on additional hazards identified within the plan. Members provided their "Level of Concern" for the following hazards:

- Major Fire & Explosion: Concerned
- On-Site HazMat Incident: Somewhat Concerned
- Transportation HazMat Incident: Somewhat Concerned
- Emerging Infectious Disease: Somewhat Concerned
- Dam Failure: Not Concerned

The complete methodology and data tables used for the HIRA is included in Appendix A.

Municipal Perspective

Municipalitites were provided an opportunity to state their level of concern for hazards identified within the plan update via the municipal hazard perspective survey. The top hazards of concern, defined by a ranking of "Concerned" and "Very Concerned " for each of the incorporated municipalities are provided below in Table 5-2.

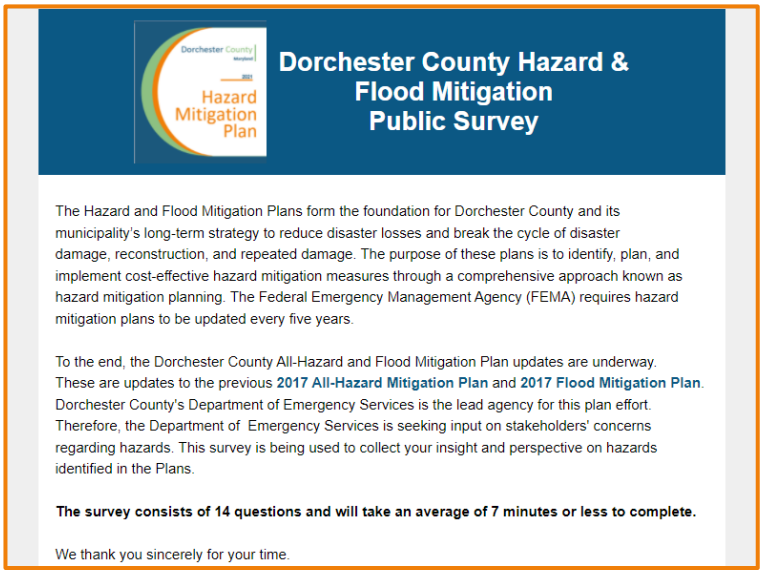
Table 5-2

Municipal Hazard Risk Perspective									
Municipality/ Hazard	Brookview	Cambridge	Church Creek	East New Market	Eldorado	Galestown	Hurlock	Secretary	Vienna
Coastal Events		Very Concerned	Very Concerned	Concerned			Concerned		Very Concerned
Thunderstorm		Concerned					Very Concerned	Concerned	Concerned
Riverine Flood		Very Concerned			Concerned		Concerned		Concerned
High Wind		Concerned	Very Concerned				Very Concerned	Concerned	Concerned
Tornado				Concerned	Concerned				Very Concerned
Extreme Heat							Concerned		Very Concerned
Drought			Concerned						Very Concerned
Winter Weather			Very Concerned					Concerned	Concerned
Wildfire			Very Concerned				Concerned		Concerned
Major Fire & Explosion		Concerned		Concerned			Very Concerned		Very Concerned
On-Site HazMat Incident							Concerned		Concerned
Transportation HazMat Incident		Concerned		Concerned					Very Concerned
Emerging Infectious Disease				Concerned	Concerned				Very Concerned
Dam Failure									

Source: Municipal Hazard Survey, 2021-2022

Public Perspective

Public input was collected to determine the level of concern regarding various hazards. The Department of Emergency Services was interested in knowing what residents thought and the survey was a tool used during this plan update to inform their understanding. Survey results closely matched those gathered from the Core Planning Team.



Dorchester County Hazard & Flood Mitigation Public Survey

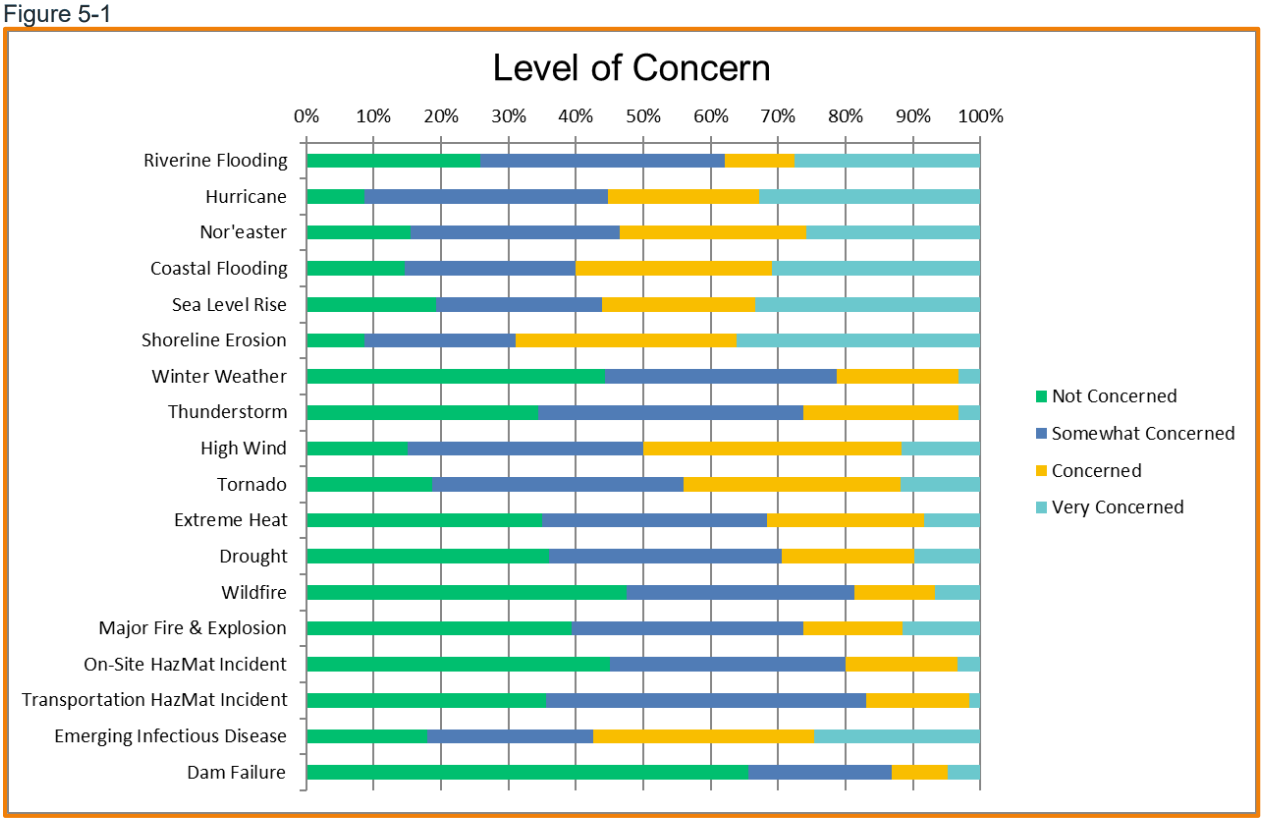
The Hazard and Flood Mitigation Plans form the foundation for Dorchester County and its municipality's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. The purpose of these plans is to identify, plan, and implement cost-effective hazard mitigation measures through a comprehensive approach known as hazard mitigation planning. The Federal Emergency Management Agency (FEMA) requires hazard mitigation plans to be updated every five years.

To the end, the Dorchester County All-Hazard and Flood Mitigation Plan updates are underway. These are updates to the previous **2017 All-Hazard Mitigation Plan** and **2017 Flood Mitigation Plan**. Dorchester County's Department of Emergency Services is the lead agency for this plan effort. Therefore, the Department of Emergency Services is seeking input on stakeholders' concerns regarding hazards. This survey is being used to collect your insight and perspective on hazards identified in the Plans.

The survey consists of 14 questions and will take an average of 7 minutes or less to complete.

We thank you sincerely for your time.

Figure 5-1



Source: Dorchester County Hazard & Flood Mitigation Public Survey, 2021-2022

Note: Public survey results are included in each hazard chapter.

State Perspective

The hazard rankings found within the 2021 State of Maryland Hazard Mitigation Plan for Dorchester County are based, in part, on Dorchester County's ranking of hazards from their 2017 hazard mitigation plan. Additionally, State rankings are assessed and calibrated against all counties in Maryland, whereas the 2022 hazard rankings for Dorchester County were assessed for the county only.

According to the 2021 Maryland Hazard Mitigation Plan, Dorchester County ranked "high" for the risk of coastal hazards, which is the same result as the Dorchester County's HIRA, and "medium high" for the risk of flood, high winds, tornado, and drought. The County ranked "medium" for the risk of thunderstorm, winter weather, wildfire, and public health.

Table 5-3

State Hazard Risk Perspective for Dorchester County					
Hazard	High	Medium High	Medium	Medium Low	Low
Coastal Hazards	X				
Thunderstorm			X		
Flood		X			
High Winds		X			
Tornado		X			
Extreme Heat				X	
Drought		X			
Winter Weather			X		
Wildfire			X		
Human Caused Hazards				X	
Public Health (endemic, epidemic, pandemic, or outbreak, or a highly fatal biological agent or toxin release)			X		
Soil Movement (landslides, sinkholes, and coastal erosion)				X	
Dam Failure					X

Source: 2021 State Hazard Mitigation Plan

Hazard Probability

Hazard Profiles discuss the nature of the hazard, history of previous occurrences, and the impact, including potential severity of an occurrence. It is assumed that hazards experienced by the County in the past may be experienced in the future, therefore identified hazard profiles include a history for each hazard and their occurrences. Information of past hazards was based on history and research from historical documents and newspapers, specifically Dorchester County's main newspaper, the Star Democrat; County plans and reports; Core Planning Team members and Internet websites. Annualized event data is included in all natural hazard profiles.

Future Probability means the likelihood of the hazard occurring and may be defined in terms of general descriptors (e.g., unlikely, occasional, likely, highly likely), historical frequencies, and/or statistical probabilities (e.g., 1 percent chance of occurrence in any given year).

Each of the (9) natural hazards have been rated using the probability assessment chart below. In-depth risk and vulnerability data and analysis has been included within each hazard chapter.

Table 5-3

Probability Rating		
Rating	Probability	Identified Hazard
4	Highly Likely Hazard event is likely to occur more than once every 5 years.	Thunderstorm Coastal
3	Likely Hazard event is likely to occur less than every 5 years, but more often than once every 30 years.	Riverine Flooding High Winds Wildfire Winter Weather
2	Occasional Hazard event is likely to occur less than every 15 years, but more often than once every 30 years.	Drought Tornado Extreme Heat
1	Unlikely Hazard event is likely to occur less than once every 30 years.	*Note: Hazards that were deemed unlikely were screened out during the initial hazard identification planning process phase. This includes Earthquake.*

Both the highly likely hazards, thunderstorm and coastal, identified on Table 5-3, match the high-risk hazards identified in the 2022 Dorchester County HIRA, Table 5-1.

Social Vulnerability

The Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) uses fifteen (15) U.S. Census variables to calculate SVI scores that can help local officials identify communities within the county that may need additional support before, during, and/or after disasters.

An important aspect relating to the health, safety, and welfare of Dorchester County's communities is social vulnerability. The County recognizes that identifying socially vulnerable populations is an important step in mitigating for natural disaster events. According to the CDC, social vulnerability refers to "the negative effects on communities caused by external stresses on human health. Such stresses include natural or human-caused disasters, or disease outbreak." Reducing social vulnerability can decrease both human suffering and economic loss.

The CDC developed a Social Vulnerability Index (SVI) to help local jurisdictions determine their level of vulnerability based on fifteen (15) indicators that are routinely utilized to measure social vulnerability. These indicators are as follows:

Socioeconomic Status

1. Below Poverty
2. Unemployed
3. Income
4. No High School Diploma

Household Composition & Disability

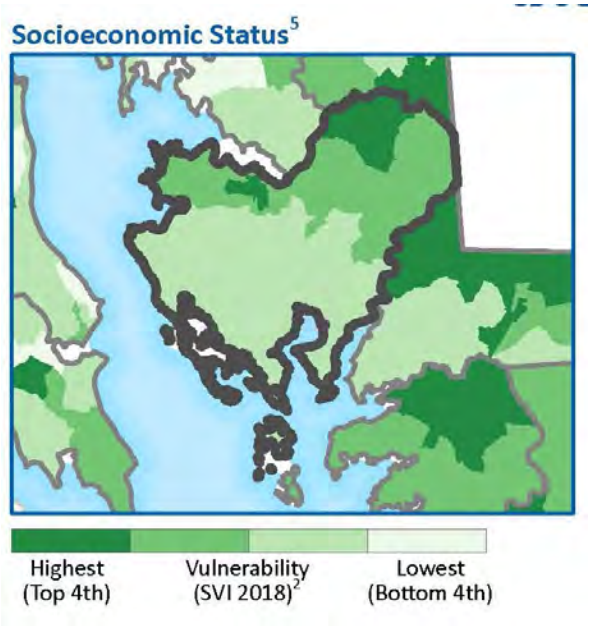
1. Aged 65 or Older
2. Aged 17 or Younger
3. Civilian with a Disability
4. Single-Parent Households

Minority Status & Language

1. Minority
2. Speaks English "Less than Well"

Housing Type & Transportation

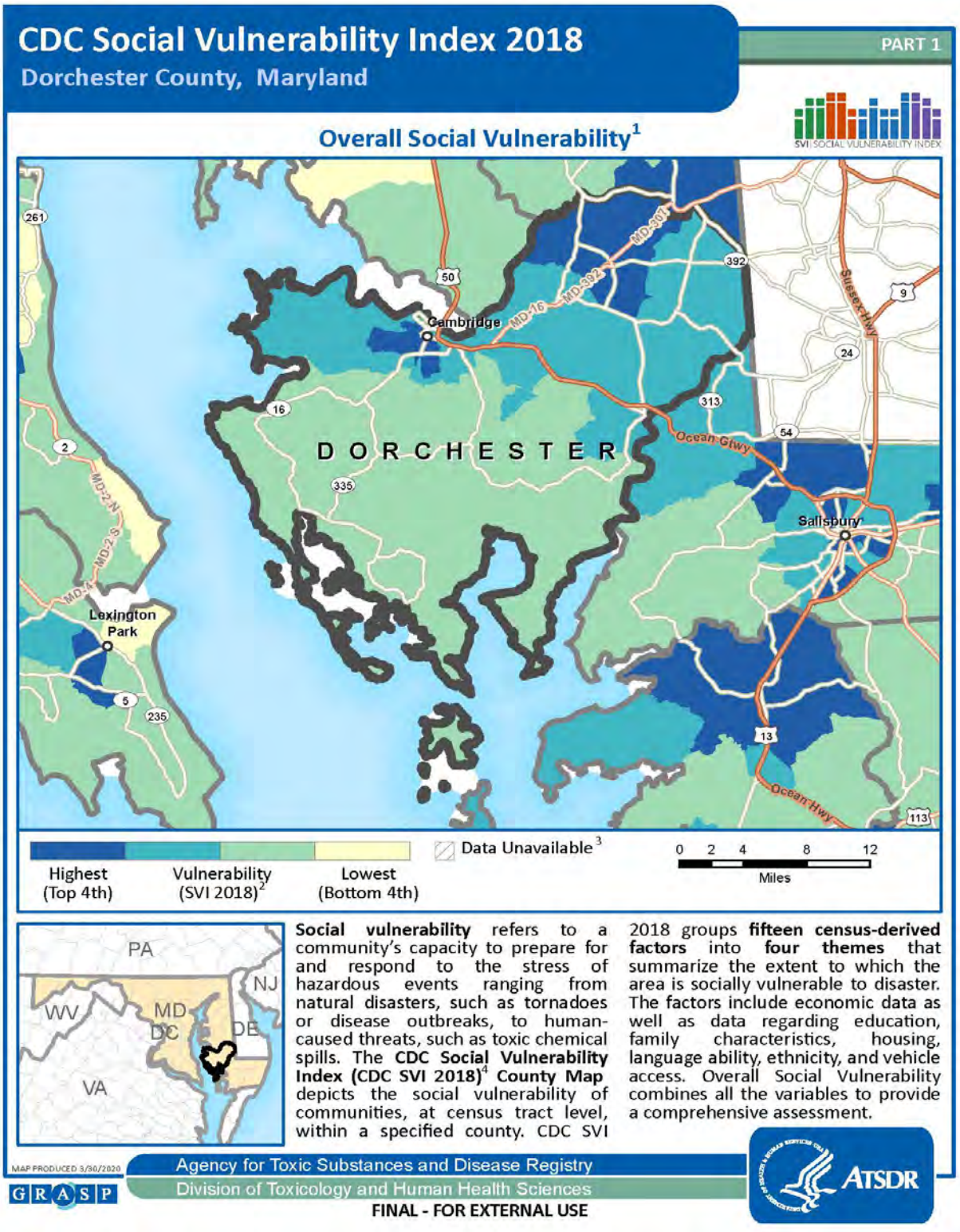
1. Multi-Unit Structures
2. Mobile Homes
3. Crowding
4. No Vehicle
5. Group Quarters



The SVI has been conducted for Dorchester County at the census tract level and is mapped on the following page. The SVI utilizes American Census Survey (ACS) 5-year estimates. The darker blue census tracts in the overall map indicate areas of higher social vulnerability while the light green tracts indicate relatively low social vulnerability. Measuring social vulnerability at the census tract level is meant to help guide further planning. Investigation at the neighborhood level is required to fully identify vulnerable populations.

The area with the highest social vulnerability depicted in Figure 5-2 is the City of Cambridge and the northeast section of the County, which includes the Towns of Secretary, East New Market and Hurlock.

Figure 5-2


CDC Social Vulnerability Index 2018
Dorchester County, Maryland
PART 1
Overall Social Vulnerability[1]
SVI SOCIAL VULNERABILITY INDEX
DORCHESTER
Cambridge
Salisbury
Lexington Park
MD-16
MD-392
MD-307
Ocean Gtwy
Ocean Hwy
Sussex Hwy
MD-2 N
MD-2 S
MD-4
261
50
392
9
24
313
54
16
2
335
5
235
13
113
Highest (Top 4th) Vulnerability (SVI 2018)[2] Lowest (Bottom 4th)
Data Unavailable[3]
0 2 4 8 12
Miles
PA
NJ
WV
MD
DC
DE
VA
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 Social Vulnerability Index (CDC SVI 2018)[4] County Map depicts the social vulnerability of communities, at census tract level, within a specified county. CDC SVI 2018 groups fifteen 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.
MAP PRODUCED 3/30/2020
GRASP
Agency for Toxic Substances and Disease Registry
Division of Toxicology and Human Health Sciences
FINAL - FOR EXTERNAL USE
ATSDR

Critical & Public Facilities

In order to assess the current risk and vulnerability of the community, an inventory of critical and public facilities in the County was performed. Critical and public facilities are those facilities that warrant special attention in preparing for a disaster and/or are of vital importance in maintaining the functioning of the community.

During the 2022 Plan Update process, the 2017 Critical and Public Facility database was reviewed and updated. Updated GIS data was obtained from Brandon Vermillion - GIS Specialist, Dorchester County Planning and Zoning. Changes since the previous plan were incorporated into the updated listing. This database was used throughout the hazard vulnerability analysis and loss estimation sections within the Plan.

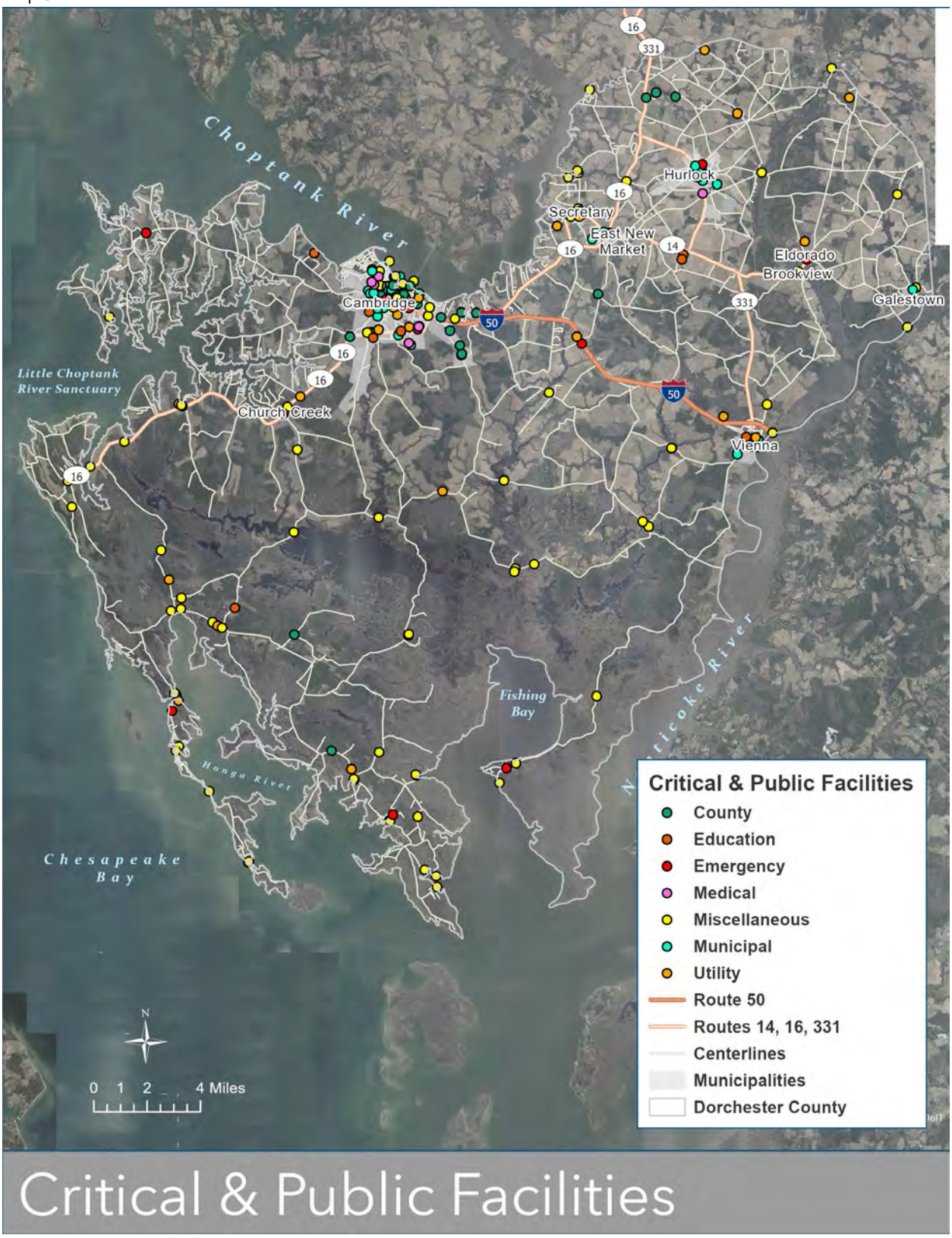
The inventory of critical and public facilities for the 2022 Dorchester County Hazard Mitigation Plan on Table 5-4 and dipicted on Map 5-1.

Table 5-4

Critical & Public Facilities		
Facility Category	Facility Types	Number of Facility
County	Airport	4
	County Government	23
	Library	2
Education	Public & Private Schools	16
	College	2
Emergency	Fire Department	14
	EOC	1
	Police Station	3
	EMS Station	4
Medical	Nursing Home	8
	Hospital	2
	Medical	10
Miscellaneous	Marina/Dock	18
	Boat Ramp	18
	Museum	4
	Community Center	3
	Park	4
	Transportation	1
	Bridge	44
Municipal	Municipal Government	61
	Library	1
Utility	Utility	23
	Communication	6

Source: 2022 Hazard Mitigation GIS Database

Map 5-1


Choptank River
Little Choptank River Sanctuary
Cambridge
Church Creek
Hurlock
Secretary
East New Market
Eldorado
Brookview
Galestown
Vienna
Fishing Bay
Honga River
Chesapeake Bay
Critical & Public Facilities
County
Education
Emergency
Medical
Miscellaneous
Municipal
Utility
Route 50
Routes 14, 16, 331
Centerlines
Municipalities
Dorchester County
N
0 1 2 4 Miles
Critical & Public Facilities

Chapter 6 Coastal Hazards

Chapter Update Overview

Coastal flooding hazard impacts were identified by the Core Planning Team during the update process as indicated in Table 6-1. Various types of coastal hazards have been identified and assessed within the chapter. In addition to hurricane, nor'easter, coastal flood and shoreline erosion, coastal hazard risk and vulnerability was expanded during the plan update process to include the area of Limit of Moderate Wave Action (LiMWA) and nuisance flooding. Furthermore, new sections to this chapter added not in the previous plan include Social Vulnerability, Historic Structures Vulnerability, and Natural Systems Protection.

Hazard history data was updated, while newly developed mapping products are presented throughout the chapter. The critical and public facility database used for the various coastal hazard vulnerability assessments presented in this chapter was vetted to include new facilities built subsequent to 2017, and the removal of facilities that moved or are no longer in operation. Loss estimations were updated and expanded to account for the 2019 Flood Risk Report and the addition of the LiMWA area. Critical, public, residential and commercial structures were included. It is important to note that while information from the 2019 Flood Risk Report (FRR) document has been integrated into this chapter, the 2019 FRR database was used to produce Dorchester County refined analysis including depth of flooding at specific structures and new mapping products not included in the FRR. Notable vulnerability assessment results indicated that several county and municipal structures are at risk to coastal flooding. Projected flood depths for these structures were produced. In addition, critical and public facilities affected by multiple coastal hazards such as hurricane storm surge, coastal flooding, and shoreline erosion were identified. Other new vulnerability assessment updates included in this chapter is the potential risk to shoreline erosion was using Shoreline Hazard Index developed by Maryland Department of Natural Resources (DNR), the Nature Conservancy (TNC), and partnering with Maryland's Chesapeake and Coastal Service (CCS). Nuisance flooding is a new addition to the plan update. This section discusses nuisance flooding and provides a listing of roadways impacted by this type of flooding.

New information specific to Social Vulnerability in relation to coastal hazard areas was included as part of the plan update. The 2018 Dorchester County Historical and Cultural Resources Hazard Mitigation & Risk Plan, as well as various flood risk reduction and natural resource protection planning and projects have been integrated into this chapter, as well. Finally, conclusion and recommendations were added at the end of this chapter.

Hazard Impacts

The Core Planning Team reviewed and discussed impacts from coastal hazard events as presented on the table below.

Table 6-1

Coastal Events Hazard Impacts	
Public Health & Safety	• Long term cost to public health results from the interruption of health services, the permanent damage to infrastructure, the setback in development, and the loss of individual income. • After a coastal event, damp environments in buildings can cause mold growth and respiratory illnesses. • Hypothermia is a potential concern for people, especially children, who become trapped in floodwaters.
Social Vulnerability	• Persons with disabilities, compromised immune systems, and existing illnesses are at an increased risk, especially if they are dependent on frequent medical treatments or drug prescriptions that they might have difficulty accessing during or after a flood. • Some people are less able to prepare for coastal floods or respond to flood events than others. Those with limited incomes, especially if they are unemployed or uninsured, are at a higher risk. • Communities in flood-prone areas with older infrastructure or have limited access to transportation are more at risk.
Economic Stability	• Hurricanes impacting Dorchester County resulted in $3.26 million in property damages and $510 thousand in crop damages – National Center for Environmental Information, NOAA 2021. • Damage to structures caused by coastal storms could force long-term closures and business interruptions.
Infrastructure	• Home and landowners within coastal areas may experience damage to or loss of property depending upon the severity of water inundation in the area. Infrastructure may experience impacts in the form of damages to roads/bridges and/or the complete loss of transportation routes. • Nuisance floods can lead to degraded storm and wastewater systems, contamination of fresh water supplies, and disruptions to business.
Environment	• Coastal storms could impact septic systems, underground storage tank and cause water and soil contamination. • Impacts from storm surge can damage existing living shorelines or bulkheads.

Source: Core Planning Team

Introduction

For this plan update, Hazard Risk & Identification Assessment (HIRA) results indicate that coastal hazards are a "high" risk for Dorchester County based on the following eight (8) parameters: injuries, deaths, property and crop damage, geographic extent, total annualized events, future probability, and community perspective. Additional information about the ranking process and results are within *Appendix A Hazard Risk & Identification Assessment Methodology.* Table 6-2 provides a compilation of coastal hazard risk assessment data.

Table 6-2

Total Coastal Events Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Tropical Storm, Hurricanes and Coastal Flooding. There are no Tropical Depressions recorded in the NCEI Database for this county.*							
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)	Future Probability	Community Perspective
0	0	$3.26M	$510K	% of County in Coastal Land Area = 98%	Total = 22 Annual Avg = 0.87	Highly Likely	Very Concerned
Source: National Centers for Environmental Information, as of February 2021 & State of Maryland Hazard Mitigation Plan **Note: Data collected for 1950-present, no data available for this event type prior to 1996*							

In order to adequately assess Dorchester County's risk and vulnerability to various coastal hazards, the following was analyzed:

- Hurricane (Storm Surge Inundation Area)
- Coastal Flooding Special Flood Hazard Area
- Areas of Limit of Moderate Wave Action
- Shoreline Erosion (MD Shoreline Hazard Index & 100-foot Risk Zone)
- Nuisance Flooding- Roadways

Topics included for each of the coastal hazards and/or risk areas are as follows:

- Hazard Profile & History
- Vulnerability Analysis
- Loss Estimations

Note: The 2021 Maryland State Hazard Mitigation Plan defines coastal flood as "Flooding of coastal areas due to the vertical rise above normal water level caused by strong, persistent onshore wind, high astronomical tide, and/or low atmospheric pressure, resulting in damage, erosion, flooding, fatalities, or injuries. Coastal areas are defined as those portions of coastal land zones (coastal county/parish) adjacent to the waters, bays, and estuaries of the oceans." Inland flood events are characterized as Flash Flood or Flood and are presented in Chapter 7 Riverine

Hurricane

Hazard Profile & History

According to Strahler's Physical Geography text, a hurricane is essentially a tropical cyclone which develops over oceans in latitudes between 8 and 15 degrees North and South of the equator where the water temperature is normally over 80 degrees Fahrenheit. Warming of the air at low levels creates instability, and along with an easterly "wave" creates a deep circular low-pressure area. Once formed, the storm moves north and west in the northern hemisphere. The diameter of a hurricane may be 100-300 miles with wind velocities greater than 73 miles per hour and the barometric pressure in the center or "eye" of the storm commonly falling to 965 mb or lower.

Hurricanes, tropical storms, and tropical depressions are all examples of tropical cyclones. Their categories and associated characteristics are as follows:

- Hurricane: maximum sustained surface wind speed exceeds 73 mph;
- Tropical Storm: maximum sustained surface wind speed from 39-73 mph; and,
- Tropical Depression: maximum sustained wind speed is less than 38 mph.

Hurricanes are rated by intensity using the Saffir-Simpson Hurricane Wind Scale, which gives an estimate of the potential damage that a hurricane may cause based on wind speed and surface pressure. Category 1 Hurricanes and/or tropical storms are the most likely to category storm impact Maryland. These storms tend to lose their intensity as they travel from their point of origin up the Atlantic coastline. More often than not these storm events are downgraded to a Tropical Storm or Depression by the time they reach Maryland. Below is the Saffir-Simpson Hurricane Wind Scale which does not take into account other potentially deadly hazards such as storm surge, rainfall flooding, and tornadoes.

Table 6-3

Saffir-Simpson Hurricane Wind Scale		
Category	Wind Speed	Damage Caused by Hurricane Winds
1	74-95 mph	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: NOAA National Hurricane Center and Central Pacific Hurricane Center: https://www.nhc.noaa.gov/aboutsshws.php

In order to assess storm surge vulnerability from tropical cyclones and hurricanes the Sea, Lake and Overland Surges from Hurricanes (SLOSH) model has been used. The Sea, Lake and Overland Surges from Hurricanes (SLOSH) model is a computerized numerical model developed by the National Weather Service (NWS) to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes by taking into account the atmospheric pressure, size, forward speed, and track data. These parameters are used to create a model of the wind field which drives the storm surge. According to the National Hurricane Center, **storm surge** is produced by water being pushed toward the shore by the force of the winds moving cyclonically around the storm. The impact on surge of the low pressure associated with intense storms is minimal in comparison to the water being forced toward the shore by the wind. The maximum potential storm surge for a particular location depends on a number of different factors. Storm surge is a very complex phenomenon because it is sensitive to the slightest changes in storm intensity, forward speed, size (radius of maximum winds-RMW), angle of approach to the coast, central pressure (minimal contribution in comparison to the wind), and the shape and characteristics of coastal features such as bays and estuaries. Adding to the destructive power of surge, battering waves may increase damage to buildings directly along the coast. Water weighs approximately 1,700 pounds per cubic yard; extended pounding by frequent waves can demolish any structure not specifically designed to withstand such forces. The two elements work together to increase the impact on land because the surge makes it possible for waves to extend inland. Additionally, currents created by tides combine with the waves to severely erode beaches and coastal highways. Buildings that survive hurricane winds can be damaged if their foundations are undermined and weakened by erosion.

Dorchester County has been affected over the years by the passage of hurricanes, including an unnamed hurricane in 1933, Hurricane Hazel in 1954, Hurricane Isabel in 2003, and most recently, Hurricane Irene in 2011. Hurricanes can affect Dorchester County from either the Gulf of Mexico or the Atlantic. Normally the greatest damage results from hurricanes that come ashore in the tidewater area of Virginia or the Carolina Capes as was the case with Hurricane Isabel.

According to the City of Cambridge 2018 Comprehensive Plan Update, with a Category 4 Hurricane, storm surge flooding may cover most of the Cambridge area extending south of the diagonal line connecting Jenkins Creek in the northwest to the Woods Road/MD Route 16 intersection in the southeast. The storm surge associated with a Category 3 Hurricane would cover less area but still inundate parts of the MD Route 16 corridor, including the Cambridge-South Dorchester High School. For Cambridge, storm surge flooding associated with smaller storm events is limited to the riparian areas and their associated tributary drainage ways. However, storm surge inundation extends beyond standard floodplains within the City of Cambridge.

The Core Planning Team and municipalities level of concern specific to hurricanes indicate “very concerned” according to the survey. However, the public survey showed that the community was “somewhat concerned” about hurricanes. Tables 6-4 and 6-5 provides data for tropical storm and hurricane events.

Table 6-4

Tropical Storm Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)
0	0	$1.755M	$500K	% of County in Coastal Land Area = 98%	Total = 6 Annual Avg = 0.24
Note: Data collected for 1950-present, no data available for this event type prior to 1996 *Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.* *Based on NCEI definitions/criteria: Tropical Storm (Z). A tropical cyclone in which the 1-minute sustained surface wind ranges from 34 to 63 knots (39 to 73 mph). A Tropical Storm should be included as an entry when these conditions are experienced in the WFO's (Weather Forecast Office) CWA (County Warning Area).*					

Table 6-5

Hurricane Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)
0	0	$10k	$10K	% of County in Coastal Land Area = 98%	Total = 3 Annual Avg = 0.12
Note: Data collected for 1950-present, no data available for this event type prior to 1996 *Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.* *Based on NCEI definitions/criteria: Hurricane/Typhoon (Z). A tropical cyclone in which the maximum 1-minute sustained surface wind is 64 knots (74 mph) or greater. In the Atlantic Ocean or the North Pacific Ocean east of the International Date Line, this event would be labeled a Hurricane, and in the North Pacific Ocean west of the International Dateline, this event would be classified as a Typhoon.*					

In terms of number of occurrences, the National Weather Service (NWS), National Center for Environmental Information (NCEI) listed a total of ten (10) hurricane and tropical storm events affecting Dorchester County from 1996-2021. Therefore, according to the data, Dorchester County experiences approximately 0.25 hurricane and/or tropical storm events per year; event data detailed in Table 6-6.

Table 6-6

Hurricane Events				
Storm Event	Date	Event Narrative	Property Damage	Crop Damage
Hurricane Bertha	July 13, 1996	One confirmed tornado was spawned by the hurricane near Madison in Dorchester County. Numerous trees and power lines blown down resulted in scattered property damage and power outages. Rainfall amounts generally ranged from 3.0 to 5.0 inches and caused some street flooding.	$100K	$15K
Hurricane Fran	September 6, 1996	A storm surge of 4 to 6 feet inundated portions of the communities of Taylors Island, Hoopers Island, and Madison in Dorchester County along the Chesapeake Bay. Many roads were flooded with some homes receiving water damage at the time of high tide. In some locations, nearly 10 feet of shore was lost due to surge effects.	$1M	Not Available
Tropical Storm Josephine	October 8, 1996	1.5 to 3.5 inches of rain resulting in flooding of several roads. Several trees and power lines were blown down resulting in some minor structural damage and scattered power outages.	$100K	Not Available
Hurricane Floyd	September 15 to September 16, 1999	Storm surge flooding of 5 to 7 feet occurred over central portions of the Chesapeake Bay inundating sections of Dorchester and Somerset counties. Few trees and power lines were blown down across the Lower Maryland Eastern Shore resulting in scattered power outages. Rainfall amounts generally ranged from 3 to 6 inches across much of the Lower Maryland Eastern Shore and caused some crop damage and street flooding.	$278K	$575K

Storm Event	Date	Event Narrative	Property Damage	Crop Damage
Tropical Storm Isabel	September 18 to September 19, 2003	The highest gusts recorded were 62 mph at Hurlock in Dorchester County. The lowest sea level pressure recorded was 1003 mb at Cambridge Maryland. The wind uprooted many thousands of trees, downed many power lines, damaged hundreds of houses, and snapped thousands of telephone poles and cross arms. Hundreds of roads, including major highways, were blocked by fallen trees. Local power companies reported many thousands of customers were without power. Rainfall amounts ranged from 1 to 3 inches across the Lower Maryland Eastern Shore.	$2.5M	Not Available
Tropical Storm Hanna	September 6, 2008	Few trees were downed. Rainfall amount of 2.32 inches was recorded about three miles north of Vienna. Storm total rainfall ranged from around 1 to 3 inches. Coastal storm tides of 1 to 3 feet above astronomical tide levels were common, with only minor beach erosion reported. Storm winds knocked down several trees and power lines, as well as caused minor structural damage. No fatalities or injuries were attributed to the winds.	$5K	Not Available
Hurricane Irene	August 27 to August 28, 2011	Tropical storm force winds knocked down several trees and power lines, as well as caused some substantial property damage. In addition, heavy rains contributed to significant crop damage. The highest sustained wind of 37 knots (43 mph) with a peak gust of 52 knots (60 mph) was recorded at Cambridge Marine site. A peak gust of 44 knots (51 mph) was recorded at CGE (Cambridge Airport). Storm total rainfall generally ranged from six to eleven inches.	$100K	$500,000
Tropical Storm Hermine	September 2 to September 5, 2016	Rain bands associated with Tropical Storm Hermine produced generally 0.25 inch to 1 inch of rainfall across the county. Cambridge (1.4 WNW) reported 0.87 inch of rain. Vienna (5 WNW) reported 0.83 inch of rain. East New Market reported 0.26 inch of rain. Wind gust of 34 knots was measured at Cambridge. Coastal storm tides of 1 to 1.5 feet above astronomical tide levels were common, with only minor beach erosion reported. The maximum storm tide reached 3.45 feet MLLW at Cambridge, which resulted in minor coastal flooding early Monday morning. The maximum storm tide reached 3.53 feet MLLW at Bishops Head, which resulted in minor coastal flooding Sunday afternoon into early Sunday evening.	$0	$0
2021 HMP Update				
Tropical Storm Isaias	August 4, 2020	Tropical storm winds downed and uprooted several trees and power lines, produced significant structural damage, and caused power outages across the county. Wind gusts of 56 knots (64 mph) were measured at Blackwater. Wind gusts of 51 knots (59 mph) were measured at Cambridge.	$250K	$0
Tropical Storm Elsa	July 8-9, 2021	Tropical storm winds downed several trees and power lines, produced minor structural damage, and caused scattered power outages across the county. Wind gusts averaged between 35 and 45 knots. Wind gusts of 34 knots (39 mph) were measured at Cambridge.	$15K	$0

Source: NWS, NCEI (NOAA)

Vulnerability Analysis

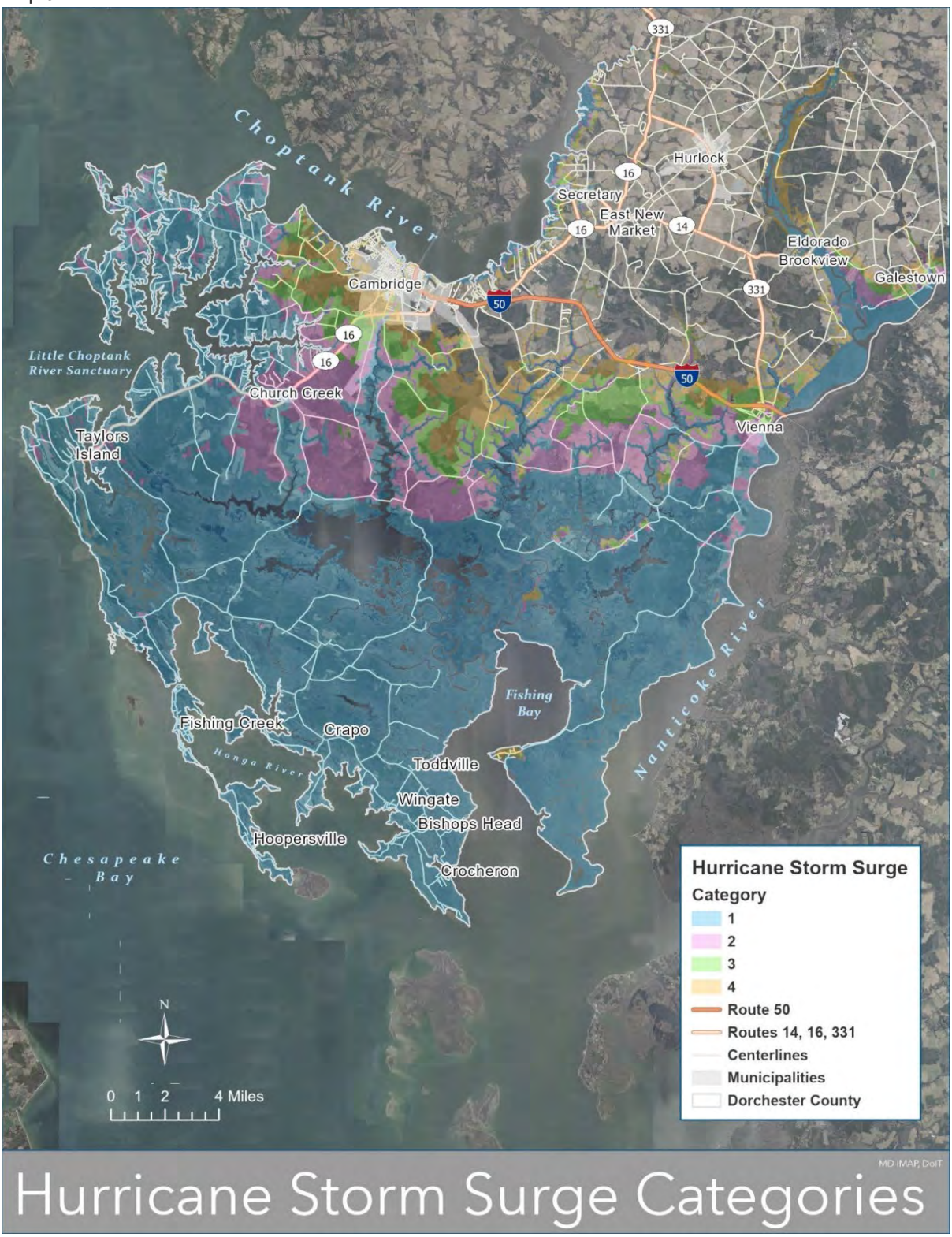
While hurricane impacts include high winds, heavy rain, lightning, tornados, hail, and storm surge, the focus of this vulnerability analysis is storm surge. Although high winds and excessive amounts of precipitation are common and cause tremendous damage, the most serious effect of hurricanes is coastal destruction caused by wind, storm waves, or surge.

Several techniques are utilized to model storm surge including one technique which involves the use of the National Weather Service's (NWS) Sea, Lake and Overland Surges from Hurricanes (SLOSH) model. This model is used to predict storm surge heights based on hurricane categories. The classification of the surge inundation area is based on the hurricane category causing the flooding. As the category of the storm increases, more land area will become inundated. Storm surge is a major component of nor'easter storms along the East Coast of the U.S. since winds are moving in a north and/or eastward position. These winds move across the ocean towards the shore and form large waves.

Storm surge data utilized for analysis reflects areas with a risk of storm tide flooding from hurricanes, based on potential storm tide heights calculated by the National Weather Service's SLOSH Model. The SLOSH Basin used for mapping was Chesapeake Bay (CP5), released in 2014. This data was prepared by the U.S. Army Corps of Engineers, Baltimore District, and Planning Division in January 2016. SLOSH storm tide elevations used for the mapping were based on the Maximum of Maximums (MOM) SLOSH output dataset. The MOM output elevations represent the highest calculated storm tide values based on thousands of SLOSH simulations using different combinations of approach direction, forward speed, landfall point, astronomical tide, and intensity (Category 1 through Category 4). Categories 1 through 4 refer to the Saffir-Simpson scale of hurricane intensity. The mapping does not reflect the expected storm tide flooding for every hurricane, or for any one particular type of hurricane. Instead, the data depicts an overall footprint of the area that has some risk of storm tide flooding from hurricanes, based on the MOM output dataset.

As indicated previously in the hazard event tables, Maryland is most likely to experience a tropical storm or category 1 hurricane. Therefore, the area shown in blue denotes the category 1 storm surge inundation, shown on Map 6-1, is most at risk.

Map 6-1



Source: Smith Planning & Design, Maryland Storm Surge - Hurricane Storm Surge MD iMAP Data Catalog (DOIT)

Critical & Public Facilities Vulnerability Analysis

Utilizing the Maryland Storm Surge - Hurricane Storm Surge from the MD iMAP Data Catalog (DOIT) and the updated critical and public facilities data, a vulnerability analysis was conducted to determine at-risk facilities. The following table, Table 6-7, lists all critical and public facilities within the Storm Surge inundation areas. The southern portion of the county, along with the Towns of Church Creek, Vienna, Galestown and the City of Cambridge are affected by storm surge. Facilities listed under Hurricane Category 1 are most likely to be impacted given the hazard event history for Maryland and Dorchester County. As listed in the table below, thirty-seven (37) critical and public facilities located in the City of Cambridge would be impacted by storm surge, while seventeen (17) facilities within Vienna would be affected. The Town of Church Creek contained eleven (11) critical and public facilities located within one of the storm surge categories. The remaining critical and public facilities are located throughout the county, specifically the southern portion.

Table 6-7

Critical and Public Facilities in the Storm Surge Inundation Areas				
Facility Category	Facility Type	Facility Detail	Address	City
Hurricane Category 1				
County	County Government	Board Of Education	Blackwater Road	Church Creek
County	County Government	County Facility	Lakesville Crapo Road	Crapo
Education	Public School	South Dorchester	3485 Golden Hill Road	Church Creek
Education	Private School	Morning Star Youth Academy	1441 Taylors Island Road	Madison
Emergency	Fire Department	Taylors Island Volunteer Fire Company	510 Taylors Island Road	Taylors Island
Emergency	Fire Department	Hoopers Island Volunteer Fire Company	2754 Hoopers Island Road	Church Creek
Emergency	Fire Department	Elliotts Volunteer Fire Company	2317 Elliott Island Road	Vienna
Emergency	Fire Department	Neck District Volunteer Fire Company	954 Cooks Point Road	Cambridge
Emergency	Fire Department	Lakes And Straits Fire Company	2103 Farm Creek Road	Wingate
Emergency	Fire Department/EMS	Madison Volunteer Fire Company	1154 Taylors Island Road	Madison
Miscellaneous	Boat Ramp	Vienna Ramp	Temple Road	Secretary
Miscellaneous	Boat Ramp	Taylors Island Ramp	Route 16	Taylors Island
Miscellaneous	Boat Ramp	Wallace Creek Ramp	1439 Hoopers Island Road	Church Creek
Miscellaneous	Boat Ramp	Shorter's Wharf Ramp	Maple Dam Road	Cambridge
Miscellaneous	Boat Ramp	Fishing Creek Ramp	2913 Hoopers Island Road	Church Creek
Miscellaneous	Boat Ramp	Muddy Hook Cove Ramp	Doeller Road	Fishing Creek
Miscellaneous	Boat Ramp	Trenton Street Ramp	225 Trenton St	Cambridge
Miscellaneous	Boat Ramp	Great Marsh Ramp	Somerset Avenue	Cambridge
Miscellaneous	Boat Ramp	Wingate Ramp	Wingate Bishops Head	Wingate
Miscellaneous	Boat Ramp	Toddville-Farm Creek Ramp	Farm Creek Road	Toddville
Miscellaneous	Boat Ramp	Crocheron Ramp	Crocheron Road	Toddville
Miscellaneous	Boat Ramp	Fishing Point Ramp	Tedious Creek Road	Toddville
Miscellaneous	Boat Ramp	Bestpitch Ferry Ramp	Bestpitch Ferry Road	Cambridge
Miscellaneous	Boat Ramp	Transquaking Ramp	4924 Drawbridge Road	Cambridge
Miscellaneous	Boat Ramp	Madison Bay Ramp	Madison Canning House Road	Madison
Miscellaneous	Boat Ramp	New Bridge Ramp	4331 New Bridge Road	Vienna

Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Boat Ramp	Elliott Island Ramp	Wharf Rd	Vienna
Miscellaneous	Boat Ramp	Ragged Point Marina	Ragged Point Road	Cambridge
Miscellaneous	Bridge			N/A
Miscellaneous	Bridge	D-009 Bishop Head Road/Goose Creek	Bishop Head Road	N/A
Miscellaneous	Bridge	RT 335/Honga River/Bay	RT 335	N/A
Miscellaneous	Bridge	D-037 Elliot Island Road/Elliott Creek	Elliot Island Road	N/A
Miscellaneous	Bridge	D-013 Wesley Church Road/Farm Creek	Wesley Church Road	N/A
Miscellaneous	Bridge	D-036 Elliott Island Road/Pokata Creek	Elliott Island Road	N/A
Miscellaneous	Bridge	D-001Hoopers Island Road/Honga River	Hoopers Island Road	N/A
Miscellaneous	Bridge	RT 335/ Wallace Creek	RT 335	N/A
Miscellaneous	Bridge	RT335/Artificial Path (Off of Honga River)	RT 335	N/A
Miscellaneous	Bridge	RT 335/Artifical Path	RT 335	N/A
Miscellaneous	Bridge	D-004 Hip Roof Road/Spicer Creek	Hip Roof Road	N/A
Miscellaneous	Bridge	D-024 Bestpitch/Transquaking River	Bestpitch Ferry Road	N/A
Miscellaneous	Bridge	D-025 Bestpitch Ferry Road/Windmill Island Creek	Bestpitch Ferry Road	N/A
Miscellaneous	Bridge	D-002 Smithville Road/Beaver Dam Creek	Smithville Road	N/A
Miscellaneous	Bridge	RT 335/Blackwater River	RT 335	N/A
Miscellaneous	Bridge	Griffith Neck Road/Beaver Dam Creek	Griffith Neck Road	N/A
Miscellaneous	Bridge	D-022 Drawbridge Road/Chicamacomico River	Drawbridge Road	N/A
Miscellaneous	Bridge	D-005 Punch Island Road/St. John Creek	Punch Island Road	N/A
Miscellaneous	Bridge	D-026 Decoursey Bridge Road/Transquaking River	Decoursey Bridge Road	N/A
Miscellaneous	Bridge	RT 16/Slaughter Creek	RT 16	N/A
Miscellaneous	Bridge	RT 335/Buttons Creek	RT 335	N/A
Miscellaneous	Bridge	D-035 New Bridge Road/Chimamacomico River	New Bridge Road	N/A
Miscellaneous	Bridge	RT 16/Parsons Creek	RT 16	N/A
Miscellaneous	Bridge	State-Vienna Bridge		N/A
Miscellaneous	Bridge	D-032 Indiantown Road/Chicone Creek	Indiantown Road	N/A
Miscellaneous	Bridge	RT 313/Artificial Path	RT 313	N/A
Miscellaneous	Bridge	Shore Drive/Shoal Creek	Shore Drive	N/A
Miscellaneous	Bridge	RT 14/Marshyhope Creek	RT 14	N/A
Miscellaneous	Bridge	Harrison Ferry Road/Marshyhope Creek	Harrison Ferry Road	N/A
Miscellaneous	Bridge	D-019 Suicide Bridge Road/Cabin Creek	Suicide Bridge Road	N/A
Miscellaneous	Bridge	D-029 Blades Road/Hunting Creek	Blades Road	N/A
Miscellaneous	Bridge	State-Market Street/Cambridge Creek	Market Street	N/A

Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Bridge	State-Choptank River Bridge	RT 50	N/A
Miscellaneous	Bridge	D-015 Key Wallace Drive/Little Blackwater River	Key Wallace Drive	N/A
Miscellaneous	Bridge	D-018 Suicide Bridge Road/Warwick River	Suicide Bridge Road	N/A
Miscellaneous	Marina/Dock	Dock	6325 Snug Harbor Road	East New Market
Miscellaneous	Marina/Dock	Cambridge Municipal Yacht Basin	0 Mill Street	Cambridge
Miscellaneous	Marina/Dock	Slaughter Creek Marina	638 Taylors Island Road	Taylors Island
Miscellaneous	Marina/Dock	Dock	Wingate Bishops Head Road	Wingate
Miscellaneous	Marina/Dock	PL Jones Boatyard & Marina	2560 Old House Point Road	Fishing Creek
Miscellaneous	Marina/Dock	Dock	Hoopers Island Road	Fishing Creek
Miscellaneous	Marina/Dock	Dock	Doeller Road	Fishing Creek
Miscellaneous	Marina/Dock	Dock	Hoopers Island Road	Church Creek
Miscellaneous	Marina/Dock		Mill Street	Cambridge
Miscellaneous	Marina/Dock	Dock	E Tedious Creek Road	Toddville
Miscellaneous	Marina/Dock	Dock	2100 Wingate Bishops Head Road	Wingate
Miscellaneous	Marina/Dock	Dock	Wingate Bishops Head Road	Wingate
Miscellaneous	Marina/Dock	Warehouse	2343 Farm Creek Road	Toddville
Miscellaneous	Marina/Dock	Dock	Maple Dam Road	Cambridge
Miscellaneous	Marina/Dock	Dock	Yacht Maintenance Co	Cambridge
Miscellaneous	Marina/Dock	Dock	Cedar Street	Cambridge
Miscellaneous	Marina/Dock	Marina	6304 Suicide Bridge Road	Hurlock
Miscellaneous	Museum	Taylors Island Museum	4212 Hoopers Neck Road	Taylors Island
Municipal	Municipal Government	Cambridge-Public Works	Water Street	Cambridge
Municipal	Municipal Government	Cambridge Public Works	310 Trenton Street	Cambridge
Municipal	Municipal Government	Cambridge-City Marina	96 Hight Street	Cambridge
Municipal	Municipal Government	Vienna Parks & Recreation	Water Street	Vienna
Municipal	Municipal Government	Vienna-Public Works	Race Street	Vienna
Utility	Communication	Tower #11	4814 Madison Canning House Road	Madison
Utility	Communication Tower	County Tower	Smithville Rd	Church Creek
Utility	Utility	Verizon	2425 Lakesville Crapo Road	Crapo
Utility	Utility	Choptank Electric	1424 Hoopers Island Road	Church Creek
Utility	Utility	Verizon	2837 Hoopers Island Rd	Church Creek
Hurricane Category 2 *Please note, all facilities listed in Categories 1 Hurricane Storm Surge are included in Category 2 Hurricane geographic extent.*				
County	County Government	Department of Tourism	2 Rose Hill Drive	Cambridge
Education	Public School	Vienna Elementary	4905 Ocean Gateway	Vienna
Education	Private	Morning Star Youth Academy	1441 Taylors Island Road	Madison
Emergency	Fire Department	Church Creek Volunteer Fire Company	1902 Church Creek Road	Church Creek

Facility Category	Facility Type	Facility Detail	Address	City
Emergency	Fire Department	Neck District Volunteer Fire Company	954 Cooks Point Road	Cambridge
Emergency	Fire Department/EMS	Eldorado-Brookview Volunteer Fire Company	5752 Rhodesdale Eldorado Road	Rhodesdale
Miscellaneous	Bridge	RT 531/Gales Creek	RT 531	N/A
Miscellaneous	Bridge	RT 16-New Market Road/Cabin Creek	RT 16	N/A
Miscellaneous	Marina/Dock	Cambridge Marine Terminal 6	0 Cemetery Avenue	Cambridge
Miscellaneous	Park	Church Creek Community Park	4663 Golden Hill Road	Church Creek
Municipal	Municipal Government	Cambridge-Public Works	Abocoo Lane	Cambridge
Municipal	Municipal Government	Vienna-Public Works	Vienna Henrys Crossroads Road	Vienna
Municipal	Municipal Government	Cambridge-Public Works	Woods Road	Cambridge
Utility	Utility	Transfer Station	1957 Brannock Neck Road	Cambridge
Hurricane Category 3 *Please note, all facilities listed in Categories 1 and 2 Hurricane Storm Surge are included in Category 3 Hurricane geographic extent.*				
County	County Government	Dorchester County Office Building	501 Court Lane	Cambridge
County	County Government	Parks & Recreation	Middle Street	Vienna
County	County Government	Parks & Recreation	Dailsville Road	Cambridge
Education	Public School	Dorchester Career and Technology Center	2465 MD-16	Cambridge
Emergency	Fire Department	Vienna Volunteer Fire Department	301 Old Us Route 50	Vienna
Miscellaneous	Bridge	RT 50/Chicamacomico River	RT 50	N/A
Miscellaneous	Bridge	RT 50/Chicamacomico River	RT 50	N/A
Miscellaneous	Bridge	Langrell Road/Hunting Creek	Langrell Road	N/A
Miscellaneous	Marina/Dock	Dock	Cedar Street	Cambridge
Miscellaneous	Museum	Vienna Heritage Museum	303 Race Street	Vienna
Miscellaneous	Park	Sailwinds Park	200 Byrn Street	Cambridge
Municipal	Municipal Government	Galestown-Parks & Recreation	5538 Wheatley Church Road	Rhodesdale
Municipal	Municipal Government	Secretary Town Hall	122 Main Street	Secretary
Municipal	Municipal Government	Vienna-Public Works	Middle Street	Vienna
Municipal	Municipal Government	Vienna-Public Works	Race Street	Vienna
Municipal	Municipal Government	Vienna-Parks & Recreation	113 Ocean Gateway	Vienna
Municipal	Municipal Government	Vienna-Parks & Recreation	115 Ocean Gateway	Vienna
Municipal	Municipal Government	Vienna Town Hall	214 Market Street	Vienna
Utility	Communication	Tower #14	2946 Greenbrier Road	Cambridge
Utility	Utility	Delmarva Power & Light Electric Substation	402 Cherry Street	Cambridge

Facility Category	Facility Type	Facility Detail	Address	City
Utility	Utility	Vienna Wastewater Treatment Plant	113 Levin Dorsey Road	Vienna
Hurricane Category 4 *Please note, all facilities listed in Categories 1, 2, and 3 Hurricane Storm Surge are included in Category 4 Hurricane geographic extent.*				
County	Airport	Cambridge-Dorchester Airport	5201 Bucktown Road	Cambridge
County	County Government	Dorchester County Office on Aging	2470 Cambridge Beltway	Cambridge
County	County Government	Beulah Landfill	Galligher Farm Road	Hurlock
County	Library	Dorchester County Public Law Library	206 High Street	Cambridge
Education	College - State Facility	UMD CES Horn Point Laboratory	2020 Horns Point Road	Cambridge
Education	Public School	Mace's Lane Middle	1101 Maces Lane	Cambridge
Emergency	Fire Department	Elliotts Volunteer Fire Company	2317 Elliott Island Road	Vienna
Medical	Nursing Home	Pleasant Day Medical Adult Day Care	2474 State Route 16	Cambridge
Miscellaneous	Bridge	RT 50/Shoal Creek	RT 50	N/A
Miscellaneous	Community Center	Cambridge MAC Senior Center	Cambridge Beltway	Cambridge
Municipal	Municipal Government	Cambridge-Public Works	Governors Avenue	Cambridge
Utility	Utility	Choptank Electric Cooperative	Race Street	Cambridge

Source: 2022 Hazard Mitigation GIS Database

Critical & Public Facilities Loss Estimates

Loss estimates for critical and public facilities located within each storm surge inundation area were calculated. Total improvement values from the 2021 Dorchester County Property Parcels Data Layer was utilized to calculate the loss estimations for critical and public facilities at risk to storm surge. Total loss estimates for Category 1 is $13,282,890; Category 2 is $5,238,100; Category 3 is $8,765,760, and Category 4 equals $22,182,160. Loss estimations are detailed in the table below.

Table 6-8

Loss Estimations for Critical & Public Facilities				
Facility Category	Loss Estimates			
Storm Surge Category	1	2	3	4
County	$ 225,900	$1,358,200	$2,760,400	$1,167,460
Education	$ 3,358,300	$2,468,800	$1,700,000	$17,486,200
Emergency	$ 1,539,600	$606,400	$202,000	$202,100
Medical	$0	$0	$0	$635,500
Miscellaneous	$ 6,342,590	$ 584,600	$1,598,900	$2,622,900
Municipal	$ 952,400	$155,100	$526,600	$3,000
Utility	$ 864,100	$65,000	$1,977,860	$65,000
Total	$13,282,890	$5,238,100	$8,765,760	$22,182,160

Source: 2021 Dorchester County Property Parcels Data Layer - Improvement values equal total losses for each facility within risk area

Coastal Flooding – Special Flood Hazard Area

Hazard Profile & History

Flood maps show the Special Flood Hazard Area (SFHA), the area that would be affected by a 1%-annual-chance flood (or base flood). Properties within the SFHA are at a high risk of flooding, with at least a 26% chance of flooding over the course of a 30-year mortgage. A Flood Insurance Rate Map (FIRM, or flood map) is an official map on which FEMA has delineated Special Flood Hazard Areas (SFHAs), or areas at a high risk of flooding. Along the coast, the flood map has delineated coastal SFHAs where the source of flooding is from coastal hazards, such as storm surge and waves.

The Core Planning Team and municipalities level of concern specific to coastal flooding indicate "very concerned" according to the survey. The public survey showed that the community was also "very concerned" about coastal flooding. Table 6-9 provides data for coastal flood events.

Table 6-9

Coastal Flooding Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (2009-2021)
0	0	$1.05M	$0	% of County in Coastal Land Area = 98%	Total = 13 Annual Avg = 1.08

Note: Data collected for 1950-present, no data available for this event type prior to 2009
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Coastal Flood (Z). Flooding of coastal areas due to the vertical rise above normal water level caused by strong, persistent onshore wind, high astronomical tide, and/or low atmospheric pressure, resulting in damage, erosion, flooding, fatalities, or injuries. Coastal areas are defined as those portions of coastal land zones (coastal county/parish) adjacent to the waters, bays, and estuaries of the oceans. Farther inland, the Storm Data preparer determines the boundary between coastal and inland areas, where flood events will be encoded as Flash Flood or Flood rather than Coastal Flood. Terrain (elevation) features will determine how far inland the coastal flooding extends.

One specific type of storm event impacting Dorchester County resulting in coastal flooding is a Nor'easter. Nor'easters, which are named for the strong northeast winds they produce, occurring during the late fall to early spring period affecting the east coast. For a Nor'easter to occur in Maryland, an arctic air mass, a high pressure that builds over New England and flows south, has to occur. This dense cold air is unable to move west over the Appalachian Mountains, therefore, it funnels south down the valleys and along the Coastal Plain. The intense winds around the Nor'easter's center builds large waves that thrash against the coastlines and force water inland causing coastal flooding and shoreline erosion. A Nor'easter differs from a hurricane since hurricanes usually come and go within one tide cycle. The nor'easter can linger through several tides, with each tide delivering more water on shore, dragging sand away from the beaches and depositing it into the Bay. It is important to note that precipitation produced by Nor'easter events also result in ice and snowfall. Major winter storm have resulted from Nor'easters impacting Maryland.

MD State Of Emergency Issued Ahead Of Nor'Easter

Elizabeth Janney, Patch Staff
Posted Fri, Jan 28, 2022 at 9:25 am ET
Updated Fri, Jan 28, 2022 at 3:19 pm ET

Excerpt - "We urge Marylanders to take this winter storm seriously, especially residents on the Eastern Shore, where we are anticipating blizzard-like conditions," Hogan said in a statement. "Stay off the roads tonight for your own safety, so that the crews and first responders can do their jobs." The emergency declaration includes Caroline, Cecil, **Dorchester**, Kent, Queen Anne's, Somerset, Talbot, Wicomico and Worcester counties.

The Core Planning Team and municipalities level of concern specific to Nor'easter indicate "very concerned" according to the survey. However, the public survey showed that the community was "somewhat concerned" about Nor'easters. One reason the public survey results may have differed from the Core Planning Team and municipal planning results is the lack of differentiation from coastal flooding. It is important to note that the public is very concerned about coastal flooding. Nor'easter storm events are included on Table 6-10.

In terms of number of occurrences, the NWS, NCEI listed a total of two (2) specific Nor'easter and twelve (12) coastal flooding events affecting Dorchester County from 1998-2021. Therefore, Dorchester County experiences 0.08 Nor'easter events and 0.92 coastal flooding events per year.

Table 6-10

Coastal Flood Events including Nor'easter			
Location	Date	Event Narrative	Property Damage
Cambridge	January 27 to January 28, 1998	A Nor'easter produced heavy rain and strong winds across the Lower Maryland Eastern Shore. Rainfall totals ranged from 3 to 5 inches. This rainfall caused street flooding and flooding of poor drainage areas throughout the region.	Not Available
Cambridge	February 4 to February 6, 1998	A Nor'easter produced heavy rain and strong winds across the Lower Maryland Eastern Shore. Rainfall totals ranged from 2 to 4 inches. Heavy rain caused some urban flood/poor drainage flood problems with a few roads closed due to high water.	Not Available
Dorchester (Coastal Flood)	November 12 to November 14, 2009	The peak tide height at Cambridge was 3.69 feet above MLLW, which was 1.67 feet above the astronomical tide. Several streets, homes and businesses were flooded in low lying areas of the county close or directly exposed to the Chesapeake Bay. An intense Nor'easter produced moderate to severe coastal flooding across portions of the Lower Maryland Eastern Shore.	$100K
Dorchester (Coastal Flood)	October 29 to October 30, 2012	Water levels reached 3.0 feet to 4.0 feet above normal adjacent to the Chesapeake Bay resulting in moderate to severe coastal flooding. Cambridge reached a tide height of 4.55 feet MLLW. Many roads in the southern half of Dorchester County were inundated and rendered impassable during the height of Sandy. Homes and businesses experienced flooding and associated water damage. However, the flooding and damage were less than that experienced during Hurricane Isabel in 2003.	$750K
Dorchester (Coastal Flood)	December 21, 2012	Water levels reached 3.0 feet to 4.0 feet above normal adjacent to the Chesapeake Bay resulting in moderate to severe coastal flooding. Cambridge reached a tide height of 4.7 feet MLLW at high tide and spent nearly 7 hours above 4.0 feet MLLW. Bishops Head reached a tide height of 4.12 feet MLLW and spent 2 hours at or above 4.0 feet MLLW. Many roads were flooded in Cambridge including Water Street, Main Street, and Oakley Street. Also, Great Marsh Park in Cambridge was underwater. Ambulance driver reported 8-10 inches of water on Taylors Island Road.	$200K
Dorchester (Coastal Flood)	October 3 to October 4, 2014	Tidal anomalies between 1.5 feet to around 2.0 feet above normal produced moderate flooding along portions of the Lower Maryland Eastern Shore adjacent to the Chesapeake Bay. Cambridge recorded a maximum storm tide of 4.21 feet MLLW at 1242 am October 4th, and 4.14 feet MLLW at 1148 am through 1200 pm October 4th. Bishops Head recorded a maximum storm tide of 4.03 feet MLLW at 1012 pm October 3rd, and 4.22 feet MLLW at 1030 am October 4th. Many roads in the southern half of Dorchester County were flooded with a foot or more of water. In addition, several streets bordering the Choptank River in Cambridge were also flooded during the Saturday high tide.	$0

Location	Date	Event Narrative	Property Damage
Dorchester (Coastal Flood)	October 4 to October 5, 2015	A tidal departure of 2 to 2.5 feet resulted in moderate flooding along the Chesapeake Bay.	$0
Dorchester (Coastal Flood)	January 10, 2016	A tidal departure of 1.5 to 2.5 feet resulted in moderate coastal flooding along the Chesapeake Bay in Maryland. The peak water level at Cambridge was 4.19 feet at 412 pm on January 10. The peak water level at Bishops Head was 3.82 feet at 136 pm on January 10.	$0
Dorchester (Coastal Flood)	February 9 to February 10, 2016	Minor to Moderate coastal flooding occurred across much of Dorchester County. Water levels reached 3.8 feet MLLW at Bishops Head MD. No property damage was reported, but a few roads in southern Dorchester County were flooded as a result of the high tide.	$0
Dorchester (Coastal Flood)	September 30, 2016	Tides of 2 feet above normal caused moderate flooding on the middle portions of the Chesapeake Bay. Water levels reached nearly 3.9 feet MLLW at Bishops Head MD. No damage was reported.	$0
2021 HMP Update			
Dorchester (Coastal Flood)	January 20, 2019	Tidal flooding occurred on the roadways in Cambridge. The Cambridge tidal gauge reached 3.95 feet MLLW. Bishops Head gauge reached 3.8 feet MLLW.	$0
Dorchester (Coastal Flood)	October 11-13, 2019	Persistent north or northeast winds, along with high waves, produced tidal anomalies between 2.0 and 3.0 feet over the upper Chesapeake Bay. This caused moderate to major coastal flooding over portions of Dorchester County. Cambridge reached 4.68 feet MLLW on October 12th. Bishops Head reached 4.81 feet MLLW on October 12th. Emergency service vehicles were flooded at Cambridge.	$0
Dorchester (Coastal Flood)	April 5, 2020	Minor to moderate tidal flooding occurred over portions of Dorchester County along the Chesapeake Bay. Bishops Head reached 3.87 feet MLLW.	$0
Dorchester (Coastal Flood)	August 4, 2020	Strong south to southeast winds associated with Tropical Storm Isaias allowed some water to pile up in the mid-to-upper Chesapeake Bay early Tuesday morning. Then, when winds shifted to more of a west or northwest direction on the southern flank of Isaias during the mid-to-late morning on Tuesday, water quickly got pushed into areas on the bay side of the Lower Eastern Shore (and water levels in these locations rose very rapidly). This caused moderate to locally major (tidal) coastal flooding over portions of Dorchester County. Cambridge reached 4.56 feet MLLW at 11:12 am on August 4. Bishops Head reached 3.8 feet MLLW at 12:06 pm on August 4.	$0

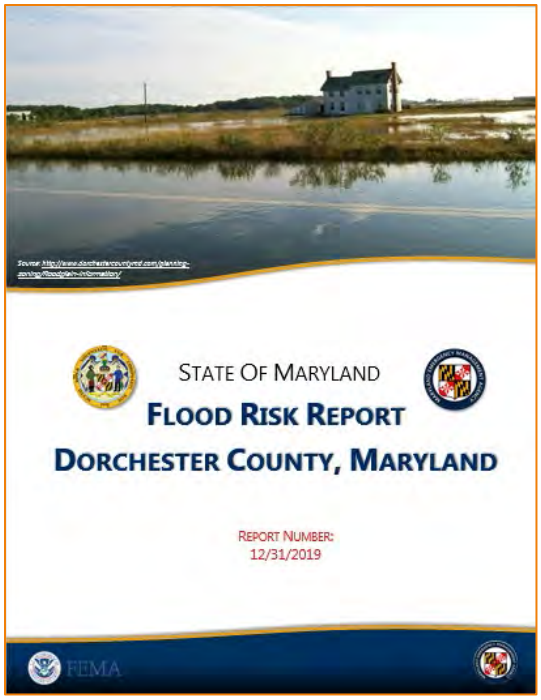
Source: NWS, NCEI (NOAA)

Vulnerability Analysis

Coastal flooding occurs when normally dry, low-lying land is flooded by seawater. The extent of coastal flooding is a function of the elevation inland floodwaters penetrate which is controlled by the topography of the coastal land exposed to flooding. In order to assess coastal flooding vulnerability, the Flood Risk Report (FRR) for Dorchester County, published in December 2019, along with the Flood Risk Database including flood depth grids and the lowest adjacent grade per structure data points were used.

FEMA, in partnership with the Maryland Department of Environment (MDE) and Maryland Department of Emergency Management (MDEM), developed Non-Regulatory Coastal Flood Risk Product for jurisdictions located within the coastal area of the Chesapeake Bay. This planning initiative was intended to assist local communities with increasing their resiliency to flooding and to better protect their citizens. Results provided in a Flood Risk Report (FRR) are

not intended to be regulatory or the final authoritative source of all flood risk data in the project area. The report is intended to be used in conjunction with other data sources to provide a comprehensive picture of flood risk within the project area.



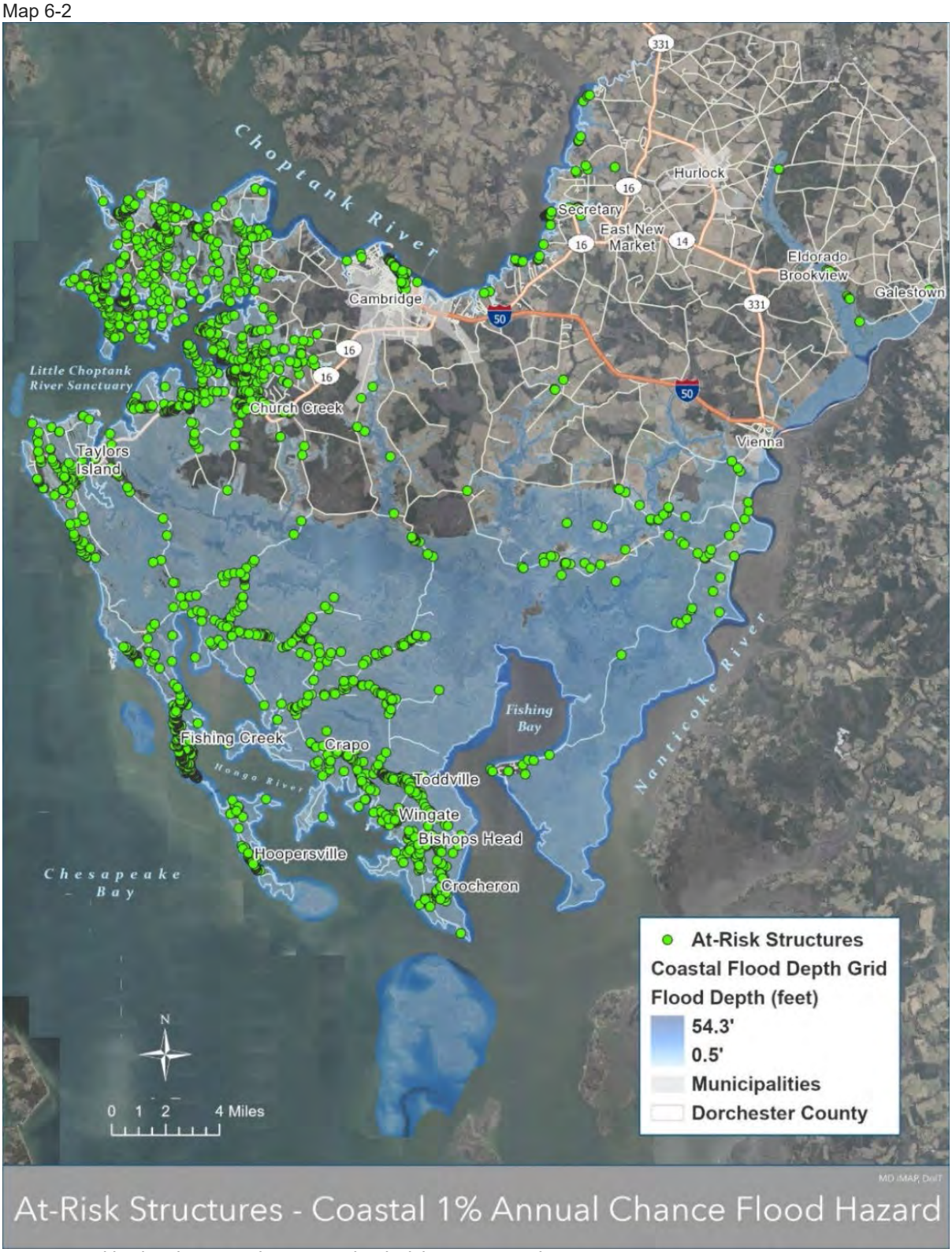
FEMA's Hazus program was utilized to determine coastal flood losses for the 1 percent annual chance flood event. In order to accurately calculate loss estimates, user defined data was imported into Hazus for the coastal flood risk product. First, depth grids were developed using the high-resolution digital elevation model (DEM) and FIRM Zones AE and VE with a static base flood elevation (BFE) for the approved Digital Flood Insurance Rate Maps (DFIRM). Flood depths were obtained by subtracting the water surface from the ground elevation; hence depth grids. Next, the user defined facility inventory was developed. User defined inventory includes residential, commercial and other (industrial, agriculture, religion, government and educational). Building footprints were utilized to determine which structures were located within the flood zone. The lowest adjacent grade was determined for each structure within the flood risk area to depict where the flood will be the highest on each structure affected. Additionally, information from the Maryland Property View Database was incorporated to ensure all necessary attributes were captured in order to obtain more accurate loss estimates. By inputting user defined data and inventory into the Hazus program, site-to-site results versus an aggregated table of damages and losses was provided.

Table 6-11

FEMA Flood Zone Descriptions		
	Flood Zone	Description
High Risk Areas		
1% Annual Chance Flood Hazard	AE	The base floodplain where base flood elevations are provided for a 100-year flood event. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
High Risk – Coastal Area		
1% Annual Chance Flood Hazard	VE	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

As depicted on Map 6-2, at-risk structures (depicted as green dots) total 2,431 and are concentrated along the northwestern and southern portions of the County. At-risk structures located in the northwestern portion of the county are located within the following communities: Hills Point, Thomas, Wrights, Lloyds, Dailsville, Madison, Woolford, Smithville and Taylors Island. In the southern portion of the county, the large concentration of structures within the 100-year floodplain are located in the following communities: Honga, Fishing Creek, Hoopersville, Crocheron, Bishops Head, Wingate, Toddville, Crapo, Crossroads, Blackwater and Lakesville.

Map 6-2



Source: Smith Planning & Design, 2019 Flood Risk Report Database

The total at-risk structures are comprised of residential 2,301, 55 commercial, and 75 other (religion, government, education and industrial).

According to the FRR, the Flood Risk Project incorporates modeled floodplain boundaries and flood depths for the 1% annual chance flood event, along with User Defined Facilities (UDFs) developed from local parcel, assessor, and building footprint data. Refined flood loss estimates for the 1% annual chance flood event were calculated using Hazus-MH, and the results are summarized by community name in Table 6-12 and provides overall flood risk data.

Table 6-12

Dorchester County, Maryland – Estimated Losses by Community Name for the 1%-Annual-Chance Flood (UDFs in Riverine and Coastal Areas)					
Community Name	2010 Population	# of Impacted Buildings	1% Flood Loss Estimate[1]	Flood Losses Per Capita	Percent of Total Countywide Flood Loss Estimate
Dorchester County (Unincorporated Areas)	16,612	2,274	$34,000,000	$2,047	92%
City of Cambridge	12,326	126	$2,650,000	$215	7%
Town of Church Creek	125	7	$60,000	$480	< 1%
Town of Eldorado	59	5	$20,000	$339	< 1%
Town of Galestown	138	2	$10,000	$72	< 1%
Town of Secretary	535	18	$90,000	$168	< 1%
Town of Vienna	271	4	$240,000	$886	< 1%
Total	32,618	2,440	$37,110,000	$1,138	100%

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

[1]*Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.*

The unincorporated areas of the county and the Town of Galestown contain structures at-risk to the coastal and riverine 1% annual chance Special Flood Hazard Areas (SFHAs). This chapter only discusses vulnerability to the coastal 1% annual chance SFHAs. Riverine vulnerability is discussed in Chapter 7 Riverine Flooding. Additionally, the Town of Hurlock is not included in this chapter since it is only affected by the riverine Special Flood Hazard Areas and therefore discussed in Chapter 7 Riverine Flooding as well.

The Towns of Brookview and East New Market are not included in this chapter since they have no at-risk structures within the regulatory 1% annual chance Special Flood Hazard Areas (SFHAs). The Town of Brookview contains an area of risk, however the risk area is 0.1 square miles, and no structures were within the coastal flood risk area according to the Hazus flood model.

Critical & Public Facilities Vulnerability Analysis

The Flood Risk Report assessed facility vulnerability to the coastal 1% annual chance hazard area. The FRR specifically provides loss estimation to essential facilities. According to the FRR, essential facilities as defined and identified within the State of Maryland Hazard Mitigation Plan. The State Plan identified five (5) essential facility types, which include: Emergency Operation Centers (EOC), fire/EMS stations, hospital and medical clinics, police stations, and schools (K-12, colleges).

The Hazus flood model utilized integrated user-supplied data in order to yield more accurate loss estimates and risk assessments for essential facilities located within Dorchester County. Essential facilities are those facilities that provide services to the community and should be

functional after a flood. The damage for essential facilities is determined on a site-specific basis (i.e., the depth of flooding at the location of the facility). The FFR states there are 60 essential facilities located within Dorchester County with a total estimated building value of $212,432,000.

Table 6-13

Dorchester County Essential Facilities			
Facility Type	Number of Structure	Estimated Building Value	Total Essential Facilities Impacted by 1% Flood
Emergency Operations Center (EOC)	1	$12,351,000	0
Fire/Rescue Stations	19	$14,844,000	5
Hospital & Medical Clinics	20	$61,892,000	0
Police Stations	2	$5,190,000	0
Schools (K-12 & Colleges)	18	$118,155,000	1
Total	60	$212,432,000	6

Source: 2019 Dorchester County Flood Risk Report

Results from the 1% annual chance flood event analysis indicate five essential facilities are at-risk. These facilities include five (5) fire/rescue stations. Two (2) facilities, Hoopers Island Volunteer Fire Company and Lakes and Straits Fire Company were determined to a have a projected flood depth exceeding 2.5 feet of water. Flood depths for each facility is provided below along with the identified facilities.

- Taylors Island Volunteer Fire Company, Taylors Island – 1.1'
- Hoopers Island Volunteer Fire Company, Fishing Creek – 3.3'
- Madison Volunteer Fire Company, Madison – 0.8'
- EMS Station 500, Madison – 0.5'
- Lakes and Straits Fire Company, Wingate – 2.6'
- South Dorchester High School – 0.6'

To expand on the analysis within the FRR, the flood depth grids were used in conjunction with the Dorchester County geodatabase. Public facility data points were extrapolated and mapped. Depth of flooding for each data point at the lowest adjacent grade was determined. Table 6-14 provides a listing of public facilities within the coastal 1% annual chance flood hazard area and associated depth of flooding for each structure (data point) is provided.

Table 6-14

Public Facilities in the Coastal Flood Risk Area					
Facility Category	Facility Type	Facility Detail	Address	City	Flood Depth
County	County Government	Board of Education	Blackwater Road	Church Creek	2.4
County	County Government	Department of Tourism	2 Rose Hill Drive	Cambridge	1.8
County	County Government	County Facility	Lakesville Crapo Road	Crapo	1.6
Municipal	Municipal Government	Vienna Waterfront Park	Water Street	Vienna	6.0
Municipal	Municipal Government	Vienna-Public Works	Water Street	Vienna	4.9
Municipal	Municipal Government	Cambridge Public Works	310 Trenton Street	Cambridge	2

Facility Category	Facility Type	Facility Detail	Address	City	Flood Depth
Municipal	Municipal Government	Cambridge City Marina	96 High Street	Cambridge	12.8
Municipal	Municipal Government	Vienna-Parks & Recreation	114 Water Street	Vienna	1.7
Municipal	Municipal Government	Cambridge-Public Works	Water Street	Cambridge	1.7
Utility	Utility	Transfer Station	3186 Shorters Wharf Road	Crapo	2.7
Utility	Utility	Verizon	2425 Lakesville Crapo Road	Crapo	2.2
Utility	Utility	Choptank Electric	1424 Hoopers Island Road	Church Creek	1.1
Utility	Utility	Verizon	2837 Hoopers Island	Church Creek	0.5

Source: 2022 Hazard Mitigation GIS Database

Several county and municipality structures are at-risk to coastal flooding with an estimated flood depth exceeding 2 feet or more are listed below:

- County Board of Education – Flood Depth: 2.4 feet;
- Verizon (Utility) – Flood Depth: 2.2 feet;
- Vienna Public Works – Flood Depth: 4.9 feet; and
- Cambridge Public Work Facilities – Flood Depth: 2 feet.

Boat ramps, marinas/docks, and bridges within the coastal 1% annual chance flood hazard area are listed on Table 6-15.

Table 6-15

Boat Ramps & Bridges within the Coastal Flood Risk Area				
Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Boat Ramp	Crocheron Wharf	Crocheron Road	Toddville
Miscellaneous	Boat Ramp	Elliott Island Ramp	Warf Road	Vienna
Miscellaneous	Boat Ramp	Toddville-Farm Creek Ramp	Farm Creek Road	Toddville
Miscellaneous	Boat Ramp	Muddy Hook Cove Ramp	Doeller Road	Fishing Creek
Miscellaneous	Boat Ramp	Great Marsh Ramp	Somerset Avenue	Cambridge
Miscellaneous	Boat Ramp	Wingate Ramp	Wingate Bishops Head	Wingate
Miscellaneous	Boat Ramp	Shorter's Wharf Ramp	Maple Dam Road	Cambridge
Miscellaneous	Boat Ramp	Taylors Island Ramp	Route 16	Taylors Island
Miscellaneous	Boat Ramp	Transquaking Ramp	4924 Drawbridge Road	Cambridge
Miscellaneous	Boat Ramp	New Bridge Ramp	4331 New Bridge Road	Vienna
Miscellaneous	Boat Ramp	Fishing Point Ramp	Tedious Creek Road	Toddville
Miscellaneous	Boat Ramp	Wallace Creek Ramp	1439 Hoopers Island Road	Church Creek
Miscellaneous	Boat Ramp	Bestpitch Ferry Ramp	Bestpitch Ferry Road	Cambridge
Miscellaneous	Boat Ramp	Madison Bay Ramp	Madison Canning House Road	Madison
Miscellaneous	Boat Ramp	Ragged Point Marina	Ragged Point Road	Cambridge
Miscellaneous	Boat Ramp	Fishing Creek Ramp	2913 Hoopers Island Road	Church Creek
Miscellaneous	Boat Ramp	Trenton Street Ramp	225 Trenton Street	Cambridge
Miscellaneous	Boat Ramp	Vienna Ramp	Temple Road	Secretary
Miscellaneous	Bridge	RT 335/Honga River/Bay	RT 335	N/A
Miscellaneous	Bridge	D-037 Elliot Island Road/Elliott Creek	Elliot Island Road	N/A

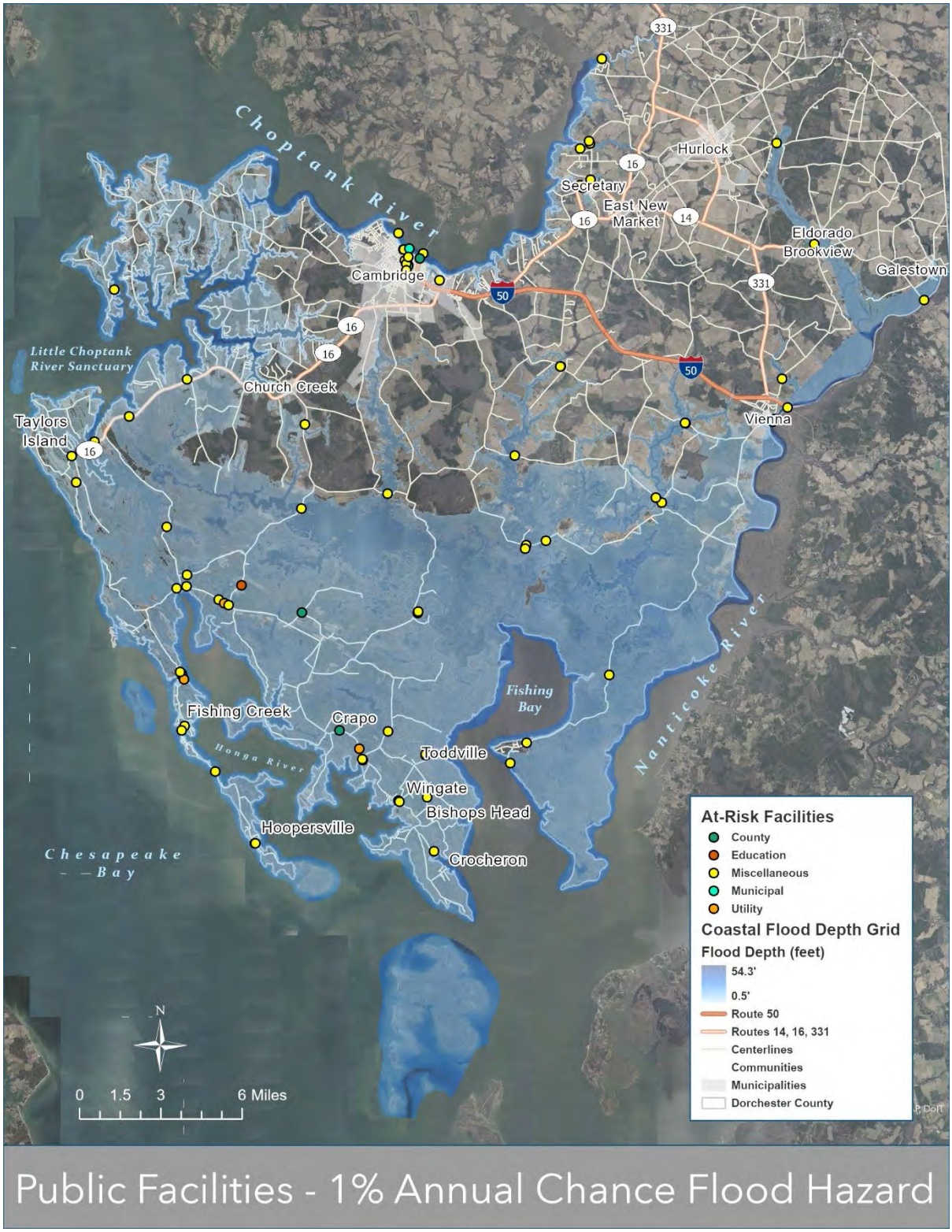
Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Bridge	D-022 Drawbridge Road/Chicamacomico River	Drawbridge Road	N/A
Miscellaneous	Bridge	D-029 Blades Road/Hunting Creek	Blades Road	N/A
Miscellaneous	Bridge	D-012 Maple Dam Road/Blackwater River	Maple Dam Road	N/A
Miscellaneous	Bridge	Harrison Ferry Road/Marshyhope Creek	Harrison Ferry Road	N/A
Miscellaneous	Bridge	D-019 Suicide Bridge Road/Cabin Creek	Suicide Bridge Road	N/A
Miscellaneous	Bridge	RT 14/Marshyhope Creek	RT 14	N/A
Miscellaneous	Bridge	D-024 Bestpitch /Transquaking River	Bestpitch Ferry Road	N/A
Miscellaneous	Bridge	D-026 Decoursey Bridge Road/Transquaking River	Decoursey Bridge Road	N/A
Miscellaneous	Bridge	RT 313/Artificial Path	RT 313	N/A
Miscellaneous	Bridge	Shore Drive/Shoal Creek	Shore Drive	N/A
Miscellaneous	Bridge	D-025 Bestpitch Ferry Road/Windmill Island Creek	Bestpitch Ferry Road	N/A
Miscellaneous	Bridge	D-036 Elliott Island Road/Pokata Creek	Elliott Island Road	N/A
Miscellaneous	Bridge	RT 335/Artificial Path (Off of Honga River)	RT 335	N/A
Miscellaneous	Bridge	Griffith Neck Road/Beaver Dam Creek	Griffith Neck Road	N/A
Miscellaneous	Bridge	RT 14/Artificial Path (Off of Warwick River)	RT 14	N/A
Miscellaneous	Bridge	State-Market Street/Cambridge Creek	Market Street	N/A
Miscellaneous	Bridge	RT 335/ Wallace Creek	RT 335	N/A
Miscellaneous	Bridge	State-Vienna Bridge	N/A	N/A
Miscellaneous	Bridge	RT 16/Parsons Creek	RT 16	N/A
Miscellaneous	Bridge	RT 16/Slaughter Creek	RT 16	N/A
Miscellaneous	Bridge	D-015 Key Wallace Drive/Little Blackwater River	Key Wallace Drive	N/A
Miscellaneous	Bridge	State-Choptank River Bridge	RT 50	N/A
Miscellaneous	Bridge	D-001 Hoopers Island Road/Honga River	Hoopers Island Road	N/A
Miscellaneous	Bridge	D-002 Smithville Road/Beaver Dam Creek	Smithville Road	N/A
Miscellaneous	Bridge	D-013 Wesley Church Road/Farm Creek	Wesley Church Road	N/A
Miscellaneous	Bridge	D-009 Bishop Head Road/Goose Creek	Bishop Head Road	N/A
Miscellaneous	Bridge	RT 335/Artificial Path	RT 335	N/A
Miscellaneous	Bridge	D-004 Hip Roof Road/Spicer Creek	Hip Roof Road	N/A
Miscellaneous	Bridge	RT 335/Blackwater River	RT 335	N/A
Miscellaneous	Bridge	D-005 Punch Island Road/St. John Creek	Punch Island Road	N/A
Miscellaneous	Bridge	RT 335/Buttons Creek	RT 335	N/A
Miscellaneous	Bridge	D-035 New Bridge Road/Chimamacomico River	New Bridge Road	N/A

Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Bridge	D-032 Indiantown Road/Chicone Creek	Indiantown Road	N/A
Miscellaneous	Bridge	RT 50/Chicamacomico River	RT 50	N/A
Miscellaneous	Bridge	RT 50/Chicamacomico River	RT 50	N/A
Miscellaneous	Bridge	D-021 Drawbridge Road/Transquaking River	Drawbridge Road	N/A
Miscellaneous	Bridge	D-018 Suicide Bridge Road/Warwick River	Suicide Bridge Road	N/A
Miscellaneous	Marina/Dock	Dock	Hoopers Island Road	Fishing Creek
Miscellaneous	Marina/Dock	Marina	E Tedious Creek Rd	Toddville
Miscellaneous	Marina/Dock	Dock	6304 Suicide Bridge Road	Hurlock
Miscellaneous	Marina/Dock	Marine Warehouse	Farm Creek Road	Toddville
Miscellaneous	Marina/Dock	Dock	Wingate Bishops Head Road	Wingate
Miscellaneous	Marina/Dock	Dock	Maple Dam Road	Cambridge
Miscellaneous	Marina/Dock	Marina	Yacht Maintenance Co	Cambridge
Miscellaneous	Marina/Dock	Dock	Hoopers Island Road	Church Creek
Miscellaneous	Marina/Dock	Dock	Doeller Road	Fishing Creek
Miscellaneous	Marina/Dock	Cambridge Municipal Yacht Basin	0 Mill Street	Cambridge
Miscellaneous	Marina/Dock	Dock	6325 Snug Harbor Road	East New Market
Miscellaneous	Marina/Dock	Dock	Wingate Bishops Head Road	Wingate
Miscellaneous	Marina/Dock	Marina	Cedar Street	Cambridge
Miscellaneous	Marina/Dock	PL Jones Boatyard & Marina	2560 Old House Point Road	Fishing Creek
Miscellaneous	Marina/Dock	Slaughter Creek Marina	638 Taylors Island Road	Taylors Island
Miscellaneous	Marina/Dock	Dock	2100 Wingate Bishops Head Road	Wingate
Miscellaneous	Museum	Taylors Island Museum	4212 Hoopers Neck Road	Taylors Island

Source: 2022 Hazard Mitigation GIS Database

The following map illustrate the spatial relationship of the coastal 1% annual chance flood hazard areas and public facility locations. As depicted on the map, the southern portion of the County is most at risk to flooding due to low elevations.

Map 6-3



Source: Smith Planning & Design, 2019 Flood Risk Report Database, MD iMap, DoIT

Residential & Commercial Structures Loss Estimates

According to the Flood Risk Report (FRR), Hazus-MH Version 3.1 Coastal Flood Model, allows users to estimate flood losses due to depth of flooding. The following tables were derived from the from the FRR and provide loss estimations for structures at-risk to the coastal 1 percent annual chance flood hazard area.

Unincorporated Areas Analyses and Flood Risk Results

The Dorchester County (Unincorporated Areas) flood risk analysis incorporates modeled floodplain boundaries and flood depths for the 1% annual chance flood event, along with User Defined Facilities (UDFs) developed from local parcel, assessor, and building footprint data.

Flood loss estimates for the 1% annual chance flood event were calculated using Hazus-MH, and the results are presented in Table 6-16. Note that minor differences between values in these tables may result from rounding and aggregation under different categories.

Table 6-16

Dorchester County (Unincorporated Areas) – Estimated Losses by Occupancy Type for the 1%- Annual-Chance Flood (UDFs in Coastal Areas)

Type	# of Impacted Buildings	Inventory Estimated Value	% of Total	1% Flood Dollar Losses[1]	1% (100-yr) Percent Loss[2]
Residential Building & Contents	2161	$410,600,000	93%	$28,300,000	7.0%
Coastal	2157	$409,200,000	93%	$28,300,000	7.0%
Commercial Building &Contents	46	$11,600,000	3%	$1,000,000	9.0%
Coastal	46	$11,600,000	3%	$1,000,000	9.0%
Other Building & Contents	67	$21,200,000	5%	$3,500,000	17.0%
Coastal	67	$21,200,000	5%	$3,500,000	17.0%
Total Building & Contents[3]	2274	$443,400,000	100%	$32,800,000	7.0%
Business Disruption[4] *(Coastal)*	N/A	N/A	N/A	$1,200,000	N/A
TOTAL[5]	2274	$443,400,000	100%	$34,000,000	8.0%

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.

[2]Percent Loss = Dollar Losses ÷ Estimated Value. Percentages are rounded to the nearest integer.

[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

[5]Total = Total Building and Contents + Business Disruption

The total estimated coastal flood losses for Dorchester County is $34 million. The following information is specific to each municipality. The City of Cambridge has the highest estimated flood losses at $2.65 million.

City of Cambridge Analyses and Flood Risk Results

The City of Cambridge is in northcentral Dorchester County. It consists of 12.95 square miles along US Highway 50. The primary flooding sources in the city are Little Blackwater Creek, Little Maple Dam Branch, and Choptank River.

The City of Cambridge flood risk analysis incorporates modeled floodplain boundaries and flood depths for the 1-percent-annual-chance flood event, along with User Defined Facilities (UDFs) developed from local parcel, assessor, and building footprint data. Note that minor differences between values in these tables may result from rounding and aggregation under different categories. Also note that no riverine flood losses are identified in Cambridge, so only coastal flood loss estimates are presented.

Table 6-17

City of Cambridge – Estimated Losses by Occupancy Type for the 1% Annual Chance Flood (UDFs in Coastal Areas)

Type	# of Impacted Buildings	Inventory Estimated Value	% of Total	1% Flood Dollar Losses[1]	1% (100-yr) Percent Loss[2]
Residential Building & Contents	115	$25,900,000	73%	$1,500,000	6.0%
Commercial Building & Contents	7	$3,200,000	9%	$700,000	22.0%
Other Building & Contents	4	$6,200,000	18%	$400,000	6.0%
Total Building & Contents[3]	126	$35,300,000	100%	$2,600,000	7.0%
Business Disruption[4]	N/A	N/A	N/A	$50,000	N/A
TOTAL[5]	126	$35,300,000	100%	$2,650,000	8.0%

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.

[2]Percent Loss = Dollar Losses ÷ Estimated Value. Percentages are rounded to the nearest integer.

[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

[5]Total = Total Building and Contents + Business Disruption

Town of Church Creek Analyses and Flood Risk Results

The Town of Church Creek is in northwestern Dorchester County. It consists of 0.34 square miles along State Highway 16. The primary flooding source in the town is Church Creek.

The Town of Church Creek flood risk analysis incorporates modeled floodplain boundaries and flood depths for the 1-percent-annual-chance flood event, along with User Defined Facilities (UDFs) developed from local parcel, assessor, and building footprint data. Note that minor differences between values in these tables may result from rounding and aggregation under different categories. Also note that no riverine flood losses are identified in Church Creek, so only coastal flood loss estimates are presented.

Table 6-18

Town of Church Creek – Estimated Losses by Occupancy Type for the 1% Annual Chance Flood (UDFs in Coastal Areas)					
Type	# of Impacted Buildings	Inventory Estimated Value	% of Total	1% Flood Dollar Losses[1]	1% (100-yr) Percent Loss[2]
Residential Building & Contents	6	$1,000,000	93%	$60,000	6.0%
Commercial Building & Contents	1	$80,000	7%	$0	0.0%
Other Building & Contents	0	$0	0%	$0	0.0%
Total Building & Contents[3]	7	$1,080,000	100%	$60,000	6.0%
Business Disruption[4]	N/A	N/A	N/A	$0	N/A
TOTAL[5]	7	$1,080,000	100%	$60,000	6.0%

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.

[2]Percent Loss = Dollar Losses ÷ Estimated Value. Percentages are rounded to the nearest integer.

[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

[5]Total = Total Building and Contents + Business Disruption

Town of Eldorado Analyses and Flood Risk Results

The Town of Eldorado is in northeastern Dorchester County. It consists of 0.08 square miles along State Highway 14. The primary flooding sources in the town are Mill Branch and Marshy Hope Creek. The Town of Eldorado flood risk analysis incorporates modeled floodplain boundaries and flood depths for the 1-percent-annual-chance flood event, along with User Defined Facilities (UDFs) developed from local parcel, assessor, and building footprint data. Note that minor differences between values in these tables may result from rounding and aggregation under different categories. Also note that no riverine flood losses are identified in Eldorado, so only coastal flood loss estimates are presented.

Table 6-19

Town of Eldorado – Estimated Losses by Occupancy Type for the 1% Annual Chance Flood (UDFs in Coastal Areas)					
Type	# of Impacted Buildings	Inventory Estimated Value	% of Total	1% Flood Dollar Losses[1]	1% (100-yr) Percent Loss[2]
Residential Building & Contents	5	$400,000	100%	$20,000	5.0%
Commercial Building & Contents	0	$0	0%	$0	0.0%
Other Building & Contents	0	$0	0%	$0	0.0%
Total Building & Contents[3]	5	$400,000	100%	$20,000	5.0%
Business Disruption[4]	N/A	N/A	N/A	$0	N/A
TOTAL[5]	5	$400,000	100%	$20,000	5.0%

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Percent Loss = Dollar Losses ÷ Estimated Value. Percentages are rounded to the nearest integer.
[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total = Total Building and Contents + Business Disruption

Town of Galestown Analyses and Flood Risk Results

The Town of Galestown is in northeastern Dorchester County. It consists of 0.26 square miles near State Highway 313. The primary flooding sources in the town are Gale Creek and Nanticoke River.

The Town of Galestown flood risk analysis incorporates modeled floodplain boundaries and flood depths for the 1-percent-annual-chance flood event, along with User Defined Facilities (UDFs) developed from local parcel, assessor, and building footprint data. Flood loss estimates for the 1-percent-annual-chance flood event were calculated using Hazus-MH. The following table indicates the severity of damage to buildings from flooding within the community.

Note that minor differences between values in these tables may result from rounding and aggregation under different categories. Also note that riverine flood losses were identified in Galestown and are presented in Chapter 7 Riverine Flooding. Only coastal flood loss estimates are presented within this chapter.

Table 6-20

Town of Galestown – Estimated Losses by Occupancy Type for the 1% Annual Chance Flood (UDFs in Coastal Areas)

Type	# of Impacted Buildings	Inventory Estimated Value	% of Total	1% Flood Dollar Losses[1]	1% (100-yr) Percent Loss[2]
Residential Building & Contents	0	$0	0%	$0	0.0%
Commercial Building & Contents	1	$10,000	100%	< $5,000	0.0%
Other Building & Contents	0	$0	0%	$0	0.0%
Total Building & Contents[3]	1	$10,000	100%	< $5,000	11.0%
Business Disruption[4]	N/A	N/A	N/A	$0	N/A
TOTAL[5]	1	$90,000	100%	< $5,000	11.0%

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.
[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Percent Loss = Dollar Losses ÷ Estimated Value. Percentages are rounded to the nearest integer.
[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total = Total Building and Contents + Business Disruption

Town of Secretary Analyses and Flood Risk Results

The Town of Secretary is in northeastern Dorchester County. It consists of 0.29 square miles along State Highway 14. The primary flooding source in the town is Warwick River.

The Town of Secretary flood risk analysis incorporates modeled floodplain boundaries and flood depths for the 1-percent-annual-chance flood event, along with User Defined Facilities (UDFs) developed from local parcel, assessor, and building footprint data. Note that minor differences between values in these tables may result from rounding and aggregation under different categories. Also note that no riverine flood losses are identified in Secretary, so only coastal flood loss estimates are presented.

Table 6-21

Town of Secretary – Estimated Losses by Occupancy Type for the 1% Annual Chance Flood (UDFs in Coastal Areas)					
Type	# of Impacted Buildings	Inventory Estimated Value	% of Total	1% Flood Dollar Losses[1]	1% (100-yr) Percent Loss[2]
Residential Building & Contents	17	$2,900,000	97%	$50,000	2.0%
Commercial Building & Contents	0	$0	0%	$0	0.0%
Other Building & Contents	1	$100,000	3%	$20,000	20.0%
Total Building & Contents[3]	18	$3,000,000	100%	$70,000	2.0%
Business Disruption[4]	N/A	N/A	N/A	$20,000	N/A
TOTAL[5]	18	$3,000,000	100%	$90,000	3.0%

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.

[2]Percent Loss = Dollar Losses ÷ Estimated Value. Percentages are rounded to the nearest integer.

[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

[5]Total = Total Building and Contents + Business Disruption

Town of Vienna Analyses and Flood Risk Results

The Town of Vienna is in eastern Dorchester County. It consists of 0.76 square miles near US Highway 50. The primary flooding source in the town is Nanticoke River.

The Town of Vienna flood risk analysis incorporates modeled floodplain boundaries and flood depths for the 1-percent-annual-chance flood event, along with User Defined Facilities (UDFs) developed from local parcel, assessor, and building footprint data. Note that minor differences between values in these tables may result from rounding and aggregation under different categories. Also note that no riverine flood losses are identified in Vienna, so only coastal flood loss estimates are presented.

Table 6-22

Town of Vienna – Estimated Losses by Occupancy Type for the 1% Annual Chance Flood (UDFs in Coastal Areas)					
Type	# of Impacted Buildings	Inventory Estimated Value	% of Total	1% Flood Dollar Losses[1]	1% (100-yr) Percent Loss[2]
Residential Building & Contents	1	$200,000	33%	$40,000	20.0%
Commercial Building & Contents	0	$0	0%	$0	0.0%
Other Building & Contents	3	$400,000	67%	$200,000	50.0%
Total Building & Contents[3]	4	$600,000	100%	$240,000	40.0%
Business Disruption[4]	N/A	N/A	N/A	$0	N/A
TOTAL[5]	4	$600,000	100%	$240,000	40.0%

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.

[2]Percent Loss = Dollar Losses ÷ Estimated Value. Percentages are rounded to the nearest integer.

[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

[5]Total = Total Building and Contents + Business Disruption

Critical Facilities Loss Estimates

According to the FRR, the Hazus flood model utilized integrated user-supplied data in order to yield more accurate loss estimates and risk assessments for essential facilities (Emergency Operation Centers (EOC), fire/EMS stations, hospital and medical clinics, police stations, and schools (K-12, colleges)) located within Dorchester County. Estimated flood losses were determined on a site-specific basis (i.e., the depth of flooding at the location of the facility). Potential flood losses for the 1% annual chance flood event were calculated using Hazus-MH, version 3.1, and the results are presented in Table 6-23.

Table 6-23

Dorchester County, Maryland – Essential Facilities Estimated Loss Summary for the 1%-Annual-Chance Flood (Coastal Areas)					
Type	Total 1% Dollar Losses(Building & Content)	Total BuildingLoss	Building Loss % of Total	Total ContentLoss	Content Loss % of Total
Fire Station	$206,764	$55,552	27%	$151,212	73%
TOTAL	$206,764	$55,552	N/A	$151,212	N/A

Source: 2019 Dorchester County Flood Risk Report & Hazus analysis results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

***Disclaimer:** Hazus does compute loss estimates for structures exposed to the minimum flood depths of 0.1 feet. However, structural and content loss are dependent upon foundation type and/or the First Flood Elevations (FFE). Therefore, structures exposed to the minimum flood depths of 0.1 feet may have content loss only or both structural or content loss or neither.*

It is important to note the essential facilities located in the coastal flood risk area. These facilities are considered critical since they are intended to provide services to the communities in the event of a disaster. These facilities and their project depth of flooding include:

- Taylors Island Volunteer Fire Company, Taylors Island – 1.1'
- Hoopers Island Volunteer Fire Company, Fishing Creek – 3.3'
- Madison Volunteer Fire Company, Madison – 0.8'
- EMS Station 500, Madison – 0.5'
- Lakes and Straits Fire Company, Wingate – 2.6'

Hooper's Island Volunteer Fire Company is at the greatest risk compared to the other facilities listed above, with the possibility of 3.0 feet of flooding resulting from a coastal 1 percent annual flood event. As depicted below in Figure 6-1, the blue shading represents the flood waters that encompass the fire department as well as the surrounding area. The portion of the structure that will have the highest flood depth is denoted with a red dot. The possible depth of flooding at this point is estimated to be 3.0 feet. Note, ingress and egress to this facility could prove problematic.

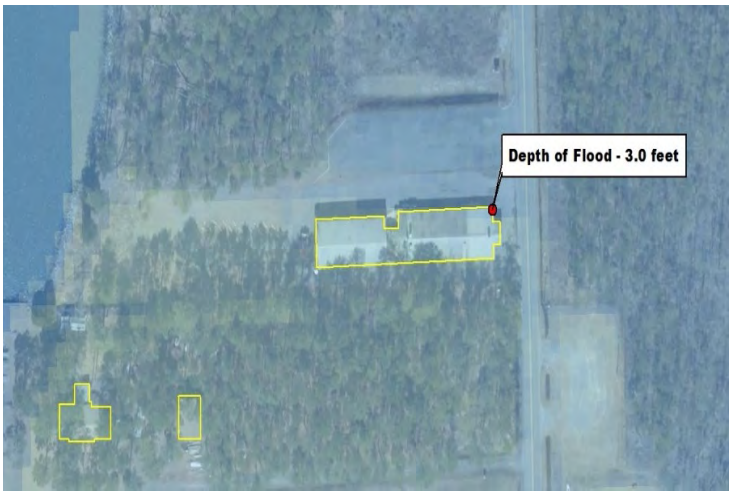
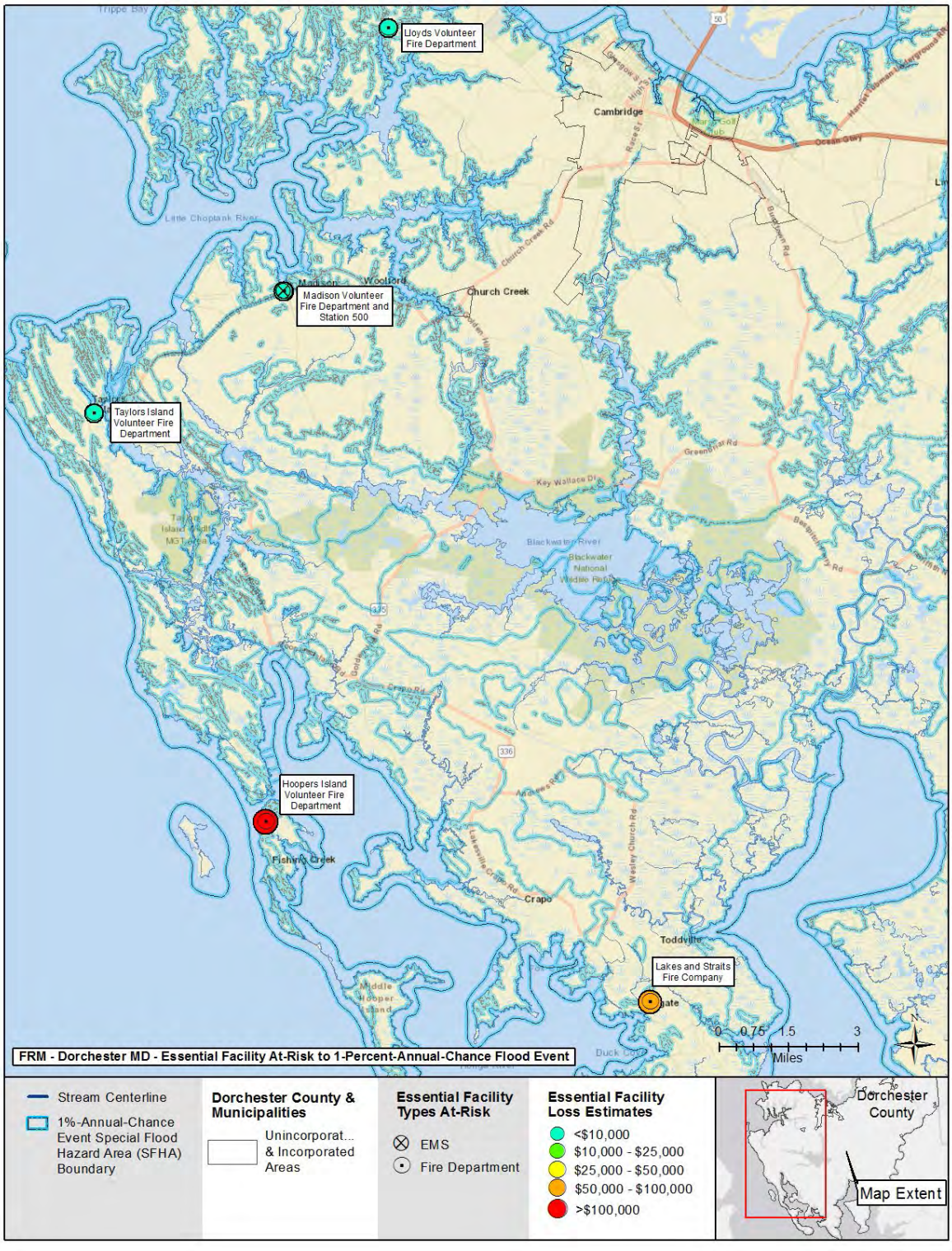


Figure 6-1 – Hooper's Island Volunteer Fire Company

Figure 6-2 – Madison Volunteer Fire Company

Compared to the other facilities listed above, the Madison Volunteer Fire Company/EMS Station 500 is affected by the lowest flood depth; however, precautions are taken during a flood event to ensure the Company is able to respond to an emergency. The County EMS staff moves the ambulance to higher ground during a heavy rain or tidal flood event. This happens when less than a foot of flooding occurs during a heavy rain event. Note, ingress and egress to this facility could prove problematic.

Figure 6-3



Source: Smith Planning & Design, 2019 Flood Risk Report

Public Facilities Loss Estimates

In regard to public facilities, loss estimates for public facilities located within the coastal flood zone were calculated. Total improvement values from the 2021 Dorchester County Property Parcels Data Layer was utilized to calculate the loss estimations for public facilities at risk to coastal flooding. Total losses estimated for public facilities located with 1% annual chance flood hazard area equaled $12,316,590.

Table 6-24

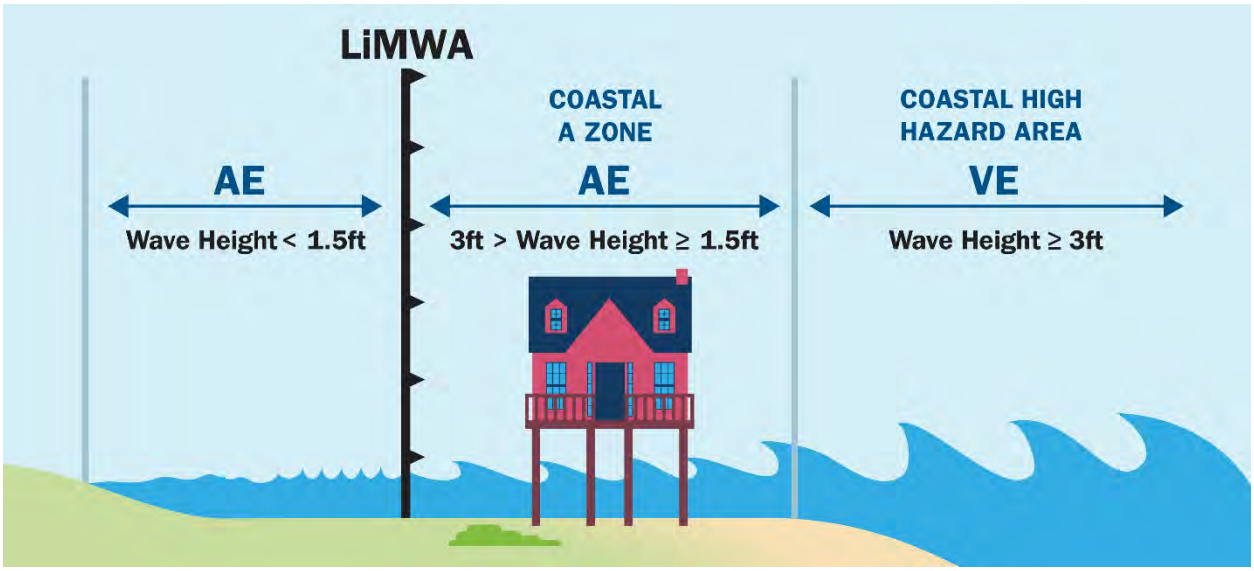
Loss Estimations for Public Facilities	
Facility Category	Loss Estimate
County	$1,358,200
Education	$2,466,200
Miscellaneous	$6,174,490
Municipal	$952,400
Utility	$300,000
Total	$12,316,590

Source: 2021 Dorchester County Property Parcels Data Layer – Improvement values equal total losses for each facility within risk area

Limit of Moderate Wave Action

Profile

FEMA states the Limit of Moderate Wave Action (LiMWA) marks the inland limit of the Coastal A Zone, the part of the coastal SFHA referenced by building codes and standards. Past events have shown that waves as small as 1.5 feet can cause foundation failure and structural damage to buildings.



Source: FEMA Features of Flood Insurance Rate Maps in Coastal Areas: https://www.fema.gov/flood-maps/coastal/insurance-rate-maps

Vulnerability Analysis

Dorchester County Flood Insurance Study indicates areas of Limit of Moderate Wave Action (LiMWA). LiMWA is defined as: Inland limit of the area affected by waves greater than 1.5 feet during the base flood. Base flood conditions between the VE Zone and the LiMWA will be similar to, but less severe than those in the VE Zone. According to 2015 Code: § 155-37 Floodplain Management District, Dorchester County, by resolution, agreed to meet the requirements of the National Flood Insurance Program and was accepted for participation in the program on October 15, 1981. As of that date, the initial effective date of the Dorchester County Flood Insurance Rate Map, all development and new construction as defined herein, are to be compliant with these regulations.

Dorchester County Floodplain Ordinance

155-37A(10)(b){39} LIMIT OF MODERAL WAVE ACTION (LiMWA)

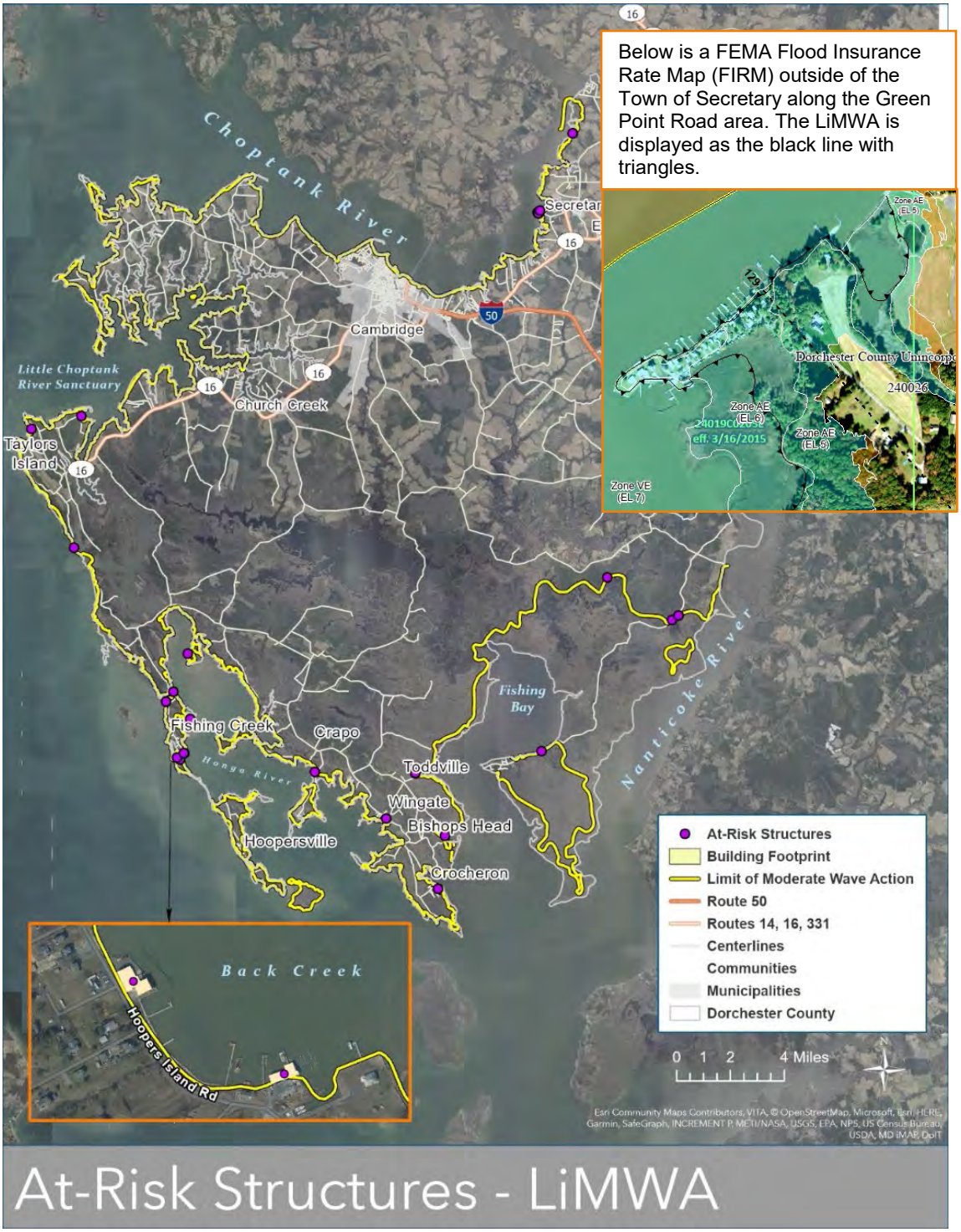
Inland limit of the area affected by waves greater than 1.5 feet during the base flood. Base flood conditions between the VE Zone and the LiMWA will be similar to, but less severe than those in the VE Zone.

COASTAL A ZONE

An area within a special flood hazard area, landward of a coastal high-hazard area (V Zone) or landward of a shoreline without a mapped coastal high-hazard area, in which the principal source(s) of flooding are astronomical tides and storm surges, and in which, during base flood conditions, the potential exists for breaking waves with heights greater than or equal to 1.5 feet.

Due to the increased vulnerability between the water's edge and the LiMWA, additional analysis was conducted to determine structures at risk within this area, otherwise known as coastal high hazard VE and coastal A zone. Map 6-4 depicts the twenty-seven (27) structures, denoted in purple, within the LiMWA. Of the structures, ten (10) commercial and seventeen (17) residential. The majority of structures are located in the southern portion of the county.

Map 6-4



Source: Smith Planning & Design, Dorchester County GIS Specialist, MD iMap, DoIT

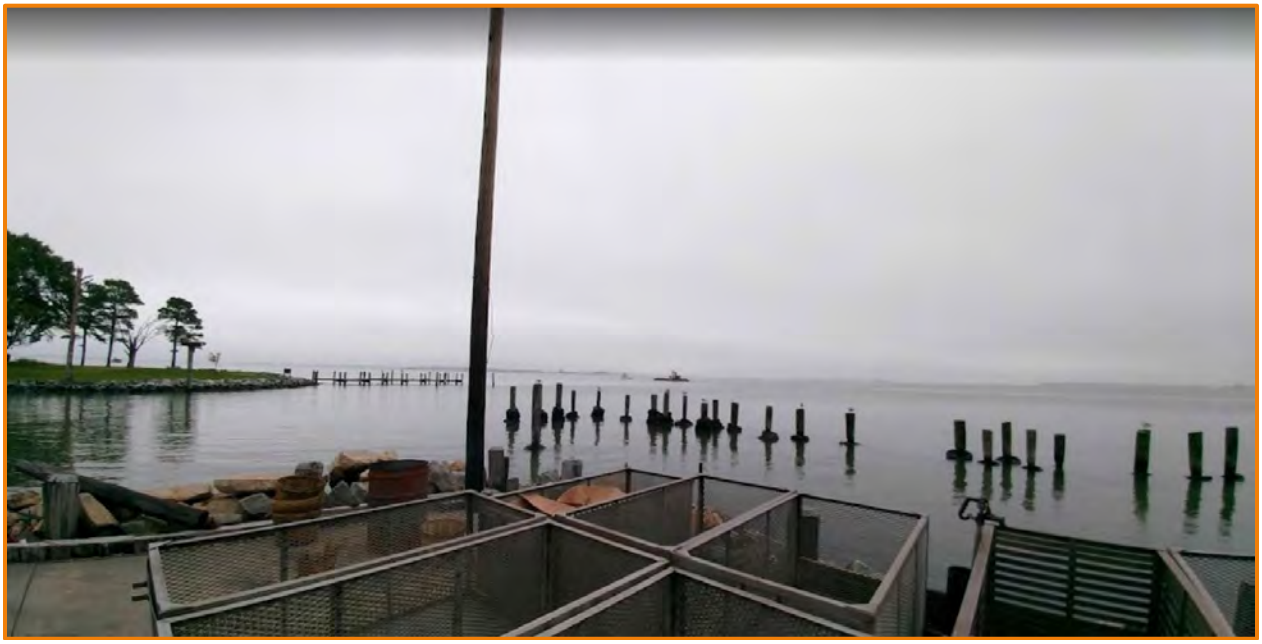
Residential & Commercial Structures Loss Estimations

In regard to commercial and residential structures, loss estimates for structures located within the coastal high hazard VE and coastal A zone were calculated. Total improvement values from the 2021 Dorchester County Property Parcels Data Layer was utilized to calculate the loss estimations for public facilities at risk to coastal flooding. Total losses estimated for residential and commercial structures located within this hazard area equaled $2,497,200.

Table 6-25

Loss Estimations for Residential & Commercial Structures	
Facility Category	Loss Estimate
Commercial	$1,118,300
Residential	$1,378,900
Total	$2,497,200

Source: 2021 Dorchester County Property Parcels Data Layer - Improvement values equal total losses for each facility within risk area



View of Back Creek from Russell Hall Seafood.
Source: Google Street Maps
Photo: Eric Timmons, October 2020

Mitigation measures may include breakwaters, living shorelines or other protection measures that decrease wave action.

Shoreline Erosion

Hazard Profile

According to the US Climate Resilience Toolkit, shoreline erosion is the process by which local sea level rise, strong wave action, and coastal flooding wear down or carry away rocks, soils, and/or sands along the coast. All coastlines are affected by storms and other natural events that cause erosion; the combination of storm surge at high tide with additional effects from strong waves, conditions commonly associated with landfalling tropical storms, creates the most damaging conditions. In the United States, coastal erosion is responsible for roughly $500 million per year in coastal property loss, including damage to structures and loss of land.

On Maryland's Eastern Shore, particularly on the Chesapeake Bay side, storm surge is also related to shoreline erosion. Counties fronting on the east side of the Bay are facing shoreline submergence subsidence that has been ongoing since the last glacial period when sea level was approximately 400 feet lower than today. While the process has been continuing for approximately 10,000 years, sea level is still rising at a rate of approximately one foot or so every century. This rise in sea level will certainly affect the relative height of future storm surge events. Sea level rise is another factor contributing to shore erosion in Maryland, by contributing, influencing, and exacerbating on-going coastal processes, resulting in coastal areas being more vulnerable to extreme events. Tide gauge measurements in the Chesapeake Bay show that sea level rates are increasing almost twice as fast as the global average.

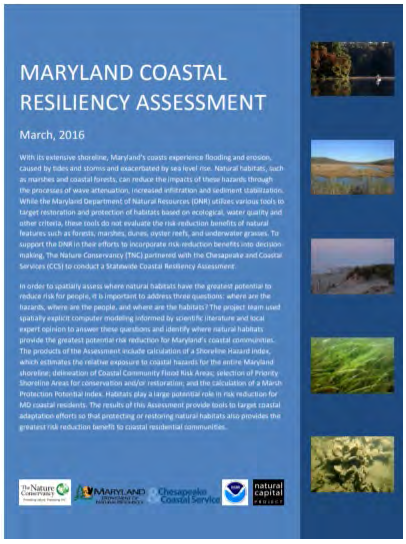
Furthermore, the Sea Level Rise: Technical Guidance for Dorchester County states that the vertical movement of rising waters will lead to increased saturation of soils at the base of banks, which will weaken and eventually result in bank erosion. Due to the effects of wave action slashing away soils at higher points along the shoreline, bank failure will be the result. The consequence of repeated bank failures is the landward withdraw of the upland/shoreline edge. According to Michael Scott, dean of the Henson School of Science and Technology at Salisbury University, shores across Dorchester County have receded by as much as 600 feet since the 1970s and continue to lose ground each day.

Source: Baltimore Sun - Maryland's Dorchester County is washing away, leaving its residents with hard choices

Vulnerability Analysis

As part of the plan update for this section, shoreline erosion was assessed using the Coastal Resiliency Assessment and Coastal Atlas. In 2016 the Maryland Department of Natural Resources (DNR), the Nature Conservancy (TNC), and partnering with Maryland's Chesapeake and Coastal Service (CCS) conducted a Statewide Coastal Resiliency Assessment.

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



The Maryland Shoreline Hazard Index was calculated from six (6) physical variables: geomorphology, elevation, relative sea level rise, wave power, storm surge height and erosion rates, and five natural feature types (forest, marsh, dune, oyster reef and underwater grasses). Each variable is ranked from very low hazard (rank=1) to very high hazard (rank=5), based on criteria shown in Table 6-26, below, used within the within the InVEST coastal vulnerability model.

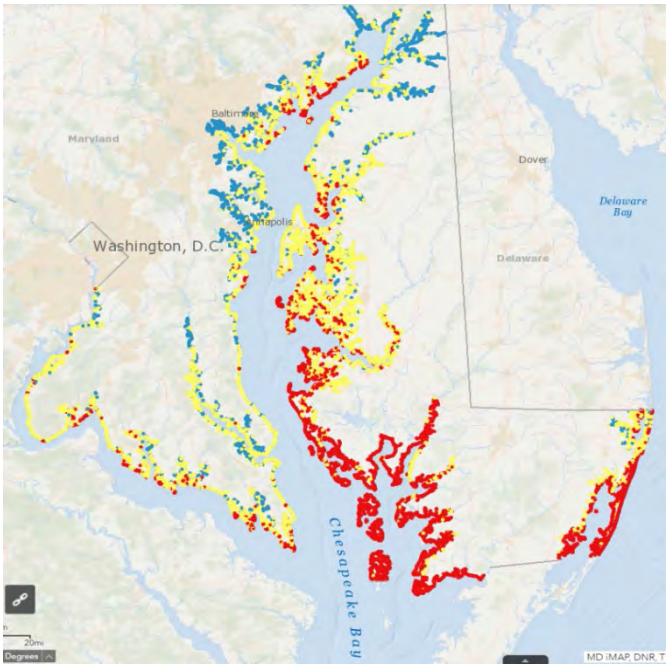
Table 6-26

Variables and Ranking System for InVEST Coastal Vulnerability Model					
Variable	Very Low Hazard Rank (1)	Low Hazard Rank (2)	Moderate Hazard Rank (3)	High Hazard Rank (4)	Very High Hazard Rank (5)
Geomorphology	Bulkhead	Riprap	Groin, breakwater, jetty, unconventional structure, living shoreline	Coarse-grained sand to gravel beaches	Other natural shoreline, dilapidated bulkhead
Elevation (meters)	14.7 - 81.6	5.9 - 14.7	2.3 - 5.9	0.5 - 2.3	0 - 0.5
Natural Habitats	Forest	Marsh	Dune	Oyster reef, Underwater grass (dense = 4, less dense = 4.5)	No habitat
Sea Level Rise (meters)	None	1.32 – 1.42	1.46 – 1.48	1.49 – 1.67	2.05 – 2.35
Wave Power (kW/m)	0 - 0.02	0.02 - 0.05	0.05 - 0.16	0.16 - 0.78	Atlantic Shoreline
Storm Surge Height (feet)	0	0.1 - 2.2	2.3 - 3.5	3.6 - 4.6	4.7 - 8.9
Erosion Rate (feet/year)	Accretion or Protected	0 - 2, no change or unknown	2 - 4	4 - 8	>8

Source: 2016 Maryland Coastal Resiliency Assessment Report

The Maryland analysis estimated the relative exposure of each 250-meter segment of the Maryland coastline to storm-induced erosion and flooding, and the relative effectiveness of existing natural habitats to buffer the shoreline from these hazards. The Shoreline Hazard Index, depicted in Figure 6-5, represents the relative exposure to coastal hazards for the entire Maryland shoreline. Exposure is rated high, moderate and low. As shown in the Figure 6-4, the exposure rate gradually increases to high in the southern portion of the state.

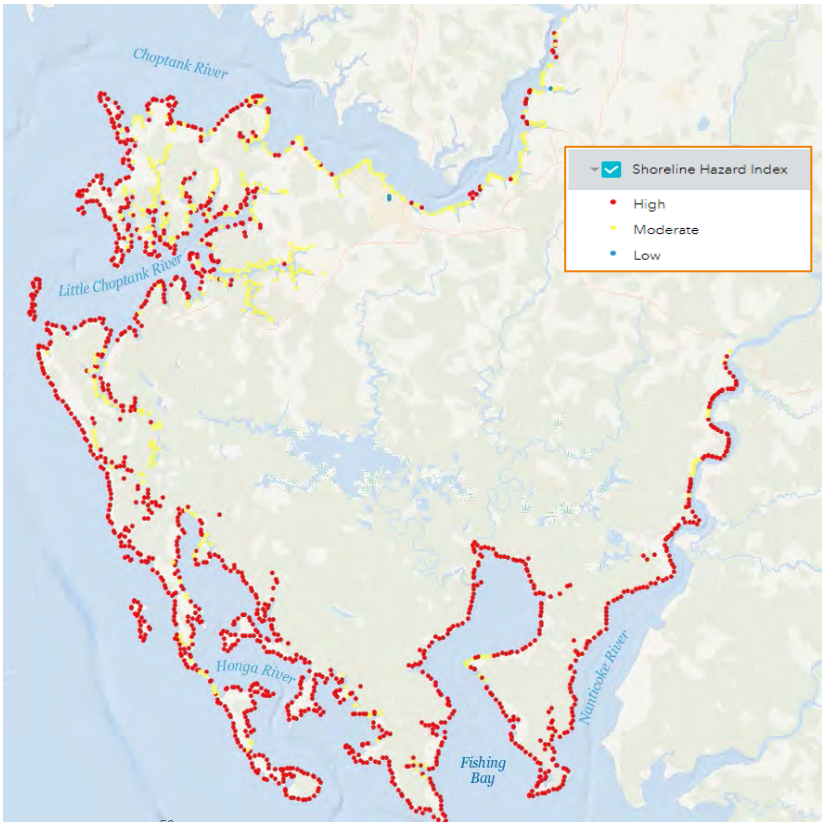
Figure 6-4



Source: Maryland Coastal Atlas

Figure 6-5 depicts the Shoreline Hazard Index for Dorchester County. As shown below, the shoreline hazard index for Dorchester County's shorelines is moderate (yellow points) or high (red points). Therefore, the relative exposure to storm-induced erosion and flooding is high for most county's shorelines.

Figure 6-5



Source: Maryland Coastal Atlas

Maryland Coastal Atlas

The Coastal Atlas is a mapping tool developed by Maryland Department of Environment that allows viewers to visually analyze and explore coastal and ocean data layers for project and planning purposes. Using the built-in tools, the user can query, map, and analyze spatial data to better understand Maryland's marine resources. The map layers include shoreline erosion rates.

Map layers include the Shoreline Hazard Index, which represents relative exposure to storm-induced erosion and flooding. Exposure is denoted as high, moderate, and low.

Erosion rates, one of the six (6) physical variables shown in Table 6-25, was extrapolated for use in this shoreline erosion vulnerability section. According to the Coastal Resiliency Assessment, the erosion rate variable indicates shoreline erosion as estimated by comparing recent (1988-1995) mapped shorelines to historical ones. Erosion rate hazard ranks were assigned as follows, based on categories used by the Maryland Geological Survey (MGS):

- **Very Low** = Accretion or Protected;
- **Low** = No change, 0 to 2 feet/year;
- **Moderate** (3) = 2 to 4 feet/year;
- **High** (4) = 4 - 8 feet/year; and,
- **Very High** (5) = > 8 feet/year.

Figure 6-6 depicts the shoreline erosion rates for Dorchester County. As shown on the figure, the Neck District, Taylors Island, Hoopers Island and Crocheron areas have the highest erosion rates. These areas should be assessed for flood risk reduction measures such as living shorelines, breakwaters, or bulkheads.

Figure 6-6

Source: [Maryland Coastal Atlas]

Critical & Public Facilities Risk Assessment

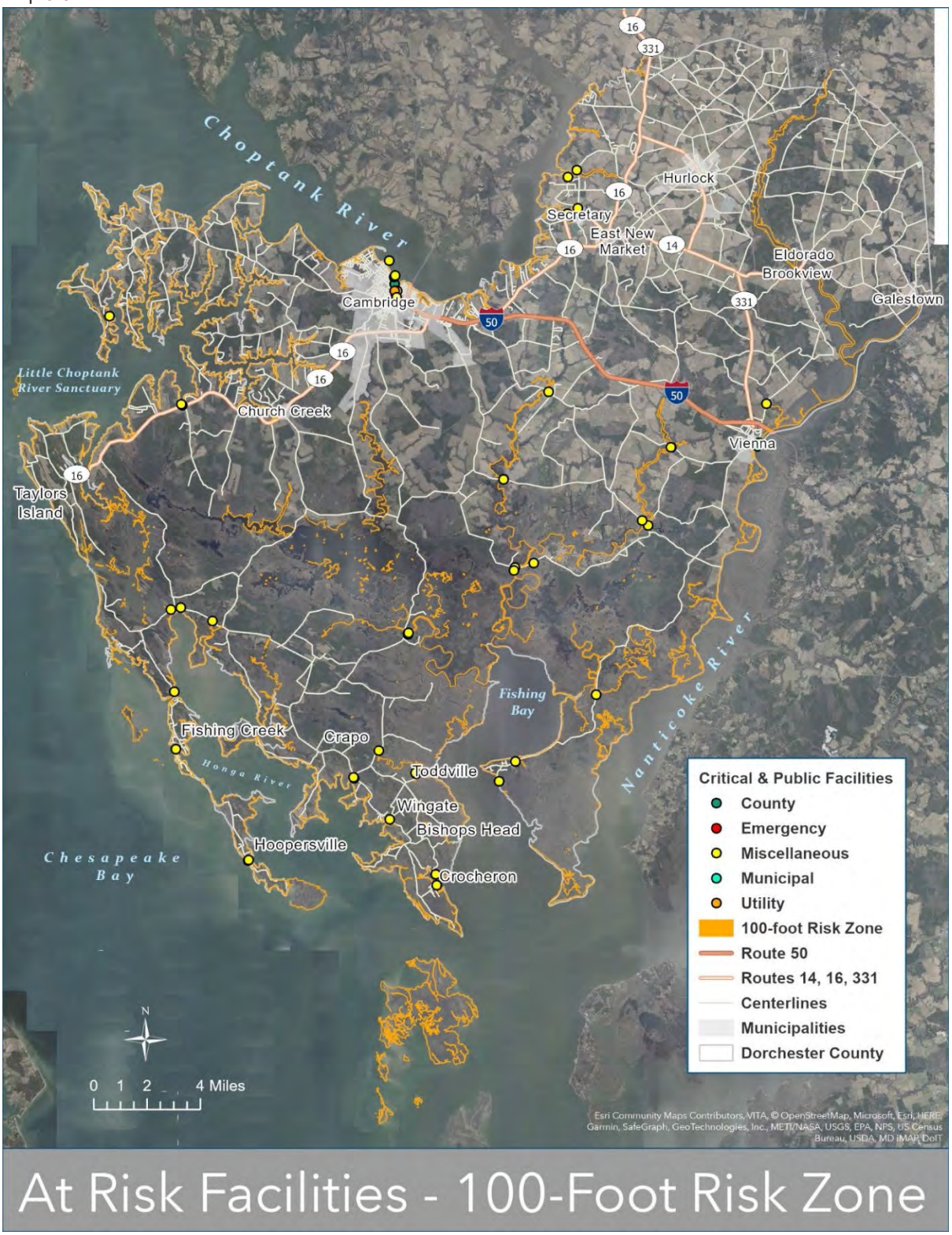
According to the 2021 Dorchester County Comprehensive Plan, Dorchester County has over 1,700 miles of shoreline, of which nearly 50% is susceptible to erosion by natural causes such as ebb and flow of the tide and storm surges and by manmade causes such as excessive upland runoff, adjacent harden shorelines and boat wake. With 60% of the County located within the tidal floodplain and over 50% of the land laying below the elevation of 4.9 feet above sea level, Dorchester County is highly susceptible to shoreline erosion. Therefore, by utilizing Geographic Information System (GIS) layers provided by Maryland Geological Survey, an analysis has been conducted to determine the vulnerability of critical and public facilities that are within close proximity to the shoreline.

In order to determine the appropriate risk area size, several sources of information were reviewed. For instance, according to *Local Government Assistance Guide: Lot Coverage*, the definition of lot coverage is as follows: "the percentage of a total lot or parcel that is: 1) occupied by a structure, accessory structure, parking area, driveway, walkway, or roadway; or 2) covered with gravel, stone, shell, impermeable decking, a paver, permeable pavement, or any manmade material." This amendment also states the lot coverage within a 100-foot buffer is not permitted; "amendments to the law also clarify that there is no allowable, by right, percentage of lot coverage within the 100-Foot Buffer." However, there are grandfathering provisions that address existing lots developed within the buffer.

Additionally, the *Local Government Assistance Guide: Critical Area Buffer*, COMAR 27.01.09.01, defines a buffer as "the area immediately adjacent to the mean high-water line of tidal waters, the edge of each bank of tributary streams and the landward edge of tidal wetlands. It includes areas that are not naturally vegetated and may be developed or disturbed." The regulation also states the buffer measurement is expanded when "highly erodible soils and hydric soils to the landward edge of the soil or 300-feet (which include the minimum 100-foot Buffer), whichever is less." This regulation applies to all new development effective of March 8, 2010, however an alternate method for buffer expansion for parcels that existed prior to January 1, 2010 with highly erodible soils; "a development activity may be located in the expansion area, without a variance, provided that the Buffer and any expansion for hydric or highly erodible soils occupies at least 75 percent of the lot or parcel and mitigation occurs at a 2:1 ratio based on the lot coverage of the proposed development activity."

Therefore, a 100-foot risk zone was placed around the current shoreline displayed on Map 6-5. Structures located within the 100-foot risk zone may need to implement mitigation measures in order to minimize the effects of shoreline erosion. Critical and public facilities located within this 100-foot risk zone are not only susceptible to damage caused by flooding but also can the impacts from shoreline erosion.

Map 6-5



Source: Smith Planning & Design, MD iMap, DoIT

Critical and public facilities located within the 100-foot risk zone include one (1) County government facility, two (2) fire departments, one (1) EMS Station, fifteen (15) boat ramps, seventeen (17) bridges, fourteen marinas/docks, three (3) municipal facilities, and one (1) utility facility. These critical and public facilities are detailed in Table 6-27.

Table 6-27

Critical and Public Facilities in the 100-Foot Risk Zone

Facility Category	Facility Type	Facility Detail	Address	City
County	County Government	Dorchester County Office Building	501 Court Lane	Cambridge
Emergency	Fire Department	Taylors Island Volunteer Fire Company	510 Taylors Island Road	Taylors Island
Emergency	Fire Department	Madison Volunteer Fire Company	1154 Taylors Island Road	Madison
Emergency	EMS Station	Station 500	1154 Taylors Island Road	Madison
Miscellaneous	Boat Ramp	Shorter's Wharf Ramp	Maple Dam Road	Cambridge
Miscellaneous	Boat Ramp	Ragged Point Marina	Ragged Point Road	Cambridge
Miscellaneous	Boat Ramp	Trenton Street Ramp	225 Trenton Street	Cambridge
Miscellaneous	Boat Ramp	Muddy Hook Cove Ramp	Doeller Road	Fishing Creek
Miscellaneous	Boat Ramp	Madison Bay Ramp	Madison Canning House Road	Madison
Miscellaneous	Boat Ramp	Vienna Ramp	Temple Road	Secretary
Miscellaneous	Boat Ramp	Taylors Island Ramp	Route 16	Taylors Island
Miscellaneous	Boat Ramp	Crocheron Ramp	Crocheron Road	Toddville
Miscellaneous	Boat Ramp	Wingate Ramp	Wingate Bishops Head	Wingate
Miscellaneous	Boat Ramp	Great Marsh Ramp	Somerset Avenue	Cambridge
Miscellaneous	Boat Ramp	Toddville-Farm Creek Ramp	Farm Creek Road	Toddville
Miscellaneous	Boat Ramp	Bestpitch Ferry Ramp	Bestpitch Ferry Road	Cambridge
Miscellaneous	Boat Ramp	Transquaking Ramp	4924 Drawbridge Road	Cambridge
Miscellaneous	Boat Ramp	New Bridge Ramp	4331 New Bridge Road	Vienna
Miscellaneous	Boat Ramp	Elliott Island Ramp	Wharf Road	Vienna
Miscellaneous	Bridge	D-037 Elliot Island Road/Elliott Creek	Elliot Island Road	N/A
Miscellaneous	Bridge	D-013 Wesley Church Road/Farm Creek	Wesley Church Road	N/A
Miscellaneous	Bridge	D-036 Elliott Island Road/Pokata Creek	Elliott Island Road	N/A
Miscellaneous	Bridge	D-012 Maple Dam Road/Blackwater River	Maple Dam Road	N/A
Miscellaneous	Bridge	RT 335/ Wallace Creek	RT 335	N/A
Miscellaneous	Bridge	RT335/Artificial Path (off of Honga River)	RT 335	N/A
Miscellaneous	Bridge	RT 335/Artificial Path	RT 335	N/A
Miscellaneous	Bridge	D-024 Bestpitch/Transquaking River	Bestpitch Ferry Road	N/A
Miscellaneous	Bridge	D-025 Bestpitch Ferry Road/Windmill Island Creek	Bestpitch Ferry Road	N/A
Miscellaneous	Bridge	Griffith Neck Road/Beaver Dam Creek	Griffith Neck Road	N/A
Miscellaneous	Bridge	D-022 Drawbridge Road/Chicamacomico River	Drawbridge Road	N/A
Miscellaneous	Bridge	D-026 Decoursey Bridge Road/Transquaking River	Decoursey Bridge Road	N/A

Miscellaneous	Bridge	D-035 New Bridge Road/Chimamacomico River	New Bridge Road	N/A
Miscellaneous	Bridge	D-032 Indiantown Road/Chicone Creek	Indiantown Road	N/A
Miscellaneous	Bridge	D-021 Drawbridge Road/Transquaking River	Drawbridge Road	N/A
Miscellaneous	Bridge	RT 14/Artificial Path (off of Warwick River)	RT 14	N/A
Miscellaneous	Bridge	D-018 Suicide Bridge Road/Warwick River	Suicide Bridge Road	N/A
Miscellaneous	Marina/Dock	Dock	Maple Dam Road	Cambridge
Miscellaneous	Marina/Dock	Dock	Cedar Street	Cambridge
Miscellaneous	Marina/Dock	Cambridge Marine Terminal 6	0 Cemetery Avenue	Cambridge
Miscellaneous	Marina/Dock	Cambridge Municipal Yacht Basin	0 Mill Street	Cambridge
Miscellaneous	Marina/Dock	Dock	Hoopers Island Road	Church Creek
Miscellaneous	Marina/Dock	Dock	6325 Snug Harbor Road	East New Market
Miscellaneous	Marina/Dock	Dock	Doeller Road	Fishing Creek
Miscellaneous	Marina/Dock	Dock	Hoopers Island Road	Fishing Creek
Miscellaneous	Marina/Dock	Warehouse	2343 Farm Creek Road	Toddville
Miscellaneous	Marina/Dock	Dock	Wingate Bishops Head	Wingate
Miscellaneous	Marina/Dock	Dock	Wingate Bishops Head	Wingate
Miscellaneous	Marina/Dock	Dock	Tedious Creek Road	Toddville
Miscellaneous	Marina/Dock	Marina	6304 Suicide Bridge Road	Hurlock
Municipal	Municipal Government	Vienna-Public Works	Water Street	Vienna
Municipal	Municipal Government	DNR	114 Water Street	Vienna
Municipal	Municipal Government	Vienna-Parks & Recreation	Water Street	Vienna
Utility	Utility	Delmarva Power & Light Electric Substation	402 Cherry Street	Cambridge

Source: 2022 Hazard Mitigation GIS Database
Note: 100-foot risk zone does not differentiate between natural shoreline and hardened shorelines.

In regard to critical and public facilities, loss estimates for structures located within the 100-foot risk zone were calculated. Total improvement values from the 2021 Dorchester County Property Parcels Data Layer was utilized to calculate the loss estimations for critical and public facilities at risk to shoreline erosion. Total losses estimated for these structures located within this hazard.

Table 6-28

Loss Estimations for Critical & Public Facilities	
Facility Category	Loss Estimate
County	$2,581,800
Emergency	$505,700
Miscellaneous	$5,529,070
Municipal	$126,900
Utility	$0
Total	$8,743,470

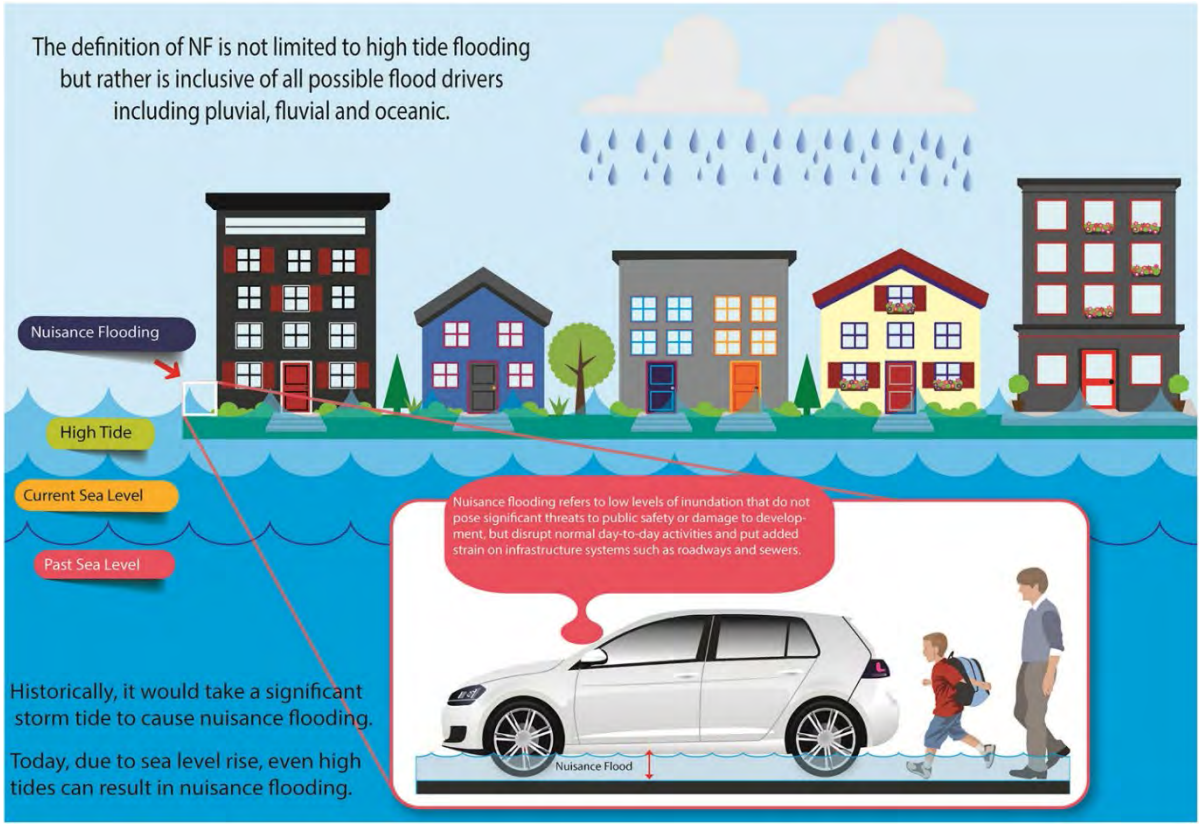
Source: 2021 Dorchester County Property Parcels Data Layer - Improvement values equal total losses for each facility within risk area

Nuisance Flooding

Hazard Profile

According to the Nuisance Flood Plan Development Guidance, there is recognition by Maryland lawmakers, local and state governments, and citizens that tidally driven nuisance flood events are happening with more frequency. While nuisance flooding may not pose a serious threat or result in major damage, it interrupts and causes impacts to daily routines and can negatively impact commerce. Pursuant to Maryland House Bill 1427 (2019), §3-1018(b) and (c), on or before Oct. 1, 2020, a local jurisdiction that experiences nuisance flooding (NF) shall develop a plan to address nuisance flooding. In addition, a local jurisdiction shall update the plan every five years; publish the plan on the local jurisdiction's website; and shall submit a copy of the plan to the Maryland Department of Planning. This legislation is an update to Senate Bill 1006 and House Bill 1350 (2018).

Dorchester County has a significant history of being impacted by coastal storms. Dorchester County has also experienced flooding outside mapped floodplains with increasing frequency, including both nuisance and urban flooding. The definition of nuisance flooding in accordance with §3-1001 of the Natural Resource Article of the Maryland Annotated Code is "high tide flooding that causes a public inconvenience." Urban flooding is associated with precipitation events and is due to a variety of issues related to development: increased impervious surface, disruption of natural watershed flows and functions, undersized and aged stormwater infrastructure, and changing weather patterns which exacerbate the inadequacies of older stormwater systems and the fragmented watersheds.

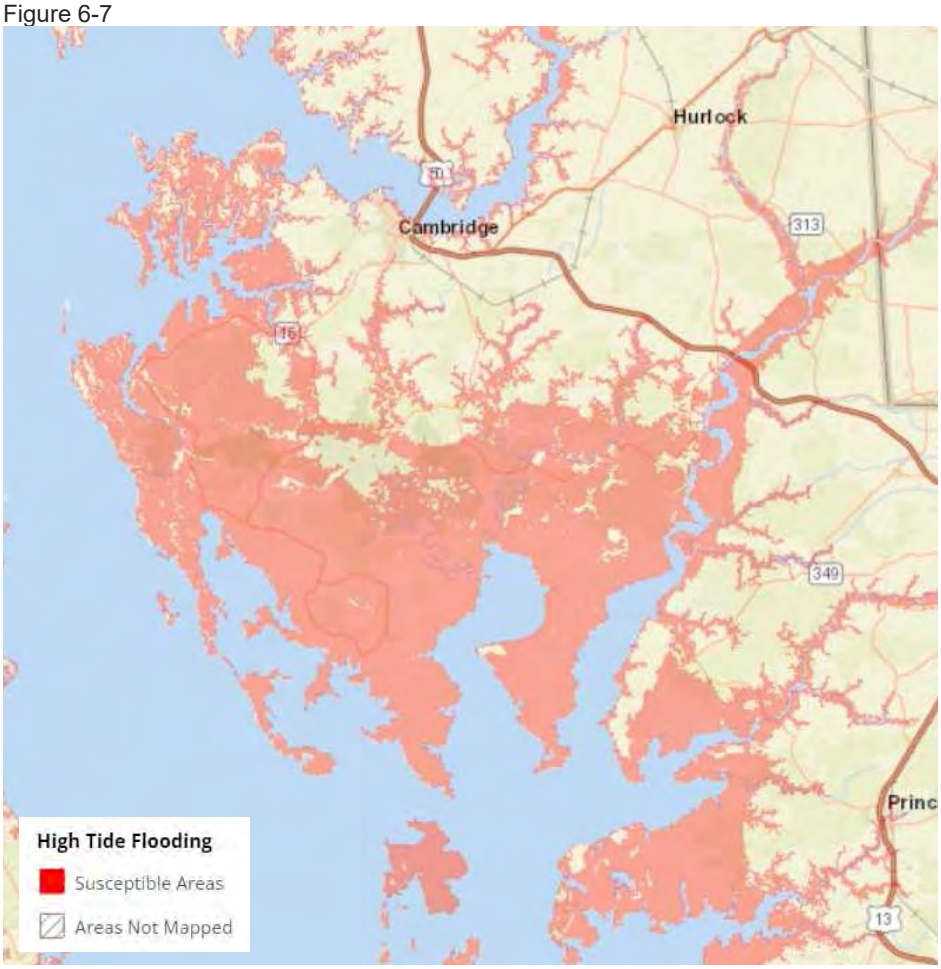


Source: Nuisance Flood Plan Development Guidance, October 2019

The National Oceanic and Atmospheric Administration (NOAA) defines nuisance flooding or high tide flooding: “flooding that leads to public inconveniences such as road closures.” Nuisance flooding is frequently referred to as “sunny day” or high tide flooding. Utilizing the NOAA Coastal Flood Exposure Mapper areas likely to flood during extreme high tides can be identified. NOAA recognizes high tide flooding as sunny day, nuisance, and recurrent tidal flooding.

The figure below illustrates low-lying coastal areas prone to flooding during extreme high tides. According to NOAA, annual occurrences of high tide flooding, exceeding local thresholds for minor impacts to infrastructure, have increased 5- to 10-fold since the 1960s in several U.S. coastal cities. The flood thresholds for this map are based on national flood thresholds from NOAA Technical Report NOS CO-OPS 086: Patterns and Projections of High Tide Flooding along the U.S. Coastline Using a Common Impact Threshold.

Figure 6-7



Source: NOAA Coastal Flood Exposure Mapper

As shown on the map, the southern portion of the county is the most prone to flooding during high tides. According to the 2021 Dorchester County Comprehensive Plan, flood origins include riverine flooding from rivers, creeks and streams and coastal flooding from the Chesapeake Bay. Approximately 56% of the County lies within the 1%-annual-chance floodplain area. Most of this area is tidal floodplain. Residents are at risk from tidal flooding, strong winds, storm surge, heavy rains and sea level rise that can cause temporary and permanent destructive flooding in both waterfront and inland areas.

Roadways impacted by nuisance flooding can be significant stressors on the infrastructure, emergency response, and public health. Nuisance flooding can disrupt daily activities through a variety of ways, such as the closure of roads due to high water, the inundation of yards and parks, and the impairment of engineered and natural drainage systems. Currently, these disruptions typically occur for a period of several hours and then abate. In addition, roadways are also impacted by urban flooding, not tidally influenced flooding.

Vulnerability Analysis

According to the Core Planning Team, nuisance flooding occurs between the communities of Toddville and Crocheron due to road elevation issues. Another area identified for nuisance flooding is the area between communities Honga and Hoopersville. Tidal flooding affects roadways in this area, which is concerning since these roadways are evacuation routes.

Tidal flooding is not the only hazard affecting the County and its municipalities. Several areas in the county and towns experience flooding due to water ponding along roadways and in low lying areas during heavy rain events. For example, the Town of Hurlock experiences this problem frequently due to stormwater management issues.

The Core Planning Team provided information and locations on nuisance and urban specific to roadways with the County and municipalities. A total of twenty-nine (29) roadways were identified. Of the 29 identified roadways, fourteen (14) are evacuation routes denoted in Table 6-29. Those roadways identified as State within the table may be potential mitigation projects for inclusion in the State of Maryland Hazard Mitigation Plan.

Table 6-29

Roadway ID #	Roadway	Flood Related Issue	Evacuation Issue (Y/N)	SWM or Elevation Problem	Nuisance/ Urban
State Roadways					
1	MD 307, MD 331 intersection/ North Main Street (Culvert on State Road)	Will Flood With 1" Or More of Rain Per Hour – Rainfall	Yes	SWM	Urban
2	MD 336 (between Goote's Marina & Kirwan Neck Road)	Tidal Flooding	Yes	Elevation	Nuisance
3	MD Route 14 (east if Marshyhope Creek Bridge)	Tidal Flooding	Yes	Elevation	Nuisance
County Roadways					
4	Multiple Roads in Fishing Creek, Hoopers Island, Hoopersville, Crapo, Wingate, Bishops Head, Crocheron, and Toddville	Tidal Flooding	Yes	Elevation	Nuisance
5	Wesley Church Road (below Farm Creek Bridge)	Tidal Flooding	Yes	Elevation	Nuisance
6	Elliott Island Road	Tidal Flooding	Yes	Elevation	Nuisance
7	Maple Dam Road (across marsh)	Tidal Flooding	Yes	Elevation	Nuisance
8	White Haven Road	Tidal Flooding	Yes	Elevation	Nuisance
9	Middletown Branch Road	Rainfall	No	SWM	Urban
10	Galestown Newhart Mill Road (near MD Route 313)	Rainfall	No	SWM	Urban
11	Puckum Road	Rainfall	No	SWM	Urban
12	Drawbridge Road (just south of Draw Bridge)	Tidal Flooding	Yes	Elevation	Nuisance
13	Steele Neck Road	Tidal Flooding	Yes	Elevation	Nuisance

Roadway ID #	Roadway	Flood Related Issue	Evacuation Issue (Y/N)	SWM or Elevation Problem	Nuisance/ Urban
14	Griffith Neck Road	Tidal Flooding	Yes	Elevation	Nuisance
15	Cook Point Road	Tidal Flooding	Yes	Elevation	Nuisance
16	Palmer Mill Road (near Harper Road)	Rainfall	Yes	SWM	Urban
17	Hip Roof Road	Tidal Flooding	Yes	Elevation	Nuisance
18	Windsor Road	Rainfall	No	SWM	Urban
19	Church Home Road	Rainfall	No	SWM	Urban
20	Shiloh Camp Road	Rainfall	No	SWM	Urban
21	Payne Road	Rainfall	No	SWM	Urban
22	Ennals Road	Rainfall	No	SWM	Urban
23	Drawbridge Road between Percy May and Middletown Branch	Heavy Rain	No	SWM	Urban
24	Smithville Road at the bridge	Tidal Flooding	No	Elevation	Nuisance
25	Bestpitch Ferry Road	Tidal Flooding	No	Elevation	Nuisance
26	Hooper Neck Road	Tidal Flooding	No	Elevation	Nuisance
Municipal Roadways					
27	Galestown: Newhart Mill Road (near Wheatly Church Road)	Rainfall	No	SWM	Urban
28	Cambridge: Water Street	Tidal Flooding	No	Elevation	Nuisance
29	Hurlock: Glen Oak Hotel Road (Hurlock's North Main Street)	Rainfall	Yes	SWM	Urban

The following six (6) roads were considered as high importance for mitigation by the Core Planning Team. Note, Maryland 336 should be considered for mitigation by the Maryland Department of Emergency Management and Maryland Department of Transportation.

- #1 - North Main Street
- #2 - MD 336 (between Goote's Marina & Kirwan Neck Road)
- #4 - Tidal Flooding in the Southern Portion
- #5 - Wesley Church Road
- #6 - Elliott Island Road
- #7 - Maple Dam Road

Dorchester County Hazard & Flood Mitigation Public Survey Public Survey Response:

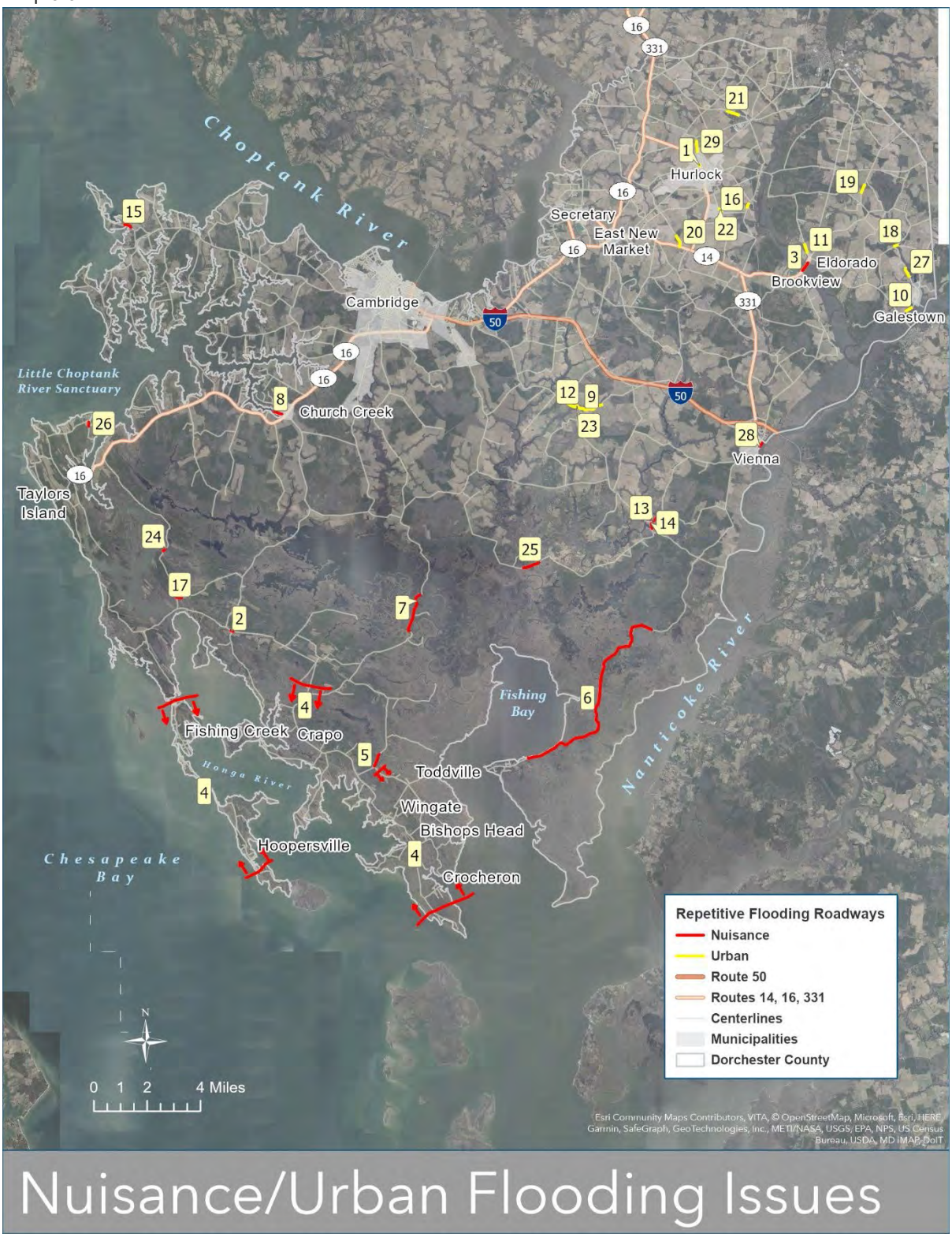
"Street flooding in Hurlock every time we have heavy

The following map, Map 6-6, depicts the sixteen (16) roadways affected by nuisance flooding and thirteen (13) roadways impacted by urban flooding. Note, the location numbers identified on the map are associated with Table 6-28.

Red arrows depicted on the Map 6-6 represent #4 on Table 6-28: *Multiple Roads in Fishing Creek Hoopers Island, Hoopersville, Crapo, Wingate, Bishops Head, Crocheron, and Toddville*. Roadways within these areas are impacted by nuisance flooding due to close proximity to numerous waterways and marshes. The following roadways are included with Roadway ID #4:

- Hoopers Island Road
- Old Point Road
- Hoopersville Road
- Lakesville-Crapo Road
- Wingate Bishops Head Road
- Crocheron Road
- Bishops Head Road
- Toddville Road
- Farm Creek Road
- East Tedious Creek Road

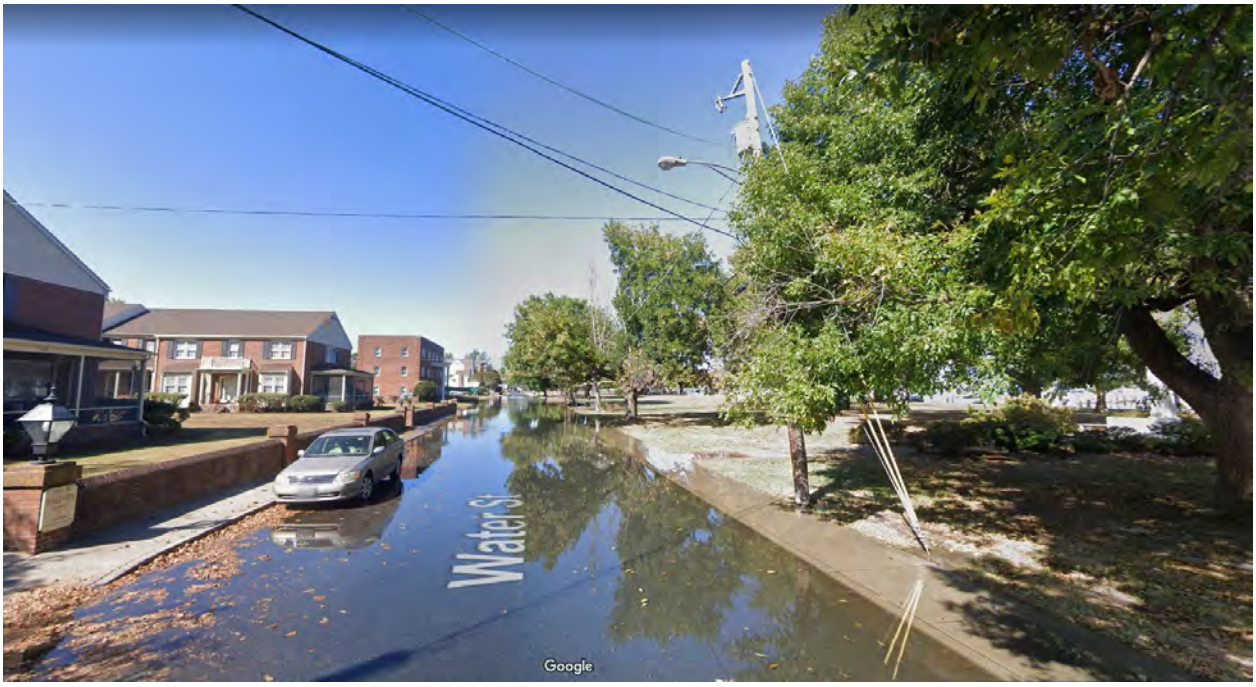
Map 6-6



Source: Smith Planning & Design, MD iMap, DoIT

In order to prepare for a nuisance flood event, critical tide information should be monitored from the NOAA tide gauge stationed at Cambridge, as well as additional gauges elsewhere throughout the Chesapeake Bay. The Cambridge Tide Gauge is located on the Bill Burton Fishing Pier; southeast of US-50 bridge on the South side of the Choptank River. These gauges enable the County to be aware of and prepare for possible nuisance flooding impacts.

The Department of Emergency Services (DES) receives notifications of special hazards and watches or warnings of severe weather before the community is impacted. DES disseminates public safety information via social media outlets. When nuisance flooding is anticipated, it may be necessary for DES to initiate a message to flood hazard areas social media outlets with details about flood severity, duration, or impacts such as road closures.



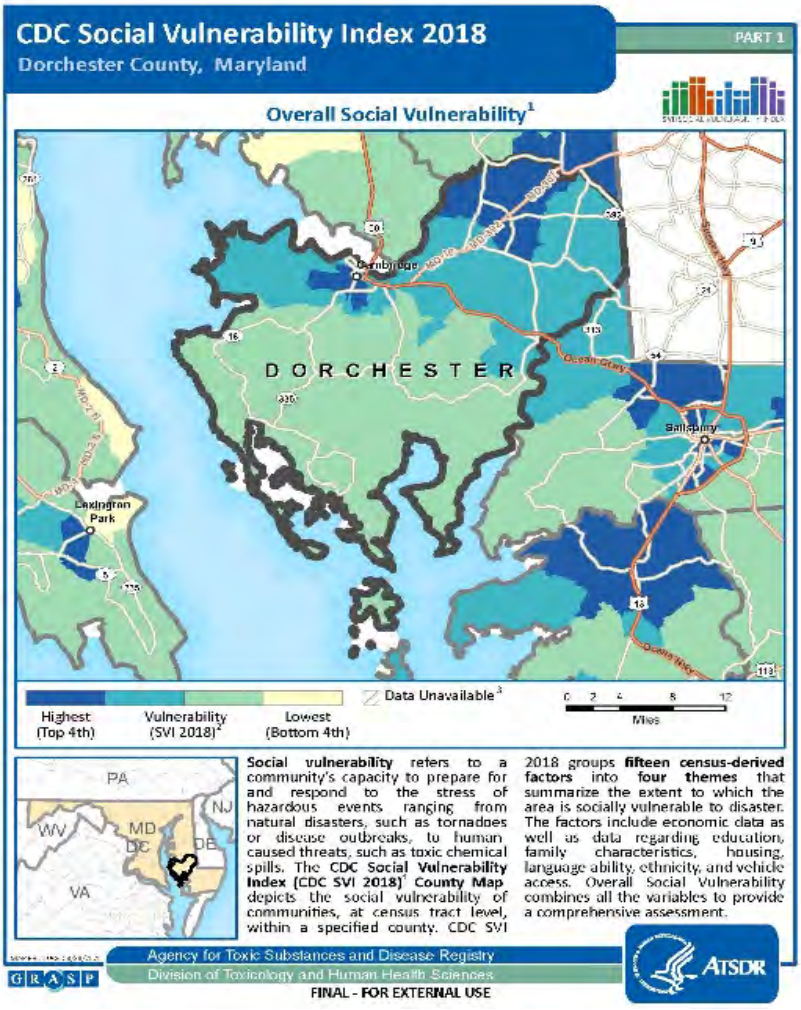
Water Street in Cambridge experiencing nuisance flooding in October 2019.

Source: Google Maps - Street View

Social Vulnerability

The Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) uses fifteen (15) U.S. Census variables to calculate SVI scores that can help local officials identify communities within the county that may need additional support before, during, and/or after disasters. The SVI has been conducted for Dorchester County at the census tract level and is mapped below, Figure 6-8. The darker blue census tracts in the overall map indicate areas of higher social vulnerability while the light green tracts indicate relatively low social vulnerability.

Figure 6-8



In reviewing Figure 6-9, below, the area with the highest social vulnerability is within the City of Cambridge and the northeast section of the County, which includes the Towns of Secretary, East New Market and Hurlock.

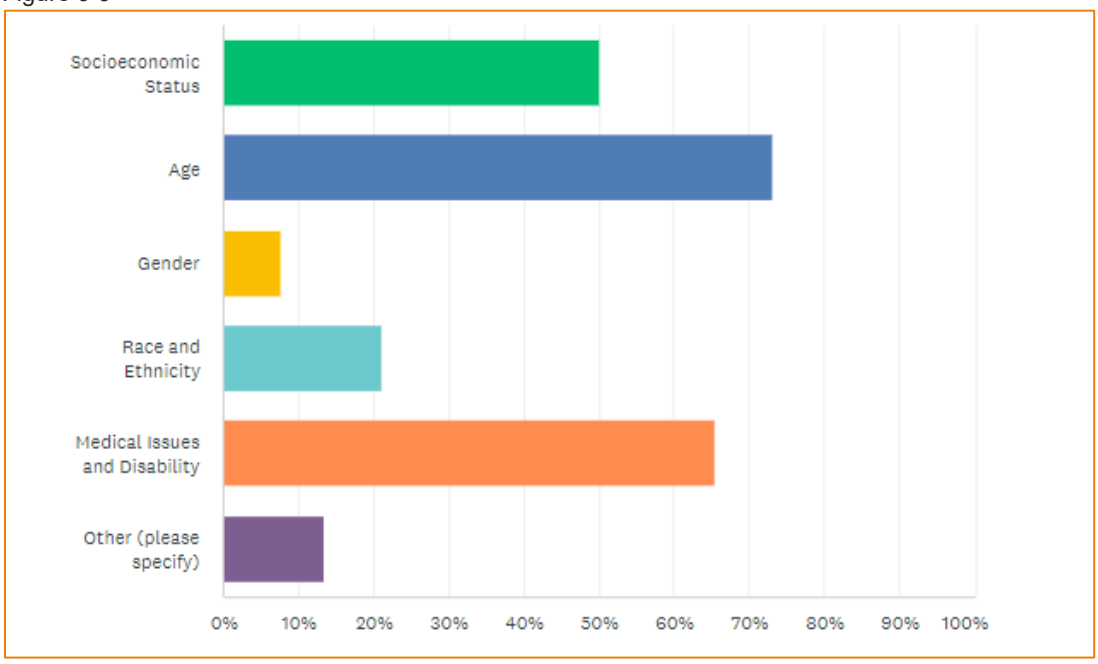
The City of Cambridge has the highest SVI shown in dark blue and is highly susceptible to coastal flooding. It is important to note that properties along the City of Cambridge shoreline have higher tax assessment values. The Neck District, which contains the communities of Thomas, Wrights, Castle Haven, Cornersville, Dailsville, Hills Point, Hudson, James and Lloyds has a moderate-high social vulnerability. This area has a high concentration of at-risk structures to coastal flooding, Map 6-2.

The southern portion of the county is impacted by the majority of coastal storms. The social vulnerability for this area is moderate-low. The southern region consists of the following communities: Taylors Island, Fishing Creek, Hoopersville, Crapo, Toddville, Wingate, Bishops Head, and Crocheron. These communities are impacted by hurricane category 1 storm surge, coastal flooding, shoreline erosion, nuisance flooding, and have areas of Limit of Moderate Wave Action (LiMWA).

As part of the public survey, the community was asked to specify which group or groups in the County are particularly at risk for or could be harmed by any of the identified hazard events. Socially vulnerable groups provided as options include socioeconomic status, age, gender, race and ethnicity, and medical issues and disabilities. Sixty-seven percent of the participants

indicated that the “Age” group (65 & older) is particularly at risk to the coastal storm hazards followed by “Medical Issues and Disability.”

Figure 6-9



Source: Screenshot of Public Survey Results

Considering the occurrence and severity of natural hazards cannot be reduced, reducing vulnerability is one of the main opportunities for reducing disaster risk. Therefore, communities identified should be targeted for outreach on preparedness activities. Ready.gov is a FEMA Ready Program developed to educate community members on how to prepare for and respond to emergencies caused by natural and man-made hazards. Information is provided for hurricanes and floods. The site also offers preparedness materials for business owners.

Prepare for Hurricanes

Know your Hurricane Risk

Hurricanes are not just a coastal problem. Find out how rain, wind, water, even tornadoes could happen far inland from where a hurricane or tropical storm makes landfall. Start preparing now.

Make an Emergency Plan

Make sure everyone in your household knows and understands your hurricane plan. In your hurricane plans include the office, kids' daycare, and anywhere you frequent. Ensure your business has a continuity plan to continue operating when disaster strikes.

Discuss the latest Centers for Disease Control (CDC) guidance on Coronavirus (COVID-19) and how it may affect your hurricane planning.

Know your Evacuation Zone

You may have to evacuate quickly due to a hurricane if you live in an evacuation zone. Learn your evacuation routes, practice with household, pets, and identify where you will stay.

Those with Disabilities

If you or anyone in your household is an individual with a disability identify if you may need additional help during an emergency.

Review Important Documents

Make sure your insurance policies and personal documents like ID are up to date. Make copies and keep them in a secure password protected digital space.

Strengthen your Home

De-clutter drains and gutters, bring in outside furniture, consider hurricane shutters.

Get Tech Ready

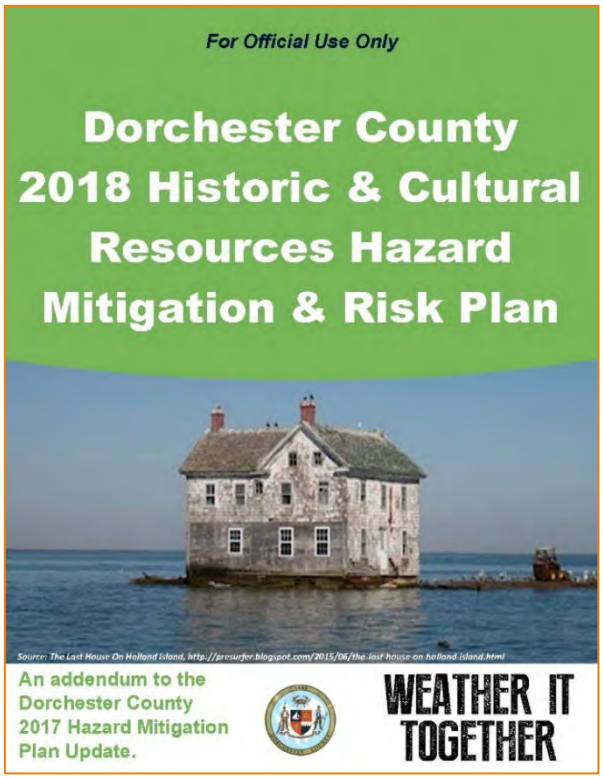
Keep your cell phone charged when you know a hurricane is in the forecast and purchase backup charging devices to power electronics.

Help your Neighborhood

Source: https://www.ready.gov/hurricanes

Historic Structures Vulnerability

In 2018, Dorchester County developed the Historic & Cultural Resources Hazard Mitigation & Risk Plan. The planning initiative was undertaken to specifically consider flood hazard risk and vulnerability to cultural and historic resources throughout Dorchester County. The risk of flood hazards included coastal flooding, hurricane storm surge, and sea level rise.



Six (6) survey districts were determined to be "Areas of Concern" since the areas will potentially be affected by future conditions, projected sea level rise, and are susceptible to current conditions; 1% annual chance flood hazard area and hurricane storm surge inundation. The Areas of Concern included:

- Todd Town-Toddville Survey District;
- Wingate Survey District;
- Bishops Head Survey District;
- Crocheron Survey District;
- Hoppersville Survey District; and,
- Fishing Creek Survey District.

A gap analysis was also completed for at-risk historic and cultural resources not within known historic and/or survey districts. The analysis identified areas of un-surveyed and/or understudied historic and cultural resources using existing structures and historic properties built in or prior to 1967. Areas displaying all three flood hazards in relation to un-surveyed buildings built in or prior to 1967 were predominately found in Crapo, Taylors Island, and Madison. These three (3) areas were then identified as additional Areas of Concern.

In addition to historical structures, the plan identified cemeteries, churchyards, and military memorials. Military memorials at risk to the flood risk scenarios were identified.

The Anchor of Hope Graveyard, (Traver's Graveyard on Hooper's Island, is a small cemetery that contains least 150 graves and is severely threatened by shoreline erosion.

Source: Leslie - https://www.pinterest.com/pin/4996249562379940/

Flood mitigation actions to a historic structure has to ensure that the structure does not lose its historic designation. Therefore, mitigation actions to reduce flood damages to historic structures that have minimal to moderate impact on the structure's historic integrity and maintains its historic designation were suggested. In addition, properties identified in the Areas of Concern met a prioritization criterion established by the Core Planning Team and Stakeholder Committee. Recommendations for structures identified in each Area of Concern and the gap analysis were provided.

Natural Systems Protection

Dorchester County and its municipalities have numerous planning initiatives and projects to reduce the risk of flooding and protect natural resources including:

- **Cambridge Shoreline Resilience Plan**

  The City of Cambridge along with their stakeholders are currently working on flood risk reduction and resilience strategies. Phase I of this planning project is primarily focused on mitigating flood risks along the Choptank River and Cambridge Creek, which are the primary sources of flooding in the city. This flooding is due to high tides, major storms and inadequate storm water management. This area largely includes the FEMA regulated Special Flood Hazard Area (SFHA), known as the land area subject to the 1% annual chance flood event. Within the Choptank and Cambridge Creek flood risk area, we have identified five distinct areas characterized by individual site conditions, development along the shoreline, and in several cases the existence of existing flood protection and functionality. These five areas include (1) Great Marsh Area- Gerry Boyle Park, (2) the West End where private property exist along the shoreline, (3) the Yacht Club and City Marina where open land extends to Cambridge Creek, (4) Cambridge Creek, which is fully developed along its banks, and (5) Sailwinds, which is a 24-acre tract under development by the Cambridge Waterfront Development Inc.

Cambridge Shoreline Resilience Plan - Project Areas

- **Coastal Community Resiliency Study for Hoopersville**

  The study will rely on the relationship within the close-knit community to incorporate community knowledge and provide an ecological assessment of the lands, marshes, and shoreline as well as evaluate the risk to the built environment. The analysis will provide the understanding, cost considerations and scientific basis to identify on-the-ground implementation projects such as marsh restoration, shoreline stabilization and enhancement, storm water drainage, habitat restorations, infrastructure planning and adaptations options for private properties to reduce flood impacts between now and

2050. The study will also serve as basis to engage residents about potential long term strategy options.

Coastal Community Resiliency Study for Twin Points Cove

The MEMA Grant for advanced flood mitigation planning is intended to implement that plan, and develop strategies and concept designs for flood mitigation projects to achieve the following:

- Integrate flood protection measures into the County's built environment, in the area of Twin Points Cove area, to minimize adverse impacts on the population and private property, while preserving water access and views.
- Provide multiple barriers to incrementally increase protection against sea level rise and major storms over time (immediate flood protection measures that can be adapted to future demand, off-shore barriers etc.).
- While the concepts and designs may be specific to the Twin Point Cove area, the long term objective is to define tools and strategies that could be applicable to other low lying areas of the County.

Hurst Creek Resiliency Project

The Hurst Creek Shoreline project is currently in the design phase. The shoreline is located within a very dynamic ecosystem with a +19-mile northwestern fetch. Complex sediment dynamics, sea level rise, land subsidence, adjacent development, and construction of a groin field have resulted in the alteration of the naturally occurring sandbar that historically acted as a barrier to the creek. As the creek's natural barrier diminished, the adjacent wetlands became more exposed to tidal currents and wave action. Sediment dynamics within the creek also shifted so that small boats are now unable to use the channel. To address the shoaling in the navigational channel while simultaneously enhancing coastal protection, Dorchester County is designing a climate-resilient living shoreline at the mouth of Hurst Creek that beneficially uses dredged material as fill. The living shoreline will take high-quality, sandy dredged material from the navigational channel at the opening of Hurst Creek, and mechanically place the material directly onto the sandbar to achieve cost-saving benefits.

Mid-Bay Island Ecosystem Restoration Project

The Mid-Chesapeake Bay Island Ecosystem Restoration Project - commonly known as Mid-Bay Island - is located in Dorchester County near what remains of James and Barren islands. It is a crucial future placement site for the DMMP and is integral to the Port's strategy for managing the nearly two million cubic yards of sediment that is dredged from the Maryland Bay's shipping channels every year while maximizing its use as a beneficial resource. Mid-Bay Island will comprise approximately 55 percent wetland and 45 percent upland habitats. The project is focused on restoring and expanding island habitat to provide hundreds of acres of wetland and terrestrial habitat for fish, shellfish, reptiles, amphibians, birds, and mammals through the beneficial use of dredged

Barren Island is located in the Chesapeake Bay near Blackwater National Wildlife Refuge in Dorchester County.

material. Once completed by mid-century, Mid-Bay Island will accommodate an estimated 90 to 95 million cubic yards of dredged material, providing over 30 years of placement capacity.

- **Town of Vienna Riverwalk**

  The purpose of the improvements was to rejuvenate the Towns 1,100-foot waterfront area and promote boating access. The project elements included living shorelines, boardwalks, bulkheads, floating piers, boat slips, and canoe launch. BayLand designed a 307-foot living shoreline project with stone sill with sand fill and over 14,000 square feet of marsh grass plantings. The design also included 300 feet of floating pier and docks to provide 10 slips for transient boaters.

BayLand also provided permitting and design services for approximately 800 feet of stone revetment and bulkhead. A 1,100 feet of timber boardwalk which was designed over the revetment, bulkhead, and stone sill to provide an uninterrupted access along the waterfront while providing easy access for boat dockage. BayLand also permitted and designed a canoe launch area with floating pier and timber boardwalk.

Conclusions & Recommendations

The following mitigation strategies were identified during the development of this plan chapter.

- Reviewing the vulnerability analysis for storm surge, coastal flooding and the shoreline erosion 100-foot risk zone, multiple critical facilities are at-risk to two or if not all three of these hazards. Critical facilities affected by all three hazards include: Taylors Island Volunteer Fire Company, Madison Volunteer Fire Company and EMS Station 500. Facilities affected by storm surge and coastal flooding only include Lakes and Straits Fire Company and Hoopers Island Volunteer Fire Company. The following table lists all critical and public facilities affected by two or more coastal events (hurricane, coastal flooding, and sea level rise and shoreline erosion).

Table 6-30

Critical & Public Facilities affected by Multiple Coastal Events				
Facility Detail	Critical or Public Facility	Hurricane Category (Storm Surge)	Coastal Flooding – Flood Depth	Within 100-Foot Risk Zone (from shoreline)
Taylors Island Volunteer Fire Company	Critical	1	1.1	Yes
Madison Volunteer Fire Company	Critical	1	0.8	Yes
EMS Station 500	Critical	1	0.5	Yes
Lakes and Straits Fire Company	Critical	1	2.6	No
Hoopers Island Volunteer Fire Company	Critical	1	3.3	No
County Facility	Public	1	1.6	No
Cambridge Public Work Facilities	Public	1	2.0	No
County Board of Education	Public	1	2.4	No
Vienna Public Works	Public	1	4.9	Yes

Source: Smith Planning and Design
Note: 100-foot risk zone does not differentiate between natural shoreline and hardened shorelines.

As listed in the table, six (6) critical and four (4) public facilities are vulnerable to two or more coastal events. These facilities may have been constructed to mitigate flooding, however; surrounding roads may cause evacuation issues. Additional mitigation measure may be necessary to ensure service provided by these facilities is not disrupted, especially during a hazard event.

- Retrofit the fire departments located within the special flood hazard areas. Continuity of operations at designated critical facilities is necessary to meet community needs and resiliency goals. The fire departments include:

    - Taylors Island Volunteer Fire Company
    - Hooper's Island Volunteer Fire Company
    - Madison Volunteer Fire Company/EMS Station 500
    - Lake and Straits Volunteer Fire Company

- Promote best practices success story with an Elevation Project Press Release. Property owners who voluntarily participated in elevating their homes located in the County's special flood hazard area may be willing to allow the County to use photos of their

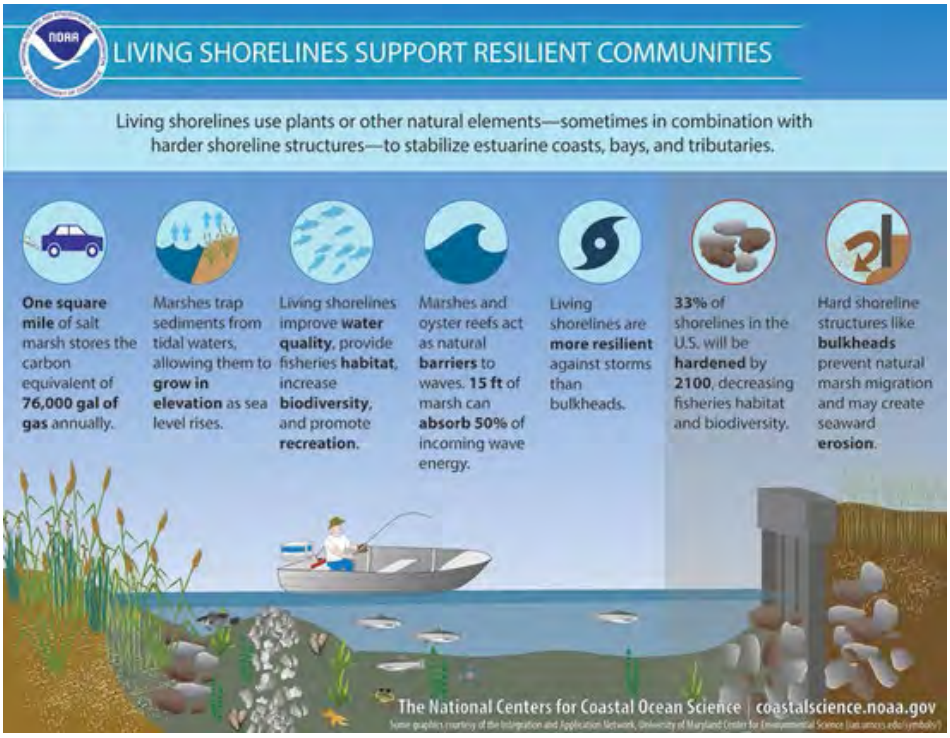
elevation project as an example of “Best Practices.” Documenting the various steps taken to complete an elevation project, including a series of before, during, and after photos will help to encourage other at-risk property owners to apply for mitigation funding.

It is important to note that Dorchester County using FEMA grant funding has undertaken flood elevation projects in coordination with property owners in the past. More recently, two (2) flood elevation projects are currently underway, both of which are being undertaken and funded solely by the property owners. One of which is on Hoopers Island Road and the other is on Parks Road.

- Explore flood risk reduction opportunities for structures located before the Limit of Moderate Wave Action (LiMWA). A total of six (6) structures in the Fishing Creek area are within the LiMWA. Breakwaters should be considered in this area. Breakwaters consist of a single structure, or a series of units placed offshore of the project site to reduce wave action on the shoreline. These structures are created with various types of materials but usually employ what is “locally” available. Rock is typically used for construction and has been shown to be very durable when properly designed and installed.

- Provide property owners located along shorelines with high erosion rate, the Neck District, Taylors Island, Hoopers Island and Crocheron, with information on potential risk reduction ideas. FEMA’s Protect your Property from Coastal Erosion could be used to provided ideas for homeowners.

- Using the Coastal Atlas, areas with shoreline erosion rates that are high and very high should be reviewed for living shorelines. Living shorelines connect the land and water to stabilize shorelines, reduce erosion, and provide valuable habitat that enhances coastal resilience.



Source: The National Centers for Coastal Ocean Science

- Prioritize the twenty-nine (29) roads identified as to having experienced repetitive flooding issues by the Core Planning Team for inclusion in the County's Capital Improvement Plan. Fourteen (14) of the identified roads are also evacuation routes. These roads should take precedence when determining mitigation measures. Repetitive flooding occurs on these roadways due to low elevation of the roadway or stormwater management issues. Upgrade and mitigate evacuation routes when funding from Federal or State sources is available.

- Use flood resistant materials below the BFE on historic structures, specifically in the "Areas of Concern". When rehabilitating or repairing a damaged historic structure, use flood resistant materials below the BFE to improve the structure's ability to withstand flooding. Guidance for using flood resistant materials can be found in Technical Bulletin, Flood-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Area in accordance with the National Flood Insurance Programs.

- Complete Maryland Historical Trust's (MHT) Architectural Survey Form for Hazard Mitigation Planning for properties in flood hazard areas that are documented in the Maryland Inventory of Historical Properties and/or listed or eligible for listing in the National Register of Historic Places (MIHP/NRHP) and listed on the Recommendations Table in the Historic & Cultural Resources Hazard Mitigation & Risk Plan. Use information obtained to develop appropriate flood mitigation measures that balance protection and preservation. *Note: During the Historic & Cultural Resources Hazard Mitigation & Risk Plan development process, sixteen (16) prioritized properties were surveyed using the Architectural Survey Form for Hazard Mitigation Planning.*

- Complete/update MIHP forms for buildings not surveyed and endangered by flood hazards and for buildings with old NRHP forms/old MIHP forms in high hazard areas within areas of concern. Areas displaying all three flood hazards (projected sea level rise, 1% annual chance flood hazard area and hurricane storm surge inundation) in relation to un-surveyed buildings built in or prior to 1967 were predominately found in Crapo, Taylors Island, and Madison.

Chapter 7 Riverine Flooding

Chapter Update Overview

Riverine flooding hazard impacts were identified by the Core Planning Team during the update process as indicated in Table 7-1. Significant flood events in the United States, Table 7-2 was added to the plan update. Watershed and topography information was added to the chapter under the Vulnerability Analysis section to provide a better understanding on how the County is affected by flooding. Hazard history data was updated, while newly developed mapping products are presented throughout the chapter. The critical and public facility database used for the various coastal hazard vulnerability assessments presented in this chapter was vetted to include new facilities built subsequent to 2017, and the removal of facilities that moved or are no longer in operation. Loss estimations were updated and expanded to account for the 2019 Flood Risk Report. It is important to note that while information from the 2019 Flood Risk Report (FRR) document has been integrated into this chapter, the 2019 FRR database was used to produce Dorchester County new mapping products not included in the FRR. New information specific to Social Vulnerability in relation to riverine flooding was included as part of the plan update. NFIP data along with Repetitive and Severe Repetitive Loss Property data were updated, and Map 7-6 was included. Conclusions and Recommendations were added at the end of this chapter.

Hazard Impacts

The Core Planning Team reviewed and discussed impacts from coastal hazard events as presented on the table below.

Table 7-1

Riverine Flooding Hazard Impacts	
Public Health & Safety	• Home and property owners within the FEMA 1% annual chance flood hazard area are most at risk to impacts from a flood event. Impacts to the public include potential for injury or loss of life, destruction and/or loss of land and property, and contamination of water due to flood. • Residents who choose to not evacuate during a flood event increase their risk for loss of life and reduce the chance of receiving assistance.
Social Vulnerability	• Socially vulnerable populations are more likely to be adversely affected by a flood event since they are less likely to recover and more likely to experience loss of life. • The elderly are at risk of death because they may have difficulty evacuating or accessing medical services to treat heat, dehydration, stokes or heart attacks
Economic Stability	• A major flood event would be costly in terms of emergency response, delivery of services, disaster cleanup, and future mitigation projects. • Damage to structures could force long-term closures and business interruptions. • Destruction of infrastructure would have long-term impacts on tourism.
Infrastructure	• Infrastructure may experience impacts in the form of damages from flooding, debris blockages, temporary closure of transportation routes, and the potential inability of the stormwater system to handle floodwaters in a severe event. • Water and wastewater treatment plants can be impacted directly due to facility locations that are typically located within the 1% annual chance flood hazard area.
Environment	• Pollutants in the waterways from overtaxed stormwater systems. • During flood events, agricultural pollutants, such as fertilizers, can enter waterways.

Hazard Profile & Risk

The FEMA definition for flooding is, “a general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters or the rapid accumulation of runoff of surface waters from any source.” Floods can be caused by the passage of frontal storms, thunderstorms, hurricanes, snow melt or any combination of the above events. This chapter focuses on following flood types, riverine flood and flash flood.

According to the National Flood Insurance Program (NFIP), flooding is the most common natural disaster in the United States. Since its inception, the NFIP has paid nearly $52 billion for flood insurance claims and related costs. Between 2010 and 2018 the annual cost of flood damage in the United States was approximately $17 billion, according to FEMA, and was four times greater than was recorded in the 1980’s.

Table 7-2

Top 10 Most Significant Flood Events by National Flood Insurance Program Payouts[1]			
Rank	Date	Event	Location
1	Aug. 2005	Hurricane Katrina	AL, FL, GA, LA, MS, TN
2	Sep. 2017	Hurricane Harvey	AL, AR, FL, GA, KY, LA, MS, NC, TX
3	Oct. 2012	Superstorm Sandy	CT, DC, DE, MA, MD, ME, NC, NH, NJ, NY, OH, PA, RI, VA, VT, WV
4	Sep. 2008	Hurricane Ike	AR, IL, IN, KY, LA, MO, OH, PA, TX
5	Aug. 2016	Louisiana severe storms and flooding	LA
6	Sep. 2004	Hurricane Ivan	AL, DE, FL, GA, LA, MD, MS, NJ, NY, NC, OH, PA, TN, VA, WV
7	Aug. 2011	Hurricane Irene	CT, DC, DE, MA, MD, ME, NC, NH,
8	Jun. 2001	Tropical Storm Allison	FL, LA, MS, NJ, PA, TX
9	Sep. 2017	Hurricane Irma	FL, GA, SC
10	Oct. 2016	Hurricane Matthew	FL, GA, NC, SC, VA

[1]Includes events from 2001 to January 31, 2019, as of December 2021. Defined by the National Flood Insurance Program as an event that produces at least 1,500 paid losses. Stated in dollars when occurred.
Source: U.S. Department of Homeland Security, Federal Emergency Management Agency; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Hurricane Center.

Human induced activities such as timbering, commercial/ residential development, and road building have the potential to increase stormwater runoff that makes downstream areas more susceptible to flooding damage during natural occurring events. Since local climatic conditions can produce large amounts of precipitation at any time of the year, the potential for flooding is not limited to any particular season. Historically, however, most major floods have occurred during heavy thunderstorm activity or in late summer or early fall during the hurricane season.

For this plan update, Hazard Risk & Identification Assessment (HIRA) results indicate that riverine flooding is “medium-high” risk for Dorchester County based on eight (8) parameters: injuries, deaths, property and crop damage, geographic extent, total annualized events, future probability, and community perspective. Additional information about the ranking process and results are provided within *Appendix A Hazard Risk & Identification Assessment Methodology.*

The Core Planning Team and municipalities level of concern specific to riverine flooding indicate “very concerned” according to the survey. However, the public survey showed that the community was “somewhat concerned” about riverine flooding. Tables 7-3 to 7-6 provides data for flood, flash flood, and heavy rain events.

Table 7-3 provides a compilation of flood hazard risk assessment data, which includes flood, flash flood, and heavy rain. According to the NCEI data, on average, Dorchester County experiences approximately 1.65 flood events per year.

Table 7-3

Total Flood Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Flood, Flash Flood, and Heavy Rain*							
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)	Future Probability	Community Perspective
0	0	$0	$0	% in 100-yr Flood Zone (A, AE, AO &VE) = 57.5%	Total = 43 Annual Avg = 1.65	Likely	Very Concerned
Source: National Centers for Environmental Information, as of February 2021 & 2016 State of Maryland Hazard Mitigation Plan **Note: Data collected for 1950-present, no data available for this event type prior to 1996* *Based on NCEI definitions/criteria: Flood (C). Any high flow, overflow, or inundation by water which causes damage. In general, this would mean the inundation of a normally dry area caused by an increased water level in an established watercourse, or ponding of water, that poses a threat to life or property.*							

In terms of number of occurrences, the NWS/NCEI listed a total of thirty-six (36) heavy rainfall event days affecting Dorchester County from 1996-2021. According to the data, on average, Dorchester County experiences approximately 1.13 heavy rainfall events per year.

Table 7-4

Heavy Rain Events		
Location	Date	Event Narrative
Hurlock	October 24 to October 27, 2007	Rainfall amounts averaged between 2 to 3 inches across the County.
Vienna	December 10 to December 12, 2008	Rainfall amounts between 1 to 4 inches occurred across the County. 3.01 inches was measured at Vienna.
Cambridge	November 11 to November 13, 2009	Rainfall amounts ranged between three and six inches across the County.
Vienna	March 29, 2010	Rainfall amounts of one to three inches occurred across the county.
Toddville	September 30, 2010	Rainfall amounts of two to seven inches occurred across the county. Blackwater reported 5.74 inches of rain. Toddville reported 5.65 inches of rain.
Vienna	November 9 to November 10, 2015	Rainfall amounts generally ranged between 1.3 inches and 2.5 inches across the county. Vienna (5 WNW) reported 2.03 inches of rain. Wingate (1 N) reported 1.43
Mount Holly	June 28, 2016	Rainfall total of 1.55 inches was measured at 3 miles east of Cambridge.
East New Market	July 29, 2016	Over two inches of rain fell in one hour and minor street flooding occurred on July 28.
East New Market	September 19, 2016	Rainfall totals generally ranged from 1 inch to 5 inches across the county. East New Market reported 5.34 inches of rain. Bucktown (3 WSW) reported 4.32 inches of rain. Linkwood (2 SE) reported 4.30 inches of rain. Cambridge (3 E) reported 3.48 inches of rain. Wingate (1 N) reported 1.34 inches of rain.

Location	Date	Event Narrative
East New Market	September 28, 2016	Rainfall totals generally ranged from 1 inch to 5 inches across the county. East New Market reported 4.76 inches of rain. Cambridge (2.1 ESE) reported 3.89 inches of rain. Cambridge (1 NW) reported 3.81 inches of rain. Bucktown (3 WSW) reported 3.47 inches of rain.
Bucktown	October 8, 2016	Rainfall totals generally ranged from 2 to 4 inches across the county.
2021 HMP Update		
Salem	July 29, 2017	Rainfall total of 2.98 inches was measured at Linkwood.
Linkwood/ Bucktown/ Cambridge	August 13, 2017	Rainfall total of 2.90 inches was measured at Linkwood. Rainfall total of 3.20 inches was measured at Bucktown. Rainfall total of 3.14 inches was measured at Cambridge.
Wingate	October 11, 2018	Rainfall total of 2.71 inches was reported at Wingate.
Sewards/ Cambridge	October 20, 2019	Rainfall total of 1.78 inches was reported at Blackwater. Rainfall total of 1.63 inches was reported at Cambridge.
Cambridge	August 4, 2020	Rainfall totals between two and five inches were reported across the county. Rainfall total of 4.75 inches was reported at Cambridge. Rainfall total of 4.06 inches was reported at Blackwater.
Toddville	September 17-18, 2020	Rainfall total of 3.08 inches was reported at Toddville.
Cambridge	October 29-30, 2020	Rainfall totals between 1.5 inches and 3.0 inches were reported across the county.
East New Market	November 11-12, 2020	Rainfall totals generally ranged between two inches and four inches across the county. Rainfall total of 4.04 inches was reported at Blackwater. Rainfall total of 3.13 inches was reported at East New Market. Rainfall total of 3.07 inches was reported at Cambridge.
Vienna	December 4-5, 2020	Rainfall totals generally ranged between one inch and three inches across the county. Rainfall total of 2.19 inches was reported at Vienna. Rainfall total of 2.02 inches was reported at Blackwater.
Cambridge	December 24-25, 2020	Rainfall totals generally ranged between two inches and three inches across the county. Rainfall total of 3.38 inches was reported at Cambridge, 3.00 inches at East New Market, 2.82 inches at East New Market, and 2.75 inches as Blackwater.
East New Market/ Cambridge/ Salem/ Sewards	July 9, 2021	Due to TS Elsa, rainfall total of 3.01 inches was reported in East New Market, 2.72 inches in Cambridge, 2.48 inches at another location in East New Market, 2.96 inches at another location in East New Market, 3.34 inches at a location in Cambridge, 3.05 inches at a location in Salem, and 2.39 inches reported in Sewards.
Salem	July 29, 2017	Rainfall total of 2.98 inches was measured at Linkwood.
Linkwood/ Bucktown/ Cambridge	August 13, 2017	Rainfall total of 2.90 inches was measured at Linkwood. Rainfall total of 3.20 inches was measured at Bucktown. Rainfall total of 3.14 inches was measured at Cambridge.

Source: NWS, NCEI (NOAA)

According to the National Centers for Environmental Information (NCEI), there have been a total of eight (8) flood events affecting Dorchester County during the years of 1996 to 2021. According to the data, on average, Dorchester County experiences approximately 0.32 flood events per year.

Table 7-5

Flood Events		
Location	Date	Event Narrative
Cambridge	June 20,1996	Three inches of rain in one hour produced flooding of several streets in the city of Cambridge.
Dorchester	October 25, 2004	Front yards and roads were flooded across southern portions of the County. Strong southerly winds occurring at high tide caused the rising waters.
Cambridge	June 25,2006	High water along Route 50
Cambridge	August 27 to August 28, 2011	Heavy rains associated with Hurricane Irene produced widespread low-land flooding across much of the county, including roadways which were washed out or closed. Storm total rainfall generally ranged from six to eleven inches. Cambridge reported 8.50 inches of rain. Vienna reported 8.19 inches of rain.
Andrews	October 29, 2012	Numerous roads were closed due to flooding. Storm total rainfall ranged from three to seven inches across the county.
2021 HMP Update		
Hurlock/East New Market	May 18-19, 2018	Numerous roads remained closed due to ongoing flooding from heavy rainfall across portions of the county.
Galestown/Elliott	October 12, 2018	Several roads remained impassable or closed across southeast portions of the county due to lingering flooding.
Linkwood/Holly	October 30, 2020	High water was reported on roadways between Linkwood and East New Market.

Source: NWS, NCEI (NOAA)

Flash floods, as the name suggests, occur suddenly after a brief but intense downpour. They move fast and terminate quickly. Although the duration of these events is usually brief, the damages can be quite severe. Flash floods are more likely to occur in places with steep slopes and narrow stream valleys, and along small tributary streams. Flash floods could also be a result of improper stormwater drainage. Flash floods can also be associated and/or contributed to by rapid snow melt accompanied by a significant rain event.

As for occurrences, the NWS, NCEI listed a total of ten (10) flash flood events affecting Dorchester County from the years 1996-2021; flash flood event data are presented in Table 7-6. According to the data, on average, Dorchester County experiences approximately 0.40 flash flood events per year.

Pete Ewers Drive washed out during heavy rain event from Elsa.

Source: Live5 WCSC - https://www.live5news.com/2021/07/08/heavy-rain-elsa-washes-away-road-dorchester-county/
Photo Source: Logan Reigstad

Table 7-6

Flash Flood Events		
Location	Date	Event Narrative
Cambridge	June 20, 1996	Three inches of rain in one hour produced flooding of several streets in the city of Cambridge.
Cambridge	July 15, 2000	Several roads closed due to flooding.
Bucktown	July 3, 2000	Numerous secondary roads closed in central and northern Dorchester County due to heavy rain.
Vienna	August 1, 2004	Numerous streets reported flooded.
Hurlock	June 25, 2006	Several basements and numerous streets flooded. Torrential rain caused numerous roads between Hurlock and East New Market and Sharptown and Galestown to be either partially damaged or washed out due to flash flooding. Total rainfall reports were of 9 to 10 inches in the northeast portion of the county.
Galestown	June 28, 2006	Heavy rain caused flash flooding and closure of several roads. Basement flooding also reported.
Eldorado	September 8, 2011	Many roads were closed due to flooding from heavy rain in the Eldorado and Galestown areas.
Cambridge	June 7, 2013	Heavy rainfall between five and six inches resulted in widespread flooding across the county. City officials reported several roads closed and impassable around Cambridge. County officials reported numerous roads flooding from Hurlock to Secretary.
Cambridge	June 18, 2013	Heavy rainfall resulted in minor street flooding in Cambridge. Indian Bone Road was impassable due to high water.
2021 HMP Update		
Elliott/Lakesville	October 11-12, 2018	Tropical cyclone Michael tracked off the Mid-Atlantic coast producing heavy rain in the region. Several roads were impassable or closed across southeast portions of the county due to flash flooding.

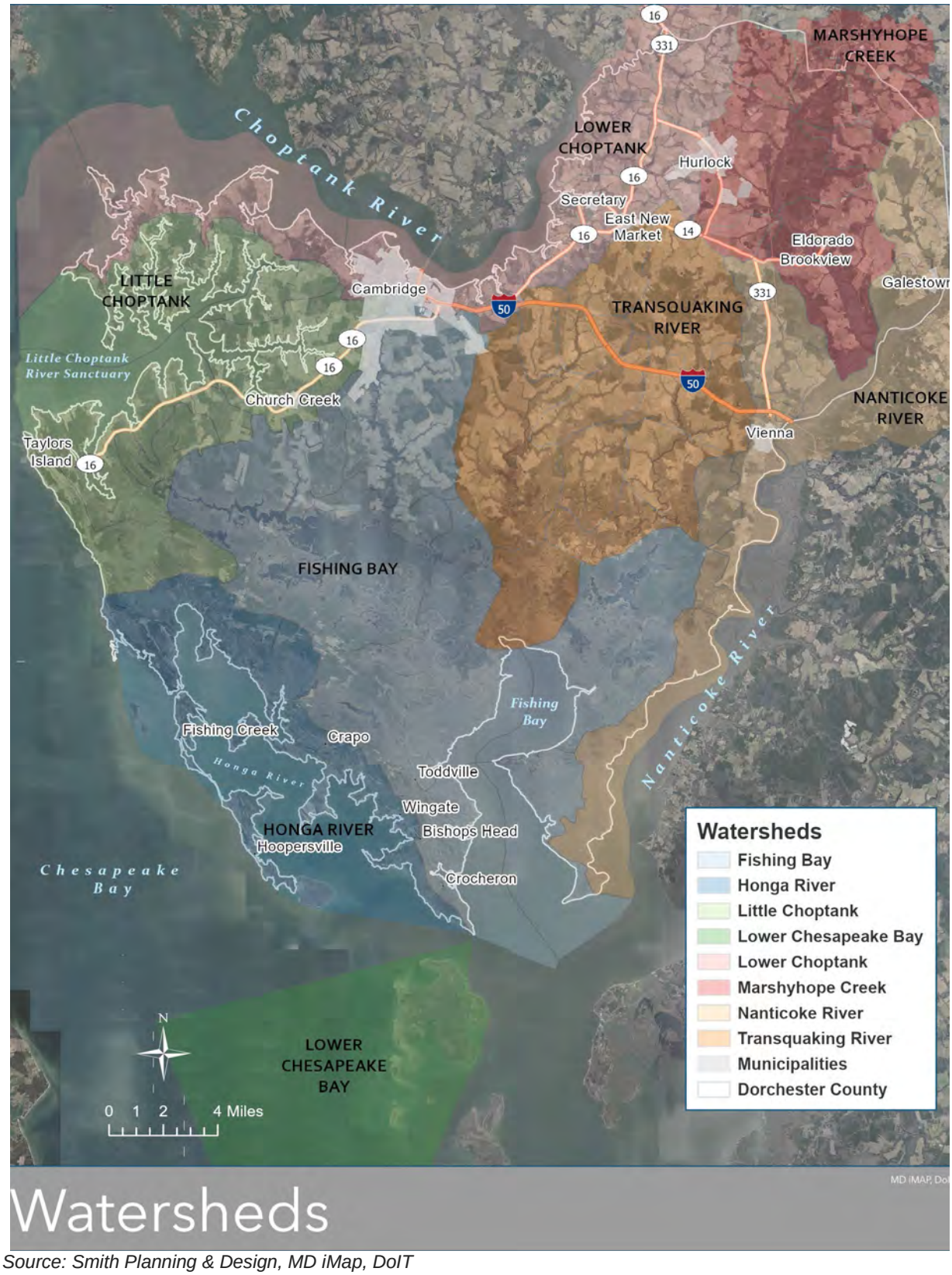
Source: NWS, NCEI (NOAA)

Vulnerability Analysis

According to the 2021 Dorchester County Comprehensive Plan, the County is low lying, with a maximum elevation of 50 feet in the northeastern section. The land north of U.S. Route 50 is generally well drained, while the land south is poorly drained. The southern portion of the County includes extensive tidal marsh or freshwater swamp land, making up about one-quarter of the County's land area. Approximately two-thirds of the County drains into the Nanticoke River watershed. The other major watershed is the Choptank River watershed. The Nanticoke and Choptank Rivers contain the following sub-watersheds:

- Nanticoke River
  - Fishing Bay
  - Marshyhope Creek
  - Nanticoke River
  - Transquaking River
- Choptank River
  - Honga River
  - Little Choptank
  - Lower Choptank

Map 7-1



Source: Smith Planning & Design, MD iMap, DoIT

Dorchester County is prone to various forms of flooding, including both riverine and flash flooding. Therefore, a Digital Flood Insurance Rate Map (DFIRM) Database published by the Federal Emergency Management Agency (FEMA) for Dorchester County was utilized to depict flood risk areas. The DFIRM is the basis for floodplain management, mitigation, and insurance activities for the National Flood Insurance Program (NFIP). FEMA's new Flood Insurance Rate Maps (FIRM) for Dorchester County became effective in March 2015. As a result of the revised flood maps, new flood zones and new flood rates apply to flood insurance policies. Many properties experience flood insurance premium relief due to Dorchester County's efforts by participating in the Community Rating System (CRS).

The National Flood Insurance Program's Community Rating System is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Dorchester County property owners currently earn a 20% discount on all flood insurance premiums.

Table 7-7 provides information on how floodplains are categorized into flood zones. Map 7-2 depicts the geographic extent of FEMA Flood Zones corresponding with Table 7-7 below.

Table 7-7

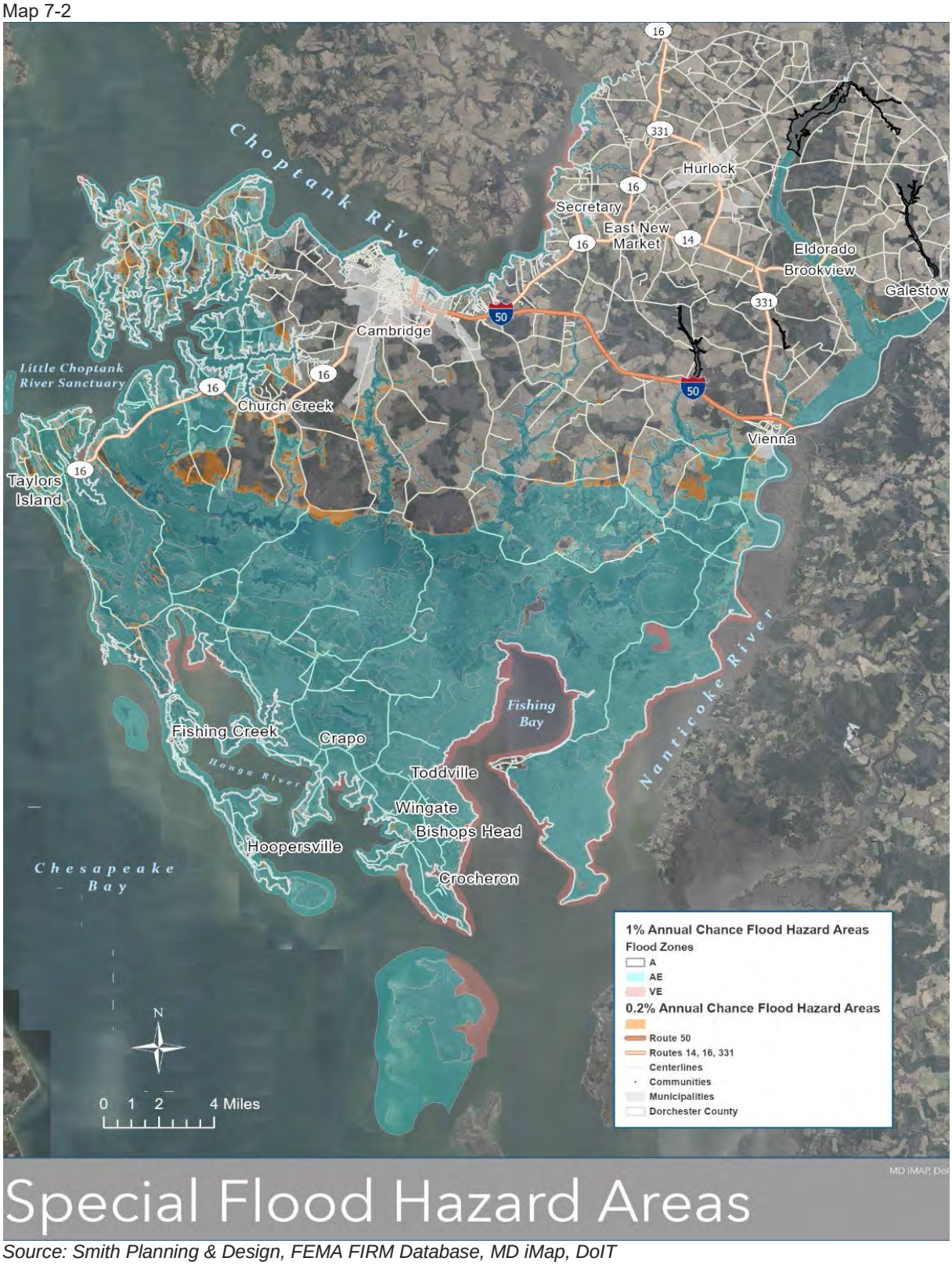
FEMA Flood Zone Descriptions		
	Flood Zone	Description
High Risk Areas		
1% Annual Chance Flood Hazard	A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
	AE	The base floodplain where base flood elevations are provided for a 100-year flood event. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
High Risk – Coastal Area		
1% Annual Chance Flood Hazard	VE	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
Moderate Risk Areas		
0.2% Annual Chance Flood Hazard	Zone X Shaded	Areas outside the 1% annual chance floodplain, areas of 1% annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1% annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1% annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone. Insurance purchase is not required in these zones.

Source: FEMA: Definitions of FEMA Flood Zone Designations

Dorchester County Floodplain Management

Dorchester County adopted the most recent FIRM in March of 2015. Dorchester County's Floodplain Management Ordinance language, located in Chapter 155 of the County Code, and Bill No. 2015-1, is in compliance with the current FIRM and FIS and is located both online and in the Department of Planning and Zoning. This department handles floodplain management for both the county and the Towns of Brookview, Church Creek, Eldorado, Galestown, and Vienna. Additional information on floodplain management for both the county and municipalities is within Appendix J.

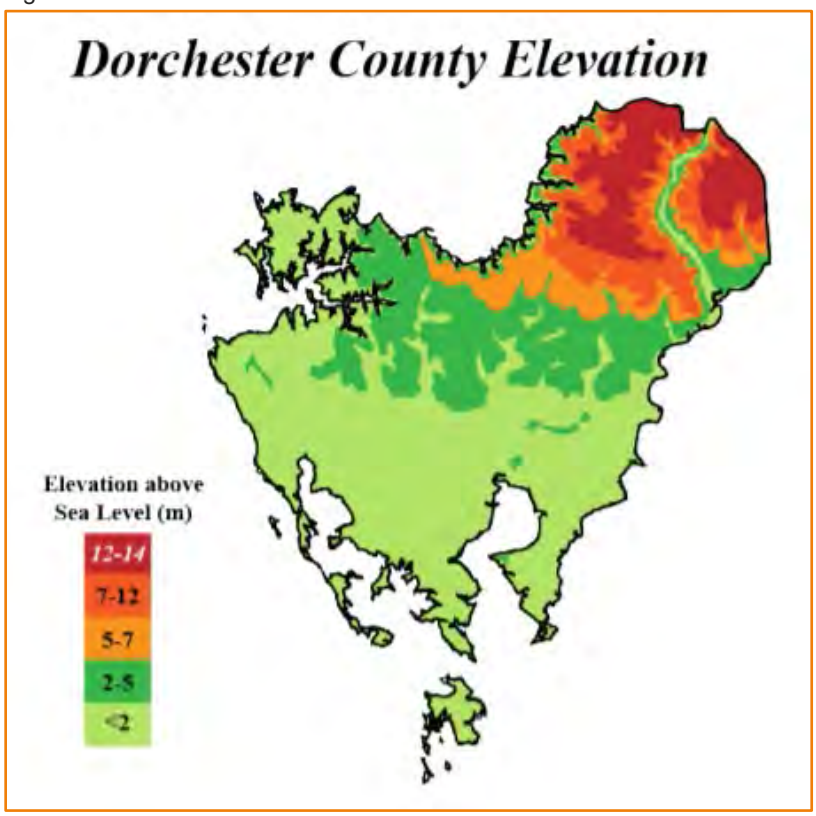
Map 7-2



Source: Smith Planning & Design, FEMA FIRM Database, MD iMap, DoIT

According to the 2015 Flood Insurance Study, the general topography of Dorchester County is flat with an elevation increase from south to north. Nearly 75 percent of Dorchester County has an elevation of less than 20 feet above sea level. Northern Dorchester County contains the county's highest elevation, 57 feet above sea level where no tidal flooding occurs. The steepest slopes within the county are found adjacent to the Choptank River, the northern boundary of the county, where fluvial processes have created steep riverbanks. The increasing elevation found in northern Dorchester County produces a gently rolling terrain with nearly all of the County's hills located in this area. Southern Dorchester County is very flat and is generally at, or slightly above, sea level and subject to considerable flooding from high tides. As depicted on Map 7-2, the majority of the southern portion of the County is within the 1% annual chance flood hazard area, Special Flood Hazard Area.

Figure 7-1

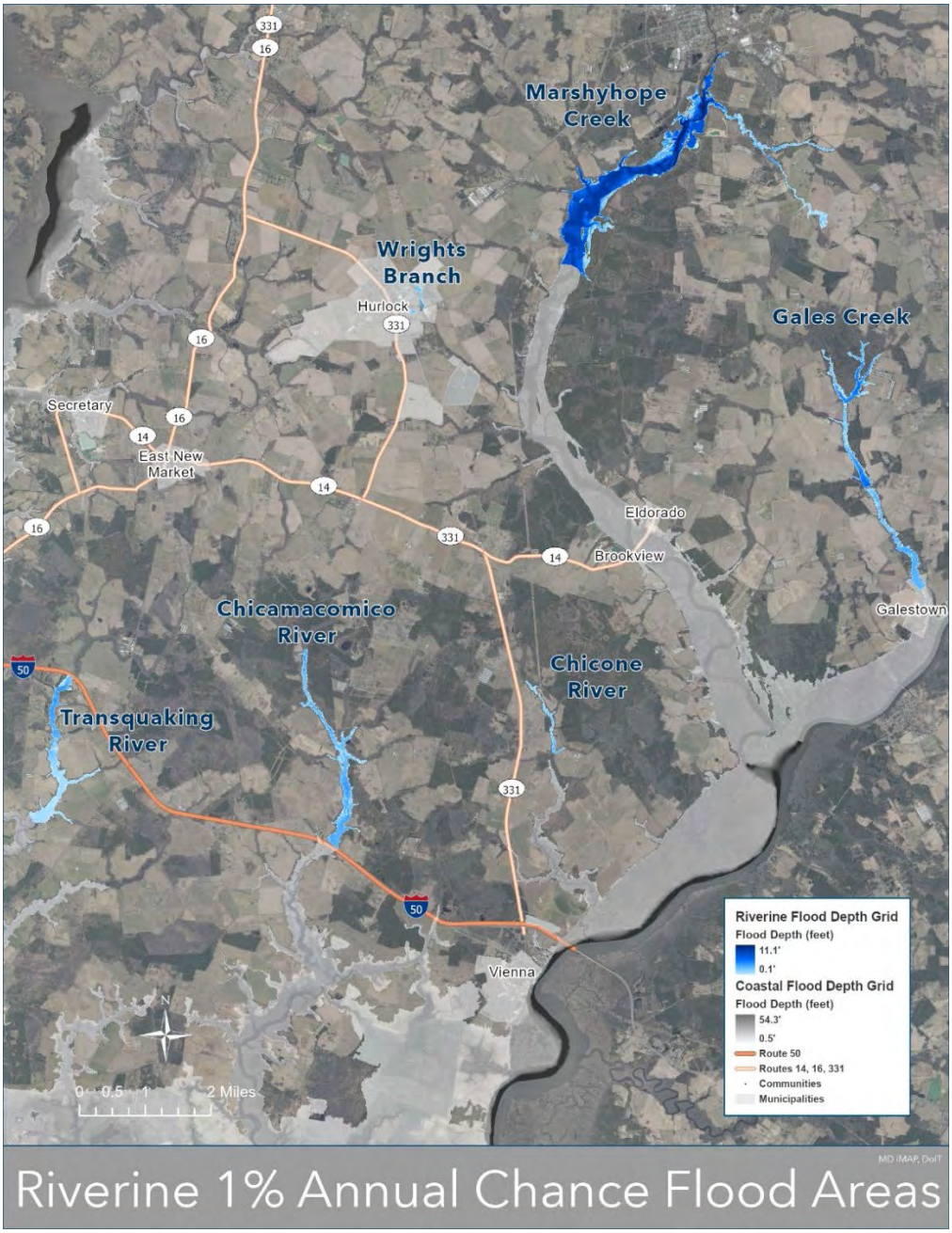


Source: Addressing the Resiliency of Coastal Infrastructure to Sea Level Rise in Dorchester County and the Eastern Shore of Maryland

Critical & Public Facilities Vulnerability Analysis

An analysis was completed to determine critical and public facilities within the FEMA Flood zones, specifically those affected by riverine flooding. Maps 7-2 and 7-3 depict both the coastal and riverine 1 percent annual chance flood hazard areas, known collectively as the Special Flood Hazard Area. The riverine area is not tidally influenced and is shown in **blue** in the northwest portion of the County. Critical and public facilities vulnerability in the riverine areas have been assessed and no facilities were found to be at risk. Please note, the area shown in **black and gray** are coastal flood areas, which are tidally influenced and a separate vulnerability assessment has been conducted and is presented in Chapter 6 Coastal Events.

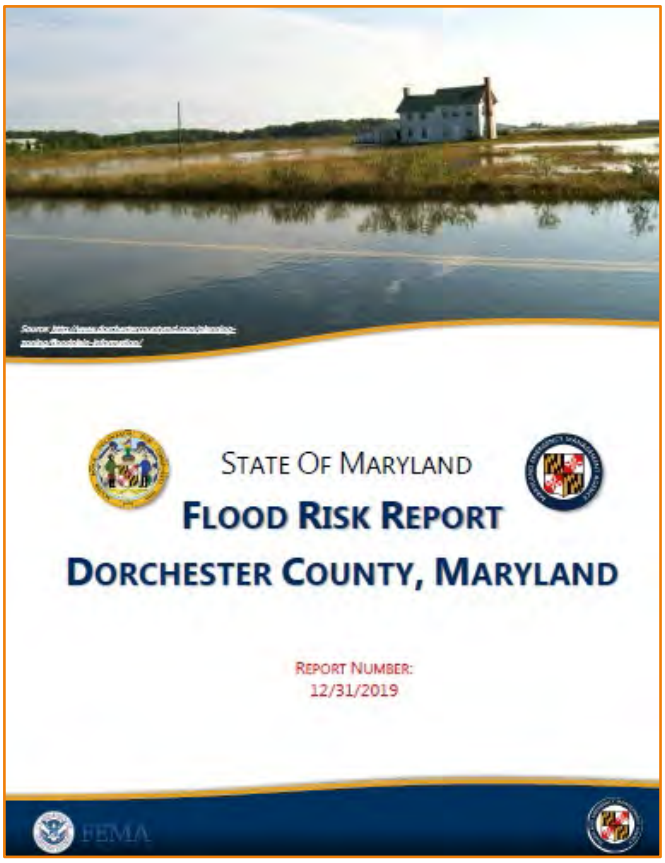
Map 7-3



Source: Smith Planning & Design, 2019 Flood Risk Report Database, MD iMap, DoIT

Residential & Commercial Vulnerability Analysis

In addition to the FEMA FIRM maps that depict flood areas, other flood risk resources are available. In December 2019, the Flood Risk Report (FRR) for Dorchester County was published. The FRR is non-regulatory product providing information for a better understanding of the flood risk in Dorchester County. The FRR provides flood risk data for the entire county as well as for each individual community. The 2019 FRR differs from the 2015 Flood Risk Report in that refined loss data results for both coastal and **riverine areas** of the County are included, as only coastal areas were analyzed in the previous 2015 version. The 2019 FFR was also expanded to include refined losses for both essential facilities and state assets. Loss estimations for residential and commercial structures are included in this report for coastal and riverine areas, however only data specific to **riverine** are included in this chapter.



According to the FFR, to fully assess flood risk, the following sources of information were leveraged:

- New/revised engineering analyses (i.e. hydrologic and hydraulic modeling), floodplain boundaries, and flood depths based on regulatory FIRM updates and published in the FEMA National Flood Hazard Layer;
- MDPropertyView – parcel-specific information containing assessed values, land use/occupancy categories, number of stories, etc. (as of February 2015), acquired through the Maryland Department of Planning;
- Building footprints, representing real-world locations for addressable structures, provided by Dorchester County Planning and Zoning - GIS Office; and,

- Hazus-MH Version 3.1 (2016) – Hazus is a nationally applicable standardized software suite that contains models for estimating potential losses from floods and other natural disasters.

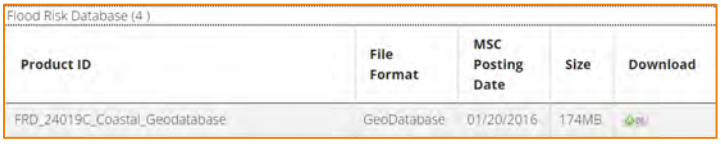
Flood depth grids were created for all mapped 1 percent annual chance floodplains in the County, whereby flood depth is a function of the difference between the calculated water surface elevation (including overland wave propagation for coastal areas) and the ground. It was noted that separate flood depth grids were created for riverine and coastal flood hazards, as engineering analyses and regulatory FIRM updates for each study type were separately performed.

According to the FRR, scenario-based flood losses were calculated using Hazus for the 1 percent annual chance flood event. Flood losses were estimated in the 'refined' study using User Defined Facilities (UDFs), which were created using local parcel, assessor, and building footprint data.

Using information from this FRR, maps were developed for inclusion in this plan document. A total of nine (9) structures were determined to be at-risk based on the riverine depth grid 1% annual chance flood hazard area (riverine areas). The at-risk structures are depicted on Map 7-4. These structures include:

- Map 1: Town of Hurlock
  - 2 Residential Structures
  - 2 Commercial Structures
    - Primary flooding source in the town is Wrights Branch.
- Map 2: Unincorporated Areas
  - 4 Residential Structures
    - Primary flooding sources in the town are Nanticoke River.
- Map 3: Town of Galestown
  - 1 Residential Structure
    - Primary flooding sources in the town are Gale Creek and Nanticoke River.

Maps were developed for this section using data obtained from the FEMA Map Service Center.

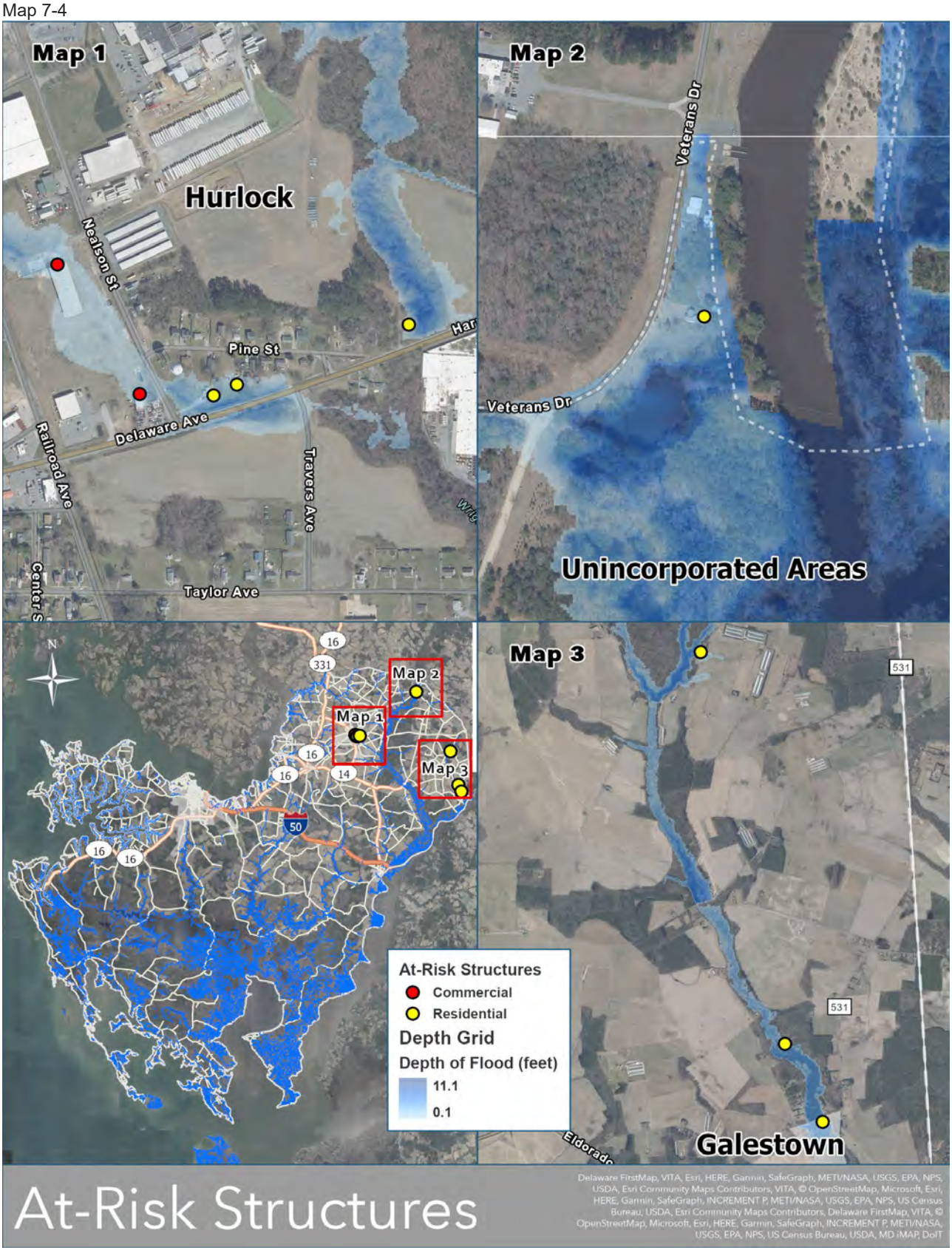

Flood Risk Database (4)

Product ID	File Format	MSC Posting Date	Size	Download
FRD_24019C_Coastal_Geodatabase	GeoDatabase	01/20/2016	174MB	

Through Risk MAP, FEMA provides communities with updated Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) Reports that focus on the probability of floods and that show where flooding may occur as well as the calculated 1- percent-annual-chance flood elevation. The 1- percent-annual-chance flood, also known as the base flood, has a 1% chance of being equaled or exceeded in any given year. FEMA and the State of Maryland understand that flood risk is dynamic—that flooding does not stop at a line on a map—and that higher-level storm events and the impacts of Climate Change can result in flooding that exceeds the regulatory 1-percent- annual-chance floodplain. Nevertheless, the regulatory 1-percent-annual-chance flood is the common denominator for all studies in Maryland (whether coastal or riverine, or between studies using detailed or approximate methodologies) and is therefore used as the basis for the flood loss analysis in this report.

Source: 2019 Dorchester County Flood Risk Report

Map 7-4

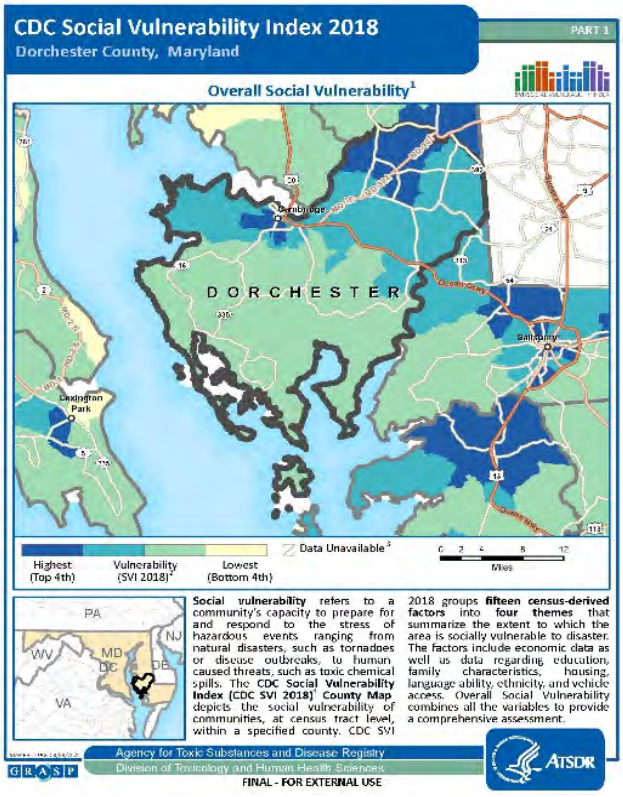


Source: Smith Planning & Design, 2019 Flood Risk Report Database, MD iMap, DoIT

Social Vulnerability

The Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) uses fifteen (15) U.S. Census variables to calculate SVI scores that can help local officials identify communities within the County that may need additional support before, during, and/or after disasters. The SVI has been conducted for Dorchester County at the census tract level and is illustrated in Figure 7-2. The darker blue census tracts in the overall map indicate areas of higher social vulnerability while the light green tracts indicate relatively low social vulnerability.

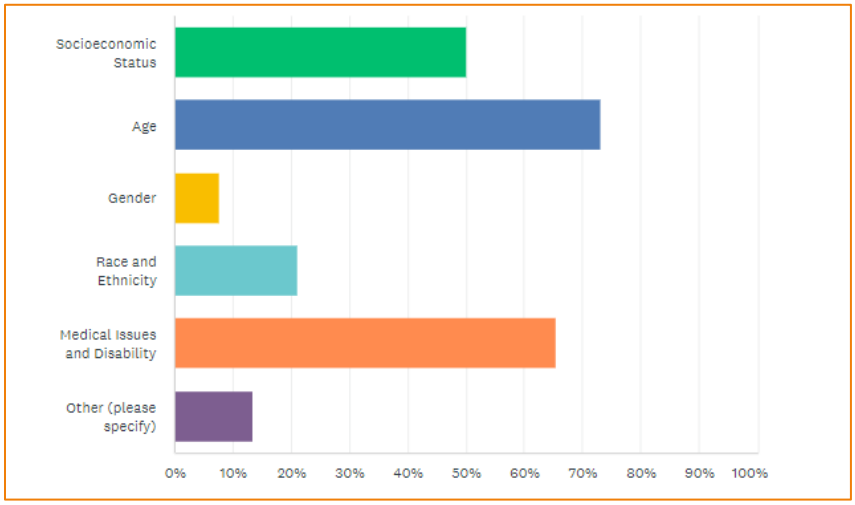
Figure 7-2



In reviewing Figure 7-2, the area with the highest social vulnerability is within the City of Cambridge and the northeast section of the County, shown in dark blue, which includes the Towns of Secretary, East New Market and Hurlock. In relation to the riverine hazard areas, only the Town of Hurlock is located within both the 1% annual chance flood hazard area and designated highest social vulnerability area.

In addition, the public survey asked the community which specific group or groups in the County are particularly at risk for, or could be harmed, by any of the identified hazard events. Socially vulnerable groups provided as options include socioeconomic status, age, gender, race and ethnicity, and medical issues and disabilities. Fifty percent of the participants indicated that the "Age" group (65 & older) is particularly at risk to the riverine flood hazard.

Figure 7-3



Source: Screenshot of Public Survey Results

Loss Estimations

According to the Flood Risk Report (FRR), Hazus-MH Version 3.1 was used to determine flood vulnerability and loss estimations. The following tables were derived from the FRR and provide loss estimations for structures at-risk to the riverine 1 percent annual chance flood hazard area.

Unincorporated Areas Analyses and Flood Risk Results

The Dorchester County (Unincorporated Areas) flood risk analysis incorporates modeled floodplain boundaries and flood depths for the 1-percent-annual-chance flood event, along with User Defined Facilities (UDFs) developed from local parcel, assessor, and building footprint data.

Flood loss estimates for the 1-percent-annual-chance flood event were calculated using Hazus-MH, and the results are presented in Table 7-8. The riverine loss estimates are highlighted in the light blue rows. Note that minor differences between values in these tables may result from rounding and aggregation under different categories.

Table 7-8

Dorchester County (Unincorporated Areas) – Estimated Losses by Occupancy Type for the 1%- Annual-Chance Flood (UDFs in Riverine and Coastal Areas)

Type	# of Impacted Buildings	Inventory Estimated Value	% of Total	1% Flood Dollar Losses[1]	1% (100-yr) Percent Loss[2]
Residential Building & Contents	2161	$410,600,000	93%	$28,300,000	7.0%
Riverine	4	$1,400,000	100%	$10,000	0.7%
Coastal	2157	$409,200,000	93%	$28,300,000	7.0%
Commercial Building &Contents	46	$11,600,000	3%	$1,000,000	9.0%
Riverine	0	$0	0%	$0	0.0%
Coastal	46	$11,600,000	3%	$1,000,000	9.0%
Other Building & Contents	67	$21,200,000	5%	$3,500,000	17.0%
Riverine	0	$0	0%	$0	0.0%
Coastal	67	$21,200,000	5%	$3,500,000	17.0%
Total Building & Contents[3]	2274	$443,400,000	100%	$32,800,000	7.0%
Business Disruption[4] *(Riverine)*	N/A	N/A	N/A	$0	N/A
Business Disruption[4] *(Coastal)*				$1,200,000	
TOTAL[5]	2274	$443,400,000	100%	$34,000,000	8.0%

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.

[2]Percent Loss = Dollar Losses ÷ Estimated Value. Percentages are rounded to the nearest integer.

[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

[5]Total = Total Building and Contents + Business Disruption

Town of Hurlock Analyses and Flood Risk Results

The Town of Hurlock is located in northeastern Dorchester County. It consists of 2.89 square miles along State Highway 392. The primary flooding source in the town is Wrights Branch.

Data provided below only includes areas in the Town of Hurlock that are located within the Dorchester County, Maryland Flood Risk Report. The Town of Hurlock flood risk analysis incorporates modeled floodplain boundaries and flood depths for the 1-percent-annual-chance flood event, along with User Defined Facilities (UDFs) developed from local parcel, assessor, and building footprint data. Flood loss estimates for the 1-percent-annual-chance flood event were calculated using Hazus-MH.

Note that no coastal flood losses are identified in Hurlock, so only riverine flood loss estimates are presented; differences between values in these tables may result from rounding and/or aggregation under different categories.

Table 7-9

Town of Hurlock – Estimated Losses by Occupancy Type for the 1%- Annual-Chance Flood (UDFs in Riverine Areas)

Type	# of Impacted Buildings	Inventory Estimated Value	% of Total	1% Flood Dollar Losses[1]	1% (100-yr) Percent Loss[2]
Residential Building & Contents	2	$100,000	20%	$20,000	20.0%
Commercial Building & Contents	2	$400,000	80%	$10,000	3.0%
Other Building & Contents	0	$0	0%	$0	0.0%
Total Building & Contents[3]	4	$500,000	100%	$30,000	6.0%
Business Disruption[4]	N/A	N/A	N/A	$10,000	N/A
TOTAL[5]	4	$500,000	100%	$40,000	8.0%

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.

[2]Percent Loss = Dollar Losses ÷ Estimated Value. Percentages are rounded to the nearest integer.

[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

[5]Total = Total Building and Contents + Business Disruption

Town of Galestown Analyses and Flood Risk Results

The Town of Galestown is located in northeastern Dorchester County. It consists of 0.26 square miles near State Highway 313. The primary flooding sources in the town are Gale Creek and Nanticoke River.

The Town of Galestown flood risk analysis incorporates modeled floodplain boundaries and flood depths for the 1-percent-annual-chance flood event, along with User Defined Facilities (UDFs) developed from local parcel, assessor, and building footprint data. Flood loss estimates for the 1-percent-annual-chance flood event were calculated using Hazus-MH. The following table indicates potential extent of damages to buildings from flooding within the community.

Note that minor differences between values in these tables may result from rounding and aggregation under different categories.

Table 7-10

Town of Galestown – Estimated Losses by Occupancy Type for the 1%- Annual-Chance Flood (UDFs in Riverine and Coastal Areas)					
Type	# of Impacted Buildings	Inventory Estimated Value	% of Total	1% Flood Dollar Losses[1]	1% (100-yr) Percent Loss[2]
Residential Building & Contents	1 (Riverine)	$80,000	89%	$10,000	13.0%
Commercial Building & Contents	1 (Coastal)	$10,000	11%	< $5,000	0.0%
Other Building & Contents	0	$0	0%	$0	0.0%
Total Building & Contents[3]	2	$90,000	100%	$10,000	11.0%
Business Disruption[4]	N/A	N/A	N/A	$0	N/A
TOTAL[5]	2	$90,000	100%	$10,000	11.0%

Source: Hazus (Version 3.1 [Riverine] and 2.2 [Coastal]) results stored as the 'Flood Risk at Structure' Dataset (S_FRAS_PT) in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.

[2]Percent Loss = Dollar Losses ÷ Estimated Value. Percentages are rounded to the nearest integer.

[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.

[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.

[5]Total = Total Building and Contents + Business Disruption

National Flood Insurance Program & Repetitive Loss Properties

National Flood Insurance Program

NFIP's 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 risk resulting from community actions meeting the three goals of the CRS: to reduce flood losses, to facilitate accurate insurance rating, and to promote the awareness of flood insurance.

For CRS participating communities, flood insurance premium rates are discounted in increments of 5%; i.e., a Class 1 community would receive a 45% premium discount, while a Class 9 community would receive a 5% discount. (A Class 10 is not participating in the CRS and receives no discount.).

Source: 2019 Dorchester County Flood Risk Report

A report from the National Flood Insurance Program (NFIP) dated September 30, 2021, indicated a total of 1,463 flood insurance policies were filed for Dorchester County and its nine municipalities.

Table 7-11

NFIP Insurance Policies						
Location	Number of Policies			Total Coverage		
	2011	2016	2021	2011	2016	2021
Brookview	0	0	1	0	0	$302,500
Cambridge	196	212	178	$44,598,400	$51,556,400	$43,427,700
Church Creek	18	6	8	$2,337,000	$995,300	$2,135,000
East New Market	0	0	0	0	0	0
Eldorado	1	2	1	$135,500	$304,500	$149,100
Galestown	2	0	0	$70,000	0	0
Hurlock	5	6	7	$1,470,000	$1,575,000	$1,883,000
Secretary	21	27	21	$2,788,000	$5,295,100	$5,147,200
Vienna	4	4	4	$1,189,300	$995,600	$980,000
Dorchester County (unincorporated)	1,400	1,315	1,243	$286,839,800	$305,486,000	$311,434,500
Total	1,742	1,572	1,463	$353,546,800	$366,207,900	$365,459,000

Source: FEMA: NFIP Insurance Report, Maryland - October 25, 2021

Of the nine municipalities in Dorchester County, six are located within close proximity to the floodplain of major waterbodies. These include the City of Cambridge and Town of Secretary next to the Choptank River, Eldorado, and Brookview near Marshyhope Creek and Galestown and Vienna next to the Nanticoke River.

In comparing the information provided in Table 7-11, insurance policies increased within several municipalities, while decreasing in the unincorporated portions of Dorchester County. Brookveiw now has one (1) policy, while the number of policies in Cambridge has decreased by 34 policies.

Note: Flood insurance is available to anyone in the County and even those structures outside of the 100-year mapped floodplain area. Therefore, in some cases, the number of policies includes structures that are location outside of the 100-year mapped floodplain.

The following question was posed within the Hazard & Flood Mitigation Public Survey conducted as part of the plan update process.

"Do you have flood insurance? If you do not have flood insurance, please select the reason that may apply."

Fifty-nine percent of participants responded that they did not have flood insurance. Ten percent stated they were not familiar with it or didn't know about flood insurance. The reason provided for not having flood insurance was overwhelming "it is too expensive," at 67%.

The National Flood Insurance Program (NFIP) total claims reported since 1978 was provided by Kevin Wagner, Community Assistance Program Manager, Maryland Department of Environment on October 25, 2021. Information provided in the report is detailed in Table 7-12. Overall reported claims paid since 1978 totaled $16,467,282. The majority of claims between 1978 and 2011 occurred in 1996 and 2003. In 1996, a total of 53 claims were processed after Hurricane Fran impacted Dorchester County; the total amount paid from those claims was $143,380. Several years later, the County was impacted again by Hurricane Isabel, which resulted in damages to hundreds of structures. A total of 650 claims were processed with a sum of $14,560,427 being paid.

Table 7-12

NFIP Insurance Claims						
Location	Number of Claims			Total Paid		
	1978-2011	2012-2016	2017-2021	1978-2011	2012-2016	2017-2021
Brookview	0	0	0	$0	$0	$0
Cambridge	298	6	6	$6,397,895.16	$191,827.86	$71,766.98
Church Creek	54	2	1	$681,294.16	$85,012.94	$9,662.77
East New Market	15	4	2	$255,468.36	$26,997.09	$9,281.92
Eldorado	0	0	0	$0	$0	$0
Galestown	0	0	0	$0	$0	$0
Hurlock	0	0	0	$0	$0	$0
Secretary	1	0	0	$40,201.32	$0	$0
Vienna	1	0	0	$11,084.44	$0	$0
Dorchester County (unincorporated)	451	21	21	$15,353,290	$224,722.55	$355,924.81
Total	820	33	30	$15,492,085.54	$528,560.44	$446,636.48

Source: FEMA: NFIP Insurance Report, Maryland - October 25, 2021

Reviewing the number of claims filed previously in 2012-2016 to the more recent 2017-2021, a increase in insurance claims filed is evident for unincorporated areas of the County. While the City of Cambridge, Church Creek, and East New Market experienced a decrease in insurance claims filed over the same time period.

Considering the amount of flood insurance policies and the number of claims that have been reported, identifying areas of repetitive loss within a community is a good indicator to utilize in determining areas of high flood damage vulnerability. While flood damage is not necessarily limited to these areas, repetitive loss data provides location indicators for areas where structures are experiencing recurring and costly flooding damage.

FEMA defines a repetitive loss property as:

A structure covered by a contract for flood insurance made available under the NFIP that:

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

FEMA defines a severe repetitive loss property as:

Properties are defined as single or multifamily residential properties that are covered under an NFIP flood insurance policy and:

- That have incurred flood-related damage for which four or more separate claims payments have been made, with the amount of each claim (including building and contents payments) exceeding $5,000, and with the cumulative amount of such claim payments exceeding $20,000; or
- For which at least two separate claims payments (building payments only) have been made under such coverage, with cumulative amount of such claims exceeding the market value of the property.

In both instances, at least two of the claims must be within 10 years of each other, and claims made within 10 days of each other will be counted as one claim.

As of October 2021, 54 repetitive and 3 severe repetitive loss properties containing single-family and commercial structures were located within Dorchester County its municipalities. Eleven (11) new repetitive loss properties, denoted with an asterisk, were identified since the previous planning cycle. During the previous planning cycle, no severe repetitive loss structures were located within Dorchester County, however, three (3) structures within the County are defined as severe repetitive loss properties, highlighted in blue in Table 7-13.

Table 7-13

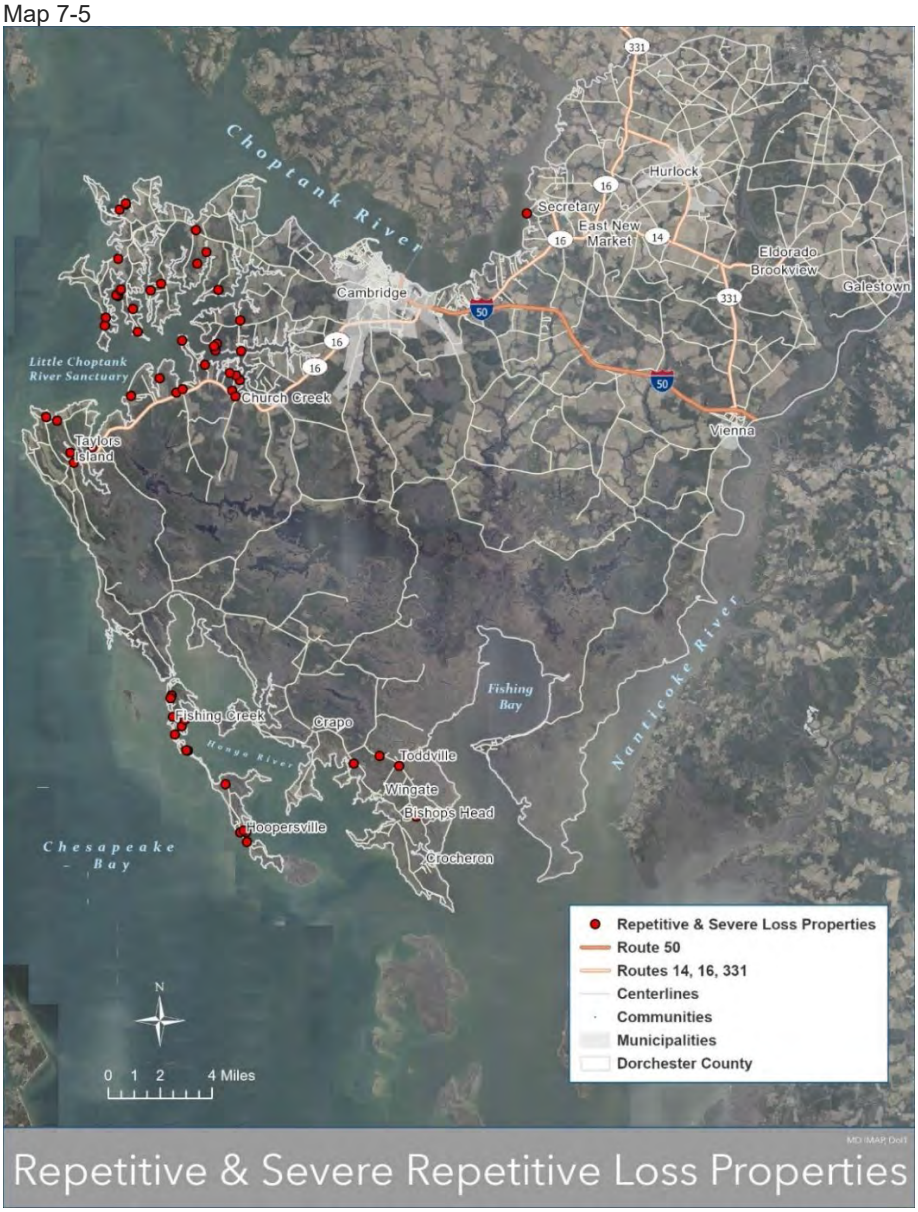
Repetitive & Severe Repetitive Loss Properties						
Severe RLP	Location	Community	Occupancy	Mitigated	NFIP Insured	Total Loss
No	Seabreeze Rd	Cambridge	Single Family	No	Yes	3
No	David Greene Rd	Cambridge	Single Family	No	Yes	2
No	Ross Thumb Rd	Cambridge	Single Family	No	Yes	2
No	Morris Neck Rd	Cambridge	Single Family	No	No	4
No	David Greene Rd	Cambridge	Single Family	No	No	2
No	Twin Point Cove Rd	Cambridge	Single Family	No	No	2
No	Seabreeze Rd	Cambridge	Single Family	No	Yes	2
No	Casson Neck Rd	Cambridge	Single Family	No	Yes	2
No	Bowen Rd*	Cambridge	Single Family	Yes	Yes	2
No	Bowen Rd	Cambridge	Single Family	No	Yes	2
No	Ragged Point Rd	Cambridge	Single Family	No	No	2
No	Ross Neck Rd	Cambridge	Single Family	No	Yes	2
No	Twin Point Rd	Cambridge	Single Family	No	No	2
No	David Greene Rd*	Cambridge	Single Family	Yes	Yes	3
Yes	Town Point Rd	Cambridge	Single Family	No	SDF	4
No	Bar Neck Rd	Cambridge	Single Family	No	No	2
No	Bar Neck Rd	Cambridge	Single Family	No	Yes	2
No	Ragged Point Rd	Cambridge	Single Family	No	Yes	2
No	Heron Rd	Cambridge	Single Family	No	Yes	2
No	Twin Point Cove Rd	Cambridge	Single Family	No	No	2
No	Hudson Rd	Cambridge	Single Family	No	Yes	2
No	Casson Neck Rd*	Cambridge	Single Family	No	No	2
No	Greenpoint Rd*	East New Market	Single Family	No	Yes	2
No	Hoopersville Rd*	Fishing Creek	Single Family	Yes	Yes	2
No	Old House Point Rd	Fishing Creek	Single Family	No	No	2
No	Hoopersville Rd	Fishing Creek	Single Family	No	No	3
No	Lodge Hall Rd	Fishing Creek	Single Family	No	No	2
No	Hoopers Island Rd*	Fishing Creek	Single Family	Yes	Yes	2
No	Steamboat Wharf Rd	Fishing Creek	Single Family	No	No	2
No	Creighton Rd	Fishing Creek	Single Family	No	Yes	4
Yes	Hoopers Island Rd*	Fishing Creek	Single Family	Yes	Yes	2
No	Steamboat Wharf Rd	Fishing Creek	Single Family	No	No	2
No	Hoopers Island Rd	Fishing Creek	Single Family	No	No	2
No	Hoopers Island Rd	Fishing Creek	Single Family	No	Yes	2
No	Hoopersville Rd*	Fishing Creek	Single Family	No	Yes	2
No	Hoopers Island Dr*	Fishing Creek	Single Family	No	Yes	2
No	Madison Canning House Rd	Madison	Commercial	No	No	3
No	Taylors Island Rd	Madison	Single Family	No	No	2
No	Old Madison Rd	Madison	Single Family	No	No	2
No	Parsons Dr	Madison	Single Family	No	Yes	2
Yes	Hoopers Neck Rd	Taylors Island	Single Family	No	No	2
No	Taylors Island Rd*	Taylors Island	Single Family	Yes	No	4
No	Taylors Island Rd	Taylors Island	Single Family	No	Yes	2
No	Hoopers Neck Rd	Taylors Island	Single Family	No	No	2
No	Hall Rd	Taylors Island	Single Family	No	Yes	2
No	Toddville Rd	Toddville	Single Family	No	No	2
No	Toddville Rd	Toddville	Single Family	No	No	2
No	Tedious Creek Rd	Toddville	Single Family	No	No	2

Severe RLP	Location	City	Occupancy	Mitigated	NFIP Insured	Total Loss
No	Toddville Rd	Toddville	Single Family	No	No	2
No	Tedious Creek Rd	Toddville	Single Family	No	No	2
No	Wingate Point Rd	Wingate	Commercial	No	No	2
No	Wingate Point Rd	Wingate	Single Family	No	No	2
No	Lee Ter	Woolford	Single Family	No	No	3
No	Laurie Ln*	Woolford	Single Family	Yes	No	2
No	Brooks Rd	Woolford	Single Family	No	Yes	3
No	Deep Water Rd	Woolford	Single Family	No	No	2
No	Vanada Way	Woolford	Single Family	No	No	2
No	Brooks Rd	Woolford	Single Family	No	No	3
No	Taylors Island Rd	Woolford	Single Family	No	Yes	2

Source: Community Assistance Program Manager, Maryland Department of Environment on October 25, 2021

Repetitive and severe repetitive loss properties listed in Table 7-13 are depicted in Map 7-5.

Map 7-5



Source: Smith Planning & Design, MDE-Community Assistance Program Manager: October 25, 2021, MD iMap, DoIT

Natural Systems Protection

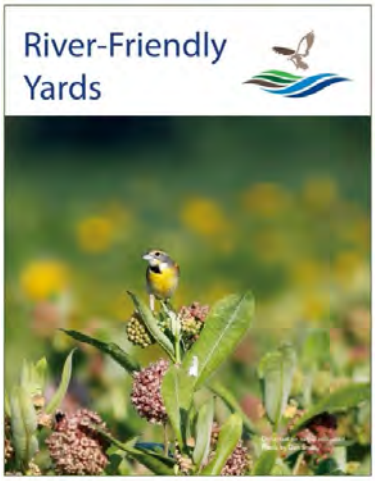
Natural systems protection activities reduce the impact of floods by preserving or restoring natural areas such as floodplains, wetlands, and dunes and their naturalfunctions. Erosion and sedimentation control is an example of a protection activity.

Although the majority of Dorchester County contains low lying areas and tidally influenced river systems, many of the smaller tributaries that convey runoff and streamflow to these river systems are nontidal. The State of Maryland designates each water body (streams, rivers, etc.) in the state with a Use Designation to indicate the anticipated use and for classification. The predominant use designation of streams within Dorchester County is Use I, which is defined as, “Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life (MDE).” A few water bodies are designed as Use II, which is defined as, “Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting (MDE).”

Nontidal stream channels transport hydrology and sediment downstream to larger water bodies, however, many of Maryland’s streams are unstable and experiencing excessive erosion. Additionally, excessive runoff from agricultural practices can result in elevated nutrient loading, specifically nitrogen and phosphorous, into our waterways resulting in decreasing water quality. Streams that experience excessive runoff often become incised and therefore disconnected from their floodplain, which exacerbates erosion and exponentially increases sediment laden runoff. Floodplains provide many benefits, including floodwater storage, sediment deposition, flood attenuation, wildlife habitat, and nutrient capture, to just name a few. Furthermore, stream channels that are unstable and eroding can impact infrastructure by washing out culverts, undercutting streambanks near facilities, impacting roadways, and exposing utilities.

The restoration of nontidal streams and floodplains to their natural function can be an effective mitigation tool that not only contributes to reduce nontidal riverine flooding impacts, but also can help to reduce sediment and nutrient loading into receiving water bodies. In Dorchester County, many of the Use I streams discharge to Use II waterways, where shellfish are grown and harvested . Studies have shown that filter feeders such as oysters and clams benefit from the reduction in suspended solids due to erosion. Since Dorchester County is considered to be the “hub of Maryland oyster farming (www.choosedorchester.org)”, stream and floodplain restoration projects have the potential to provide additional, farther-reaching benefits, than just mitigating riverine flooding, but can also have an important economic and community benefit as well.

According to Shore Rivers https://www.shorerivers.org/river-friendly-yards, a River-Friendly Yard mimics the natural environment to benefit water quality. Even if you are not on the waterfront, every drop of water from your property is carried to our rivers. We are learning that stitching together small habitats into conservation corridors may make the essential difference we need for all species, including our own, to thrive. In a time when it is easy to feel despondent about our environmental future, there is real hope in your yard of any size. Enjoy beautiful native plantings; create bird and pollinator habitat; improve soggy lawns and basements; and help ShoreRivers achieve our vision of healthy waterways across Maryland’s Eastern Shore.



RIVER-FRIENDLY YARDS HOMEOWNER BOOKLET

Conclusions & Recommendations

The following mitigation strategies were identified during the development of this plan chapter.

- Promote best practices success stories with an Elevation Project Press Release. Property owners who voluntarily participated in elevating their homes located in the County's special flood hazard area may be willing to allow the County to use photos of their elevation project as an example of "Best Practices." Documenting the various steps taken to complete an elevation project, including a series of before, during, and after photos will help to encourage other at-risk property owners to apply for mitigation funding.

- Mitigate repetitive and severe repetitive loss properties identified in this Chapter. There are 54 repetitive and 3 severe repetitive loss properties located within Dorchester County. The strategy is to eliminate or reduce the damage to property and the disruption of life caused by repeated flooding of the same properties. Depending on the severity of flooding at these locations, another possibility is to elevate the structure, so it is well above the base flood elevation. Acquiring buildings and removing them from the floodplain is not only the most effective flood protection measure available, but also an opportunity to convert a problem area into a community asset and obtain environmental benefits. These properties are listed in Table 7-13 and depicted on Map 7-5. Prioritize neighborhoods that contain multiple RL and SRL properties, there by developing community wide mitigation projects rather than scattered site projects.

- In terms of the social vulnerability index, areas with the highest SVI scores shown on Figure 7-4 are the City of Cambridge and the northeast section of the County, which includes the Towns of Secretary, East New Market and Hurlock. Target these areas with warning notifications, specifically the Town of Hurlock, during riverine flood events, which is impacted by the riverine 1% annual chance flood hazard area.

- Educate the communities at-risk to the 1% annual chance flood hazard areas about flood insurance. Conduct flood insurance workshops for the public. Also conduct flood insurance workshops targeted to flood insurance agents, real estate agents, and area surveyors, include continuing education credits as an initiative for participation.

Chapter 8 Winter Weather

Chapter Update Overview

Winter weather hazard impacts were identified by the Core Planning Team during the update process as indicated in Table 8-1. To reflect winter weather events that have occurred during this planning cycle, Tables 8-2 and 8-3 were updated. The critical and public facility database used for the vulnerability assessments was vetted to include new facilities and the removal of facilities that moved or are no longer in operation. A new component was added for this plan updated, Social Vulnerability. Conclusion and recommendations were added at the end of this chapter.

Hazard Impacts

The Core Planning Team reviewed and discussed impacts from coastal hazard events as presented on the table below.

Table 8-1

Winter Weather Hazard Impacts	
Public Health & Safety	• Impacts to the public include potential for dangerous road conditions resulting in accidents, power outages (no heat), freezing temperatures, and medical emergencies from shoveling or falls causing injury or loss of life. • Delayed response from health and safety responders are possible if county residents do not heed weather warnings. • First responders face the risk of personal injury while performing necessary job functions. First responders who are exposed to extreme cold or work in cold environments may be at risk of cold stress.
Social Vulnerability	• Populations with chronic health conditions are at higher risk during a winter weather event because their health conditions could be exacerbated by several factors including stress related to the extreme weather conditions, inability to access medical attention, or essential medical equipment that may became inoperable due to lack of power.
Economic Stability	• A major winter weather event would be costly for state and local governments due to the potential for damages associated with property (during severe storms), storm cleanup, and loss of power. • Power outages and road closures prohibit citizens' ability to work, which could cause business disruption.
Infrastructure	• Home and landowners throughout the state may experience varying levels of damage to property depending upon received snow and ice loads, although damage is usually minimal. • Infrastructure may experience impacts in the form of damage to roadways (particularly during snow removal), and interruptions to above ground power and communication systems.
Environment	• Winter storms impact the environment by damaging vegetation and tree limbs. Additionally, rapid snowmelt may also lead to flash flood events, which causes further environmental impacts. • Excessive use of de-ice chemicals to treat roads, driveways, and sidewalks washes into soil, lakes, and streams, and could contaminate drinking water reservoirs and wells.

Hazard Profile & Risk

The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. According to the Maryland State Archives, the average seasonal snowfall total for Maryland is 20.6 inches. Snowfall ranges from 10 inches on the lower Eastern Shore to 110 inches in Garrett County annually. One of the highest snowfalls ever recorded in a single winter in Maryland was during the winter of 2009-10, when 262.5 inches of snow fell at Keyser's Ridge in Garrett County. In comparison, Dorchester County averages approximately 10 inches of snowfall annually, according to the National Weather Service (NWS).

Source: WJZ-CBS Baltimore. 12/9/2018

According to NOAA-NCEI, the most severe winter storm in terms of `snowfall occurred on February 6, 2010, with 24" of snow being reported for a one-day period by the Vienna Weather Station. More recently, while several smaller winter storm/weather events have occurred, the most significant yet recent winter storm that affected Dorchester County occurred on January 22-24, 2016, where snowfall totals from 5 to 13 inches of snow were reported across the County.

While the above is true for much of the state, winter storms in the County occur with less frequency and are usually less severe in terms of cold temperature, snow accumulation and the amount of time snow is on the ground. As noted in *Chapter 2 County Profile*, Dorchester County typically receives approximately 10 inches of snow per year/season.

Dorchester County reported 7 inches of snow on January 4, 2018. Traffic camera along Route 50 at Route 331 captured snow-covered roads during the event.

Source: www.choosecambridge.com. 1/4/2018

While each winter season brings with it the possibility of major snow and ice storms, some winter storms in Maryland do stand out for their severity and duration. Storms that stand out include the winter storm of 1979, which dropped more than two feet of snow in Ocean City and the President's Day storm in 2003 that resulted in more than 19 inches of snow in Cambridge. As far as cold weather is concerned, in 1912, temperatures dropped to nearly -20° F over much of the State. During a prolonged cold spell in 1977, much of the Chesapeake Bay froze over for an extended period of time.

Heavy snowfall and extreme cold can be detrimental to an entire region by immobilizing emergency vehicles or closing evacuation routes. Even areas that normally experience mild winters can be hit with a major snowstorm or extreme cold, which can result in not only in closed highways but also flooding, storm surge, downed power lines and hypothermia.

For this plan update, Hazard Risk & Identification Assessment (HIRA) results indicate that winter weather is a "medium" risk for Dorchester County based on the following eight (8) parameters: injuries, deaths, property and crop damage, geographic extent, total annualized events, future probability, and community perspective. Additional information about the ranking process and results are within *Appendix A Hazard Risk & Identification Assessment Methodology.* Table 8-2 provides a compilation of winter weather risk assessment data, which includes winter storm, winter weather, blizzard, ice storm, frost/freeze, heavy snow, and sleet. Dorchester County's annual average for winter weather events is 1.54 events per year.

The Core Planning Team and municipalities level of concern specific to winter weather indicate "somewhat concerned" according to the survey. However, the public survey showed that the community was "concerned" about winter weather.

Table 8-2

Winter Weather Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Winter Storm, Winter Weather, Blizzard, Ice Storm, Frost/Freeze, Heavy Snow and Sleet.*							
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)	Future Probability	Community Perspective
0	0	$35k	$0	Average snowfall total: 9.5" (1996-present NOAA/NWS)	Total = 79 Annual Avg = 1.54	Likely	Concerned

Source: National Centers for Environmental Information, as of February 2021, State of Maryland Hazard Mitigation Plan, & NOAA/NWS

Table 8-3 provides the significant winter storm/weather events affecting Dorchester County since 1996; however, the table only lists events considered significant and/or with snow accumulations greater than 8 inches for the previous planning cycles, whereas all events for the 2021 update are included.

Table 8-3

Winter Storm/Weather Events		
Date	Event	Event Narrative
January 6, 1996	Winter Storm	A major winter storm (popularly known as the "blizzard of "96) affected much of the mid-Atlantic region during the weekend of January 6-8, 1996.

Date	Event	Event Narrative
February 2, 1996	Winter Storm	Winter storm tracked northeast from the gulf coast states to off the Virginia coast. It spread heavy snow across the lower Maryland eastern shore from early Friday morning into Sunday afternoon. Snow amounts generally ranged from 12 to 24 inches.
February 15, 2003	Winter Storm	Far north portion of Dorchester County 15", Cambridge in Dorchester County 13", Southern portion of Dorchester County 10". Local law enforcement agencies reported numerous accidents. Schools were closed Monday, February 17th due to very slippery road conditions.
March 1, 2009	Winter Storm	Snowfall amounts were generally between four and eleven inches across the County. Church Creek reported 11.0 inches of snow. Cambridge reported 6.0 inches of snow.
December 18, 2009	Winter Storm	Snowfall amounts were generally between four and fourteen inches across the County. Cambridge reported 14.0 inches of snow. Eldorado reported 9.0 inches of snow.
January 30, 2010	Winter Storm	Snowfall amounts were generally between six and thirteen inches across the County. Toddville reported 13.0 inches of snow. Vienna reported 11.0 inches of snow. Cambridge reported 6.0 inches of snow.
January 30 to January 31, 2010	Winter Storm	Snowfall amounts were generally between six and thirteen inches across the county. Toddville reported 13.0 inches of snow. Vienna reported 11.0 inches of snow. Cambridge reported 6.0 inches of snow.
February 5 to February 6, 2010	Winter Storm	Snowfall amounts were generally between ten and twenty inches across the county. Hurlock reported 20.0 inches of snow. Toddville reported 18.0 inches of snow. Cambridge reported 16.0 inches of snow.
February 9 to February 10, 2010	Blizzard	Snowfall amounts were generally between six and fifteen inches across the county. Toddville reported 15.0 inches of snow. Cambridge reported 12.0 inches of snow. Snow, heavy at times, occurred with northwest winds 30 to 40 mph with gusts to 50 mph, resulting in poor visibilities and even whiteout conditions.
January 22 to January 23, 2016	Winter Storm	Strong Low Pressure moving from the Southeast United States northeast and off the Mid Atlantic Coast produced between three and thirteen inches of snow and strong winds across the Lower Maryland Eastern Shore. Snowfall totals were generally between 5 inches and 13 inches across the county. Cambridge (3 S) reported 13.0 inches of snow.
2021 HMP Update		
February 15, 2016	Winter Storm	Snowfall totals were generally between 4 inches and 6 inches across the county. Cambridge and Taylors Island reported 6.0 inches of snow.
March 3, 2016	Winter Storm	Snowfall totals were generally between 4 inches and 7 inches across the county. Linkwood reported 5.5 inches of snow. Cambridge reported 4.0 inches of snow.
January 30, 2017	Winter Weather	Snowfall totals were generally between 0.5 inch and 3 inches across the county. Vienna (5 WNW) reported 3 inches of snow. Cambridge reported 2 inches of snow.
December 8, 2017	Winter Storm	Snowfall totals ranged between three inches and seven inches across the county. Cambridge (3 S) reported 7.0 inches of snow. Vienna (5 WNW) reported 3.5 inches of snow. Linkwood (2 SE) reported 3.5 inches of snow.
January 3, 2018	Winter Storm	Snowfall totals ranged between six inches and nine inches across the county. Cambridge reported 7.0 inches of snow. Cambridge (3 S) reported 6.5 inches of snow.

Date	Event	Event Narrative
March 21, 2018	Winter Weather	Snowfall totals ranged between one inch and three inches across the county. Cambridge (3 S) reported 3.0 inches of snow. Linkwood reported 2.0 inches of snow. East New Market and Vienna (5 WNW) reported 1.5 inches of snow.
December 9, 2018	Winter Weather	Snowfall totals generally ranged between one inch and three inches across the county. East New Market (1 SE) reported 2.2 inches of snow. Linkwood (2 SE) reported 1.5 inches of snow.
January 12, 2019	Winter Storm	Snowfall totals generally ranged between three inches and five inches across the county. Linkwood (2 SE) reported 4.5 inches of snow. East New Market (2 ENE) reported 4.3 inches of snow. Cambridge (1 W) reported 3.8 inches of snow.
February 1, 2019	Winter Weather	Snowfall totals generally ranged between one inch and two inches across the county. East New Market (2 ENE) reported 2.2 inches of snow. Hurlock (4 NNW) reported 2.1 inches of snow. Cambridge reported 2.0 inches of snow.
January 31, 2021	Winter Weather	Snowfall totals generally ranged between one inch and three inches across the county. Snowfall total of 3.1 inches was reported at East New Market. Snowfall total of 3.0 inches was reported at (1 W) Hurlock and Cambridge.
February 6, 2021	Winter Weather	Snowfall totals generally ranged between one half inch and two inches across the county. Snowfall total of 2.0 inches was reported at Taylor's Island. Snowfall total of 1.8 inches was reported at (2 ENE) East New Market.
February 11, 2021	Winter Weather	Snowfall totals generally ranged between one inch and three inches across the county. Snowfall total of 1.7 inches was reported at (2 SE) East New Market. Snowfall total of 1.5 inches was reported at (1 SE) Cambridge.
February 13, 2021	Winter Weather	Light freezing rain or freezing drizzle resulted in ice accretion between a trace and 0.20 inch across the county. A few trees and power lines were downed, with scattered power outages reported due to the ice accretion.
February 18, 2021	Winter Weather	Ice accretions between a trace and 0.20 inch, along with sleet accumulations between 0.5 inch and 1.0 inch were reported. A few trees and power lines were downed, with some scattered power outages reported.

Source: NWS, NCEI (NOAA)

Critical & Public Facilities Vulnerability

Critical and public facilities' vulnerability to winter weather depends on the age of the building (and the building codes in effect at the time it was built), type of construction, and condition of the structure (how well it has been maintained).

The following critical and public facilities were built prior to 1960, before the International Building Code was enforced, and may be at a higher risk due to age of construction and lack of building codes during the time period.

Table 8-4

Critical and Public Facilities Constructed Prior to 1960				
Facility Category	Facility Type	Facility Detail	Address	City
County	County Government	Dorchester County Circuit Court House	206 High Street	Cambridge
County	County Government	Board of Education	Blackwater Road	Church Creek
County	County Government	Board of Education	610 Glasgow Street	Cambridge
County	County Government	St. Clair Head Start/Day Care Center	824 Fairmount Ave	Cambridge
County	County Government	County Facility	Lakesville Crapo Road	Crapo
Education	College	Chesapeake College-Cambridge Center	0 High Street	Cambridge
Education	Public School	Cambridge Christian Academy	207 Maryland Ave	Cambridge
Education	Public School	South Dorchester	3485 Golden Hill Road	Church Creek
Emergency	Fire Department	Neck District Volunteer Fire Company	954 Cooks Point Road	Cambridge
Emergency	Fire Department	Madison Volunteer Fire Company	1154 Taylors Island Road	Madison
Emergency	Fire Department	Taylors Island Volunteer Fire Company	510 Taylors Island Road	Taylors Island
Emergency	Fire Department	Hoopers Island Volunteer Fire Company	2754 Hoopers Island Road	Church Creek
Emergency	Fire Department/EMS	Hurlock Volunteer Fire Company	301 Charles Street	Hurlock
Emergency	Fire Department/EMS	Eldorado-Brookview Volunteer Fire Company	5752 Rhodesdale Eldorado Road	Rhodesdale
Emergency	Fire Department	East New Market Volunteer Fire Department	101 Main Street	East New Market
Emergency	Police Station	Hurlock Police Department	200 Nealson Street	Hurlock
Medical	Hospital	Choptank Community Health System	503 Muir Street	Cambridge
Medical	Medical	Humberto A Rossi. M.D.PA	305 Maryland Ave	Cambridge
Medical	Medical	MS Shariff M.D.PA	105 Aurora Street	Cambridge
Medical	Medical	Special Home	210 Henry Street	Cambridge
Medical	Medical	Mary Ann D. Moore MDPA	300 Dorchester Ave	Cambridge
Medical	Medical	Rose Hill Family Physicians LLC	319 Dorchester Ave	Cambridge
Medical	Medical	Delmarva Community Services	6210 Shiloh Church Hurlock Road	Hurlock
Medical	Nursing Home	Glasgow Nursing Home	311 Glenburn Ave	Cambridge

Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Boat Ramp	Fishing Creek Ramp	2913 Hoopers Island Road	Church Creek
Miscellaneous	Boat Ramp	New Bridge Ramp	4331 New Bridge Road	Vienna
Miscellaneous	Boat Ramp	Toddville-Farm Creek Ramp	Farm Creek Road	Toddville
Miscellaneous	Community Center	Dorchester Family YMCA	201 Talbot Ave	Cambridge
Miscellaneous	Community Center	Cokesbury Community Center	5957 Cokesbury Road	Federalsburg
Miscellaneous	Marina/Dock	Dock	E Tedious Creek Rd	Toddville
Miscellaneous	Museum	Dorchester Arts Center	120 High Street	Cambridge
Miscellaneous	Museum	Taylors Island Museum	4212 Hoopers Neck Road	Taylors Island
Miscellaneous	Museum	Vienna Heritage Museum	303 Race Street	Vienna
Miscellaneous	Museum	County Building	321 High Street	Cambridge
Municipal	Municipal Government	Cambridge Utilities	312 High Street	Cambridge
Municipal	Municipal Government	East New Market Housing Authority	40 Academy Street	East New Market
Municipal	Municipal Government	Cambridge-District Court	310 Gay Street	Cambridge
Municipal	Municipal Government	Secretary Town Hall	122 Main Street	East New Market
Municipal	Municipal Government	Mayor & Council of Hurlock	300 S Main Street	Hurlock
Municipal	Municipal Government	Hurlock-Office Building	220 S Main Street	Hurlock
Municipal	Municipal Government	Cambridge-Public Works	100 Brohawn Avenue	Cambridge
Municipal	Municipal Government	Vienna-Parks & Recreation	113-115 Ocean Gateway	Vienna
Municipal	Municipal Government	Galestown Community House	5538 Wheatley Church Road	Rhodesdale
Municipal	Municipal Government	East New Market Town Office	10 Academy Street	East New Market
Municipal	Municipal Government	Cambridge-Public Works	310 Trenton Street	Cambridge
Municipal	Municipal Government	Cambridge City Council	305 Gay Street	Cambridge
Utility	Communication	Tower #11	4814 Madison Canning House Road	Madison
Utility	Utility	Transfer Station	3186 Shorters Wharf Road	Crapo
Utility	Utility	Municipal Utilities Commission	105 Brohawn Ave	Cambridge
Utility	Utility	Vienna Power Plant	0 Chapel of Ease Road	Vienna
Utility	Utility	Water Treatment Plant	3723 Greenpoint Road	East New Market

Source: 2022 Hazard Mitigation GIS Database

Loss Estimations

Total improvement values from the 2021 Dorchester County Property Parcels Data Layer was utilized to calculate the loss estimations for critical and public facilities at risk to winter weather. Loss estimates for critical and public facilities that could be damaged during a winter weather totaled $26,012,195.

Table 8-5

Loss Estimations for Critical and Public Facilities	
Facility Category	Loss Estimate
County	$7,037,400
Education	$4,199,000
Emergency	$1,900,600
Medical	$2,227,700
Miscellaneous	$5,030,500
Municipal	$3,671,800
Utility	$1,945,195
Total	$26,012,195

Source: 2021 Dorchester County Property Parcels Data Layer - Improvement values equal total losses for each facility within risk area

All critical and public facilities within the County are vulnerable to severe winter weather due to the potential of disruption in services and transportation systems as well as possible structure failure due to heavy snow loads. However, the following facilities built prior to 1960 should have a higher importance considering their significance to the well-being of Dorchester County residents.

- Neck District Volunteer Fire Company
- Hurlock Volunteer Fire Company
- Madison Volunteer Fire Company
- Eldorado-Brookview Volunteer Fire Company
- Taylors Island Volunteer Fire Company
- Hoopers Island Volunteer Fire Company
- Choptank Community Health System

Social Vulnerability

The Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) uses fifteen (15) U.S. Census variables to calculate SVI scores that can help local officials identify communities within the county that may need additional support before, during, and/or after disasters.

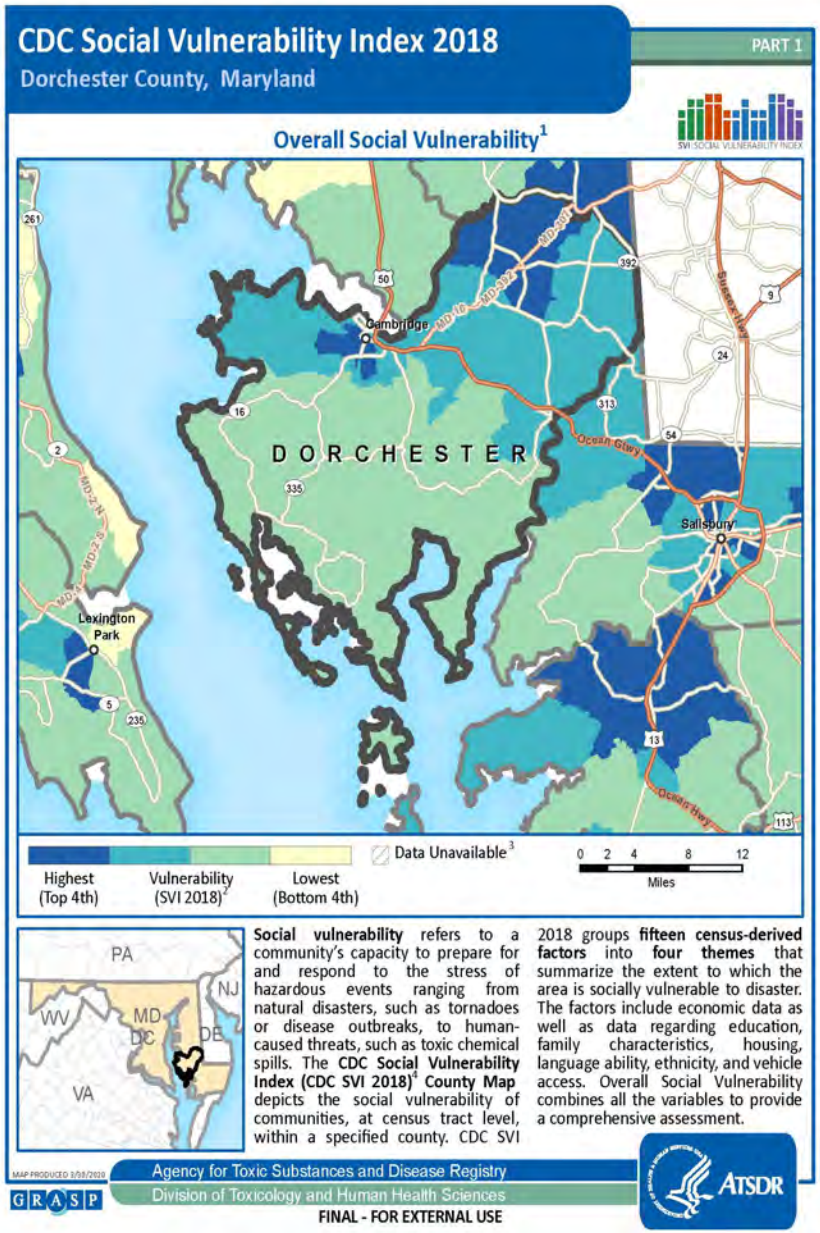
The SVI has been conducted for Dorchester County at the census tract level and is mapped on the following page. The SVI utilizes American Census Survey (ACS) 5-year estimates. The darker blue census tracts in the overall map indicate areas of higher social vulnerability while the light green tracts indicate relatively low social vulnerability. Measuring social vulnerability at the census tract level is meant to help guide further planning. Investigation at the neighborhood level is required to fully identify vulnerable populations.

In reviewing Figure 8-1, below, the area with the highest social vulnerability is within the City of Cambridge and the northeast section of the County, which includes the Towns of Secretary, East New Market and Hurlock. These areas may be more vulnerable to external environmental factors such as winter weather.

According to NWS, a Winter Weather Warning or Advisory is issued when a hazardous winter weather event is occurring or imminent.

- An **Advisory** is for conditions less serious that cause significant inconvenience. However, if caution is not exercised the situation could escalate to threat of life and/or property.
- A **Warning** is used for conditions posing a threat to life or property.

Figure 8-1


CDC Social Vulnerability Index 2018
Dorchester County, Maryland
PART 1
Overall Social Vulnerability[1]
SVI SOCIAL VULNERABILITY INDEX
DORCHESTER
Cambridge
Salisbury
Lexington Park
Highest (Top 4th)
Vulnerability (SVI 2018)[2]
Lowest (Bottom 4th)
Data Unavailable[3]
0 2 4 8 12
Miles
PA
NJ
WV
MD
DC
DE
VA
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 Social Vulnerability Index (CDC SVI 2018)[1] County Map depicts the social vulnerability of communities, at census tract level, within a specified county. CDC SVI 2018 groups fifteen 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.
MAP PRODUCED 3/18/2020
GRASP
Agency for Toxic Substances and Disease Registry
Division of Toxicology and Human Health Sciences
ATSDR
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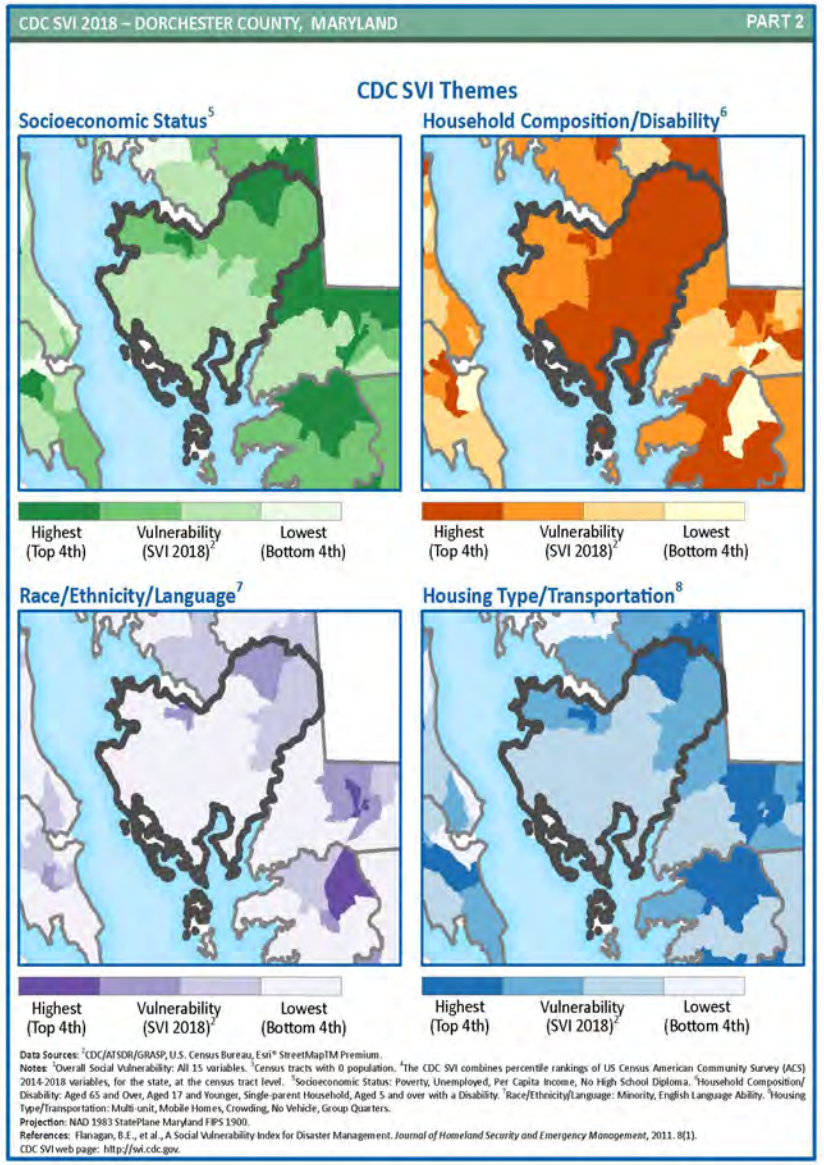
CDC SVI 2018 – DORCHESTER COUNTY, MARYLAND
PART 2
CDC SVI Themes
Socioeconomic Status[5]
Household Composition/Disability[6]
Race/Ethnicity/Language[7]
Housing Type/Transportation[8]
Highest (Top 4th)
Vulnerability (SVI 2018)[2]
Lowest (Bottom 4th)
Data Sources: [2]CDC/ATSDR/GRASP, U.S. Census Bureau, Esri® StreetMapTM Premium.
Notes: [1]Overall Social Vulnerability: All 15 variables. [3]Census tracts with 0 population. [4]The CDC SVI combines percentile rankings of US Census American Community Survey (ACS) 2014-2018 variables, for the state, at the census tract level. [5]Socioeconomic Status: Poverty, Unemployed, Per Capita Income, No High School Diploma. [6]Household Composition/Disability: Aged 65 and Over, Aged 17 and Younger, Single-parent Household, Aged 5 and over with a Disability. [7]Race/Ethnicity/Language: Minority, English Language Ability. [8]Housing Type/Transportation: Multi-unit, 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 SVI web page: http://svi.cdc.gov.
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Conclusions & Recommendations

The following mitigation strategies were identified during the development of this plan chapter.

- Ensure there is continuous power at facilities used for shelter operations and at warming centers during a winter weather event. Evaluate current facilities used for shelters or warming centers for generator needs.

- Evaluate the following critical facilities for snow load capabilities. Continuity of operations at designated critical facilities is necessary to meet community needs and resiliency goals.
    - Neck District Volunteer Fire Company
    - Hurlock Volunteer Fire Company
    - Madison Volunteer Fire Company
    - Eldorado-Brookview Volunteer Fire Company
    - Taylors Island Volunteer Fire Company
    - Hoopers Island Volunteer Fire Company
    - Choptank Community Health System

- According to the American Heart Association, seniors who have cardiovascular conditions may experience increased side effects in the cold. Lower temperatures and winds can reduce body heat, blood vessels tend to constrict, making it more difficult for oxygen to reach the entire body. Ensure point of contact information for all agencies/departments/organizations involved in senior services is updated annually. Establish a method to track unmet needs for timely resource request during winter storm activations.

- In terms of the social vulnerability index, areas with the highest SVI score shown on Figure 8-1 are the City of Cambridge and the northeast section of the County, which includes the Towns of Secretary, East New Market and Hurlock. Target these areas during winter storm activations for needs, such as water, food, warmth, and medical attention.

Chapter 9 Thunderstorm, Hail, Wind & Tornado

Chapter Update Overview

Thunderstorm, hail, wind and tornado hazard impacts were identified by the Core Planning Team during the update process, as indicated in Table 9-1. To reflect updated thunderstorm, hail, wind and tornado events that have occurred during this planning cycle or are new to the plan chapter, Tables 9-2 to 9-12 within this chapter have been updated and/or added. A new component was added for this plan updated, Social Vulnerability. Conclusion and recommendations were added at the end of this chapter.

Hazard Impacts

The Core Planning Team reviewed and discussed impacts from thunderstorm, hail, wind, and tornado hazard events as presented on the table below.

Table 9-1

Thunderstorm, Hail, Wind & Tornado Hazard Impacts	
Public Health & Safety	• Lightning is very dangerous, even observed at several miles away and citizens should seek shelter immediately. Hail poses the threat of personal injury, particularly as hail stones reach larger sizes. • Tornado Impacts to the public include potential for injury or loss of life, and destruction of property due to rotating vortex and/or straight-line winds, such as collapsed structures, flying debris, and downed power lines. • Mobile homes are highly susceptible to tornadoes if not properly tied down.
Social Vulnerability	• Tornadoes have the potential to be not only be fatal, however they can also displace people by destroying their homes or places of work. • Flash floods can be caused by thunderstorms and can impact residents by damage to their properties or destruction of crops.
Economic Stability	• A major tornado event would be costly for state and local governments due to the potential for damages associated with property, debris generation, and loss of power. • A major thunderstorm event would be costly due to the potential for damages associated with property, loss of operations (commercial, transportation), access to commercial areas, debris generation, loss of power, and overall cost of recovery from the event.
Infrastructure	• Infrastructure may experience tornado and wind impacts in the form of blowing debris, and interruptions to above ground power and communication systems. • Infrastructure may experience impacts in the form of fire caused by lightning strikes, roof and crop damage from hail, loss of operations, and interruptions to above ground power and communication systems.
Environment	• Tornados impact the environment by potentially spreading debris and pollution; damaging sewer and wastewater treatment plants; and disturbing wildlife and natural areas. • Lightning and hail impact the environment primarily from wildfire caused by lightning, and crop damage caused by hail.

Thunderstorm & Lightning

Profile

Thunderstorms are usually high intensity storms of short duration originating in a warm moist air mass that either is forced to rise by mountainous terrain or by colliding with a cooler dense air mass. The process of convection in the atmosphere brings about the release of moisture from the warm air mass as it raises, cools and condenses. This condensation proceeds until most of the moisture in the air mass has been released as precipitation. Since the motion of the air is nearly vertical and attains high velocities, rainfall is intense and generally concentrated over a small area in a short time frame. Thunderstorms can be 10-15 miles in diameter and normally last 20-30 minutes. Lightning, high winds, hail, and occasionally tornadoes are associated with thunderstorms.

When wind speeds exceed 58 mph, thunderstorms are considered severe. A downburst of cold air during a severe thunderstorm can result in straight line winds up to 134 mph. One of the most extreme hazards from thunderstorms is lightning strike. Lightning has been known to strike up to 6-10 miles from the center of a storm. It is estimated that more than 30,000,000 points on the ground in the continental 48 states are hit by lightning every year.

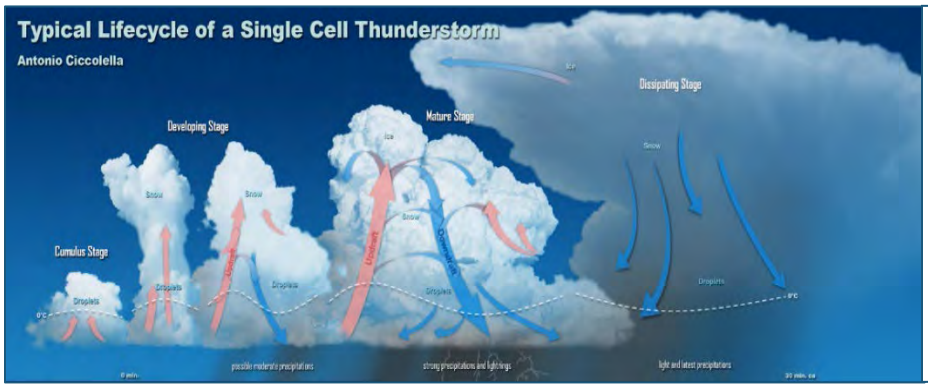


Diagram showing the typical cycle of a thunderstorm.

Source: http://pressbooks-dev.oer.hawaii.edu/atmo/chapter/chapter-14-thunderstorm-fundamentals/

For this plan update, Hazard Risk & Identification Assessment (HIRA) results indicate that Thunderstorm wind, lighting, and hail hazards are a “high” risk for Dorchester County based on the following eight (8) parameters: injuries, deaths, property and crop damage, geographic extent, total annualized events, future probability, and community perspective. Additional information about the ranking process and results are within *Appendix A Hazard Risk & Identification Assessment Methodology.* Table 9-2 provides a compilation of thunderstorm wind, lightning, and hail hazard risk assessment data. Note, thunderstorm wind is further discussed in the “Wind” section of this chapter on page 9-8.

The Core Planning Team and municipalities level of concern specific to thunderstorm wind, lightning, and hail indicate “concerned” according to the survey. However, the public survey showed that the community was “very concerned” about thunderstorm wind, lightning, and hail hazards.

Table 9-2

Thunderstorm Wind, Lightning and Hail Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Thunderstorm Wind, Lightning, and Hail.*							
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1968-2021)	Future Probability	Community Perspective
0	0	$1.882M	$0	ASCE Wind Design Speed = 115 2"> hail and lightning events with Injuries/ Deaths = 1	Total = 109 Annual Avg = 2.02	Highly Likely	Very Concerned
Source: National Centers for Environmental Information, as of February 2021, & 2019 Building Code Administration & 2016 State of Maryland Hazard Mitigation Plan *Note: Data collected for 1950-present, no data available for this event type prior to 1968*							

According to NOAA, lightning is created as a discharge of built-up energy due to the separation of positive and negative charges which are generated inside a thunderstorm. According to the National Weather Service (NWS), on average, approximately 49 people die each year nationally as a result of lightning strikes. In Maryland, there have been twelve (12) lightning deaths according to the National Lightning Safety Institute. All lightning is dangerous and even the weakest thunderstorm produces lightning. People engaged in swimming, golfing, or hiking are at the highest risk for a lightning strike. Lightning strikes have resulted in over 15 thousand structural fires and burn approximately two million acres of forest per year in the United States.

Source: www.patch.com. Elizabeth Jannev. 7/21/2021

Table 9-3 provides an overview of lightning events that have occurred in Dorchester County. The probability of occurrences is 0.23 lightning events per year.

Table 9-3

Lightning Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (2008-2021)
0	0	$225K	$0	Countywide	Total = 3 Annual Avg = 0.23
Note: Data collected for 1950-present, no data available for this event type prior to 2008.					

Since the previous planning cycle, one new lightning event was included in the event table below. This event occurred in East New Market and resulted in $5,000 of property damage.

Table 9-4

Lightning (Strikes)			
Location	Date	Event Narrative	Property Damage
Woolford	July 24, 1995	House set on fire by lightning. No significant damage reported.	Not Available
Cambridge	June 29, 2008	Lightning strike produced a fire which destroyed a home on Higgins Mill Road in Cambridge.	$100,000
Cambridge	July 23, 2014	Lightning strike caused a fire which produced electrical damage to an apartment on Willis Street in Cambridge.	$20,000
Cambridge	July 23, 2014	Lightning strike caused a fire which produced extensive structural damage to a house on Castle Haven Road in Cambridge.	$100,000
2021 HMP Update			
East New Market	July 22, 2020	A lightning strike cause a house fire on Beach Haven Road.	$5,000

Source: NWS, NCEI (NOAA)

Vulnerability Analysis

Dorchester County is affected primarily by thunderstorm activity through the interaction of warm and cool air masses along frontal systems. Thunderstorms are more common in the spring when frontal zones are passing over the County from west to east and during the summer months when warm, moist air is lifted over the eastern shore by differential heating of the land and surrounding water. Intense thunderstorms can produce rapid runoff, particularly in the headwaters of small stream basins. In urban areas runoff from stormwater is a problem for downstream property owners when new construction occurs upslope from existing developed areas.

The municipalities of Dorchester County face the same threat from thunderstorms as the County in terms of stormwater issues. In some cases, in older developed areas, inadequate stormwater management contributes to ponding from runoff in low lying residential areas or in older residential areas down slope from new construction.

As shown in the hazard risk and history for lightning, structural fires do occur in the County as a result of lightning strikes. Fortunately, the damage is usually minor. Critical and public facilities should be aware of the risks of such a hazard occurring, particularly power failure. Emergency backup generators should be installed at these facilities.

An additional vulnerability to lightning strikes are communication towers. These structures are very tall, which increases the likelihood to be stuck by lightning. Additionally, due to the prevalence and multitude of the various electronic equipment located on communication towers (i.e. antennae wires, etc.), static charge can build on the tower itself, which in turn can increase the probability of a lightning strike. It is important to evaluate and assess the potential impacts the loss of tower derived communications loss can have during a thunderstorm event. Mitigation measures may be implemented to protect these towers from a potential lightning strike, especially since many of our communications now rely on the wireless capabilities of these structures.

Hail

Profile

Hail is a form of solid precipitation that mostly consists of water and has been measured between 0.20 inches to 5.9 inches in diameter. The larger hail stones come from severe thunderstorms and can occur within two miles of the parent thunderstorm. Thunderstorms provide the strong, upward motion of air and lower heights for freezing from which hail is formed. The hail stones are suspended in the air by the strong upward motion of air until the weight of the hail overcomes the updraft and falls to the ground. The velocity at which hail falls to the ground is dependent on several factors: size of the stone, friction in the air, motion of the wind, collisions with other precipitation, and the melting factor. A hail stone measured at 0.39 inches falls at a rate of 20 mph while a larger stone, 3.1 inches in diameter, falls at a rate of 110 mph.

Table 9-5 provides an overview of hail events that have occurred in Dorchester County. As details in below, a total of 20 hail events have occurred in the county between 1958 and 2021.

Table 9-5

Hail Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1958-2021)
0	0	$0	$0	2"> hail and lightning events with Injuries/Deaths = 1	Total = 20 Annual Avg = 0.32
Note: Data collected for 1950-present, no data available for this event type prior to 1958.					

Since 1958, twenty-five (25) hail events have affected Dorchester County. One of the largest recorded events occurred in the Town of Church Creek in 2002 with golf ball to tennis ball sized hail. Damaging hail events have been reported between March and September; however, the majority of these events have occurred during the month of May and occur countywide. More recently, another event occurred in 2009 in Drawbridge, with golf size hail. During the planning cycle 2016-2021, no new hail events have been reported for Dorchester County.

Table 9-6

Historical Hail Events			
Location	Date	Event Narrative	Magnitude
Dorchester	5/4/1958	No Report	1.75 in.
Dorchester	5/10/1990	No Report	1.75 in.
Taylors Island	8/16/1996	No Report	0.88 in.
Cambridge	3/29/1997	No Report	0.75 in.
East New Market	6/2/1998	No Report	1.00 in.
Cambridge	6/26/1998	No Report	0.75 in.
Cambridge	4/9/1999	No Report	1.00 in.

Location	Date	Event Narrative	Magnitude
Secretary	4/23/1999	No Report	2.00 in.
Toddville	7/14/2000	No Report	1.00 in.
Vienna	5/22/2001	No Report	1.00 in.
Hudson	5/22/2001	No Report	1.75 in.
Madison	7/4/2001	No Report	1.00 in.
Cambridge	7/4/2001	Widespread 3/4-inch hail.	1.00 in.
Cambridge	7/5/2001	No Report	1.00 in.
Linkwood	7/5/2001	No Report	1.75 in.
Church Creek	4/28/2002	Golf ball to tennis ball size hail. Largest hail was either egg shaped or disk shaped.	2.50 in.
Bucktown	8/29/2003	No Report	0.75 in.
Crapo	9/20/2005	No Report	0.88 in.
Wingate	6/12/2007	Quarter size hail fell in Wingate.	1.00 in.
Cambridge	6/12/2007	Penny to quarter size hail fell in Cambridge.	1.00 in.
Cambridge	8/26/2007	Penny size hail was reported by a deputy in Cambridge.	0.75 in.
Drawbridge	5/9/2009	Golf ball size hail reported in Cokeland.	1.75 in.
Hurlock	5/29/2009	Penny size hail was reported.	0.75 in.
Cambridge	7/28/2012	Quarter size hail was reported.	1.00 in.
Cambridge	7/28/2012	Quarter size hail was reported.	1.00 in.
2021 HMP Update			
		NO NCEI HAIL EVENTS SINCE 7/28/2012	

Source: *NWS, NCEI (NOAA)*

Vulnerability Analysis

A severe weather warning is issued for hail stones that have reached a damaging size, since serious damage to man-made structures and farmers' crops can be the result. Therefore, the National Weather Service will issue a severe thunderstorm warning when hail stones are 1" or greater in diameter. Damage to any of the critical and public facilities could be detrimental to the County, especially if the Emergency Services facilities were affected. Additionally, the damage to crops during a hail event is a significant concern for the agricultural community.

Multi-peril crop insurance is a valuable risk management tool that allows growers to insure against losses due to adverse weather conditions. Crop insurance policies are available for at least one commodity in every county in Maryland, with a total of 20 agricultural enterprises represented across the state. Field crops covered include corn, corn silage, soybeans, wheat, barley, spring oats, grain sorghum, forage seeding, forage production (including pasture), and tobacco. Field crops account for 99% of all the acres covered by crop insurance in Maryland and represent about 80% of the value of insurance protection sold on a per acre basis.

Farmers have a wide range of crop insurance policies from which to choose from. The USDA offers a variety of programs to help farmers, ranchers, communities, and businesses that have been hard hit by natural disaster events. One Federal Disaster Assistance Program is the Noninsured Disaster Assistance Program (NAP) that pays producers of covered non insurable crops when low yields, loss of inventory, or prevented planting occur due to natural disasters.

- **Noninsured Disaster Assistance Program (NAP)**
  The Noninsured Crop Disaster Assistance Program (NAP) provides benefits to producers of commercial agricultural products for which multi-peril crop insurance coverage is not available. NAP is designed to reduce financial losses when natural disasters cause catastrophic reduction in production. NAP provides coverage that is very similar to that provided by CAT policies available through crop insurance agents. NAP coverage is available through your local USDA Farm Service Agency office. To purchase NAP coverage, you pay a fee of $250 per crop per county (with fees capped at $750 per producer per county, but not to exceed a total of $1,875 for producers growing crops in multiple counties). Sign up deadlines for NAP vary by crop; contact your local FSA office for more information.

Another insurance coverage available is the Federal Crop Insurance Program (FCIP). This insurance program offers farmers the opportunity to purchase insurance coverage against financial losses caused by a wide variety of perils, including certain adverse growing and market conditions. (Source: Federal Crop Insurance: A Primer, 2021)

Wind

Profile

According to the hazards that are identified within *the Maryland Local Mitigation Plan Guidance*, wind is the motion of air past a given point caused by a difference in pressure from one place to another. The effects can include blowing debris, interruptions in elevated power and communications utilities and intensified effects of winter weather. Two basic types of damaging wind events other than tropical systems affect Maryland; synoptic-scale winds and thunderstorm winds. Synoptic-scale winds are high winds that occur typically with cold frontal passages or Nor'easters. Downbursts cause the high winds in a thunderstorm.

For this plan update, Hazard Risk & Identification Assessment (HIRA) results indicate that high winds are a "medium-high" risk for Dorchester County based on the following eight (8) parameters: injuries, deaths, property and crop damage, geographic extent, total annualized events, future probability, and community perspective. Additional information about the ranking process and results are within *Appendix A Hazard Risk & Identification Assessment Methodology.* Table 9-7 provides a compilation of high wind and strong wind risk assessment data. The Core Planning Team and municipalities level of concern specific to high wind indicate "concerned" according to the survey. However, the public survey showed that the community was "very concerned" about high wind.

Table 9-7

High Wind Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: High Wind and Strong Wind*							
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (2006-2021)	Future Probability	Community Perspective
0	0	$1.073M	$0	ASCE Wind Design Speed = 115	Total = 10 Annual Avg = 0.63	Likely	Very Concerned
Source: National Centers for Environmental Information, as of February 2021 & 2019 Building Code Administration *Note: Data collected for 1950-present, no data available for this event type prior to 2006*							

Table 9-8 provides information obtained from the National Centers for Environmental on thunderstorm winds. According to the data, Dorchester County has experienced $1.657 million dollars in property damage between 1968 and 2021.

Table 9-8

Thunderstorm Wind Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1968-2021)
0	0	$1.657M	$0	ASCE Wind Design Speed = 115	Total = 86 Annual Avg = 1.62
Note: Data collected for 1950-present, no data available for this event type prior to 1968					

Table 9-9 provides wind events within the NCEI categories of Thunderstorm Wind, High Wind, and Strong Wind. While only wind events within these categories with reported property damages greater than $5,000 are shown within the table, it is important to note that many other winds events resulting in property damage less than that threshold have occurred.

Table 9-9

Thunderstorm, High & Strong Wind Events				
Location	Date	Even Narrative	Magnitude	Property Damage
Cambridge	2/24/2012	Scattered severe thunderstorms moved from west to east across Dorchester County. The first areas of damage: Maple Dam Road to Pintail Point just west and south of Cambridge. Wind damaged several homes and businesses in downtown Cambridge. Roofing membranes were peeled off of several businesses. The severe storms continued east striking Secretary, New East Market and Hurlock. A tree fell onto the East New Market Town Hall causing some damage. Minor wind damage continued into Hurlock.	74kts.	$100K
Christs Rock	2/24/2012	Along Maple Dam Road, several homes experienced minor damage and one-horse stable was destroyed along with several outbuildings. One horse suffered minor injuries. A local resident who heard the warning measured a 77-mph wind.	67kts.	$100K
Cambridge	6/29/2012	Numerous trees were downed, and an awning was blown off a residence in Cambridge Creek.	50kts.	$5,000
Dorchester	10/29/2012	The very strong winds downed trees, produced minor structural damage, and caused scattered power outages. Wind gust of 61 knots (70 mph) was measured at Bishops Head.	61kts.	$10,000
Dorchester	3/6/2013	Wind gust of 52 knots (60 mph) was measured at Crocheron. Roof damage was reported in Vienna.	52kts.	$10,000
Taylors	6/13/2013	Emergency managers reported widespread tree damage across much of the county. The most significant damage was observed on Taylor's Island where several buildings and structures were damaged. A tree also fell onto a home on Hooper Island on Hooper Island Road. Several trees were blocking highways including Liners Road near Andrews and US-50 near Salem. Widespread downed trees, several power lines downed.	50kts.	$50,000
2021 HMP Update				
Church Creek/ Hurlock	4/2/2016	Roofing was ripped off the Church Creek Post Office. Also, several trees were downed. Trees were also down near Hurlock.	50 kts.	$12,000
Taylors Is./ Cambridge/ Hurlock	6/19/2017	Multiple trees down. Home damaged in Hurlock. Power lines down.	50 kts.	$12,000
East New Market	10/24/2017	Tree was downed on a house near E. New Market. Additional trees downed across County.	35 kts.	$10,000
Dorchester County	3/2/2018	Very strong wind downed trees, produced minor structural damage, and caused power outages.	55 kts.	$25,000
Linkwood	7/17/2018	Roof was blown off a barn, and several trees downed near 4895 Drawbridge Road	50 kts.	$25,000

Location	Date	Even Narrative	Magnitude	Property Damage
Dorchester County	10/11/2018	Several trees were downed, and minor structural damage occurred.	50 kts.	$5,000
Hawkeye/ East New Market	8/20/2019	Widespread tree damage reported along Mt. Holly Rd. in E. New Market to Secretary.	50 kts.	$12,000
Hurlock/ Cambridge/ East New Market	4/13/2020	Trees downed. Wind gusts to 63 mph. A large tree downed near E. New Market.	50-55 kts.	$6,000
Smithville/ Cambridge	7/1/2021	Multiple trees and power lines downed. Vehicles, incl. campers overturned. NWS determined damaged caused by straight line winds.	65 kts.	$78,000
Source: NWS, NCEI (NOAA)				

Vulnerability Analysis

High and strong wind events can also occur in the County without the presence of thunderstorms. There are several reasons as to how wind can occur without the presence of thunderstorms, such as low-pressure systems, cold fronts, remnants of hurricanes, and other meteorological causes. High wind events as characterized by the Nation Weather Service are winds that are over 50 knots (57.5 mph), and strong wind events are less than 50 knots.

Source: https://www.myeasternshoremd.com. Photo by Mike Detmer. 7/21/2021

Tornado

Profile

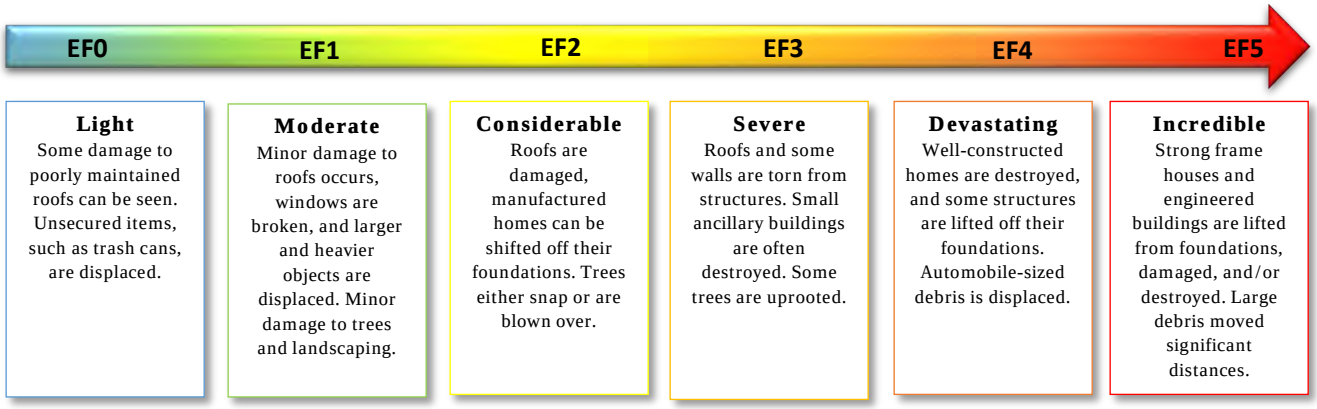
A tornado is defined by Strahler in his Physical Geography Text as a violently rotating column of air extending from a thunderstorm to the ground. Normally thunderstorms and associated tornadoes developing warm, moist air in advance of strong eastward moving cold fronts in late winter and early spring. Tornadoes can also occur along a "dryline" which separates very warm, moist air to the east from hot, dry air to the west. Both of these scenarios are common in the Central Plains. Under the right temperature and moisture conditions, intense thunderstorms can produce tornadoes in areas of differential heating such as occurs on the Eastern Shore.

Tornadoes can be ranked by intensity using the Fujita Scale devised by Dr. Theodore Fujita at the University of Chicago in 1971. Since 2007, tornadoes are rated by the National Weather Service according to the Enhanced Fujita Scale (EF Scale). Ratings vary from EF0, for light damage, to EF5, for the total destruction of a building. A tornado's rating is determined by a combination of wind speed (Table 9-10) and damage estimates to structures. Figure 9-1 below provide the basic FEMA definitions for each EF category.

Table 9-10

Enhanced Fujita Wind Scale	
EF Number	3 Second Gust (mph)*
0	65-85
1	86-110
2	111-135
3	136-165
4	166-200
5	Over 200
* The three-second gust is the highest sustained gust over a 3 second period having a 1 in 50 probability of being exceeded per year.	

Figure 9-1 – Enhanced Fujita Wind Scale



Local National Weather Service (NWS) offices are responsible for issuing tornado warnings. Tornado warnings indicate that a tornado has been spotted or that Doppler radar detects a thunderstorm circulation capable of spawning a tornado. Nationally, tornado season is from

March through August. According to the United States Tornadoes, July is the peak month for tornado activity in Maryland.

For this plan update, Hazard Risk & Identification Assessment (HIRA) results indicate that tornados are a "medium-high" risk for Dorchester County based on the following eight (8) parameters: injuries, deaths, property and crop damage, geographic extent, total annualized events, future probability, and community perspective. Additional information about the ranking process and results are within *Appendix A Hazard Risk & Identification Assessment Methodology.* Table 9-11 provides a compilation of tornado, funnel cloud, and waterspout risk assessment data. The Core Planning Team and municipalities level of concern specific to tornados indicate "somewhat concerned" according to the survey. The public survey showed that the community was also "somewhat concerned" about tornados. Dorchester County has experienced $5.742 million in property damages due to tornado events between 1984 and 2021.

Table 9-11

Total Tornado Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Tornado, Funnel Cloud, and Waterspout*							
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1984-2021)	Future Probability	Community Perspective
16	1	$5.742M	$0	SVRGIS (intensity & frequency) = 1	Total = 13 Annual Avg = 0.35	Occasional	Somewhat Concerned
Source: National Centers for Environmental Information, as of February 2021 & 2016 State of Maryland Hazard Mitigation *Note: Data collected for 1950-present, no data available for this event type prior to 1984.*							

Tornadoes can occur in every state, although the mid-west states have by far the greatest potential for this type of event. According to the NCEI data, since 1984, Dorchester County has experienced (11) eleven tornado events, therefore the County experiences 0.42 tornado events per year. These events occurred throughout the County.

Table 9-12

Tornado Events						
Location	Date	Event Narrative	Magnitude	Width	Property Damage	Injuries
Dorchester	May 8, 1984	No Report	F1	150 Yards	$2.5M	6
Dorchester	May 8, 1984	No Report	F1	100 Yards	$2.5M	8
Dorchester	August 28, 1982	No Report	F0	7 Yards	$0	0
Madison	July 13, 1996	Small tornado damaged a home and numerous trees were damaged or destroyed in the area of Indian Trail Acres near Madison.	F0	50 Yards	$40,000	0

Location	Date	Event Narrative	Magnitude	Width	Property Damage	Injuries
Madison	July 4, 2001	Several trees down. One tree fell on home. Recreational trailer overturned onto its side against a tree. Several chimneys broken off houses. Winds estimated between 70 and 80 mph.	F1	50 Yards	$20,000	0
Taylors Island	April 28, 2002	Tornado path length 16-18 miles. One house and several outbuildings destroyed near Hip Roof Road. Most of the damage along tornado path rated F0 to F1.	F3	150 Yards	$150,000	0
Church Creek	September 2, 2003	Small tornado briefly touched down. No damage.	F0	50 Yards	$0	0
Cambridge	October 14, 2003	F0/weak F1 tornado damaged several homes, outbuildings, a garage, 2 cars, 3 chicken houses, and 2 businesses. Also, numerous trees down or damaged.	F1	150 Yards	$500,000	0
Honga	September 30, 2004	Waterspout came onshore south of Taylors Island and continued across a marshy area before dissipating.	F0	30 Yards	$0	0
Cambridge	October 16, 2004	F0 tornado occurred near David Green Road and caused minor damage to a couple bird houses and trailer, along with one tree downed.	F0	25 Yards	$2,000	0
Elliott Island	July 24, 2009	An apparent waterspout moved on shore. The tornado then overturned a 24-foot travel trailer 3 times at the extreme west end of Elliott Island. There was also some damage to trees and other vegetation. Winds were estimated at the high end of an EF0.	F0	N/A	$10,000	2
2021 HMP Updates						
Finchville	April 15, 2019	A brief EF0 tornado touched down on Bailey Store Rd., about 2.5 miles SE of Federalsburg. Small sheds were damaged/ destroyed, an empty trailer was tipped over and some trees were snapped and downed.	EF0	100 yds	$15,000	0

Source: NWS, NCEI (NOAA)

More recently, National Weather Service (NWS) confirmed 2 tornado touchdowns in Dorchester County in 2021. Tornados were associated with Tropical depression Ida and were reported on August 31, and September 1, 2021. An EF-0 tornado touched down just southwest of Hurlock at about 4:45 p.m. on September 1, 2021. A tornado warning issued around 5 p.m. advised residents a confirmed tornado had been located near Federalsburg or Hurlock moving northeast at 25 mph. As a result of the tornadoes, structural damage, partial removal of the roof to one commercial property, two road closures, and downed electrical lines at scattered sites were reported.

Vulnerability Analysis

In assessing the critical and public facilities' vulnerability to tornadoes, the major factor to consider is the possibility of these structures failing when subjected to wind loads that exceed their design or to flying debris that penetrates the building. In general, building damages can range from cosmetic to complete structural failure, depending on wind speed and location of the building with respect to the tornado path and can be analyzed by a structural engineer.

Tornado touches down near Hurlock in Dorchester County, Maryland.
Source: Photo by Ashley Parker. 9/1/2021 https://www.myeasternshoremd.com/dorchester_star.

Mobile homes are particularly susceptible to tornado damage. According to the *Dorchester County 2021 Property Parcels Data* layer, there are an estimated total of 937 mobile homes. In terms of new mobile homes and/or replacements, the Dorchester County Office of Planning and Zoning's permit data listed a total of (5) five permits were given for new mobile homes and a total of (26) twenty-six were given for mobile home replacements during the previous planning cycle. According to Dorchester County Permit Data, the area in which the majority of permits issued for mobile homes and/or replacements are located is within and/or around the Town of Hurlock.

Considering there are no standard loss estimation models or tables for tornadoes currently, estimated losses are difficult to calculate. In terms of calculating human losses, shelters throughout the community should be assessed for their locations, capacity, and wind speed strength in order to ensure they are able to house residents and withstand wind speeds generated by tornadoes. Additionally, the County needs to ensure the enforcement of building codes for wind speed. The ordinances need to be enforced in order to ensure mobile homes are utilizing tie-downs.

WATCH: Tornado spotted in Hurlock
An apparent tornado caught on video in Hurlock, Maryland. The National Weather Service said local law enforcement also reported spotting a tornado. *Video courtesy of Mary Beth Claude*

Source: Delmarva Now. September 2, 2021; https://www.delmarvanow.com/story/news/local/maryland/2021/09/02/tornado-spotted-hurlock-idas-remnants-reach-mid-

Social Vulnerability

The Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) uses fifteen (15) U.S. Census variables to calculate SVI scores that can help local officials identify communities within the county that may need additional support before, during, and/or after disasters. The SVI has been conducted for Dorchester County at the census tract level and is mapped on the following page. The SVI utilizes American Census Survey (ACS) 5-year estimates. The darker blue census tracts in the overall map indicate areas of higher social vulnerability while the light green tracts indicate relatively low social vulnerability. Measuring social vulnerability at the census tract level is meant to help guide further planning.

Figure 9-2 illustrates the area with the highest social vulnerability is within the City of Cambridge and the northeast section of the County, which includes the Towns of Secretary, East New Market and Hurlock. These areas may be more vulnerable to thunderstorm, hail, wind, and tornado hazard impacts. These areas of concern should contain tornado warnings systems/sirens.

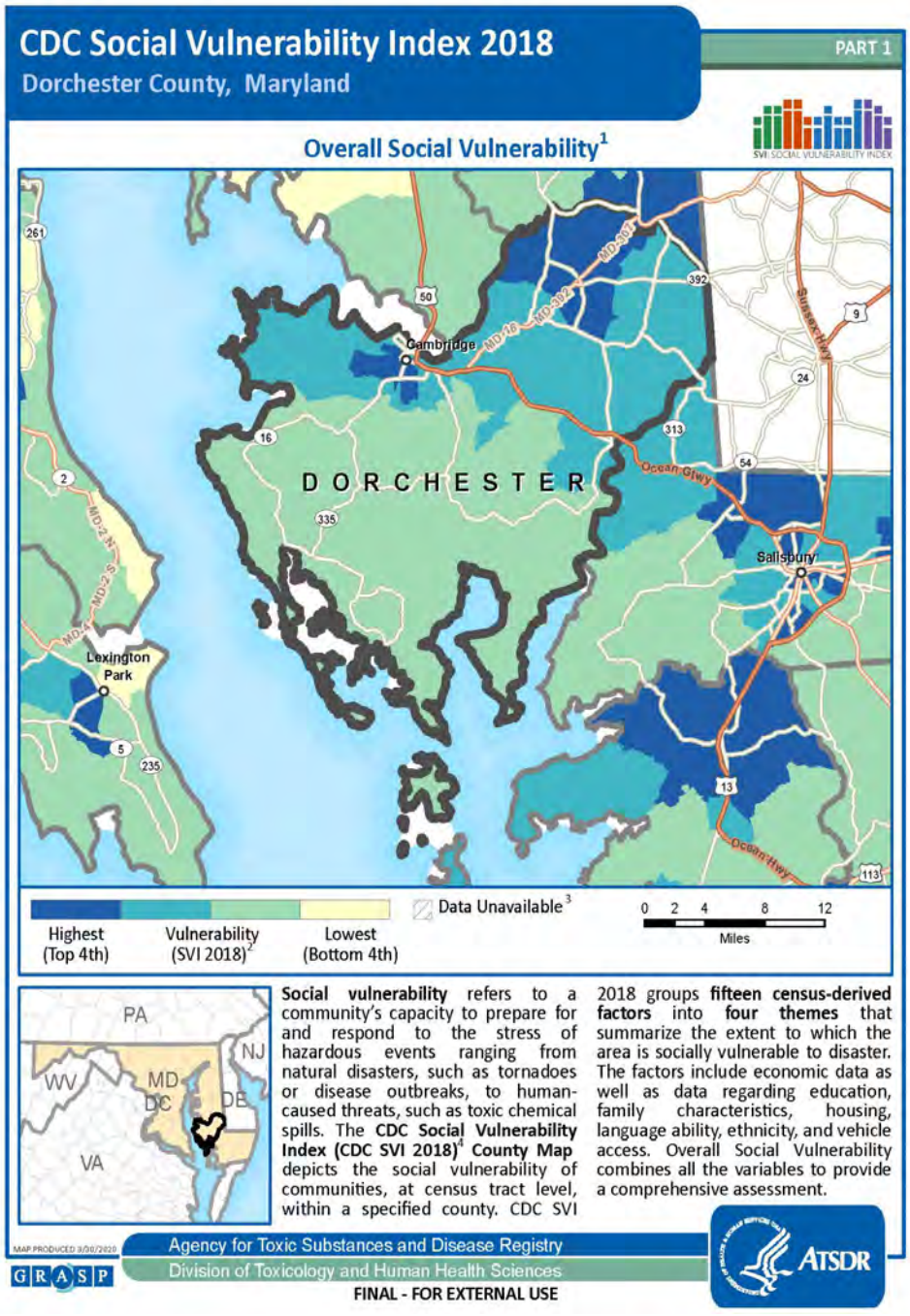


Figure 9-2

Conclusions & Recommendations

The following mitigation strategies were identified during the development of this plan chapter.

- Protect critical facilities and infrastructure from lightning damage by installing lightning protection devices, such as lightning rods and grounding, on communications infrastructure and other critical facilities. Review the following towers for lightning rods and grounding needs:
  - Tower #11, 4814 Madison Canning House Road
  - Tower #13, 3829 Vincent Road
  - Bucktown Tower , 2946 Greenbrier Road
  - Tower #29, 6840 Eldorado Road
  - Vienna Tower, 4710 Ocean Gateway
  - County Tower, Smithville Road

- Encouraging wind engineering measures and construction techniques that may include structural bracing, straps and clips, anchor bolts, laminated or impact-resistant glass, reinforced garage doors, window shutters, waterproof adhesive sealing strips, or interlocking roof shingles. Assess critical facilities vulnerability to wind hazards. The major factor to consider is the possibility of these structures failing when subjected to wind that exceed the ASCE Wind Design Speed of 115 mph or to flying debris that penetrates the building. This especially true for facilities constructed prior to 1972 when wind load design criteria was established.

- Establish standards for all utilities companies regarding tree pruning around lines. Continue working with DNR, Delmarva Power, Choptank Electric, Verizon and other utilities to identify areas where underground lines can be installed in order to mitigate power outages.

- Encourage citizens in the areas with the highest social vulnerability, the City of Cambridge and the northeast section of the County, to sign up for the **Emergency Alert Program:** https://member.everbridge.net/892807736724055/new.

- Provide information to farmers on the multiple insurance opportunities available, which assists farmers with losses due to adverse weather conditions, such as the Noninsured Disaster Assistance Program (NAP) and Federal Crop Insurance Program (FCIP).

Chapter 10 Extreme Heat, Drought & Wildfire

Chapter Update Overview

New to Chapter 10 is Table 10-1, Extreme Heat, Drought & Wildfire Hazard Impacts. The Core Planning Team provided hazard impacts for the five (5) categories listed in the table. Extreme Heat Tables 10-3 and 10-4 were updated. A new component was added for this plan update, Social Vulnerability. Vulnerable population to extreme heat events were assessed. Drought hazard Tables 10-5 and 10-6 were updated. NOAA's National Integrated Drought Information System (NIDIS) was added to the section for drought monitoring. Finally, Tables 10-7 and 10-8 in the wildfire section were updated. Conclusion and recommendations were added at the end of this chapter.

Hazard Impacts

The Core Planning Team reviewed and discussed impacts from extreme heat, drought & wildfire hazard events as presented on the table below.

Table 10-1

Extreme Heat, Drought & Wildfire Hazard Impacts	
Public Health & Safety	• Drought events take a long time to develop and may be either short-term or long-term events. Impacts to the public during a drought take the form of crop damage/failures, water rationing and other water source impacts, and wildfires. • Exposure to extreme heat can result in illnesses. Heat stress can result in heat stroke, heat exhaustion, heat cramps, or heat rashes. The population at a greater risk of heat stress include those who are 65 years of age or older, are overweight, have heart disease or high blood pressure, or take medications that may be affected by extreme heat.
Social Vulnerability	• Small children, the elderly, and certain other groups including people with chronic diseases, low-income populations, and outdoor workers have higher risk for heat-related illness
Economic Stability	• Droughts impact on economic conditions increase due to increased fire potential and the increased cost of energy. • Increases in irrigation during extreme heat or drought events could adversely increase cost to farming operations and run-off issues.
Infrastructure	• Property and infrastructure is typically not vulnerable to drought. However, the water supply infrastructure may be impacted by drought during a long-term event. • Higher summer temperatures will increase electricity use, especially during heat waves.
Environment	• Droughts impact the environment by causing wildfires, overloading water and wastewater treatment plants, creating dust storms, and disturbing wildlife and natural areas. • The shrink and swell cycle of soils may lead to decrease in soil health, pipe damage, and damage to foundations

Extreme Heat

Profile

According to the National Weather Service, when temperature and humidity together exceed certain levels (85° F and 100% humidity, 90° F and 70% humidity, or 110° F and 30% humidity) heatstroke is likely if exposure continues for many hours. Such conditions, which can create a heat index temperature of 105° F or greater, are encountered in Maryland virtually each summer. For example, Baltimore normally has 32 days per year with temperatures over 90° while the humidity is in the 70% range.

Dorchester County normally averages close to the same temperature and humidity during the summer months as Baltimore and Washington DC. This translates into a similar number of days for inland areas with a heat index above 105° F. However, along the coast, the temperature and humidity are more closely related to the Tidewater Area in Virginia where there are fewer days with those conditions. Using the heat index, possible heat disorders that may manifest are shown on the table below:

Table 10-2

Heat Disorders on High-Risk Groups	
Heat Index	Possible Heat Disorders
130 or Higher	Heatstroke/sunstroke highly likely with continued exposure.
105-130	Sunstroke, heat cramps or heat exhaustion likely and heatstroke possible with prolonged exposure and/or physical activity.
90-105	Sunstroke, heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity.
80-90	Fatigue possible with prolonged exposure and/or physical activity.

Source: NOAA

For this plan update, extreme heat was ranked as “medium-high” for Dorchester County by using the composite score method detailed in *Appendix A Hazard Identification & Risk Assessment*. Eight (8) ranking parameters were used to develop the composite risk score and are provided on Table 10-3. The Core Planning Team, municipalities and community level of concern specific to extreme heat indicate “somewhat concerned” according to the survey.

Table 10-3

Total Extreme Heat Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Excessive Heat and Heat*							
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)	Future Probability	Community Perspective
0	1	$0	$0	% Crop from 2017 Agriculture Census = 32%	Total = 4 Annual Avg = 0.15	Occasional	Somewhat Concerned

Source: National Centers for Environmental Information, as of February 2021 & 2016 State of Maryland Hazard Mitigation Plan
Note: One extreme heat event is recorded that spanned 3 days in 2011. An extended period of excessive heat and humidity occurred across most of the Lower Maryland Eastern Shore from July 21st to July 23rd. High temperatures ranged from 96 to 103 degrees during the afternoons, with heat index values ranging from 110 to 119. Overnight lows only fell into the mid 70’s to mid-80’s.

The NOAA/NCEI listed one (1) excessive heat events and three (3) heat events affecting Dorchester County between 1996 and 2021. The last heat event to affect Dorchester County was reported in 2012. This event was caused by a high-pressure system centered just to the west of the Middle Atlantic Region produced hot and humid weather over the Lower Maryland Eastern Shore.

Table 10-4

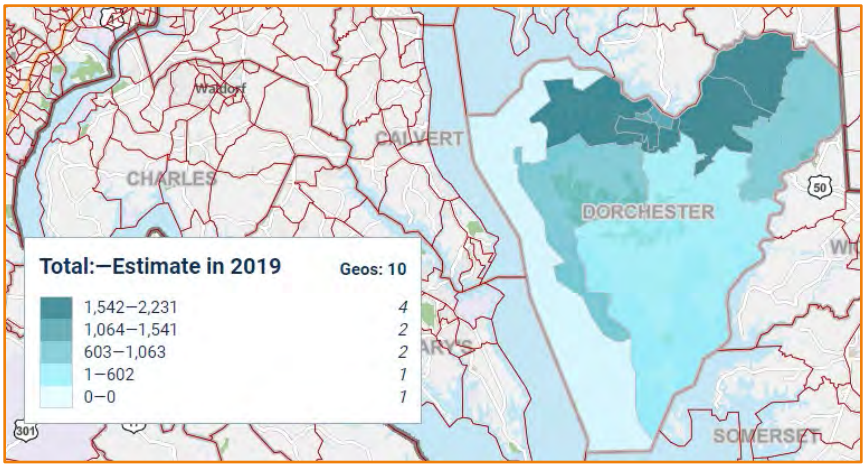
Extreme Heat & Heat Events	
Date	**Event Narrative**
May 18 to May 21, 1996	An early-season four-day heat wave produced record or near record high temperatures across the lower Maryland eastern shore. High temperatures were in the 80s across the region on May 18th. Then on May 19th, 20th and the 21st higher temperatures occurred.
July 20, 2002	High temperatures reached the lower 90's. Heat related death of a man, found inside residence where the temperature was 100 degrees.
July 21 to July 23, 2011	An extended period of excessive heat and humidity occurred across most of the Lower Maryland Eastern Shore from July 21st to July 23rd. High temperatures ranged from 96 to 103 degrees during the afternoons, with heat index values ranging from 110 to 119. Overnight lows only fell into the mid-70s to mid-80s.
July 5-8, 2012	High temperatures ranged from the mid 90's to lower 100's across the County from 7/5 through 7/8.
2021 HMP Update	
NO NCEI EXTREME HEAT OR HEAT EVENTS SINCE 7/5-8/2012	

Source: NWS, NCEI (NOAA)

Vulnerability Analysis

Children under (5) five years of age and persons (65) sixty-five year and older are oftentimes considered vulnerable to extreme heat conditions. According to the estimated 2019 Census Data – Community Facts, 5.6% of the population in Dorchester County are (5) five year of age and under, while 22.1% of the population is (65) sixty-five years of age and older. The figure below from the US Census map for 2019: ACS 5-Year Estimated Detail Table: Households by Prescence of People 65 Years and Over shows the majority of population 65 years and over reside in the northern portion of Dorchester County.

Figure 10-1: Households by Prescence of People 65 Years and Over



Source: https://data.census.gov/cedsci/map?q=&t=Older%20Population&g=0500000US24019%241400000&tid=ACSDT5Y2019.B11007&mode=thematic&layer=VT_2019_140_00_PY_D1&cid=B11007_001E

Note: 2020 Census data at the block level is not available currently.

Drought

Profile

A drought is essentially a deficiency of precipitation over a period of time resulting from a weather pattern that brings no moisture into an area. Droughts may be short term, a few weeks to a month, or long term, several months to several years. A long-term drought may be interrupted by occasional precipitation without breaking the drought cycle. The Midwestern states are prone to cyclic long-term droughts that last several years. Beginning in 1930, the states in the Great Plains began a long-term drought that lasted most of the decade of the 1930's and led to the abandonment of farms and ranches on a scale not seen in this country since that time. This same drought affected Maryland in 1930 and early 1931. During the 15 months from December 1929 through February 1931, rainfall was 21.5 inches below normal for much of the state. Other drought periods that have affected the state include 1953-56, 1968-71, 1980-83, 1994-98, 2002-2003, and 2007-2008.

Using the composite score method discussed in Appendix A, drought was ranked as "medium." Table 10-5 provides numerous parameters used to determine the drought ranking. Dorchester County has reported over $2.0 million in crop damage, which occurred during the 1998 drought event. The Core Planning Team, municipalities, and community level of concern specific to drought indicate "somewhat concerned" according to the survey.

Table 10-5

Total Drought Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Drought*							
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1998-2021)	Future Probability	Community Perspective
0	0	$0	$2.0M	% Crop land cover from 2019 USDA Cropland Data = 32%	Total = 30* Annual Avg = 1.30	Occasional	Somewhat Concerned
Source: National Centers for Environmental Information, as of February 2021, State of Maryland Hazard Mitigation Plan & USDA Cropland Data-2019							

The National Centers for Environmental Information (NCEI) storm event database included one drought event for Dorchester County. This event was recorded in 1998 and extended over 30 days. A very dry period from July through November resulted in drought-like conditions across much of the Lower Maryland Eastern Shore. This caused significant crop damage and other drought-related problems throughout much of the area.

Table 10-6

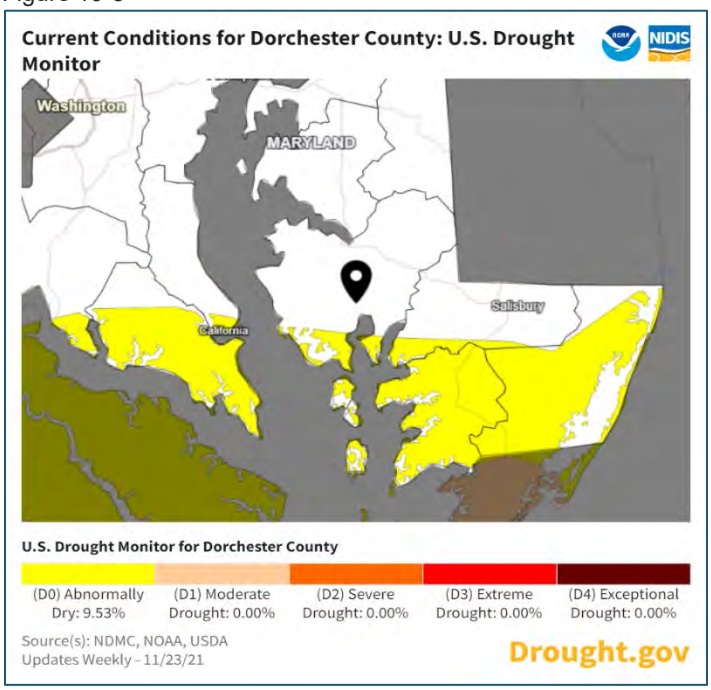
Drought Events		
Date	Event Narrative	Crop Damage
November 1 to November 30, 1998	A very dry period from July through November resulted in drought-like conditions across much of the Lower Maryland Eastern Shore. This caused significant crop damage and other drought-related problems throughout much of the area.	$2 Million
2021 HMP Update		
	NO NCEI DROUGHT EVENTS SINCE 1998	

Source: *NWS, NCEI (NOAA)*

NOAA's National Integrated Drought Information System (NIDIS), monitors droughts daily for the United States. NIDIS uses the U.S. Drought Monitor Classification Scheme (Figure 10-2) for drought monitoring. According to the site, 9.53% (southern portion) of Dorchester County is currently abnormally dry (Figure 10-3).

Figure 10-2

Figure 10-3



The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Map courtesy of NDMC.

The NIDIS website provides Drought Conditions for Dorchester County and is updated weekly. The site provides current conditions as well as streamflow and future conditions, and historical conditions for the County.

Vulnerability Analysis

Dorchester County normally receives 40-44 inches of precipitation per year, about average for the state. However, that does not mean the County is immune to drought. Water supply can be affected, particularly where groundwater is relied on to supply community systems, as is the case in Dorchester County. Some small community water supplies may be adversely affected by even moderate drought conditions and the effect of long-term drought on the County's agriculture community could be detrimental. The municipalities in the County rely on groundwater for their supply. Since the aquifers underlying the Eastern Shore have their recharge areas primarily to the west of the Chesapeake Bay, localized drought conditions have little effect on the water supply. However, long term draw-down of these aquifers combined with drought on the western shore could adversely affect water supply on the eastern shore.

Wildfires

Profile

A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. In the United States more than 2 million acres burn each year as a result of wildfire. Between 1960 and 1999, more than 6 million acres have been consumed during 8 fire seasons; more than 8 million acres in 2000, and nearly 7 million acres in 2002. Most of the acreage involved and the accompanying suppression efforts are in the western states on land managed by the US Forest Service, the Bureau of Land Management, the Bureau of Indian Affairs, the US Fish and Wildlife Service and the National Park Service. Unfortunately, in recent years, more private property has been affected by wildfires as urban development encroaches on forest land. Occasionally brush fires threaten urban development where homes are built in close proximity to forest, or brush covered land. As more former agriculture land reverts to brush, this problem will become more prevalent. As of November 2021, a total of 52,729 fires occurred in the United States totaling 6,631,430 acres burned since January 2021. The 10-year average between 2001 and 2020 for the United States is 53,675 wildfires burning 7,122,253 acres.

According to the 2021 Dorchester County Comprehensive Plan, approximately 36% of Dorchester County's land surface is covered by forests, and another 25% is covered with wetland areas, wildfire is a major concern. With more than 57,000 acres owned by the State of Maryland and the Federal Wildlife Administration, the State Department of Natural Resources and the Federal government take a leading role in fire suppression throughout the County.

According to data provided by the Maryland DNR Forest Service, Dorchester County experienced 706 fires during the years 2000 to 2020 which consumed approximately 43,907 acres. In terms of the number of fires reported per year, there is a general downward trend in the data since 2009; however, this does not necessarily equate to a downward trend in the number of acres burned. For example, in 2017 only 13 fires were reported but those fires impacted 1,909 acres. The full scope and breadth of the impact due to wildfires is dependent on a multitude of variables such as time of year, fuel availability, atmospheric conditions, weather, and access routes for firefighting equipment.

The wildfire hazard was ranked as "medium" using the composite score method. Table 10.7 details information used for the several of paraments in the composite score method. In addition, the Core Planning Team, municipalities, and community level of concern specific to wildfire indicate "somewhat concerned" according to the survey.

Table 10-7

Wildfire Hazard Data Table							
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Events (2000-2020)	Future Probability	Community Perspective
3	0	$0	$0	Avg Annual Acres Burned = 0.59%	Total = 706 Annual Avg = 33.6/yr.	Likely	Somewhat Concerned

Source: Data obtained from MD-DNR Forest Service for 2000-2020.

In terms of number of occurrences, the Maryland Forest Service listed a total of 706 wildfire events affecting Dorchester County during the years of 2000 to 2020. Using the data, Dorchester County experiences approximately 33.6 wildfire events per year.

Table 10-8

Wildfire Events		
Year	Number of Fires	Acres Burned
1988	75	5,812.3
1989	45	1,754.8
1990	43	1,613.7
1991	94	5,335.3
1992	39	1,154.2
1993	84	1,678.7
1994	77	1,139.1
1995	127	3,783.8
1996	17	429.4
1997	47	1,034.6
1998	70	780.2
1999	68	1,359.5
2000	30	162.2
2001	78	4,087.8
2002	75	2,187.2
2003	11	1126.9
2004	37	2,811.7
2005	48	3,827.5
2006	72	5,295.5
2007	74	4,292.5
2008	65	1,797.4
2009	30	4,313.4
2010	15	1,056
2011	26	6,046.9
2012	12	165.4
2013	10	13.9
2014	28	1,591.2
2015	11	502
2016	9	14.8
2017	13	1,909.2
2018	13	243.3
2019	38	1,224.8
2020	11	1,237.1
Total	1,492	69,782.3

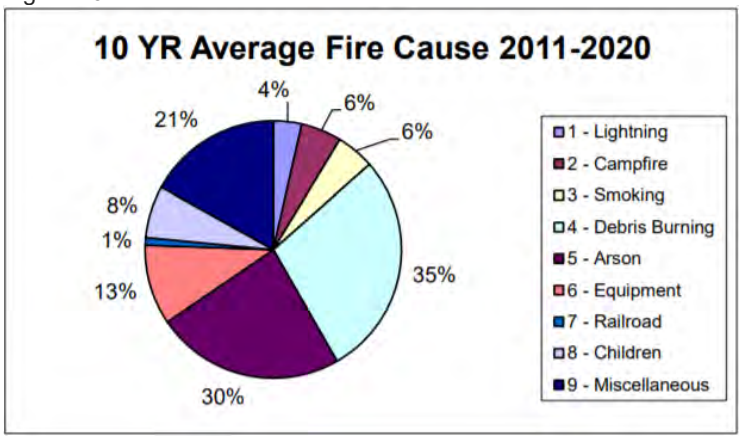
Source: *Maryland Forest Service*

Vulnerability Analysis

The intensity of wildfires increases greatly in areas of dense fine fuels, such as grasses, or dense resinous fuels, such as mountain laurel shrubs or evergreen trees. In these areas, wildfires can spread rapidly and burn with amazing intensity. Maryland rarely experiences active crown fires - wildfires that burn in the tree canopy. However, crown fires can occur in dense stands of evergreen trees during times of very dry and windy weather. Wildfires occur in every month in Maryland, but peak in the spring and fall. During these seasons the leaves are off the deciduous trees, allowing sunlight and wind to reach the forest floor and dry the forest fuels. The relative humidity of the air is also drier and, combined with a breeze, creates the conditions for wildfires to spread rapidly.

According to the Maryland Forest Service Wildland Fire Program 2020 Annual Wildland Fire Report, the highest number of fires occur during the months of March and April. The average fire cause for the past 10 years has been debris burning.

Figure 10-4



Source: Maryland Forest Service Wildland Fire Program 2020 Annual Wildland Fire Report - https://dnr.maryland.gov/forests/Documents/fire/2020AnnualWildfireReport.pdf

Wildfires are a common occurrence in Maryland. In an average year, the Maryland Forest Service responds to an average of 123 wildfires that burn more than 1,780 acres of forest, brush, and grasses. Fire departments respond to over 5,000 wildfire incidents per year.

While some wildfires in Maryland can burn hundreds or even thousands of acres, most are smaller in size, burning less than 10 acres. Even these smaller wildfires can threaten lives, homes, other structures, and our natural resources. Each year hundreds of homes and structures are threatened, and dozens are damaged or destroyed by wildfires.

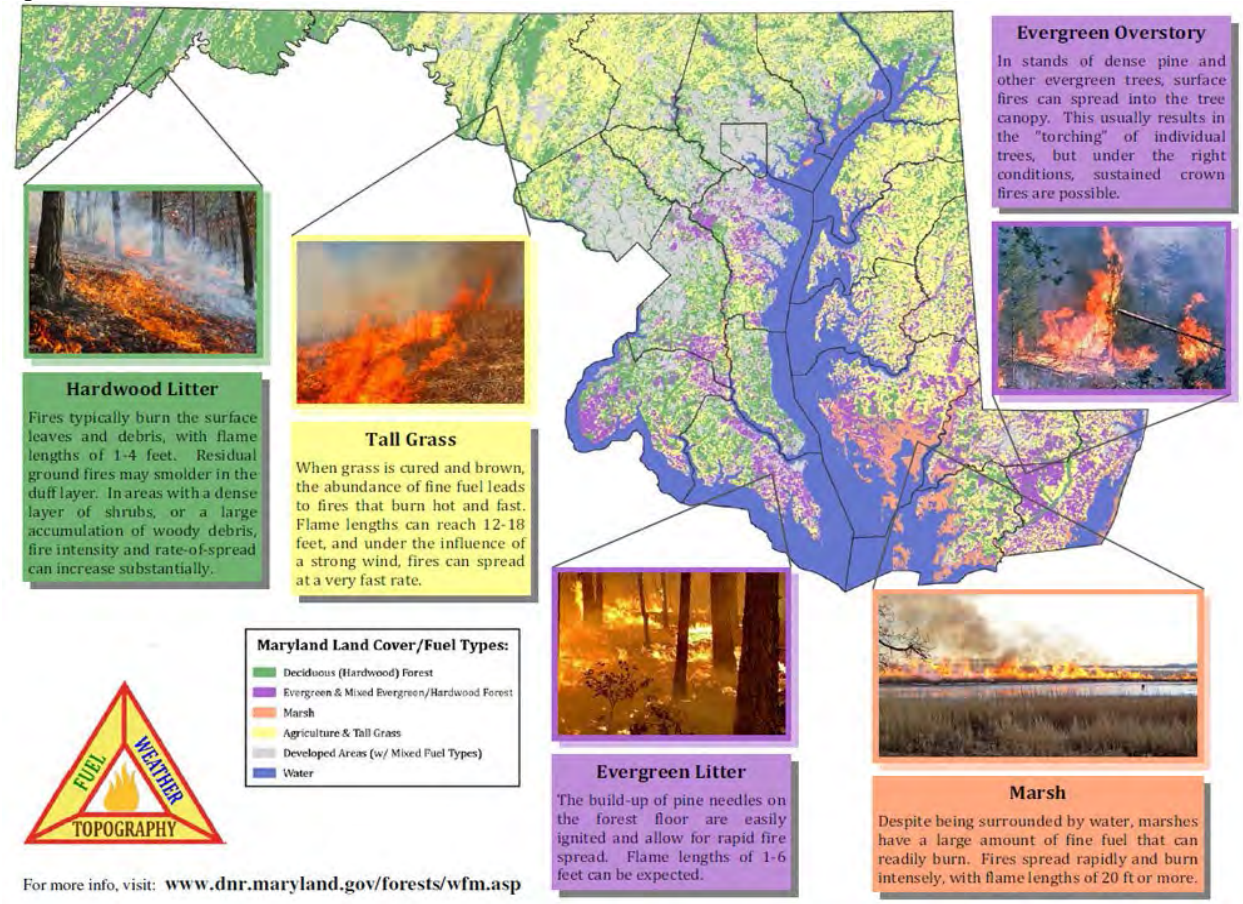
Source: MD DNR Wildfire Statistics - https://dnr.maryland.gov/forests/pages/wfm.aspx

According to the 2017 Dorchester County Land Preservation Park and Recreation Plan, the county has 146,135 acres of woodland. A large portion of those acres make up the Chesapeake State Forest, however most woodlands are privately owned farms or owned by other commercial timber companies such as Spicer's Lumber, Dorchester Lumber, or Glatfelter Pulpwood, Co. The Loblolly Pine is the most common species grown commercially in Dorchester County. Other species found in the county include of Sweet Gum, Poplar, and Oak Woodlands. A large portion of south Dorchester County, approximately two-thirds, is marshland with altitudes of two feet or less above sea level.

According to Maryland Department of Natural Resources, predominant fuel types in Dorchester County include:

- Marsh
- Evergreen & Mixed Evergreen/Hardwood Forest
- Agriculture & Tall Grass

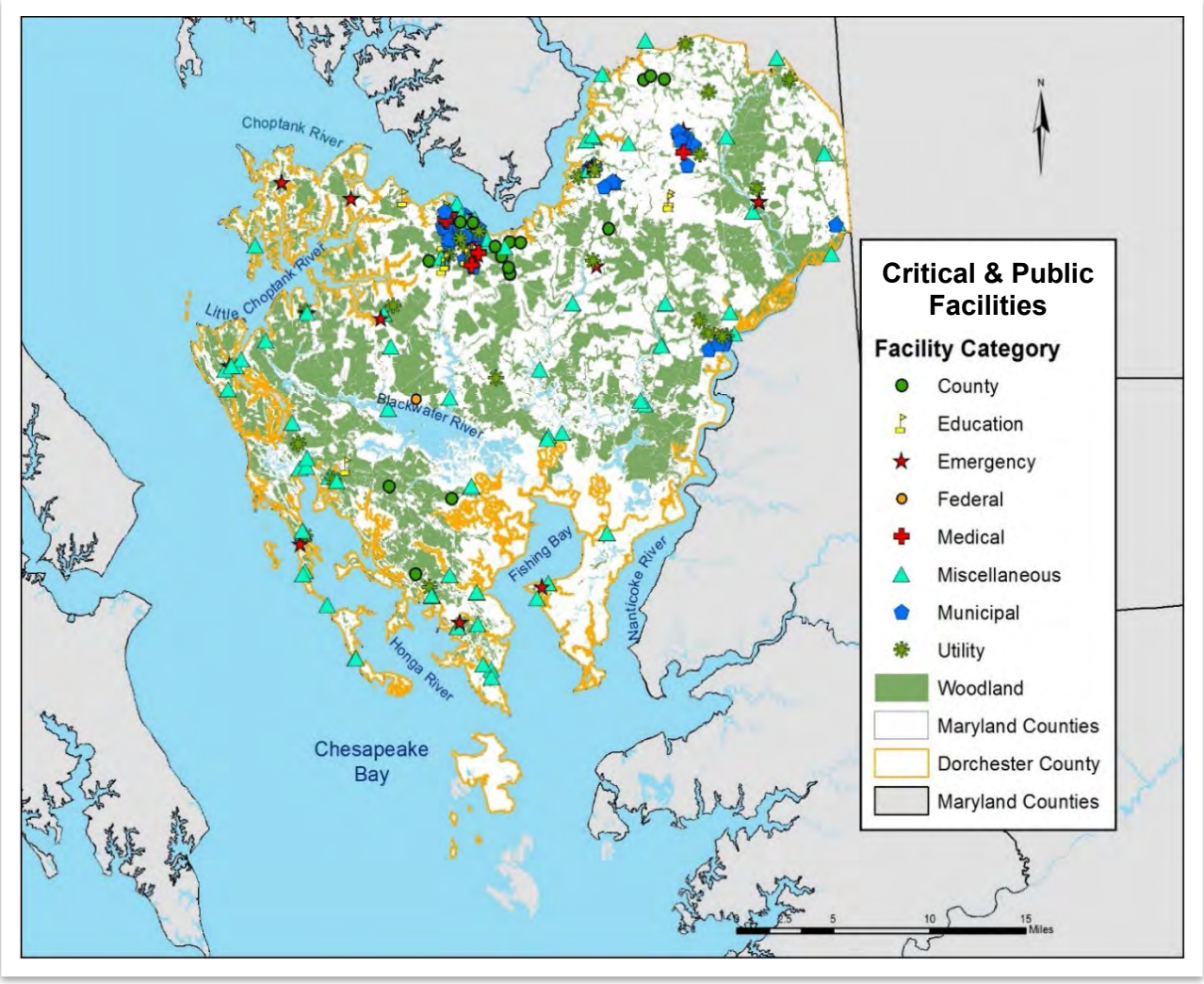
Figure 10-5



Source: Maryland Department of Natural Resources - https://dnr.maryland.gov/forests/PublishingImages/fire_facts3.jpg

An urban-wildland interface fire is defined as a fire that occurs where structures and other human development meet or intermingle with wildland. Therefore, utilizing the GIS woodland layer provided by Dorchester County, analysis could be conducted to determine which critical and public facilities are at high risk from wildfires.

Map 10-1



Source: Smith Planning and Design and Dorchester County Planning & Zoning

Social Vulnerability

The Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) uses fifteen (15) U.S. Census variables to calculate SVI scores that can help local officials identify communities within the county that may need additional support before, during, and/or after disasters.

The SVI has been conducted for Dorchester County at the census tract level and is mapped on the following page. The SVI utilizes American Census Survey (ACS) 5-year estimates. The darker blue census tracts in the overall map indicate areas of higher social vulnerability while the light green tracts indicate relatively low social vulnerability. Measuring social vulnerability at the census tract level is meant to help guide further planning. Investigation at the neighborhood level is required to fully identify vulnerable populations.

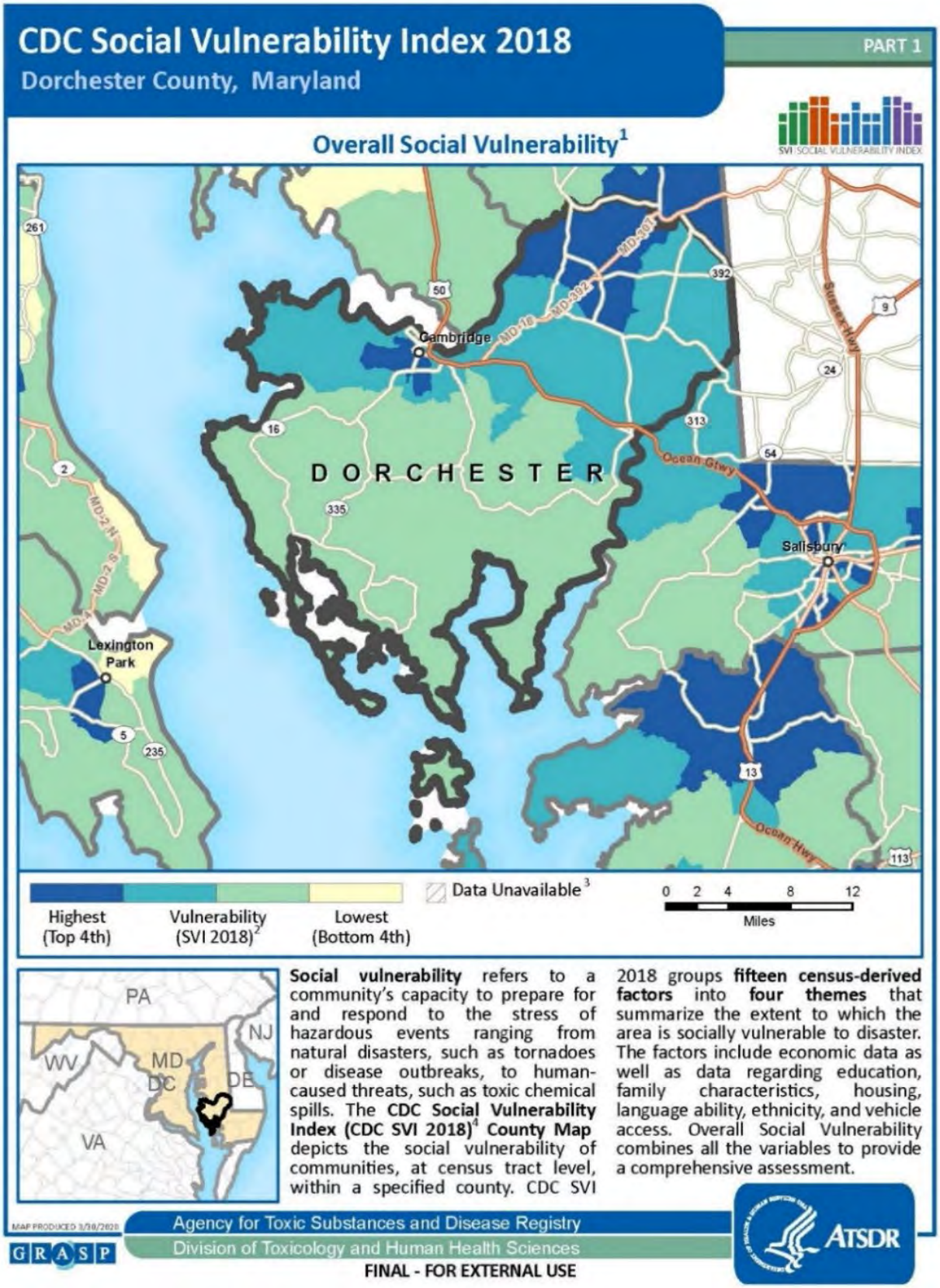
The area with the highest social vulnerability depicted in Figure 10-6 is the City of Cambridge and the northeast section of the County, which includes the Towns of Secretary, East New Market and Hurlock.

Comparing Figure 10-6, *CDC Social Vulnerability Index 2018*, and Figure 10-1, *Households by Prescence of People 65 Years and Over*, the highest social vulnerability area located in the northern portion of the county , also included the highest population of 65 years and over. Strategically placing cooling centers in the areas highly susceptible to the extreme heat hazard, specifically the northern portion, would assist residents significantly.

According to the NOAA's National Integrated Drought Information System (NIDIS), the southern portion of the county is considered "abnormally dry" as of November 2021. This portion of the county is in the light green tracts, indicating relatively low social vulnerability. All residents in Dorchester County should be aware of water-saving measures that can be taken specifically during hot summer months.

In reviewing Figure 10-6, the norther portion of the county consists of evergreen and mixed evergreen/hardwood forest and agriculture and tall grass fuel types. The highest social vulnerability area, located in the northern portion of the County, intersects with these fuel types, which can rapidly spread and burn fast. Residents should be informed about the various mitigation measures that can be taken to protect their homes.

Figure 10-6


CDC Social Vulnerability Index 2018
Dorchester County, Maryland
PART 1
Overall Social Vulnerability[1]
SVI SOCIAL VULNERABILITY INDEX
DORCHESTER
Cambridge
Salisbury
Lexington Park
Highest (Top 4th)
Vulnerability (SVI 2018)[2]
Lowest (Bottom 4th)
Data Unavailable[3]
0 2 4 8 12
Miles
PA
NJ
WV
MD
DC
DE
VA
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 Social Vulnerability Index (CDC SVI 2018)[4] County Map depicts the social vulnerability of communities, at census tract level, within a specified county. CDC SVI 2018 groups fifteen 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.
MAP PRODUCED 3/16/2020
GRASP
Agency for Toxic Substances and Disease Registry
Division of Toxicology and Human Health Sciences
ATSDR
FINAL - FOR EXTERNAL USE

Conclusions & Recommendations

According to NASA's Global Climate Change, scientists have high confidence that global temperatures will continue to rise for decades to come, largely due to greenhouse gases produced by human activities. The Intergovernmental Panel on Climate Change (IPCC) forecasts a temperature rise of 2.5 to 10 degrees Fahrenheit over the next century. According to the Third and Fourth National Climate Assessment Reports, some of the long-term effects of global climate change in the Northeast are heat waves, heavy downpours and sea level rise pose growing challenges to many aspects of life. Infrastructure, agriculture, fisheries and ecosystems will be increasingly compromised.

The following mitigation strategies were identified during the development of the plan chapter.

- Ensure all residents, especially those that are most susceptible to the effects of extreme heat in the northern portion of the county, have information regarding services the county provides during an extreme heat event. Promote the availability of cooling centers and their locations.
- Continue to support and promote volunteer fire companies through training and technical assistance for wildfire events. Maryland Department of Natural Resources provides wildfire training: https://dnr.maryland.gov/forests/Pages/fire/wildfiretraining.aspx.
- Educate homeowners on ways to protect their home from wildfires and include information on county website. Maryland Department of Natural Resources FireWise program offers information on landscaping for woodland homes; https://dnr.maryland.gov/forests/Documents/fire/Firewise_LandscapingWoodlandsBrochure.pdf
- Work with Volunteer Fire Departments to develop community fire response plans.
- Promote water saving tips for homeowners and businesses throughout the year. Use social media infographics to remind homeowners of water-saving measures that can be taken specifically during hot summer months.
- Incorporating drought tolerant or xeriscape practices into landscape ordinances to reduce dependence on irrigation. Xeriscaping is the practice of landscaping with minimal use of water. Include this information on the county website and social media campaigns.
- Promote the use of permeable driveways and surfaces to reduce runoff and promote groundwater recharge.
- Work with the Dorchester County Soil Conservation District to educate farmers on constructing windbreaks, which help prevent evaporation from reclaiming salt-affected soil.

Chapter 11 Human Impacted Hazards

Chapter Update Overview

New to Chapter 11 is Table 11-1, Human Impacted Hazard Impacts. The Core Planning Team provided hazard impacts for the five (5) categories listed in the table. The vulnerability section for major fire or explosion was updated with new data from the United States Fire Administration as well as statistics from Maryland State Fire Marshal's Office. New to the transportation hazmat incident vulnerability section is the identification of critical and public facilities within 1,000 feet of centerline along Routes 50, 14, 16 and 331. New components added for this plan update include Dam Failure and Social Vulnerability. Conclusion and recommendations were added at the end of this chapter.

Hazard Impacts

The Core Planning Team reviewed and discussed impacts from human impacted hazard events as presented on the table below.

Table 11-1

Human Impacted Hazard Impacts	
Public Health & Safety	• A large group of people in close proximity such as the workers at the on-site facilities who regularly use or handle hazardous materials, transportation carriers, nearby residents and students, first responders, and healthcare workers are all at risk of health impacts from hazardous materials. • Residents and businesses on Taylor's Island would be impacted by the 10-mile radius 'Plume" zone that would affect if an incident occurred at Calvert Cliffs.
Social Vulnerability	• Social impacts caused by dam failures include disruptions in social patterns, loss of services provided by institutions in the inundation area, and loss of recreational opportunities. • Major fires or explosions could displace residents in the vicinity of the incident or cause businesses to close.
Economic Stability	• Dam failure impacts include the costs of repair, debris removal, replacement of contents, and the loss of jobs.
Infrastructure	• Infrastructure such as water treatment plants, healthcare facilities, businesses, communications networks, and transportation networks located in dam inundation areas could be impacted during a dam failure.
Environment	• Dam failures impacts on the environment include polluted water and soils, loss of habitat, and erosion of stream banks. • A hazardous materials incident could impact the environment by killing organisms in waterways, destroying animals and plants in a contaminated area, causing major reproductive complications in animals, or otherwise limit the ability of an ecosystem to survive. Certain hazardous substances also have the potential to explode or cause a fire, threatening both animals and human populations.

Major Fire/Explosion

Profile

In this document fire or explosion refers to a major incident involving a commercial or industrial or transportation fire or explosion. Fire is defined as the state, process, or instance of combustion in which fuel or other material is ignited and combined with oxygen, giving off heat, light and flame. An explosion is defined as an expansion with violent force of materials through a chemical change or through decomposition. According to the Maryland State Fire Marshall's Office, to prevent deaths, injuries, and property damage due to fires, it investigates arsons, and provides instruction on fire safety. Manufacturers, dealers, and users of explosives are regulated by the State Fire Marshal.

An example of a major fire and explosion event, in 2013, a cargo train carrying chemicals derailed near Baltimore. The blast from the explosion was felt nearly on mile away and the fire sent a thick plume of dark smoke in and above the wreckage site. Another fire and explosion event occurred in Silver Spring, Maryland in August of 2016. This event resulted in two deaths, thirty-four injuries, and displaced approximately one hundred people. The cause of the massive fire explosion was a natural gas leak at a large apartment complex. More recently, a steel gas main on Stevenson Road in Pikesville exploded on May 14, 2021 (right picture). The explosion injured several people, and several structures, vehicles and power lines were enveloped by the fire.

A Baltimore Gas & Electric worker watches as a ruptured gas line burns on Stevenson Road in Pikesville.

Source: Jerry Jackson/Baltimore Sun

According to the survey provided to the Core Planning Team, municipalities, and the public, the level of concern for major fire/explosion events are as follows:

- Core Planning Team Results - concerned
- Municipal Results – concerned
- Public Results - not concerned

Vulnerability Analysis

Dorchester County is no different than other rural counties throughout the Country, having a network of volunteer fire companies whose primary role historically has been to suppress fires and minimize damage to life and property as a result of these fires. Dorchester County is at risk due to the clustering of commercial and industrial structures in the Cambridge and Hurlock communities. Additionally, all municipalities share the threat of fire to residential, commercial or other structures. The municipalities of Cambridge and Vienna have the possibility of fire/explosion transportation related incidents due to their location along Route 50.

According to the United States Fire Administration (2005-2019) many regional factors affect fire issues in the United States, such as climate, poverty, education and demographics, however, one of the most useful ways to compare fire fatalities across groups of people is to look at their relative risk of dying in a fire. The following age groups were examined:

Ages 0-4

"Although the relative risk of dying in a fire in 2019 for children under the age of 4 was lower than the overall U.S. population, children ages 0 to 4 had the highest fire death rates compared to children of all ages and, as a result, had a higher relative risk of dying in a fire compared to older children."

Ages 5-9

" The fire death rate trend for children ages 5 to 9 increased 3.6 percent over the 10-year period (2010-2019). In 2019, the relative risk of dying in a fire for this group was approximately 50 percent less than that of the general population."

Ages 10-14

"Children ages 10 to 14 had the lowest relative risk of dying in a fire compared to children of all ages. This group's relative risk of dying in a fire was approximately 60 percent less than the general population; however, this age group showed an increase of 26.1 percent in the child fire death rate trend from 2010 to 2019."

Ages 65 and over

"The fire death rate trend for older adults (ages 65 and older) decreased 1.5 percent from the previous period. Although the trend in fire death rates has decreased for the older adult population, older adults face the greatest relative risk of dying in a fire. In 2019, older adults had more than double a greater risk of dying in a fire than the population as a whole."

Data reported in the Maryland Fire Incident Reporting System for 2019, fire deaths in Maryland showed are in notable decline compared to the previous year. The 65 deaths in 58 fires in 2019 represent an 8.45 percent death decrease overt the 71 deaths in 62 fires reported in 2018, and the same 8.45 percent decrease over the 71 deaths in 54 fires in 2017.

The Maryland State Fire Marshall's Office reports statistics on fire deaths for each jurisdiction; Dorchester County fire death data is provided below.

Table 11-2

Fire Deaths										
Dorchester	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	3	0	0	0	2	2	1	0	2	0
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	0	0	2	1	0	0	1	0	0	0

Source: Maryland State Fire Marshalls Office

On-site Hazmat Incident

Profile

A hazardous material (hazmat) may be defined as a substance or material, which, due to its chemical, physical, or biological nature, poses a threat to life, health or property if released from a confined setting. A release may occur by spilling, leaking, emitting toxic vapors, or any other process that enables the material to escape its container, enter the environment and create a potential hazard. Several common hazmats include materials that are explosive, flammable or combustible, poisonous or radioactive. Related combustible HazMats include oxidizers and reactive materials, while toxins produced by etiological (biological) agents are types of poison that can cause disease.

There are several notable Maryland hazmat incidents. According to the US National Regulatory Commission, in 2002, an on-site HazMat event occurred in Mason Springs, Maryland. The event forced an evacuation after a chemical mishap at the Mattawomen Wastewater Treatment Plant in Charles County, resulting in a cloud of poisonous gas that overwhelmed seven (7) people and forced twenty-two (22) Mason Springs' residents from their homes. In 2007, an on-site hazmat event occurred in Elkton, Maryland at Teruma Vascular Systems. Thirty-five (35) employees were sent to the hospital after complaining of either headache or tightness in the chest. Recently in June 2021, an on-site HazMat incident occurred at the FBI building in Baltimore County. One (1) person was hospitalized with minor injuries after an unknown chemical "became aerosolized."

Vulnerability Analysis

On-site hazmats are a "concern" for the Core Planning Team, while municipalities and the overall community are "somewhat concerned." The county maintains a record of each site and the material(s) stored at the site. These sites include water and sewage treatment plants, and a number of manufacturing, wholesale and retail concerns in Cambridge and Hurlock areas.

Another concern is the Calvert Cliffs Nuclear Power Station located across the Bay in Calvert County and the Liquid Gas Conversion Plant located just to the south of Calvert Cliffs. According to the Dorchester County Department of Emergency Services, if an incident occurred at the Power Plant, the two zones involved may require protective actions to be taken. The first zone is the 10-mile radius 'Plume" zone that would affect Taylors's Island. The second 50-mile radius zone, 'Ingestion" zone, would affect the water, agriculture and livestock. Restrictions may be placed on their use in order to protect the citizens from long-range effects of radiation.

Source: Exelon; https://www.exeloncorp.com/locations/power-plants/calvert-cliffs

Transportation Hazmat Incident

Profile

The release of hazmat while in transit is of great concern to the US Department of Transportation. While most hazardous materials are stored and used at fixed sites, these materials are usually produced elsewhere and shipped to the fixed facility by rail car, truck, or onboard hips or barges. While these vehicles are identified by signs denoting the hazard, the possibility of release is present at any time. Hazardous materials are constantly being moved in Maryland on interstate highways, rail systems and on shipping lanes in the Chesapeake Bay and its tributaries.

Vulnerability Analysis

The Core Planning Team, municipalities, and the overall community are "somewhat concerned" about transportation hazmat incidents according to survey results. The bulk of hazardous materials pass through the County by truck, particularly on U.S. Route 50, which crosses the northern part of the County from west to east. Other highways that are used to transport hazardous materials include: MD State Routes 14, 16, and 331.

According to the Maryland Department of Transportation, the annual average daily traffic volume for US Route 50 in Cambridge was 26,483 in 2020. Additionally, MD Route 16 at the Cambridge traffic count station, within the Town of East New Market, experiences approximately 6,091 vehicles daily, while Route 331 has a daily average of 3,752 travelers through the Town of Hurlock. Therefore, critical and public facilities located within the City of Cambridge, the Town of East New Market and the Town of Hurlock may be more susceptible to a transportation hazmat incident. The following tables, 11-3 to 11-6, lists critical and public facilities within 1,000 feet of centerline along Routes 50, 14, 16 and 331. These facilities may be at-risk depending upon the type and quantity of hazardous material spilled during a transportation accident.

Table 11-3

Route 50 - Critical and Public Facilities				
Facility Category	Facility Type	Facility Detail	Address	City
Education	Public School	Warwick Elementary	155 Main Street	Secretary
Emergency	Fire Department/ EMS	Brookview Volunteer Fire Company	5752 Rhodesdale Eldorado Road	Eldorado
Emergency	Fire Department	Secretary Volunteer Fire Company	115 Myrtle Street	Secretary
Miscellaneous	Bridge	Marshyhope Creek	RT 14	Brookview
Miscellaneous	Bridge	Artifical Path	RT 14	Secretary
Miscellaneous	Boat Ramp	Vienna Ramp	Temple Road	Secretary
Municipal	Municipal Government	Secretary Town Hall	122 Main St	Secretary
Municipal	Municipal Government	Secretary-Parks & Recreation	Popular Street	Secretary
Municipal	Municipal Government	Parks & Recreation/ Water Tower	Creamery Road	East New Market
Municipal	Municipal Government	East New Market-Housing Authority	40 Academy Street	East New Market
Utility	Utility	Water Tower	Main Street	Secretary

Table 11-4

Route 14 - Critical and Public Facilities				
Facility Category	Facility Type	Facility Detail	Address	City
Education	Public School	Warwick Elementary	155 Main Street	Secretary
Emergency	Fire Department	Eldorado-Brookview Volunteer Fire Company	5752 Rhodesdale Eldorado Road	Rhodesdale
Emergency	Fire Department/EMS	Eldorado-Brookview Volunteer Fire Company	5752 Rhodesdale Eldorado Road	Rhodesdale
Emergency	Fire Department	Secretary Volunteer Fire Company	115 Myrtle Street	Secretary
Miscellaneous	Bridge	Marshyhope Creek	RT 14	Brookview
Miscellaneous	Bridge	Artifical Path (Off of Warwick River)	RT 14	Secretary
Miscellaneous	Boat Ramp	Vienna Ramp	Temple Road	Secretary
Municipal	Municipal Government	Secretary Town Hall	122 Main St	Secretary
Municipal	Municipal Government	Secretary-Parks & Recreation	Popular Street	Secretary
Municipal	Municipal Government	Parks & Recreation/ Water Tower	Creamery Road	East New Market
Municipal	Municipal Government	East New Market-Housing Authority	40 Academy Street	East New Market
Utility	Utility	Water Tower	Main Street	Secretary

Table 11-5

Route 16 - Critical and Public Facilities				
Facility Category	Facility Type	Facility Detail	Address	City
County	County Government	Hospital Related Facility	2474 State Route 16	Cambridge
County	County Government	Parks & Recreation	Dailsville Road	Cambridge
County	County Government	Dorchester County Office on Aging	2470 Cambridge Beltway	Cambridge
Education	Public School	Cambridge Montessori School	2620 Cambridge Beltway	Cambridge
Emergency	Fire Department	East New Market Volunteer Fire Depart	101 Main Street	East New Market
Emergency	EOC	EOC	829 Fieldcrest Road	Cambridge
Emergency	Fire Department	Church Creek Volunteer Fire Company	1902 Church Creek Road	Church Creek
Emergency	Fire Department/EMS	Madison Volunteer Fire Company	1154 Taylors Island Road	Madison
Miscellaneous	Bridge	Parsons Creek	RT 16	Smithville
Miscellaneous	Bridge	Cabin Creek	RT 16/ New Market Road	Hurlock
Miscellaneous	Bridge	Hunting Creek	Langrell Road	Hurlock
Miscellaneous	Marina/Dock	Slaughter Creek Marina	638 Taylors Island Road	Taylors Island
Miscellaneous	Boat Ramp	Taylors Island Ramp	Route 16	Taylors Island
Miscellaneous	Community Center	Cambridge MAC Senior Center	Cambridge Beltway	Cambridge
Miscellaneous	Park	Church Creek Community Park	4663 Golden Hill Road	Church Creek
Miscellaneous	Boat Ramp	Madison Bay Ramp	Madison Canning House Road	Madison

Facility Category	Facility Type	Facility Detail	Address	City
Municipal	Municipal Government	Cambridge-Public Works	Stone Boundary Road	Cambridge
Municipal	Municipal Government	East New Market Town Office	10 Academy Street	East New Market
Utility	Utility	Choptank Electric Cooperative	Race Street	Cambridge
Utility	Utility	Transfer Station	1957 Brannock Neck Road	Cambridge
Utility	Communication	Tower #11	4814 Madison Canning House Road	Madison

Table 11-6

Route 331 - Critical and Public Facilities				
Facility Category	Facility Type	Facility Detail	Address	City
Education	Public School	Hurlock Elementary	209 Charles St	Hurlock
Emergency	Fire Department	Hurlock Volunteer Fire Company	302 S Main St	Hurlock
Emergency	Fire Department/EMS	Hurlock Volunteer Fire Company	300 Charles St	Hurlock
Medical	Medical	Delmarva Community Services	6210 Shiloh Church Hurlock Road	Hurlock
Municipal	Municipal Government	Commissioners of Cambridge	300 S Main St	Hurlock
Municipal	Municipal Government	Hurlock-Public Works	49 Delaware Ave	Hurlock
Municipal	Municipal Government	Hurlock-Public Works	106 Gay St	Hurlock
Municipal	Municipal Government	Hurlock-Office Building	220 S Main St	Hurlock
Municipal	Library	Hurlock Free Library	222 S Main St	Hurlock
Municipal	Municipal Government	Hurlock-Public Works	103 Oak St	Hurlock
Municipal	Municipal Government	Hurlock-Public Works	100 Thompson St	Hurlock
Municipal	Municipal Government	Hurlock City Hall	311 Charles St	Hurlock
Utility	Utility	Verizon	201 Poplar St	Hurlock

Most communities, whether large or small, are origins, destinations, or through-routes for hazardous materials transportation. In order to plan and prepare for possible hazardous materials and terrorist transportation incidents, planners need basic data on the types and quantities of chemicals transported through the jurisdiction. The process of acquiring and analyzing this information, referred to here as a commodity flow study, is one of the first steps in preparing a community's integrated hazardous materials emergency plan. Results can be used to analyze current traffic patterns, focus planning efforts on existing needs, and reduce the potential for incidents to occur.

Dam Failure

Profile

A dam is a barrier built across a waterway for impounding water. Dams vary from impoundments that are hundreds of feet tall and contain thousands of acre-feet of water (e.g., Galestown Millpond Dam) to small dams that are a few feet high and contain only a few acre-feet of water (e.g., small residential pond). “Dry dams,” which are designed to contain water only during floods and do not impound water except for the purposes of flood control, include otherwise dry land behind the dam.

According to the USACE National Inventory of Dams, four (4) low hazard dams are located in Dorchester County. Hazard classifications related to dams throughout Maryland are available through MDE’s Dam Safety Division. According to the online survey, the Core Planning Team, municipalities and overall community are “not concerned” with dam failure.

Table 11-7

USACE National Inventory of Dams – Dorchester County, MD						
Name	Owner Type	Purpose	River	Emergency Action Plan(EAP)	Last Inspection Date	Hazard Potential Classification
Cabin Creek Mill Dam	Private	Recreation	Cabin Creek	No	-	Low
Hurlock Oxidation Ponds	Local Government – Town of Hurlock	-	Offstream-Wrights Branch	No	12/17/2019	Low
Mill Creek Dam	Private	Recreation	Mill Creek	No	12/11/2019	Low
Galestown-Reliance Road	Local Government	Recreation /Irrigation	Gales Creek	No	12/12/2018	Low

Source: USACE National Inventory of Dams

Vulnerability Analysis

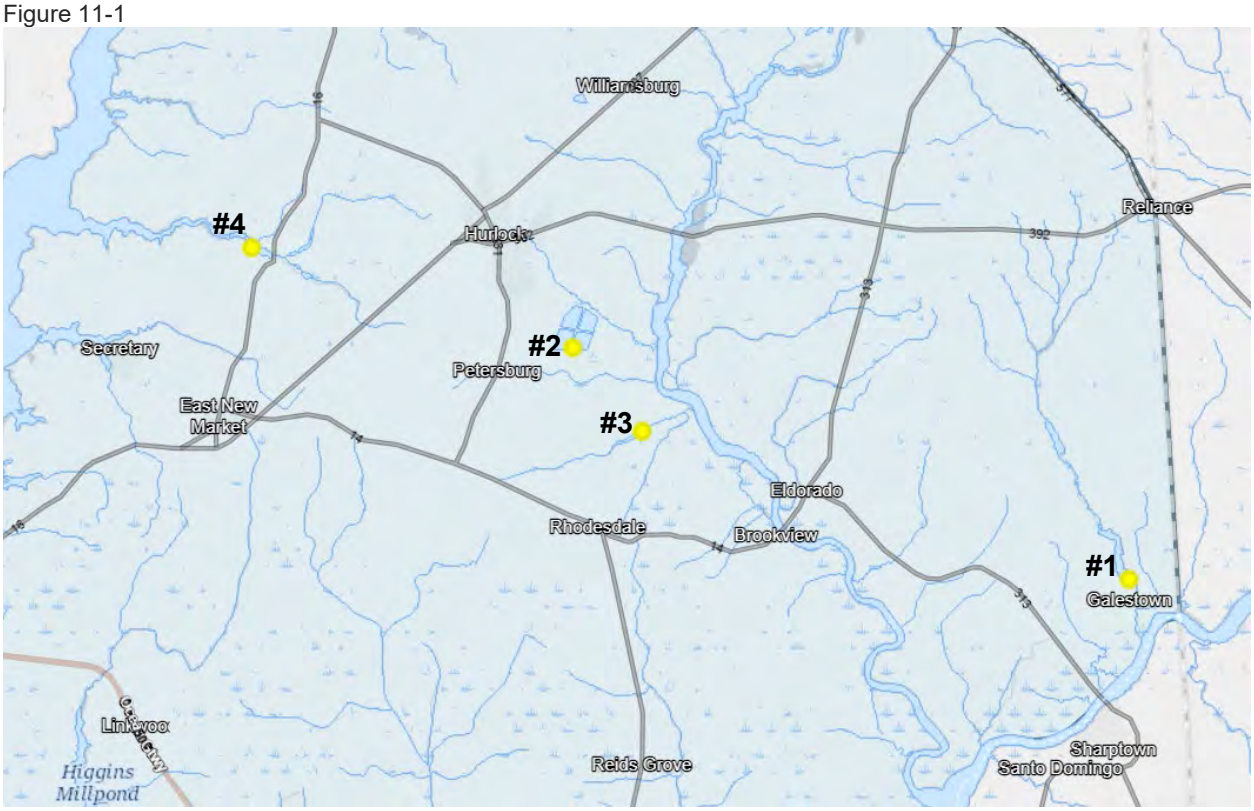
The average dam age in the United States is 60 years. Many older dams were not built to any particular standard and thus may not withstand extreme rainfall events. Older dams are made out of an assortment of materials. These structures may not have any capacity to release water and could be overtopped, which could result in catastrophic failure. The Cabin Creek Mill Dam is an earthen dam constructed in 1882 and has a 15-foot uncontrolled spillway. An earthen dam is constructed out of materials such as gravel, weathered rock, sand, silt, or soil.

In addition, dams may not always be regulated, given that the downstream risk may have changed since the dam was constructed or since the hazard classification was determined. For instances, years after a dam is built, a house, subdivision, or other development may be constructed downstream from the dam itself. The Cabin Creek Mill Dam is not regulated by the State. Considering the dam was constructed in 1882, a dam failure could result in downstream consequences.

The drainage areas for each dam located in Dorchester County is listed below. The dam failure inundation zone for these dams are not mapped. Not having knowledge of these risk areas could lead to unprotected development in these zones.

- #1: Galestown Millpond (Galestown-Reliance Road) – 8.1 sq miles
- #2: Hurlock Oxidation Ponds – 0.2 sq miles
- #3: Mill Creek Dam – 3.3 sq miles
- #4: Cabin Creek Mill Dam – 6.4 sq miles

Figure 11-1



Source: USACE National Inventory of Dams

Dam owners should consider regularly evaluating their dams for conformance to current engineering standards and dam safety requirements. The dam risk reduction evaluation might consider:

- Changes in watershed hydrology (upstream and downstream conditions)
- Downstream development (hazard creep)
- Updated hydrologic guidance for extreme storms
- Dam stability and performance
- Seismic stability and performance as prescribed for the dam's seismic zone

Social Vulnerability

The Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) uses fifteen (15) U.S. Census variables to calculate SVI scores that can help local officials identify communities within the county that may need additional support before, during, and/or after disasters.

The SVI has been conducted for Dorchester County at the census tract level and is mapped on the following page. The SVI utilizes American Census Survey (ACS) 5-year estimates. The darker blue census tracts in the overall map indicate areas of higher social vulnerability while the light green tracts indicate relatively low social vulnerability. Measuring social vulnerability at the census tract level is meant to help guide further planning. Investigation at the neighborhood level is required to fully identify vulnerable populations.

The area with the highest social vulnerability depicted in Figure 11-2 is the City of Cambridge and the northeast section of the County, which includes the Towns of Secretary, East New Market and Hurlock.

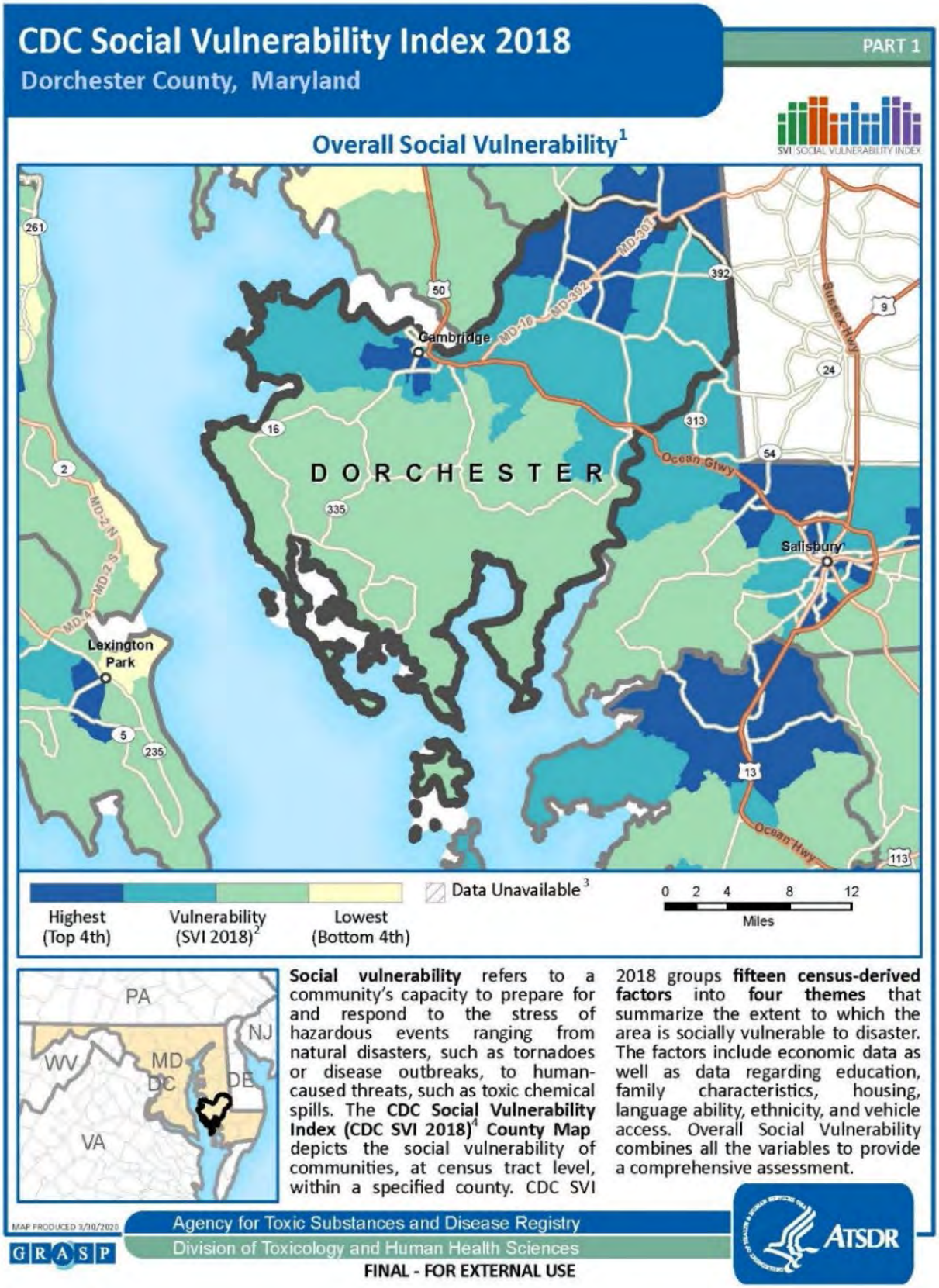
Incidents involving a commercial or industrial or transportation fire or explosion can occur anywhere in the county. Special consideration should be made for incidents occurring in the northern portion of the county considering the social vulnerability index results for Dorchester County.

The County maintains annual chemical reporting for Tier II on-site hazmat locations. Special consideration for those locations in the northern portion of the county should be made, specifically for evacuation and health related impacts from hazardous material releases.

Considering U.S. Route 50, which crosses the northern part of the County from west to east, passes the bulk of hazardous materials through the County, and the darker blue census tracts in the overall map indicate areas of higher social vulnerability, this area is highly vulnerable.

The four (4) low hazard dams identified in Dorchester County are located in the northeast portion of the county, in and around Secretary, Hurlock, Eldorado, Brookview, and Galestown. This same area is shown as socially vulnerable area according to Figure 11-2.

Figure 11-2


CDC Social Vulnerability Index 2018
Dorchester County, Maryland
PART 1
Overall Social Vulnerability[1]
SVI SOCIAL VULNERABILITY INDEX
DORCHESTER
Cambridge
Salisbury
Lexington Park
Ocean Gtwy
Ocean Hwy
Sussex Hwy
MD-16
MD-392
MD-207
MD-2 N
MD-2 S
MD-4
261
50
392
9
24
313
54
16
2
335
5
235
13
113
Highest (Top 4th)
Vulnerability (SVI 2018)[2]
Lowest (Bottom 4th)
Data Unavailable[3]
0 2 4 8 12
Miles
PA
NJ
WV
MD
DC
DE
VA
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 Social Vulnerability Index (CDC SVI 2018)[4] County Map depicts the social vulnerability of communities, at census tract level, within a specified county. CDC SVI 2018 groups fifteen 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.
MAP PRODUCED 3/30/2020
GRASP
Agency for Toxic Substances and Disease Registry
Division of Toxicology and Human Health Sciences
ATSDR
FINAL - FOR EXTERNAL USE

Conclusions & Recommendations

The following mitigation strategies were identified during the development of the plan chapter.

- Encourage volunteer firefighters to attend fire and rescue combat technical training. This will assist when responding to major fires/explosions or HazMat incidents. Work with Maryland Fire and Rescue Institute (MFRI), https://www.mfri.org/, to provide training.
- Continue mailing flyers to residents within the 'Plume" zone, Taylors's Island. The Department of Emergency Services should continue to ensure flyers are available at the Fire Department and Post Office. In addition, resume annual public meeting schedule.
- Prepare a preidentified mechanism and message for disseminating information quickly to the public when a hazardous materials incident occurs. Information on the incident and recommended protective actions by the public should be included in the message.
- Add the review of new transportation safety rules and legislative mandates to the LEPC meeting agenda annually. For instance, the following mandates were added in 2020-2021:
    - The HM-224I Final Rule to enhance the safe air transportation of lithium batteries.
    - The HM-215P Final Rule to harmonize with newer international standards and improve the global transportation system by minimizing the regulatory burden.
    - The HM-265 NPRM proposing to maintain or enhance the safe transportation of hazardous materials by rail, vessel, and highway.
- Conduct a hazmat Commodity Flow Study. The bulk of hazardous materials pass through the County by truck, particularly on U.S. Route 50, which crosses the northern part of the County from west to east. Other highways that are used to transport hazardous materials include: MD State Routes 14, 16, and 331. The annual average daily traffic volume for U.S. Route 50 in Cambridge was 26,483 in 2020. Additionally, MD Route 16 at the Cambridge traffic count station, within the Town of East New Market, experiences approximately 6,091 vehicles daily, while Route 331 has a daily average of 3,752 travelers through the Town of Hurlock.
- Map inundation areas for each dam in order to identify areas of the county at risk from a dam failure.
- Send mailings to residents within each dam inundation area providing information about the dam and what to do if a dam failure occurs.
- Perform a vulnerability assessment to identify hospitals, schools, community buildings, and other assets at risk from a dam failure.

Chapter 12 Emerging Infectious Diseases

Chapter Update Overview

Chapter 12 Emerging Infectious Disease is a new chapter for the plan update. The Core Planning Team provided hazard impacts for the five (5) categories listed in Table 12-1. The chapter profiled and assessed pandemics and epidemics. The Dorchester County Health Department's *2020 Dorchester County Health Department (DCHD) Emerging Infectious Disease (EID)/Infectious Disease Response Plan (IDRP)* was reviewed and incorporated in the capability section. The IDRP was assessed to determined how it corresponded to the CDC's "guiding principles" Conclusion and recommendations were added at the end of this chapter.

Hazard Impacts

The Core Planning Team reviewed and discussed impacts from emerging infectious diseases hazard events as presented on the table below.

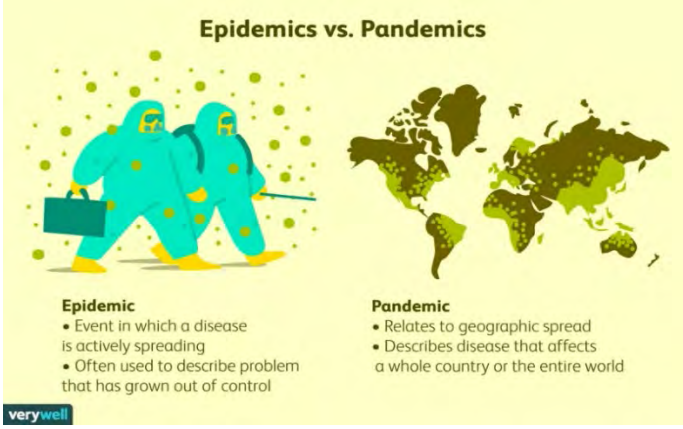
Table 12-1

Emerging Infectious Diseases Hazard Impacts	
Public Health & Safety	• Resource limitations, such as available hospital space, staffing, and supplies are impacts from emerging infectious diseases. • First responders and healthcare provides risk to emerging infectious diseases is increased substantially during a pandemic.
Social Vulnerability	• Vulnerable groups affected by emerging infections include the elderly, people being cared for in hospitals or nursing homes, and people with inadequate access to health care, such as migrant farm workers.
Economic Stability	• Emerging infectious diseases contributes substantially to the increasing costs for health care. • Hospitals and healthcare facilities are impacted with financial challenges by emerging infectious disease outbreaks.
Infrastructure	• A lack of personal protective equipment (PPE) for healthcare workers, hospital equipment, sanitizing supplies, toilet paper, and water become short in supply during a pandemic.
Environment	• An estimated 75% of new infectious diseases are zoonotic, meaning they transmit from animals to humans. Experts believe these diseases may be associated with increased human-to-animal contact as people encroach on animal habitats.

Hazard Profile & Risk

The Emerging Infectious Disease is a new plan chapter and will be focusing on the following pandemics and epidemics.

- Pandemics
  - Novel Covid-19 Virus
  - Novel Influenza A (H1N1)
  - Severe Acute Respiratory Syndrome (SARS)
- Epidemics
  - Zika Virus
  - Ebola Virus



Source: www.verywellhealth.com

Diseases and conditions reported by the State of Maryland for Dorchester County are also reviewed in the new plan chapter. Maryland Department of Health (MDH) maintains occurrence counts for diseases, conditions, outbreaks, and unusual manifestations as reported by health care providers and other diseases notifiable by laboratories in Maryland. The surveillance and reporting of these diseases is the responsibility of all healthcare provides, which investigates and completes reporting both electronically and manually as per MDH regulations. Dorchester County Health Department (DCHD) and MDH implements Maryland's bio surveillance program. The goal of this program is to mitigate and/or reduce morbidity and mortality associated with disease outbreak(s) and/or other public health events. DCHD and MDH conduct syndromic surveillance that includes monitoring trends through ESSENCE incorporates traditional and nontraditional health indicators from multiple data sources (emergency department chief complaints, over the counter (OTC) medication sales, and poison control center data). Notifiable diseases include but are not limited to measles, Hepatitis B, Human Immunodeficiency Virus (HIV), salmonellosis, giardiasis, malaria, Lyme disease and rabies.

According to the survey provided to the Core Planning Team, municipalities, and the public, the level of concern for emerging and infectious diseases are as follows:

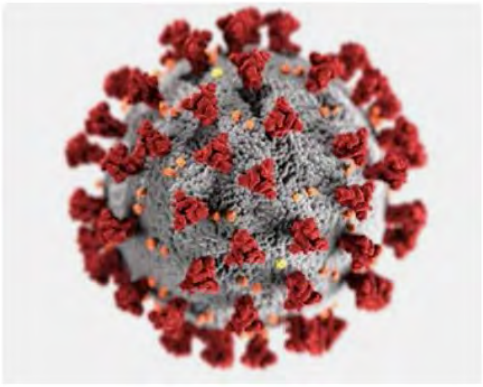
- Core Planning Team Results – somewhat concerned
- Municipal Results – concerned
- Public Results - concerned

Pandemic

The World Health Organization (WHO) defines a pandemic as the worldwide spread of a new disease. A pandemic happens when a new strain of a virus appears for which people have little or no immunity. As a result, it spreads easily from person to person around the world, causing widespread illness and death. Individuals, families, caregivers, healthcare workers and teachers can all take steps to get ready for a pandemic before it happens. Pandemics cause a short-term fiscal impact and a long-term economic impact on the nations around the world. Pandemics have significant social and political impacts such as clashes between nations, population displacement, and increased social tension and discrimination. Modern pandemics have subtle social disruptions such as anxiety, social isolation, fear-inducing behavior, and economic hardships.[i]

Novel COVID-19 Pandemic

The Novel COVID-19 pandemic has exploded since cases were first reported in Wuhan, Hubei Province, China in December 2019. As of July 2021, more than 187.5 million cases of COVID-19—caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection—have been reported globally, including more than 4 million deaths. Cases have been reported in more than 189 countries, including all 50 states of the United States. Additionally, the WHO reports that approximatley 3.4 billion people globally have received the COVID-19 vaccination.

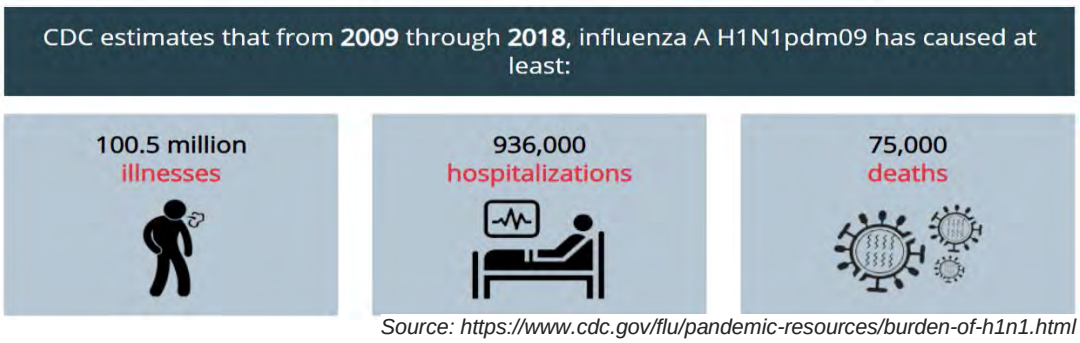


Source: World Health Organization (WHO)

Individuals of all ages are at risk for infection and severe disease. However, the probability of fatal disease is highest in people aged ≥65 years and those living in a nursing home or long-term care facility. Others at highest risk for COVID-19 are people of any age with certain underlying conditions, especially when not well-controlled, additionally those living in intergenerational households and working in close-quarters. In addition, COVID-19 can spread between people who are in close contact with one another (within about 6 feet), through respiratory droplets produced when an infected person coughs, sneezes or talks, and by persons who are asymptomatic. Symptoms, or a combination of symptoms, can appear 2-14 day after exposure. Typically, for most people, mild or moderate COVID-19 cases lasts about two weeks. However, other people may experience lingering health problems even when they have recovered from the acute phase of the illness. The National Institutes of Health refer to long-term COVID-19 symptoms as PASC, which stands for post-acute sequelae of SARS-CoV-2. More common terms are post-COVID syndrome, long COVID or long-term COVID. People living with post-COVID syndrome are sometimes known as "long haulers."[ii] *Note: COVID-19 is an evolving pandemic. Symptoms are being updated as experts learn more about this virus.*

2009 Novel Influenza A (H1N1) Pandemic

According to the Center for Disease Control, 2009 H1N1 (sometimes called "swine flu") was a new influenza virus causing illness in people. The new H1N1 virus contained a unique combination of influenza genes not previously identified in animals or people. This virus was designated as influenza A (H1N1) pdm09 virus.[iii] This virus was first detected in people in the United States in April 2009. This virus was spreading from person-to-person worldwide, probably in much the same way that regular seasonal influenza viruses spread. Globally, 80 percent of (H1N1) pdm09 virus-related deaths were estimated to have occurred in people younger than 65 years of age. On June 11, 2009, the World Health Organization (WHO) declared that a pandemic of 2009 H1N1 flu was underway. On August 10, 2010, WHO declared an end to the global 2009 H1N1 influenza pandemic. However, (H1N1) pdm09 virus continues to circulate as a seasonal flu virus, and cause illness, hospitalization, and deaths worldwide every year.[iv]



Source: https://www.cdc.gov/flu/pandemic-resources/burden-of-h1n1.html

Severe Respiratory Acute Syndrome (SARS)

According to the World Health Organization (WHO), severe acute respiratory syndrome (SARS) is a viral respiratory disease caused by a SARS-associated coronavirus. It was first identified at the end of February 2003 during an outbreak that emerged in China and spread to 4 other countries. SARS is an airborne virus and can spread through small droplets of saliva in a similar way to the cold and influenza. It was the first severe and readily transmissible new disease to emerge in the 21st century and showed a clear capacity to spread along the routes of international air travel. In addition, it can be spread indirectly via surfaces that have been touched by someone who is infected with the virus.

Most patients identified with SARS were previously healthy adults aged 25–70 years. A few suspected cases of SARS have been reported among children under 15 years. Symptions of SARS usually begins with a high fever (temperature greater than 100.4°F), while some have mild respiratory symptoms at the onset. Others include headache, an overall feeling of discomfort, and body aches. About 10 percent to 20 percent of patients have diarrhea. After 2 to 7 days, SARS patients may develop a dry cough, with most patients developing pneumonia.

Epidemic

The World Health Organization (WHO) defines an epidemic as the occurrence in a community or region of cases of an illness, specific health-related behavior, or other health-related events clearly more than normal expectancy. The community or region and the period in which the cases occur are specified precisely. The number of cases indicating the presence of an epidemic varies according to the agent, size, and type of population exposed, previous experience or lack of exposure to the disease, and time and place of occurrence.

Zika Virus Epidemic

According to the Maryland Department of Health, the Zika virus is an arboviral infection that is spread primarily through the bite of certain species of infected *Aedes* mosquitoes, sexually transmitted, or through blood transfusion (likely but not confirmed). Zika virus has been identified as an illness that causes multiple birth defects including microcephaly, which is defined as abnormal smallness of the head, a congenital condition associated with incomplete brain development. There is no identified vaccine or medication that can be taken to prevent Zika infection. The Eastern Shore has been mildly affected by the Zika virus in the recent past, with a few cases reported over the years. As of the latest data from 2019, no Zika cases have been reported in Dorchester County, Maryland. The greatest threat from the zika virus for the eastern shore has not been local transmission, travel related cases have been the cause of spread.

Ebola Virus Epidemic

According to the Center for Disease Control, Ebola Virus Disease (EVD) is a rare and deadly disease in people and nonhuman primates. The viruses that cause EVD are located mainly in sub-Saharan Africa. People can get EVD through direct contact with an infected animal (bat or nonhuman primate) or a sick or dead person infected with Ebola virus. It is caused by an infection with a group of viruses within the genus *Ebolavirus*:

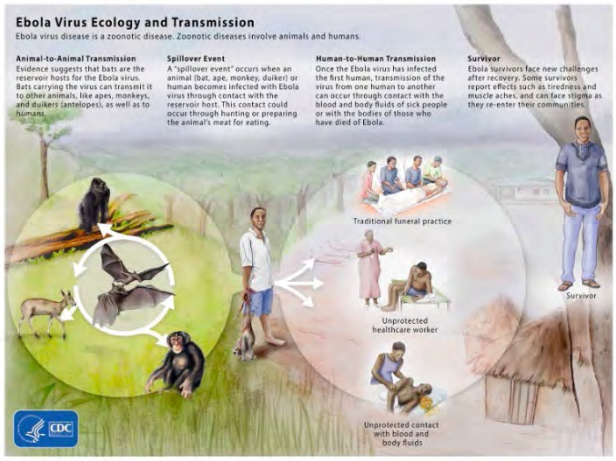
- Ebola virus (species *Zaire ebolavirus*)
- Sudan virus (species *Sudan ebolavirus*)
- Taï Forest virus (species *Taï Forest ebolavirus*, formerly *Côte d'Ivoire ebolavirus*)

- Bundibugyo virus (species *Bundibugyo ebolavirus*)
- Reston virus (species *Reston ebolavirus*)
- Bombali virus (species *Bombali ebolavirus)*

Of these, only four (Ebola, Sudan, Taï Forest, and Bundibugyo viruses) are known to cause disease in people. Reston virus is known to cause disease in nonhuman primates and pigs, but not in people. It is unknown if Bombali virus, which was recently identified in bats, causes disease in either animals or people.

Ebola symptoms usually include:

- Fever;
- Headache;
- Diarrhea;
- Vomiting;
- Weakness;
- Joint and muscle aches;
- Stomach pain;
- Lack of appetite; and,
- Bleeding.



The symptoms can be similar to other, more common, infections. Symptoms appear 2-21 days after exposure to the virus, but most commonly occur 8-10 days after exposure. People are not contagious for the disease until the first symptoms appear (sudden onset of fatigue, fever, muscle pain, headache, and/or sore throat). The Ebola virus is transmitted through direct contact with the blood or body fluids of an infected person with symptoms or through exposure to objects (such as needles) contaminated by infected body fluids. This virus poses an extremely high risk to familial caregivers and health care workers. Transmission can also occur from directly handling bats, rodents, or primates in areas where Ebola occurs. To date, there have been no cases of the disease acquired in Maryland.

The *Maryland Department of Health's Emerging Infectious Plan* defines Emerging Infectious Diseases as the following:

a) An infectious disease that is novel or new to a geographic area;

b) An existing infectious disease that is causing a marked increase in cases or geographic spread; or,

c) A biological agent used to cause harm or death in a population (bioterrorism).

Epidemics can be considered as part of a broad hazard category that could be termed "public health emergencies." In addition to disease epidemics, such events can take the form of large-scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service. Epidemics may also be secondary to some other disaster such as flood, tornado, and hurricane or HazMat incident.

Vulnerability Analysis

Traveling abroad can put you at risk for infectious diseases that are not widespread in the United States. Travelers who become ill in a country where treatment for these diseases may be somewhat limited are even more at risk. All people planning travel should become informed about the potential hazards of the countries they are traveling to. Further information to reduce their risk of getting these diseases (https://www.hopkinsmedicine.org/health/conditions-and-diseases/emerging-infectious-diseases). In addition, Dorchester County Health Department (DCHD) provides travel health services. People who are preparing to travel can call the communicable disease program to obtain information on recommended vaccinations for the areas the individual is traveling to. DCHD offers a major of the recommended vaccinations.

The Maryland Department of Health and Mental Hygiene provides fact sheets for various illness and diseases. Reported occurrences of specific infectious diseases from the time period of 2013 to 2019 are provided in Table 12-2.

Table 12-2

Reported Conditions							
Condition	2013	2014	2015	2016	2017	2018	2019
Animal Bites	99	100	110	133	92	99	121
Arboviral, Chikungunya viral infection	0	0	0	1	0	0	0
Campylobacteriosis	9	9	6	2	8	6	6
Chlamydia	214	248	207	152	184	206	216
Cryptosporidiosis	0	0	0	3	3	1	0
Ehrlichiosis	1	0	0	0	0	1	0
Giardiasis	1	2	2	2	1	1	0
Gonorrhea	50	68	124	58	68	64	63
H. influenzae - Invasive Disease	0	0	0	0	1	0	2
Hepatitis A (Acute-Symptomatic)	0	0	0	0	0	0	2
Hepatitis B (Acute-Symptomatic)	1	1	2	0	1	0	1
Hepatitis C (Acute-Symptomatic)	2	2	0	1	1	0	0
Legionellosis	0	1	0	1	1	2	1
Lyme Disease	12	11	7	0	13	0	4
Meningitis, Aseptic	0	0	0	0	0	0	2
Meningitis, fungal	0	0	0	1	0	0	0
Mycobacteriosis, Other than TB & Leprosy	2	6	1	2	6	3	1
Pertussis	6	2	2	1	0	0	4
Rabies - Animal	5	6	7	9	6	10	6
Salmonellosis - Other than Typhoid Fever	10	11	10	13	12	15	22
Shiga toxin producing E. coli (STEC)	1	0	0	0	0	0	0
Shigellosis	0	0	0	1	0	0	0
Spotted Fever Rickettsiosis	0	0	0	0	1	0	2
Strep Group A - Invasive Disease	2	0	0	0	3	1	0
Strep Group B - Invasive Disease	5	7	3	6	4	4	4
Strep pneumoniae – Invasive Disease	0	1	1	0	5	2	0

Syphilis - Primary and Secondary	1	0	0	2	0	1	1
Tularemia	1	0	0	0	0	0	0
Vibriosis (Non-Cholera)	1	2	1	1	0	0	1
Yersiniosis	0	0	2	0	0	0	0
Total Conditions	423	477	485	389	410	416	459

Source: Maryland Department of Health

Additional information is available to the public on the Dorchester County Health Department's website (https://dorchesterhealth.org/). The website provides not only health related topics, but also information on how to prepare and prevent various types of disasters. The Dorchester County Emergency Management Division's website also provides resourceful information on disaster mitigation, preparedness, and recovery (https://dorchestercountymd.com/emergency-management-division-2/).

Capability

The Dorchester County Health Department utilizes the *2020 Dorchester County Health Department (DCHD) Emerging Infectious Disease (EID)/Infectious Disease Response Plan (IDRP)* for response and coordination efforts during an infectious disease outbreak.

The plan outlines the mission, preparedness, response and recovery measures to be taken during an infectious disease outbreak. The plan states the mission of the Maryland Department of Health (MDH) and Dorchester County Health Department (DCHD) during an infectious disease outbreak or emergency is to:

- Detect and monitor the occurrence of cases or outbreaks of infectious diseases of public health significance;
- Prevent disease transmission and reduce morbidity and mortality related to infectious disease;
- Provide community partners with guidance and assistance for infectious disease management and control including diagnosis, treatment, prophylaxis, infection control, and isolation and quarantine;
- Provide the coordination, centralization, and facilitation of multi-agency support and resources in the event of a natural or intentional infectious disease emergency.

The EID/IDRP addresses response protocols for various types of infectious disease scenarios, and also includes appendices that provide disease specific guidance based on the infectious agent present. The following disease specific guidance is included in the appendices:

- HIV and AIDS: Reportable Conditions According to the 1999 Surveillance Definition (All Ages)
- Reporting of Sexually Transmitted Diseases (STDs) - Not Including HIV
- Preventing Congenital Syphilis
- Treatment of Tuberculosis
- Getting Up-to-Date Information
- Addresses & Telephone Numbers for Communicable Disease Reporting
- General Infection Control Measures and Disease Specific Resources

Dorchester County Health Department also maintains a functional Continuity of Operations Plans (COOP), which is updated annually. To ensure all staff has and maintains Incident Command Systems (ICS) training, the Health Department conducts annual reviews.

All Maryland Department of Health (MDH) and Dorchester County Health Department (DCHD) plans are exercised in collaboration, where possible, with other local, state, and federal preparedness partners. The Health Department conducts training and exercise based on different response incidents. Upcoming exercises to be conducted include hospital burn surge and pandemic flu, as per grant requirements.

The Dorchester County Health Department operated the Joint Information Center (JIC) during the COVID-19 pandemic. Weekly reports were distributed via email to over 50 JIC partners and any community organization that needed assistance during the pandemic.

On June 10, 2020, the Federal Emergency Management Agency (FEMA) released The Mass Care/Emergency Assistance Pandemic Planning Considerations to assist state, tribal, and territorial governments in planning mass care delivery. The guide provides information on sheltering, feeding, evacuation and the federal resource request process. It was developed using health and safety planning information and requirements outlined by the Department of Health and Human Services (DHHS) and the Centers for Disease Control and Prevention (CDC).

This document provided planning considerations for jurisdictions that are responding to a pandemic or responding to a pandemic occurring concurrently with a natural, technological and/or human caused disaster. For planning purposes, the document includes only mass care and emergency assistance functions and planning considerations in the context of a pandemic. The delivery of mass care and emergency assistance may vary due to the health and safety planning requirements put forth by DHHS and the CDC.

Concept of operations is based on two types of events: a pandemic without a disaster event and a pandemic during a disaster event.

Response to Concurrent Pandemic and Disaster Event(s)

A natural, technological, or human-caused disaster has occurred in an area disproportionately affected by a pandemic outbreak or a pandemic event emerges during disaster response.

As a direct result of the natural or human-caused disaster, it is necessary to provide mass care and emergency assistance services to affected individuals and emergency responders. In addition, evacuations may be necessary to a neighboring jurisdiction(s) as well as the provision of public health and medical services to individuals affected by the pandemic. This could place an additional burden on neighboring states or tribes providing mass care to the affected populations. Some jurisdictions may not be willing to accept survivors who have, or potentially have been, infected by illness.

NOTE: Depending on the magnitude of the disaster event, a Stafford Act declaration for major disaster may be issued to provide federal financial assistance to the state or tribe and affected survivors in accordance with existing regulations.

Source: The Mass Care/Emergency Assistance Pandemic Planning Considerations

Response to a Pandemic Event Only

Viruses may cause moderate to severe illness and spread easily from person to person. Due to the pandemic outbreak, a range of actions have been established to prevent further spread of the disease, including social distancing, shelter-in-place, travel restrictions and cancellation of large gatherings.

A jurisdiction may experience an outbreak of disease that is beyond the capacity of the state, tribe, territory or affected local government. The affected jurisdiction should initially seek state or tribal assistance. If a state or tribe is unable to provide adequate resources, the state or tribe should request federal assistance.

Homeless populations residing in congregate shelters across the country are at risk, due to lack of space for social distancing and increased risk of cross contamination

FEMA recognizes that non-congregate sheltering will be necessary during a pandemic in an effort to save lives, to protect property and public health and to ensure public safety, as well as to lessen or avert the threat of a catastrophe. In accordance with section 502 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, eligible emergency protective measures taken to respond to a pandemic emergency at the direction or guidance of state, local, tribal and territorial public health officials may be reimbursed under Category B of FEMA's Public Assistance program.

Source: The Mass Care/Emergency Assistance Pandemic Planning Considerations

The following assistance components are included in the National Response Framework (NRF), 4th Edition Annex for ESF #6, Mass Care, Emergency Assistance, Temporary Housing and Human Assistance.

Mass Care

- Sheltering
- Feeding
- Distribution of Emergency Supplies
- Reunification

Emergency Assistance

- Assistance to People with Disabilities, and Others with Access and Functional Needs, Including those with disabilities
- Household Pets, Services and Support Animals
- Mass Evacuee Support

For details on each of these components, please refer to the Appendices in The Mass Care/Emergency Assistance Pandemic Planning Considerations.

Centers for Disease Control and Prevention (CDC) Guiding Principles

The CDC recommends the following "guiding principles" to consider when developing and implementing mitigation strategies. Excerpts from the *2020 Dorchester County Health Department (DCHD) Emerging Infectious Disease (EID)/Infectious Disease Response Plan (IDRP)* and information gathered during the Hazard Mitigation Plan Update Health Group meeting, correspond to CDC's guiding principles.

1. *Community mitigation efforts aim to reduce the rate at which someone infected comes in contact with someone not infected or reduce the probability of infection if there is contact. The more a person interacts with different people, and the longer and closer the interaction, the higher the risk of spread.*

Response:

Public Health Surveillance

- The goals of routine infectious disease surveillance and investigation are:
  - To detect disease and initiate case and contact or source investigations for infectious disease in accordance with reportable conditions reporting requirements and recommendations;
  - To ensure early detection of clusters of disease that might signal an infectious disease outbreak and;
  - To inform and assist local, state, and federal agencies involved in detection, investigation, and control of infectious diseases including monitoring the effectiveness of interventions.

Monitoring Potentially Exposed Persons

- For certain infectious diseases of concern, the public health authority (it may be local and/or state health department) assumes responsibility for establishing and maintaining communication with potentially exposed people, or monitorees, in accordance with guidance issued by CDC and MDH. The purpose of the monitoring is to prevent the infectious disease of concern from spreading by

ensuring that monitorees receive appropriate healthcare if they develop any symptoms. The monitoring period will vary depending on the infectious disease of concern.

Isolation and Quarantine

- An algorithm has been developed and is intended to assist in the decision of how to best handle an individual's behavior in order to reduce the spread of disease. In all scenarios, the least restrictive alternative should be utilized. This algorithm serves as general guidance and depending on the risk posed may not be applicable to all disease scenarios.
- The Secretary of the Department of Health may order an individual into isolation or quarantine at a health care facility; the individual's home; or a non-health care facility.
- The Secretary may quarantine an individual in a health care facility due to a pre-existing medical condition of the individual being quarantined or when a health care facility is more appropriate than the individual's home because of medical conditions of family members residing in the individual's home.

2. *Each community is unique. Appropriate mitigation strategies should be based on the best available data. Decision making will vary based on the level of community transmission and local circumstances. Refer to Table 12-3.*

Table 12-3

Level of Mitigation Needed by Community Transmission and Community Characteristics		
Level of Community Transmission	Community Characteristics and Description	Level of Mitigation
Substantial, uncontrolled transmission	Large scale, uncontrolled community transmission, including communal settings (e.g., schools, workplaces)	Shelter in place
Substantial, controlled transmission	Large scale, controlled community transmission, including communal settings (e.g., schools, workplaces)	Significant mitigation
Minimal to moderate community transmission	Sustained transmission with high likelihood or confirmed exposure within communal settings and potential for rapid increase in cases	Moderate mitigation
No to minimal community transmission	Evidence of isolated cases or limited community transmission, case investigations underway; no evidence of exposure in large communal setting	Low mitigation

Source: https://www.cdc.gov/coronavirus/2019-ncov/community/community-mitigation.html

The Dorchester County Health Department follows state guidance based on emerging infectious diseases.

3. *As communities adjust mitigation strategies, they should ensure that the healthcare system capacity will not be exceeded. Precautions should be taken to protect health care professionals and other critical infrastructure workers. Communities need to assure healthcare systems have adequate staffing, a surplus of inpatient and ICU beds, and critical medical equipment and supplies such as PPE.*

Preparedness

General Activities

- Stockpile necessary equipment and supplies that will be needed to respond to an infectious disease emergency;
- Contact local partners to obtain current PPE levels;
- Maintain contact systems with local partners, other local health departments, as well as epidemiology, laboratory, preparedness and response planners and informatics teams at the MDH, for availability on a 24/7 basis, 365 days per year.

Response

Responder Safety and Health

- Any infectious disease response that involves direct contact with potentially infected persons should always be conducted using appropriate infection control precautions to include:
  - Training;
  - Administrative controls (e.g. isolation policies and procedures, procedures for recognizing patients with infectious diseases before they expose workers);
  - Engineering controls (e.g. negative pressure rooms with patients with airborne diseases);
  - Work practice controls (e.g. not recapping needles); and
  - Personal protective equipment.

DCHD manages and coordinates PPE stockpile deliveries from the state to the locals.

4. *As communities adjust mitigation strategies, they should ensure public health capacity will not be exceeded. Public health system capacity relies on detecting, testing, contact tracing, and isolating those who are or might be sick, or have been exposed to known or suspected COVID-19 cases; it is important to stop broader community transmission and prevent communities from having to implement or strengthen further community mitigation efforts.*

Response

Public Health Surveillance

- The goals of routine infectious disease surveillance and investigation are:
  - To detect disease and initiate case and contact or source investigations for infectious disease in accordance with reportable conditions reporting requirements and recommendations;
  - To ensure early detection of clusters of disease that might signal an infectious disease outbreak and;

- To inform and assist local, state, and federal agencies involved in detection, investigation, and control of infectious diseases including monitoring the effectiveness of interventions.

Non-Pharmaceutical Intervention

- Goals of Non-pharmaceutical Interventions
  - Goals for adopting non-pharmaceutical interventions for containment include:
    - Limit transmission and subsequent morbidity and mortality rates in order to minimize the burden on the health care system and critical infrastructure, to enable healthcare systems to continue normal operations.
    - Reduce the amount of social disruption.

Pharmaceutical Interventions and Emergency Medical Materiel

- Medical countermeasures may or may not be developed and/or available for an infectious disease outbreak. Even if an appropriate medical countermeasure (MCM) for treating the infectious disease exists, the quantity available may not be sufficient to meet demand. Appropriate MCM's for combating an infectious disease may include vaccine, antibiotics, antivirals, or other treatments depending on the nature of the pathogen.
- In cases where vaccine is available, all doses of vaccine will likely not arrive simultaneously. MDH in consultation with CDC, will provide guidance on the preferred MCM to use and prioritization recommendations for an infectious disease outbreak where MCM quantity is in limited supply. Insufficient supplies of MCM and emergency medical materiel will place greater emphasis on non-pharmaceutical strategies to control the spread of the disease in Maryland. It is also possible that the pathogen causing the outbreak may over time become resistant to the standard treatment due to mutation or drug-resistance.
- Stockpiled emergency MCM assets and PPE may be available at the local, regional, state, or federal level; however, quantity may be extremely limited. Unlike pandemic influenza, which may trigger Strategic National Stockpile (SNS) asset delivery to MDH from CDC without a request, other types of public health emergencies require a request for Emergency Medical Materiel to the state and possibly the federal government be made. The process for requesting emergency medical materiel, including the identification of authorized requestors, is outlined in Maryland's local and state eMCM Plans. Local requests for emergency medical materiel will always go first to the state. Due to high demand and possible limited quantities, a request for assets might not result in receipt of materiel. Federal and state governments may need to allocate supplies in the event of shortages.

5. *Attention should be given to people who are at higher risk for severe illness when determining and adjusting community mitigation strategies.*

Response

Public Health Surveillance

- Conducting Active Surveillance – case finding
  - Heighten monitoring of high-risk populations and focus investigation on groups most likely at risk for severe outcomes or for causing severe impact to the community. (e.g. schools, daycares, nursing homes, group homes, correctional facilities etc.).

These populations will be prioritized for pharmaceutical interventions until the interventions are widely available.

6. *Certain settings and vulnerable populations in a community are at particularly high risk for transmission. This includes but is not limited to congregate settings such as nursing homes and other long-term care facilities, correctional facilities, and the homeless population.*

Response

Public Health Surveillance

- Conducting Active Surveillance – case finding
  - Heighten monitoring of high-risk populations and focus investigation on groups most likely at risk for severe outcomes or for causing severe impact to the community. (e.g., schools, daycares, nursing homes, group homes, correctional facilities etc.).

Appendix 1: Disease Reporting

Certain diseases detected in these facilities require reporting to, and investigation by DCHD's communicable disease program to manage or prevent outbreaks.

DCHD will maintain communications with these facilities, or in the case of homeless people, advocate groups to keep them informed. DCHD is often times the resource for these facilities for interpreting and implementing non-pharmaceutical intervention policies that are implemented at the state level. Example being the COVID-19 admission and visitor regulations placed on nursing homes.

7. *Mitigation strategies can be scaled up or down, depending on the evolving local situation, and what is feasible, practical, and legal in a jurisdiction. Any signs of a cluster of new cases or a reemergence of broader community transmission should result in a re-evaluation of community mitigation strategies and a decision on whether and how mitigation might need to change.*

Response:

Public Health Surveillance

- The goals of routine infectious disease surveillance and investigation are:
  - To detect disease and initiate case and contact or source investigations for infectious disease in accordance with reportable conditions reporting requirements and recommendations;
  - To ensure early detection of clusters of disease that might signal an infectious disease outbreak and;
  - To inform and assist local, state, and federal agencies involved in detection, investigation, and control of infectious diseases including monitoring the effectiveness of interventions.

8. *Cross-cutting community mitigation strategies can be organized into the following categories: promoting behaviors that prevent spread; maintaining healthy environments; maintaining healthy operations; and preparing for when someone gets sick. Presuming a community is not sheltering-in-place, cross-cutting strategies should be implemented to the extent possible, and in accordance with the amount of ongoing community transmission.*

The communicable disease and health education programs promote healthy behaviors annually. During the pandemic, the PIO promotes materials through the county JIC. Healthy environments are promoted based on CDC guidance when available, such as COVID mitigation strategies. DCHD has a COOP plan that prioritizes services and staff to accommodate a loss of staff due to widespread illness. We also assist businesses with these plans if they request it. We offered this prior to COVID in collaboration with emergency management, but there was not much uptake.

9. *Community mitigation strategies should be layered upon one another and used at the same time—with several layers of safeguards to reduce the spread of disease and lower the risk of another spike in cases and deaths. No one strategy is sufficient.*

Mitigation strategies come in the form of pharmaceutical and non-pharmaceutical interventions as listed in our plan. However, those are scalable based on the disease of the day. Question 12 below covers this. A good task for us would be to review these and add masks. Prior to COVID, masks were not seen as the best strategy for various reasons.

10. Individuals make choices about following the behavioral practices that are recommended. Compliance to community mitigation decisions will also impact the spread of COVID-19.

Response

Mental Health Support

- An infectious disease emergency may cause anxiety and fear in the general public, individuals affected by the disease, and responders. This is particularly true in the event of an infectious disease resulting in very serious illness or mass fatalities.
- Mental health services will need to be provided in a way that keeps mental health providers from being exposed to the infectious disease. Public messaging through mass and social media can help spread clear information, dispel stress-causing misinformation, and connect the general public with resources. A call center may also be used to allow anyone to speak with a trained and informed individual about their concerns. For details on mental health response, refer to the DCHD Mental Health Response Plan.

DCHD works closely with local mental health organizations to connect individuals to mental health resources that were given through telehealth means and promote crisis hotlines for mental health and domestic violence. Behavioral health programs focused on recovery and Subjective Units of Distress Scale (SUDs) stood up telehealth services and peer support hotlines as well.

11. CDC offers setting-specific strategies for a variety of sectors that include businesses, schools, institutes of higher education, parks and recreational facilities, and other places.

Response

Non-Pharmaceutical Intervention

- Planning Responsibilities for Non-Pharmaceutical Intervention Planning
  - MDH will:
    - Encourage local jurisdictions to identify community partners such as educational facilities, public gathering sites, corporations, businesses, faith-based organizations, community centers, etc. that may be impacted by the implementation of social distancing strategies.
    - Assist state and local school system leadership in outbreak and emergency planning regarding:
    - Triggers for school closures,
    - Plans for parent/guardian notification,
    - Business continuity planning,
    - School distance learning,
    - Education of staff, parents, and students (e.g., distribution of educational materials, information on social distancing and disease prevention),
    - Continued communications during dismissal period, and
    - The continuation or dismissal of extramural school activities.

12. Travel patterns within and between jurisdictions will impact efforts to reduce community transmission. Coordination across state and local jurisdictions is critical – especially between jurisdictions with different levels of community transmission.

Response

Monitoring Potentially Exposed Persons

- Local or state health department responsibilities may include:
  - Establish a process to obtain monitoring information such as symptoms and travel plans during the monitoring period.
  - Coordinate transfer of monitoring responsibilities to the appropriate jurisdiction if monitoree is traveling during their monitoring period.

Non-Pharmaceutical Intervention

- Planning Responsibilities for Non-Pharmaceutical Intervention Planning
  - MDH will work with CDC to develop travel-related containment measures to include drafting Ports of Entry (POE) infectious disease response plans. Plans should include: quarantine facilities, screening of passengers, providing treatment and referral to ill persons, conditional release of exposed persons, and coordinating public and media communication.
    - DCHD obtains guidance from MDH and CDC on appropriate containment measures.

Conclusions & Recommendations

The following mitigation strategies were identified during the development of the plan chapter.

- Prepare a COVID-19 After-Action Report and Improvement Plan for the Dorchester County's Health Department. The Health Department participated in the Maryland Department of Health's statewide After-Action Report; however, Dorchester County's Health Department is planning an internal hot wash once the COVID cases decrease to minimal numbers or comes to an end.
- Update the *2020 Dorchester County Health Department (DCHD) Emerging Infectious Disease (EID)/Infectious Disease Response Plan (IDRP)*. Following the recent COVID-19 pandemic, modify the EID/IDRP based on recommendations included in the After-Action Report and Improvement Plan.
- Encourage residents preparing to travel to call the communicable disease program to obtain information on recommended vaccinations for the destinations individual(s) may be traveling to. DCHD offers a major of the recommended vaccinations.
- Increase the number of staff within the county who have taken ICS Train-the-Trainer courses, to provide availability and flexibility for the training plan. Partner with the Department of Emergency Services to provide the ICS Train-the-Trainer courses to staff.
- Continue to educate the public about infectious disease and protective measures through meetings, handouts, events, signs (ex. Front lobby), commercials, newspaper ads, etc.
- Conduct anthrax and pandemic flu full exercises every other year during the next five (5) year planning cycle.

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[i] [i] Effects of Pandemic Outbreak on Economies: Evidence From Business History Context. Front. Public Health, 12 March 2021 | https://doi.org/10.3389/fpubh.2021.632043

[ii] COVID 'Long Haulers': Long-Term Effects of COVID-19. John Hopkins Medicine. https://www.hopkinsmedicine.org/health/conditions-and-diseases/coronavirus/covid-long-haulers-long-term-effects-of-covid19

[iii] 2009 H1N1 Pandemic (H1N1pdm09 virus). Centers for Disease Control and Prevention. https://www.cdc.gov/flu/pandemic-resources/2009-h1n1-pandemic.html?web=1&wdLOR=cFFF423C1-3A8A-4094-B073-2196BD7B01BF

[iv] 2009 H1N1 Pandemic (H1N1pdm09 virus). Centers for Disease Control and Prevention. https://www.cdc.gov/flu/pandemic-resources/2009-h1n1-pandemic.html?web=1&wdLOR=cFFF423C1-3A8A-4094-B073-2196BD7B01BF

Chapter 13 Climate Change

Chapter Overview

Chapter 13 Climate Change is a **new** chapter developed for the plan update and includes sea level rise. Social vulnerability has been discussed throughout this plan chapter. Rising global temperatures resulting in changes to climate impacts our future. These impacts are categorized for this chapter as follows: Extreme Heat, Air Quality, and Sea Level Rise. Findings from the EPA's 2021 Climate Change and Social Vulnerability in the United States report was used for both extreme heat and air quality vulnerability. The 2018 Sea Level Projections for Maryland and the 2019 NOAA Sea Level Rise data were used for risk and vulnerability assessment. Conclusion and recommendations were added at the end of this chapter.

Hazard Impacts

The Core Planning Team reviewed and discussed impacts due to climate change and are presented in the table below.

Table 13-1

Climate Change Hazard Impacts	
Public Health & Safety	• Food and water shortages owing to climate change may occur, even at current levels of heating. • Rising temperatures exacerbating heat related illnesses. • Labor hours lost by weather-exposed workers due to high-temperature days.
Social Vulnerability	• Intergovernmental Panel on Climate Change (IPCC) estimates that about half the global population – between 3.3 billion and 3.6 billion people – live in areas "highly vulnerable" to climate change. • Decreasing air quality causing increasing in asthma in the young and premature death in adults ages 65 and older due to particulate air pollution.
Economic Stability	• Sea-level rise will impact loan real estate values over time and limit land use. • Saltwater intrusion into groundwater aquifers can increase treatment costs for drinking water facilities or render groundwater wells unusable.
Infrastructure	• Sea level rise coupled with storm related flood events may inundate and undermine infrastructure that was previously not affected. • Extreme heat causes damage to roads and railways. • Increasing extreme weather events will cause more disruptions to transportation networks.
Environment	• Sea level rise can decrease wetland and marsh habitats. • Increase in sea level rise causes saltwater intrusion into the groundwater aquifers. • Climate change may result in the die off of animal and plant species.

Source: Core Planning Team

Changes observed in Earth's climate since the early 20th century are primarily driven by human activities, particularly fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth's atmosphere, raising Earth's average surface temperature. These human-induced temperature increases are commonly referred to as global warming. Natural processes can also contribute to climate change, including internal variability (e.g., cyclical ocean patterns like El Niño, La Niña and the Pacific Decadal Oscillation) and external forces (e.g., volcanic activity, changes in the Sun's energy output, variations in Earth's orbit). Future global temperature changes and sea level rise affects everyone. Climate change impacts are expected to increase in both frequency and magnitude.

Climate Change

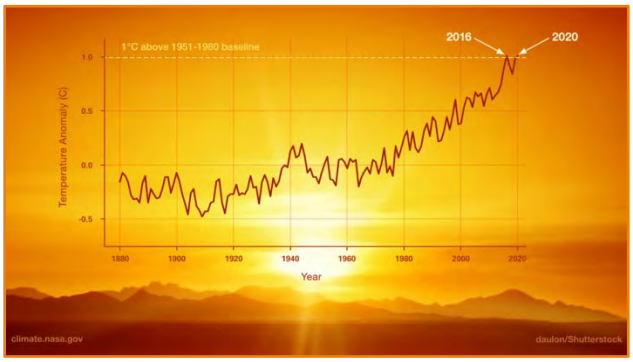
Hazard Profile & History

Rising global temperatures resulting in changes to climate impacts our future. These impacts are categorized for this chapter as follows:

- Extreme Heat;
- Air Quality; and,
- Sea Level Rise.

Extreme Heat

Since the pre-industrial period, human activities are estimated to have increased Earth's global average temperature by about 1 degree Celsius (1.8 degrees Fahrenheit), a number that is currently increasing by 0.2 degrees Celsius (0.36 degrees Fahrenheit) per decade. It is unequivocal that human influence has warmed the atmosphere, ocean, and land.



This graph illustrates the change in global surface temperature relative to 1951-1980 average temperatures, with the year 2020 tying with 2016 for the warmest on record *(Source: NASA's Goddard Institute for Space Studies. Credit: NASA/JPL-Caltech)*

Terms

Weather refers to atmospheric conditions that occur locally over short periods of time—from minutes to hours or days. Familiar examples include rain, snow, clouds, winds, floods or thunderstorms.

Climate, on the other hand, refers to the long-term regional or even global average of temperature, humidity and rainfall patterns over seasons, years, or decades.

Global warming is the long-term heating of Earth's climate system observed since the pre-industrial period (between 1850 and 1900) due to human activities, primarily fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth's atmosphere. The term is frequently used interchangeably with the term climate change, though the latter refers to both human- and naturally produced warming and the effects it has on our planet. It is most commonly measured as the average increase in Earth's global surface temperature.

Climate change is a long-term change in the average weather patterns that have come to define Earth's local, regional and global climates. These changes have a broad range of observed effects that are synonymous with the term.

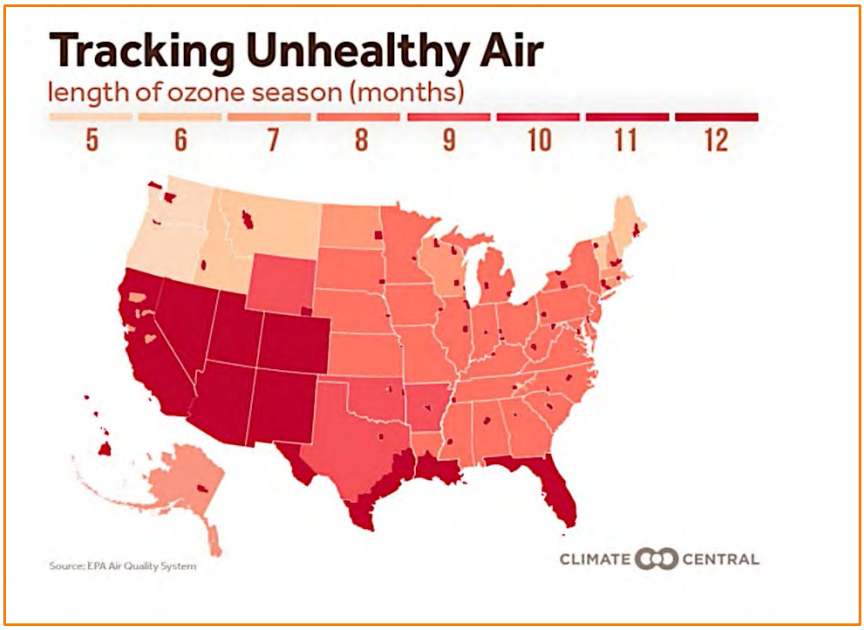
Sea level rise is caused primarily by two factors related to global warming: the added water from melting ice sheets and glaciers and the expansion of seawater

Air Quality

Climate change can impact air quality and, conversely, air quality can impact climate change. Changes in climate can result in impacts to local air quality. Atmospheric warming associated with climate change has the potential to increase ground-level ozone in many regions, which may present challenges for compliance with the ozone standards in the future. The impact of climate change on other air pollutants, such as particulate matter, is less certain, but research is underway to address these uncertainties.

Emissions of pollutants into the air can result in changes to the climate. Ozone in the atmosphere warms the climate, while different components of particulate matter (PM) can have either warming or cooling effects on the climate. For example, black carbon, a particulate pollutant from combustion, contributes to the warming of the Earth, while particulate sulfates cool the earth's atmosphere.

“Ozone seasons” are designated time periods when ground-level ozone typically reaches its highest levels and requires monitoring. Intensely sunny, hot days are most conducive for chemical reactions between nitrogen oxides (NOx) and volatile organic compounds (VOC) to create ground-level ozone. Ozone season is generally associated with summer months, but the length of the season is set to match the times of year when ozone is most likely to approach unhealthy levels, so it varies from state to state and tends to be longer in highly populated areas.



Sea Level

Global warming is causing global mean sea level to rise in two ways. First, glaciers and ice sheets worldwide are melting and adding water to the ocean. Second, the volume of the ocean is expanding as the water warms. A third, much smaller contributor to sea level rise is a decline in the amount of liquid water on land, aquifers, lakes and reservoirs, rivers, and soil moisture. This shift of water from land to ocean is largely due to groundwater pumping.

According to NOAA's Climate Change: Global Sea Level report, in 2020, global mean sea level was 3.6 inches above the 1993 average, making it the highest annual average in the satellite record (1993-present). The global mean water level in the ocean rose by 0.14 inches per year from 2006–2015, which was 2.5 times the average rate of 0.06 inches per year throughout most of the twentieth century. By the end of the century, global mean sea level is likely to rise at least one foot above 2000 levels, even if greenhouse gas emissions follow a relatively low pathway in coming decades.

According to the 2018 Sea-level Rise Projections for Maryland, 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, with about a one-in-twenty chance it could exceed 2.0 feet and about a one-in one-hundred chance it could exceed 2.3 feet. Rates of sea-level rise increasingly depend on the future pathway of global emissions of greenhouse gases during the next sixty years. If emissions continue to grow well into the second half of the 21st century, the "likely" range of sea level rise experienced in Maryland is 2.0 to 4.2 feet over this century.

Likely means a two-thirds chance of sea-level rise within that range.

Year	Emissions Pathway	Central Estimate 50% probability SLR meets or exceeds:	Likely Range 67% probability SLR is between:	1 in 20 Chance 5% probability SLR meets or exceeds:	1 in 100 Chance 1% probability SLR meets or exceeds:
2030		0.6 ft	0.4 – 0.9 ft	1.1 ft	1.3 ft
2050		1.2 ft	0.8 – 1.6 ft	2.0 ft	2.3 ft
2080	Growing	2.3 ft	1.6 – 3.1 ft	3.7 ft	4.7 ft
	Stabilized	1.9 ft	1.3 – 2.6 ft	3.2 ft	4.1 ft
	Paris Agreement	1.7 ft	1.1 – 2.4 ft	3.0 ft	3.2 ft
2100	Growing	3.0 ft	2.0 – 4.2 ft	5.2 ft	6.9 ft
	Stabilized	2.4 ft	1.6 – 3.4 ft	4.2 ft	5.6 ft
	Paris Agreement	2.0 ft	1.2 – 3.0 ft	3.7 ft	5.4 ft
2150	Growing	4.8 ft	3.4 – 6.6 ft	8.5 ft	12.4 ft
	Stabilized	3.5 ft	2.1 – 5.3 ft	7.1 ft	10.6 ft
	Paris Agreement	2.9 ft	1.8 – 4.2 ft	5.9 ft	9.4 ft

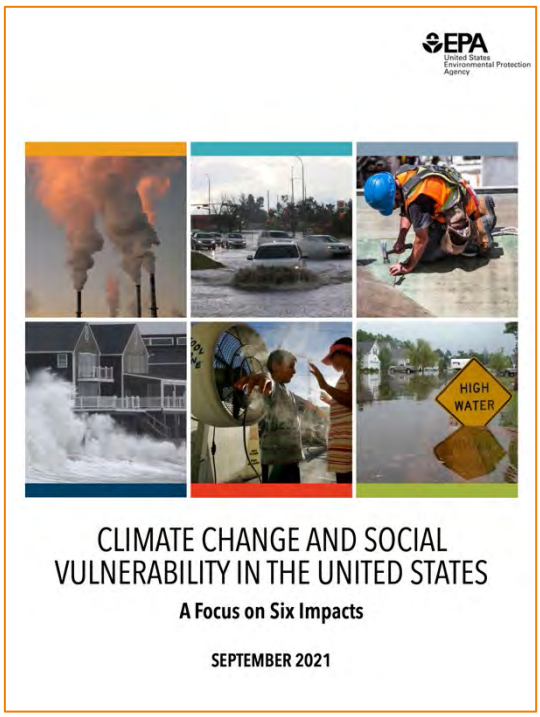
Source: 2018 Sea-level Rise Projections for Maryland

Vulnerability Assessment

Climate change impacts and vulnerability have been assessed for this chapter as follows:

- Extreme Heat;
- Air Quality; and,
- Sea Level Rise.

The Climate Change and Social Vulnerability in the United States report was developed by EPA's Office of Atmospheric Programs and contains modeling contributions from Federal agency analysts, academic experts, and consultants, including Industrial Economics, Inc. Support for the report's production was provided by Industrial Economics, Inc. EPA gratefully acknowledges the use of inland flooding risk data from the First Street Foundation.



Findings from this report have been used for both **extreme heat and air quality vulnerability** in this plan chapter.

According to FEMA's National Risk Index, people are at risk of experiencing climate change impacts when they are both exposed and vulnerable to climate hazards. Those who are socially vulnerable are disproportionately exposed to projected climate hazards.

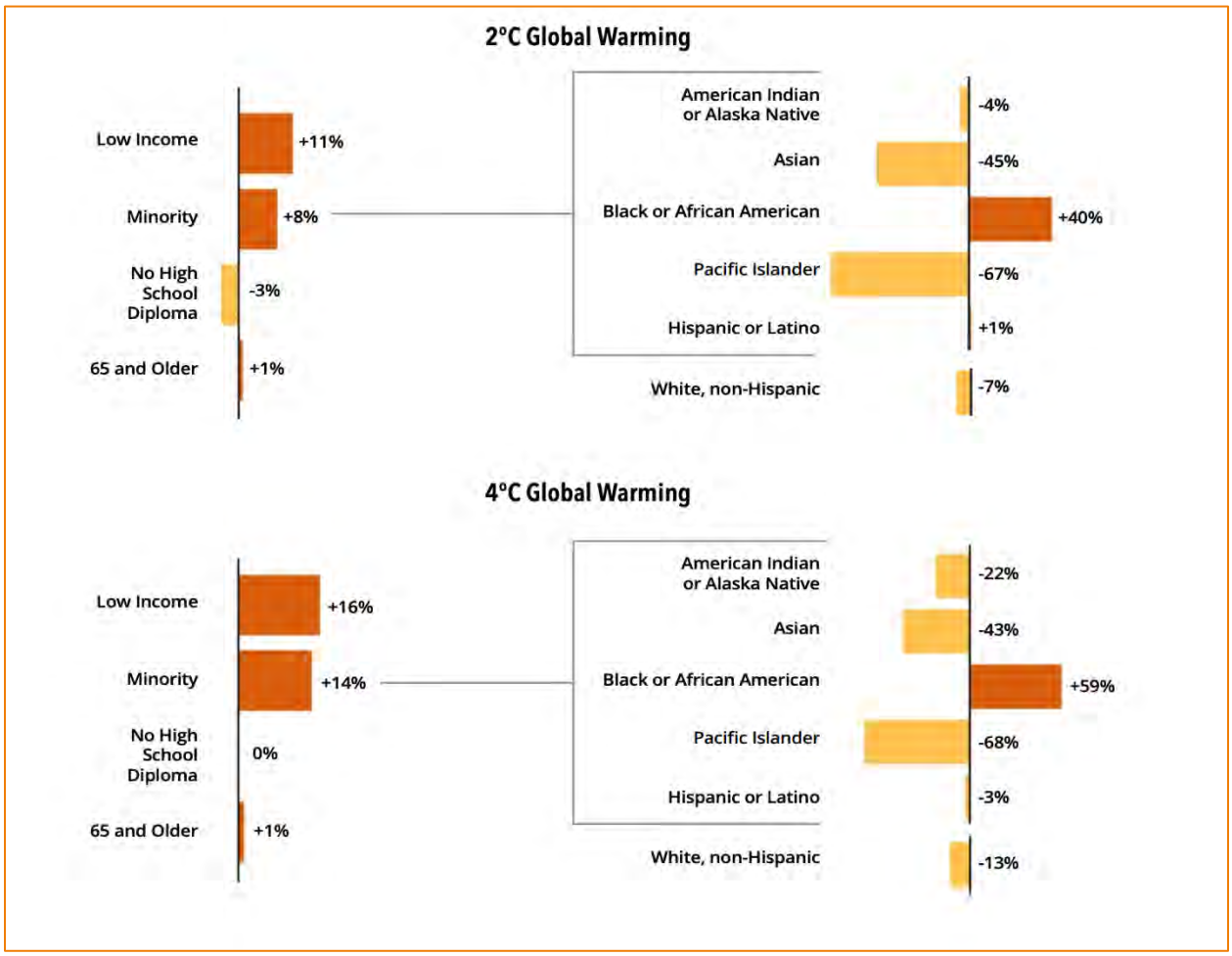
Social vulnerability is the susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood.

Source: https://hazards.fema.gov/nri/social-vulnerability

Extreme Heat

Heat waves are occurring more often than they used to in major cities across the U.S. Their frequency has increased steadily, from an average of two heat waves per year during the 1960s to six per year during the 2010s. *Source: EPA's Climate Change Indicators website*.

Key findings Social Vulnerability and Temperature Mortality from the Climate Change and Social Vulnerability in the United States (based on population centers-cities):



The bar charts present the relative likelihood that individuals in each socially vulnerable group (e.g., low income) currently live in areas with the highest projected increases in mortality relative to their reference populations (e.g., non-low income). Positive percentages indicate higher comparative risk, and negative percentages indicate lower comparative risk. Levels of global warming are relative to the 1986-2005 average.

With 2°C of global warming, climate-driven increases in high-temperature days are projected to result in 14 lost labor hours per year, on average, for weather-exposed workers in the U.S. With 4°C of global warming, the average number of hours lost per weather-exposed worker increases to 34 hours per year.

Projected Average Annual Labor Hours Lost per Weather-Exposed Worker due to Climate-Driven Effects on High-Temperature Days

REGION	GLOBAL WARMING (RELATIVE TO 1986-2005) 2°C	4°C
Midwest	11	30
Northeast	7	24
Northern Great Plains	11	30
Northwest	5	15
Southeast	20	44
Southern Great Plains	26	50
Southwest	17	34
National Total	**14**	**34**

Older individuals tend to experience worse health outcomes due to cardiac strain created by exposure to heat, and young children sweat less, which limits their body's ability to naturally cool. Access to air conditioning can mitigate one's risk of health impacts from extreme heat, but may be limited depending on income, location, and other factors.

Extreme heat can be dangerous for anyone; however, it can be particularly dangerous for those with chronic medical conditions. According to EPA's Climate Change and the Health of People with Existing Medical Conditions, people with existing medical conditions are at increased risk for illness and death from climate change-related impacts on health, including changing exposures to extreme heat, extreme weather events, and poor air quality. Existing medical conditions can make individuals more sensitive to these exposures, increasing the potential for health impacts and worsening symptoms. This population is defined as a high-risk group within the Maryland Department of Health's 2021 Extreme Heat Emergency Plan.

High Risk Groups are populations disproportionately affected by Extreme Heat Events. These groups include children and youth athletes, individuals who may be socially isolated (such as the elderly or those with psychiatric illness), and individuals with medical risk factors, such as alcoholism, cardiovascular or pulmonary disease, hypertension, diabetes, or tobacco use.

Source: Maryland Department of Health's 2021 Extreme Heat Emergency Plan

In addition to people with chronic medical conditions, the CDC Climate and Health Technical Report Series states that outside workers, older adults, children, communities of color, the homeless, individuals with a mental health disability, individuals without access to air-conditioning, and low-income communities are particularly vulnerable to heat-related illness. Socially and economically disadvantaged populations face the greatest risks due to where they live, their health, income, language barriers, and limited access to resources.

Air-conditioning is the number one protective factor against heat-related illness and death. If a home is not air-conditioned, people can reduce their risk for heat-related illness by spending time in public facilities that are air conditioned. Currently, Dorchester County utilizes public libraries as cooling centers.

Air Quality

The relationship between social vulnerability and exposure to air pollution is well established in the literature. EPA's most recent Particulate Matter Integrated Science Assessment (ISA) concludes that race and ethnicity are important factors in determining PM2.5 related risk, and those Black individuals, in particular, are at increased risk for health effects, in part due to disparities in exposure.

Climate change is projected to increase annual premature deaths associated with PM2.5 across large areas of the country.

Projected Regional Changes in Annual Premature Deaths Among People Ages 65 and Older due to Climate-Driven Effects on PM2.5

	GLOBAL WARMING (RELATIVE TO 1986-2005)	
REGION	**2°C**	**4°C**
Midwest	-850	-900
Northeast	400	1,200
Northern Great Plains	-43	-29
Northwest	79	180
Southeast	1,900	3,900
Southern Great Plains	-3	290
Southwest	610	1,200
National Total	**2,100**	**5,800**

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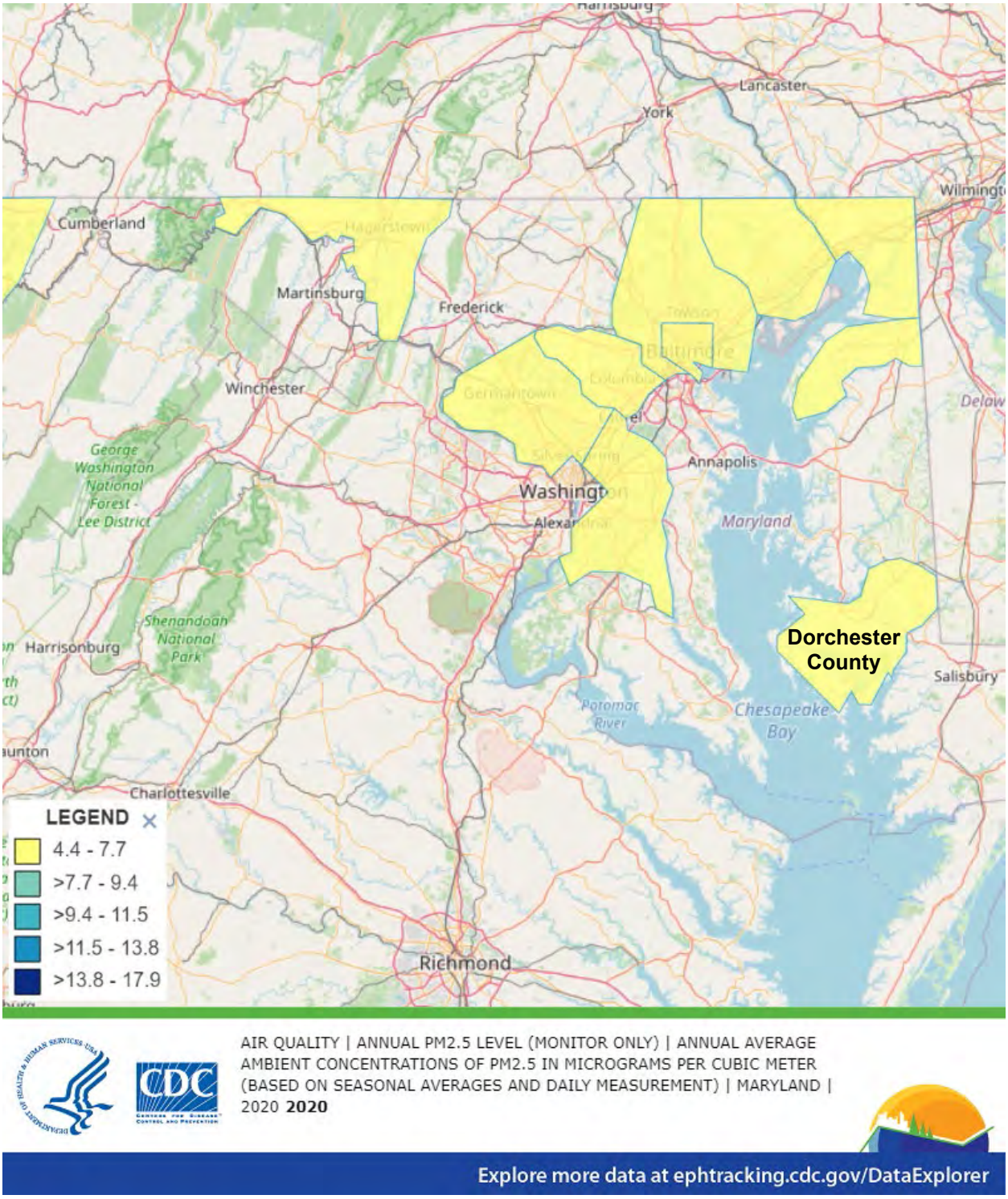
Actions to reduce particular pollutants that form PM2.5 have been highly successful over the past several decades; since 2000, national average concentrations of PM2.5 have been reduced by 41%. However, climate change can hinder these improvements by altering weather patterns and increasing the prevalence of conditions that lead to poor air quality.

According to Indoor Air Hygiene Institute, PM2.5 is used when describing pollutant levels both outdoor and indoor, where health impact from exposure considers amount of PM2.5 over a 24-hour period. Most studies indicate PM2.5 at or below 12 µg/m3 is considered healthy with little to no risk from exposure. If the level goes to or above 35 µg/m3 during a 24-hour period, the air is considered unhealthy and can cause issues for people with existing breathing issues such as asthma. Prolonged exposure to levels above 50 µg/m3 can lead to serious health issues and premature mortality.

Using the CDC National Environmental Public Health Tracking Network, the average annual PM2.5 level (monitor only) for Dorchester County is 4.4. Dorchester County is below 12ug/m3, therefore there is little risk from exposure.



Source: Centers for Disease Control and Prevention. National Environmental Public Health Tracking Network. (n.d.) Web. Accessed: 03/03/2022. www.cdc.gov/ephtracking

Sea Level Rise

Sea level rise driven by global warming will increase both high and low tide levels. Sea level is measured by two main methods: tide gauges and satellite altimeters. Tide gauge stations from around the world have measured the daily high and low tides for more than a century, using a variety of manual and automatic sensors. The two (2) nearest tide gauges for Dorchester County are the Cambridge and Bishops Head tide gauges.

In March 2019, NOAA's Office for Coastal Management released new Sea Level Rise data. The sea level rise layers show inland extent and relative depth of inundation above mean higher high water (MHHW). The sea level rise inundation areas are illustrated during the highest high tides (excludes wind-driven tides) with the sea level rise amount. These layers are projections and do not consider natural processes such as erosion, subsidence, or future construction. (NOAA Digital Coast Sea Level Rise Viewer, January 2017: Frequent Questions)

Mean Higher High Water (MHHW) is the average height of the highest tide recorded at a tide station each day during the recording period.

For the vulnerability assessment, both the sea level rise projections provided in the 2018 Sea Level Projections for Maryland for 2050, ranging from 0.8 to 1.6 feet and the 2019 NOAA Sea Level Rise data were used. Map 13-1 shows a range of sea level projections between 1 and 2 feet. Areas shown in orange indicate 1 foot in sea level rise, while 2 feet of sea level rise is denoted in green. These depictions reflect permanent flood inundation area(s), they do not account for increased storm activity or storm surge. Areas of sea level rise, as depicted, indicate dry land that water will permanently submerge in the future.

In terms of vulnerability, Table 13-2 lists the critical and public facilities at risk to the projected sea level rise.

Table 13-2

Critical and Public Facilities At Risk to Sea Level Rise				
Facility Category	Facility Type	Facility Detail	Address	City
NOAA 1-foot Sea Level Rise Inundation Area				
County	County Government	Board of Education	Blackwater Road	Church Creek
Miscellaneous	Boat Ramp	Taylors Island Ramp	Route 16	Taylors Island
Miscellaneous	Boat Ramp	Shorter's Wharf Ramp	Maple Dam Road	Cambridge
Miscellaneous	Boat Ramp	Muddy Hook Cove Ramp	Doeller Road	Fishing Creek
Miscellaneous	Boat Ramp	Toddville-Farm Creek Ramp	Farm Creek Road	Toddville
Miscellaneous	Boat Ramp	Crocheron Wharf	Crocheron Road	Toddville
Miscellaneous	Boat Ramp	Fishing Point Ramp	Tedious Creek Road	Toddville
Miscellaneous	Boat Ramp	Transquaking Ramp	4924 Drawbridge Road	Cambridge
Miscellaneous	Boat Ramp	Madison Bay Ramp	Madison Canning House Road	Madison
Miscellaneous	Bridge	D-009 Bishop Head Road/Goose Creek	Bishop Head Road	N/A
Miscellaneous	Bridge	RT 335/Honga River/Bay	RT 335	N/A
Miscellaneous	Bridge	D-037 Elliot Island Road/Elliott Creek	Elliot Island Road	N/A
Miscellaneous	Bridge	D-013 Wesley Church Road/Farm Creek	Wesley Church Road	N/A

Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Bridge	D-036 Elliott Island Road/Pokata Creek	Elliott Island Road	N/A
Miscellaneous	Bridge	D-012 Maple Dam Road/Blackwater River	Maple Dam Road	N/A
Miscellaneous	Bridge	RT 335/ Wallace Creek	RT 335	N/A
Miscellaneous	Bridge	RT335/Artificial Path (Off of Honga River)	RT 335	N/A
Miscellaneous	Bridge	RT 335/Artificial Path	RT 335	N/A
Miscellaneous	Bridge	D-004 Hip Roof Road/Spicer Creek	Hip Roof Road	N/A
Miscellaneous	Bridge	D-024 Bestpitch/Transquaking River	Bestpitch Ferry Road	N/A
Miscellaneous	Bridge	D-025 Bestpitch Ferry Road/Windmill Island Creek	Bestpitch Ferry Road	N/A
Miscellaneous	Bridge	D-002 Smithville Road/Beaver Dam Creek	Smithville Road	N/A
Miscellaneous	Bridge	RT 335/Blackwater River	RT 335	N/A
Miscellaneous	Bridge	Griffith Neck Road/Beaver Dam Creek	Griffith Neck Road	N/A
Miscellaneous	Bridge	D-022 Drawbridge Road/Chicamacomico River	Drawbridge Road	N/A
Miscellaneous	Bridge	D-005 Punch Island Road/St. John Creek	Punch Island Road	N/A
Miscellaneous	Bridge	D-026 Decoursey Bridge Road/Transquaking River	Decoursey Bridge Road	N/A
Miscellaneous	Bridge	RT 335/Buttons Creek	RT 335	N/A
Miscellaneous	Bridge	D-035 New Bridge Road/Chimamacomico River	New Bridge Road	N/A
Miscellaneous	Bridge	RT 16/Parsons Creek	RT 16	N/A
Miscellaneous	Bridge	State-Vienna Bridge		N/A
Miscellaneous	Bridge	D-032 Indiantown Road/Chicone Creek	Indiantown Road	N/A
Miscellaneous	Bridge	RT 50/Chicamacomico River	RT 50	N/A
Miscellaneous	Bridge	D-021 Drawbridge Road/Transquaking River	Drawbridge Road	N/A
Miscellaneous	Bridge	RT 313/Artificial Path	RT 313	N/A
Miscellaneous	Bridge	Shore Drive/Shoal Creek	Shore Drive	N/A
Miscellaneous	Bridge	RT 14/Marshyhope Creek	RT 14	N/A
Miscellaneous	Bridge	Harrison Ferry Road/Marshyhope Creek	Harrison Ferry Road	N/A
Miscellaneous	Bridge	D-019 Suicide Bridge Road/Cabin Creek	Suicide Bridge Road	N/A
Miscellaneous	Bridge	D-029 Blades Road/Hunting Creek	Blades Road	N/A
Miscellaneous	Bridge	State-Market Street/Cambridge Creek	Market Street	N/A
Miscellaneous	Bridge	D-015 Key Wallace Drive/Little Blackwater River	Key Wallace Drive	N/A
Miscellaneous	Bridge	D-018 Suicide Bridge Road/Warwick River	Suicide Bridge Road	N/A
Miscellaneous	Bridge	RT 14/Artificial Path (off of Warwick River)	RT 14	N/A

Facility Category	Facility Type	Facility Detail	Address	City
Miscellaneous	Marina/Dock	Warehouse	2343 Farm Creek Road	Toddville
Miscellaneous	Marina/Dock	Dock	Maple Dam Road	Cambridge
Miscellaneous	Museum	Taylors Island Museum	4212 Hoopers Neck Road	Taylors Island
NOAA 2-feet Sea Level Rise Inundation Area *Please note, all facilities listed in 1-foot sea level rise inundation area are included in 2-feet sea level rise inundation area.*				
Emergency	Fire Department	Taylors Island Volunteer Fire Company	510 Taylors Island Road	Taylors Island
Emergency	Fire Department	Hoopers Island Volunteer Fire Company	2754 Hoopers Island Road	Church Creek
Emergency	Fire Department	Lakes And Straits Fire Company	2103 Farm Creek Road	Wingate
Emergency	Fire Department/EMS	Madison Volunteer Fire Company	1154 Taylors Island Road	Madison
Miscellaneous	Boat Ramp	Trenton Street Ramp	225 Trenton Street	Cambridge
Miscellaneous	Boat Ramp	Wingate Ramp	Wingate Bishops Head	Wingate
Miscellaneous	Boat Ramp	New Bridge Ramp	4331 New Bridge Road	Vienna
Miscellaneous	Boat Ramp	Elliott Island Ramp	Wharf Road	Vienna
Miscellaneous	Boat Ramp	Ragged Point Marina	Ragged Point Road	Cambridge
Miscellaneous	Marina/Dock	Dock	Hoopers Island Road	Church Creek
Miscellaneous	Marina/Dock	Cambridge Marine Terminal 6	0 Cemetery Avenue	Cambridge
Miscellaneous	Marina/Dock	Dock	E Tedious Creek Rd	Toddville
Miscellaneous	Marina/Dock	Dock	Wingate Bishops Head Road	Wingate
Miscellaneous	Marina/Dock	Marina	Yacht Maintenance Co	Cambridge
Municipal	Municipal Government	Cambridge- Public Works	Water Street	Cambridge

Source: 2022 Hazard Mitigation GIS Database

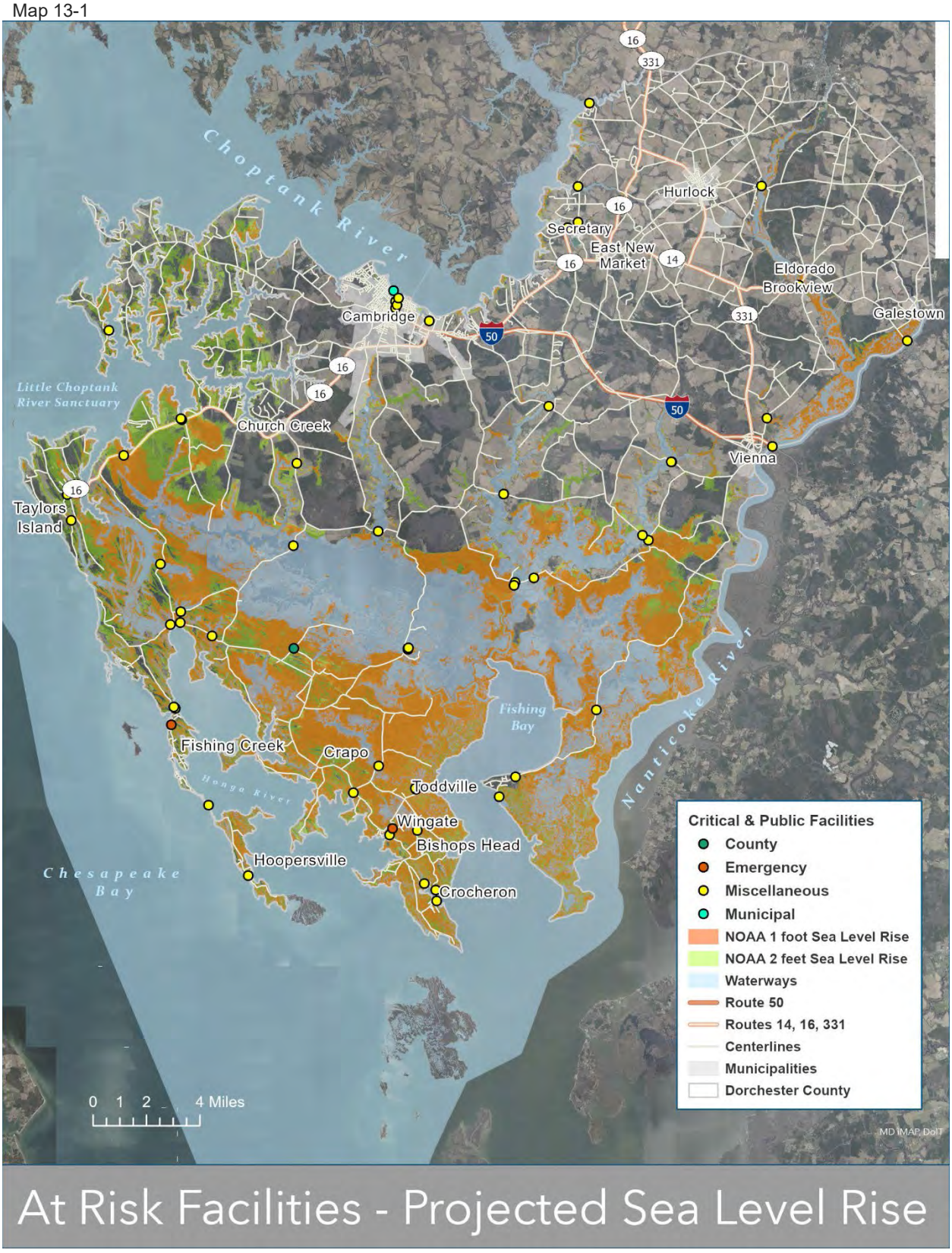
In regard to critical and public facilities, loss estimates for facilities located within the projected sea level rise inundation areas were calculated. Total improvement values from the 2021 Dorchester County Property Parcels Data Layer was utilized to calculate the loss estimations for critical and public facilities at risk. Total improvement value for critical and public facilities located with projected sea level rise inundation areas equaled $3,448,400. Damages resulting in 10% of total losses for facilities located in the projected sea level rise inundation area is $344,840.

Table 13-3

Projected Sea Level Rise Areas Loss Estimations for Critical & Public Facilities		
Facility Category	Total Improvement Value	10% Damage Loss Estimate
County	$18,900	$1,890
Education	$1,065,300	$106,530
Miscellaneous	$2,269,100	$226,910
Municipal	$95,100	$9,510
Total	$3,448,400	$344,840

Source: 2021 Dorchester County Property Parcels Data Layer –
Improvement values equal total losses for each facility within risk area

Map 13-1


Choptank River
Little Choptank River Sanctuary
Cambridge
Hurlock
Secretary
East New Market
Eldorado
Brookview
Galestown
Vienna
Church Creek
Taylors Island
Fishing Bay
Fishing Creek
Crapo
Toddville
Wingate
Bishops Head
Hoopersville
Crocheron
Honga River
Chesapeake Bay
Nanticoke River
16
331
50
14
Critical & Public Facilities
County
Emergency
Miscellaneous
Municipal
NOAA 1 foot Sea Level Rise
NOAA 2 feet Sea Level Rise
Waterways
Route 50
Routes 14, 16, 331
Centerlines
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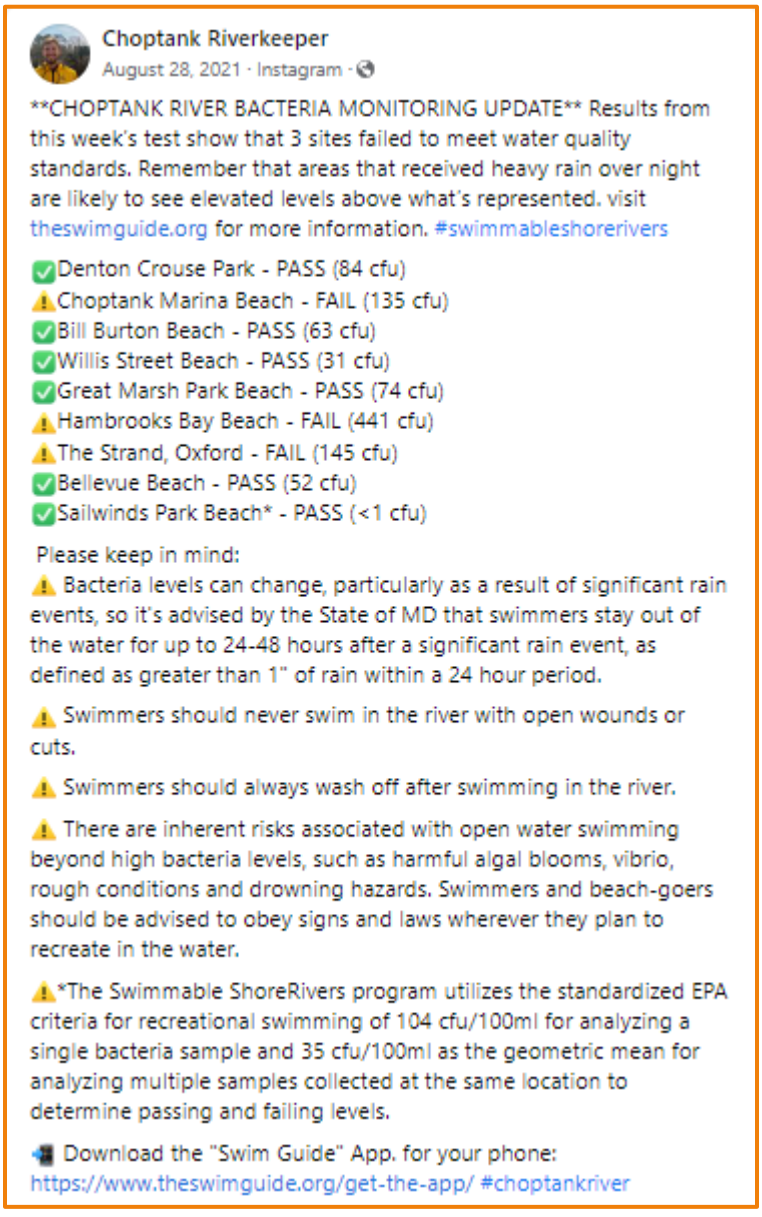
Dorchester County
0 1 2 4 Miles
MD iMAP, DoIT
At Risk Facilities - Projected Sea Level Rise

According to WHO's Climate Change and Infectious Diseases, vectors, pathogens and hosts each survive and reproduce within a range of optimal climatic conditions: temperature and precipitation are the most important, while sea level elevation, wind, and daylight duration are also important. Human exposure to waterborne infections occurs by contact with contaminated drinking water, recreational water, or food. This may result from human actions, such as improper disposal of sewage wastes, or be due to weather events. Rainfall can influence the transport and dissemination of infectious agents, while temperature affects their growth and survival.

Sea-level rise and warming temperatures may substantially increase vector-borne disease burden (a broader habitat range & longer reproductive season such as mosquitos and ticks). There is also the potential of an influx of water-borne diseases as our potable water systems may become contaminated with sewage & other parasitic contaminants with rising water. Studies have shown that elevated water temperatures accelerate the growth rate of certain water-borne pathogens, such as Vibrio species.

This would be a major public health concern to Dorchester County residents because if wounds are contaminated with Vibrio, as these infections are potentially life-threatening (septicemia) to those who use our local waterways for recreation & occupational use. Vibrio infections can also cause gastroenteritis through the consumption of contaminated seafood, one of the major economic industries in the county.

The Choptank Riverkeeper and ShoreRivers provide updates to the public through social media about bacteria monitoring, example to the right. Additional agencies in the county should provide this information as well through their social media outlets.



Choptank Riverkeeper
August 28, 2021 · Instagram ·

CHOPTANK RIVER BACTERIA MONITORING UPDATE Results from this week's test show that 3 sites failed to meet water quality standards. Remember that areas that received heavy rain over night are likely to see elevated levels above what's represented. visit theswimguide.org for more information. #swimmableshorerivers

✅Denton Crouse Park - PASS (84 cfu)
⚠️Choptank Marina Beach - FAIL (135 cfu)
✅Bill Burton Beach - PASS (63 cfu)
✅Willis Street Beach - PASS (31 cfu)
✅Great Marsh Park Beach - PASS (74 cfu)
⚠️Hambrooks Bay Beach - FAIL (441 cfu)
⚠️The Strand, Oxford - FAIL (145 cfu)
✅Bellevue Beach - PASS (52 cfu)
✅Sailwinds Park Beach* - PASS (<1 cfu)

Please keep in mind:
⚠️ Bacteria levels can change, particularly as a result of significant rain events, so it's advised by the State of MD that swimmers stay out of the water for up to 24-48 hours after a significant rain event, as defined as greater than 1" of rain within a 24 hour period.

⚠️ Swimmers should never swim in the river with open wounds or cuts.

⚠️ Swimmers should always wash off after swimming in the river.

⚠️ There are inherent risks associated with open water swimming beyond high bacteria levels, such as harmful algal blooms, vibrio, rough conditions and drowning hazards. Swimmers and beach-goers should be advised to obey signs and laws wherever they plan to recreate in the water.

⚠️*The Swimmable ShoreRivers program utilizes the standardized EPA criteria for recreational swimming of 104 cfu/100ml for analyzing a single bacteria sample and 35 cfu/100ml as the geometric mean for analyzing multiple samples collected at the same location to determine passing and failing levels.

📲 Download the "Swim Guide" App. for your phone:
https://www.theswimguide.org/get-the-app/ #choptankriver

Conclusions & Recommendations

The following mitigation strategies were identified during the development of this plan chapter.

- Identify shorelines lacking the installation of protection measures and are low-lying lands that will become permanently inundated by higher sea levels. Determine mitigation measures such bulkheads, riprap and other shoreline armoring to protect these shorelines.

- Retrofit or relocate the following critical facilities that are located within the 2 feet projected sea level rise hazard area.

    - Taylors Island Volunteer Fire Company
    - Hoopers Island Volunteer Fire Company
    - Lakes And Straits Fire Company
    - Madison Volunteer Fire Company & EMS Station

  It is important that these facilities are able to fully perform as intended not only during day-to-day operations but also during a hazard event.

- Consider the geographic extent of regulated floodplain in relation to increasing storm events and sea level rise. This may include a flood protection level established for the 0.2 percent annual chance floodplain prompting a change to the County's floodplain ordinance.

- Maintain, identify, and protect new marsh migration corridors. Create habitat mosaics that are more resilient to climate change impacts, such as sea level rise.

- Create new and restore existing wetlands as a best management practice to increase resiliency by providing storm buffers, drought buffers and sea level rise buffers. Consider projects to create wetlands to increase floodplain holding capacity.

- Create an "ideal" living shoreline by installing riparian buffers along the tide line using native trees and shrubs; tidal wetlands using grasses, rushes, and sedges at mid-tide elevations and marsh grasses and common three-square at low tide; and underwater grasses in shallow water.

- Develop and include climate change information specific to Dorchester County within a planning document or other media platform for public awareness:

    - Embed energy and emissions assessments into county planning, which is a prerequisite for being able to adequately implement climate adaption measures in the future.
    - Assess building usage and emissions.
    - Assess County owned and operated transportation resources for usage and emissions.
    - Assess sustainable energy sources, which are critical for moving the needle forward.

- Provide information on energy saving measures that residents can use to achieve significant energy savings and reduce electricity consumption.

Energy Conservation Measure	Estimated Annual kWh savings	Annual Electric Bill Savings	Estimated Reduction in Household Electricity Consumption
Replace all lights with Compact Fluorescent Lights (CFLs)	1000	$130	6%
Blow-in Wall Insulation	700	$90	4%
Seal Ductwork	650	$85	4%
Repair Ceiling Leaks	600	$80	3%
Upgrade to an ENERGY STAR, front-load clothes washer	400	$50	2%
Upgrade Attic Insulation	300	$40	2%
Upgrade a 10 year old refrigerator to an ENERGY STAR refrigerator	300	$40	2%
Upgrade to ENERGY STAR room air conditioner	250	$30	1%
Install low flow showerhead	250	$30	1%

Source: EmPOWER Maryland

- Focus on minority populations that would be disproportionately impacted by effects of climate change whether it be lower-income neighborhoods where energy upgrades may be less attainable or those seasonal migrant workers who are more susceptible to severe occupational risk hazards up in the northern end of the county (ie. watermelon pickers) during a heatwave.

- Dedicate a cooling shelter to be used during extreme heat events. Work with multiple agencies to staff during these events. Dorchester County currently only utilizes public libraries as cooling centers.

- Encourage various agencies in the county to share bacteria monitoring updates provided by the Choptank Riverkeeper and ShoreRivers on their various social media outlets.

SECTION 3

Chapter 14 Goals and Objectives
Chapter 15 Mitigation Strategies
Chapter 16 Plan Maintenance & Implementation

Chapter 14 Goals & Objectives

Introduction

Upon completing the review of the goals and objectives established in the 2017 Hazard Mitigation Plan and the development of additional objectives for the 2022 Hazard Mitigation Plan, mitigation actions were identified and evaluated. These actions ranged from construction projects—retrofitting existing structures to resist floods and high winds—to non-construction related projects such elevation of vulnerable structures and implementation of educational awareness programs. The Core Planning Team (CPT) rated all projects identified during the 2022 Plan update process.

By completing the plan update process, the CPT was able to develop new objectives as part of the mitigation strategies, which are denoted in blue. The goals and objectives serve as the basis for implementing mitigation action items, which aid in mitigating the hazards described in Chapters 6-13 of the Plan.

Upon review of goals and objectives, the CPT determined which of the six broad categories the new mitigation action items would be associated with. These categories include Prevention, Property Protection, Public Education and Awareness, Natural Resources Protection, Emergency Services, and Structural Protection.

Goals as identified in this Plan are broad-based and long-term. The following goals identify what the community expects to accomplish through mitigation actions during the next five years. Objectives as identified in this Plan are more specific and narrower in scope than goals. They expand upon goals and provide more details on how to accomplish them.

Note: *These goals, objectives, and mitigation action items apply to municipal participants as well as the unincorporated parts of the County.*

Goals & Objectives

GOAL 1: *Maintain and enhance Dorchester County's Department of Emergency Service's capacity to continuously make Dorchester County less vulnerable to hazards.*

Objective 1.1 Institutionalize hazard mitigation.
Objective 1.2 Improve organizational efficiency.
Objective 1.3 Maximize utilization of best technology.
Objective 1.4 Maximize utilization of GIS software.

GOAL 2: *Build and support municipal capacity and commitment to become continuously less vulnerable to hazards.*

Objective 2.1	Increase awareness and knowledge of hazard mitigation principles and practice among local and municipal public officials. Provide training to employees and community members.
Objective 2.2	Provide assistance to municipal officials and help municipalities obtain funding for mitigation planning and project activities.
Objective 2.3	Prepare technical reports for critical facilities as necessary.
Objective 2.4	Promote partnerships among the municipalities and the County to develop a countywide approach to mitigation activities and resilience initiatives.

GOAL 3: *Improve coordination and communication with other relevant organizations.*

Objective 3.1	Establish and maintain lasting partnerships.
Objective 3.2	Streamline policies to eliminate conflicts and duplication of effort.
Objective 3.3	Incorporate hazard mitigation into activities of other organizations.

GOAL 4: *Increase public understanding, support, and demand for hazard mitigation.*

Objective 4.1	Identify hazard specific issues and needs.
Objective 4.2	Heighten public awareness of natural hazards.
Objective 4.3	Publicize and encourage the adoption of appropriate hazard mitigation actions.
Objective 4.4	Increase the number of businesses that have developed a business risk reduction plan.
Objective 4.5	Increase the proportion of businesses and residences that have flood insurance.

GOAL 5: *Protect existing and future properties (residential, commercial, public, and critical facilities).*

Objective 5.1	Utilize the most effective approaches to protect buildings from hazards, including acquisition and elevation.
Objective 5.2	Enact and enforce regulatory measures to ensure that new development will not increase hazard threats from coastal/riverine flooding, storm surge, sea level rise or the threat of wildfire at the urban/forest interface.

Objective 5.3	Review and update Building Codes to ensure that manufactured housing, including mobile homes, are constructed and installed in a manner to minimize wind and storm surge damage.
Objective 5.4	Reduce the number of houses in the floodplain that are subject to flooding.
Objective 5.5	Increase the number of critical facilities that have carried out mitigation measures to ensure their functionality in a 1% annual chance flood event.
Objective 5.6	Ensure existing high risk residential structures are utilizing retrofitting techniques to mitigate repetitive flooding.
Objective 5.7	Fund updated flood models with climate change impacts included.

GOAL 6: *Ensure that public funds are used in the most efficient manner.*

Objective 6.1	Prioritize new mitigation projects, starting with sites facing the greatest threat to life, health, and property.
Objective 6.2	Use public funding to protect public services, and critical and public facilities.
Objective 6.3	Use public funding on private property where benefits exceed costs.
Objective 6.4	Maximize the use of outside funding sources.
Objective 6.5	Encourage property-owner self-protection measures.
Objective 6.6	Prioritize signage in and around high hazard dams denoting dam inundation area.

GOAL 7: *Promote sustainable development to improve the quality of life.*

Objective 7.1	Establish open space parks and recreational areas in flood hazard areas.
Objective 7.2	Provide for the conservation and preservation of natural resources. Conduct public outreach to ensure that the communities understand that these areas may be inundated with water at times and are functioning in a natural capacity for flood water storage and habitat.
Objective 7.3	Limit additional housing (especially elderly and high density) in areas of high hazard risk.

GOAL 8: *Prevent destruction of forests and structures in the Urban Wildland Interface.*

Objective 8.1	Improve communications capability between municipal and county emergency management and law enforcement personnel.
Objective 8.2	Identify specific high hazard areas in the Urban Wildland Interface and notify residents of means to protect their property from wildfire damage.
Objective 8.3	Develop evacuation procedures to enable residents near forested areas to evacuate safely.

GOAL 9: *Protect public infrastructure, especially evacuation routes.*

Objective 9.1	Upgrade or replace public roads and stormwater management features to include mitigation into the project design and construction.
Objective 9.2	Improve evacuation routes utilized in flood hazard events to mitigate life-threatening road conditions and road closures.
Objective 9.3	Mitigate problem road sections within the County and municipalities.
Objective 9.4	Consider evacuation routes in relation to dam inundation areas.

GOAL 10: *Integrate plan and policies across disciplines and agencies within the County through the consideration of potential hazards and future development.*

Objective 10.1	Integrate hazard mitigation into areas such as land use, transportation, climate change, natural and cultural resource protection, water resources, and economic development.
Objective 10.2	Solicit participation and offer opportunities for various departments to work together on a regular basis.
Objective 10.3	Clearly define roles of, and improve intergovernmental coordination between planners, emergency managers, engineers, and other staff, and municipal and regional partners in improving disaster resiliency.

GOAL 11: *Eliminate or reduce human, environmental, social, and economic loss from natural and technological hazards.*

Objective 11.1	Maintain healthy environments at county-owned and operated locations, beyond the global pandemic.
Objective 11.2	Identify vulnerable populations and provide resources to these groups based on their unique needs.

Chapter 15 Mitigation Strategies

Introduction

Mitigation actions address the goals and objectives developed by the Core Planning Team. These actions form the core of the 2022 Dorchester County All-Hazard Mitigation Plan. The mitigations actions were grouped into the following six broad classifications.

1. **Prevention.** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations. Please note *Planning & Regulatory* is included under the prevention classification.

2. **Property Protection.** Actions that involve the modification of existing critical and public facilities, buildings, structures, and public infrastructure to protect them from hazards. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and infrastructure modification.

3. **Public Education and Awareness.** Actions to inform and educate citizens, elected officials, and property owners about potential ways to mitigate for hazards that can occur in the County. Such actions include outreach programs, projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

4. **Natural Resource Protection.** Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural protection systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration preservation.

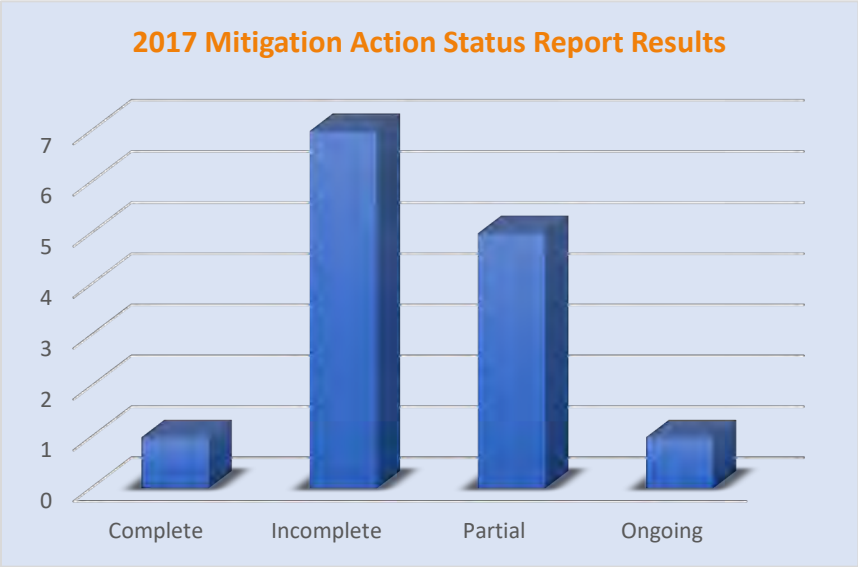
5. **Emergency Services.** Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems and emergency response services.

6. **Structural Projects.** Actions that involve the construction of structures to reduce the impact of a hazard event. Such structures include dams, levees, floodwalls, seawalls, retaining walls, barrier islands, and safe rooms.

2017 Mitigation Action Status Update

During this plan update process, hazard-specific action items from the 2017 Hazard Mitigation Plan were reviewed by Core Planning Team members. As a result, a mitigation status report was developed for the 2022 Plan Update. A progress status and additional details have been provided for each of the 2017 action items within *Appendix B 2017 Mitigation Action Item Status Update Report*. In addition, the *Appendix B 2017 Mitigation Action Item Status Update Report* was added to the project website for stakeholder and public reivew in the summer of 2021.

Results of the status report completed as part of this plan update indicated that 50% of the 2017 mitigation actions are either complete or in-process, while the remaining 50% are incomplete, as shown on the graph below.



2022 Mitigation Action Items

New mitigation action items were developed throughout the plan update process. In addition, mitigation actions that were identified as incomplete from the 2017 Hazard Mitigation Plan were reviewed and carried over, as applicable, into the plan update. Mitigation actions were included at the end of each hazard chapter under the “Conclusions & Recommendations” section. In addition, a compilation of all fifty-three (53) mitigation action items identified in the various hazard chapters are within *Appendix D 2022 Mitigation Action Items*.

Mitigation action items were reviewed by the Core Planning Team (CPT) throughout the plan update process. Upon completion of the hazard chapters, a compilation of mitigation actions items were provided to the CPT for an additional review.

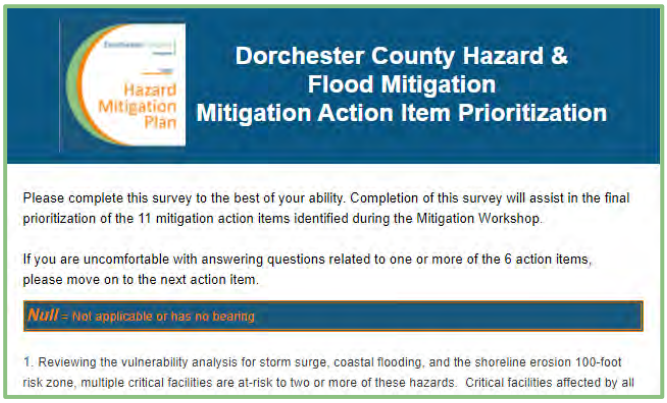
On March 10, 2022, the Mitigation Action Item Workshop was held. During the workshop, mitigation action items were reviewed and prioritized by the Core Planning Team. CPT members were led through a three-step process, which included both individual and group work discussion. As a result, eleven (11) mitigation action items were identified for project development.

The three-step process used during the Mitigation Action Item Workshop is included in *Appendix E Core Planning Team Meeting Notes*.

2022 Mitigation Projects

Mitigation projects were developed following the March 2022 Mitigation Action Item Workshop. Mitigation Project sheets were disturbed to all CPT members and are included on pages 15-5 to 15-22 of this chapter. In order to prioritize these projects, Core Planning Team members were asked to complete an online survey. The online survey was used as a tool for ranking purposes by CPT members. The basis for this online survey is the STAPLEE evaluation method, which uses seven criteria for evaluation: Social, Technical, Administrative, Political, Legal, Economic, and Environmental.

The online survey consisted of the following six (6) questions developed from the STAPLEE Evaluation Method. These six (6) questions were asked for each mitigation project:



1. Do you think there would be community acceptance/general support for this mitigation action?
2. Do you think implementation of this mitigation action will enhance the health and safety of the community?
3. Do you think the County/Municipality will be able to sufficiently staff and/or provide technical support to implement this mitigation action?
4. Do you think the benefits of this mitigation action will exceed the likely costs?
5. Do you think the maintenance requirements for this option will be affordable and not provide an undue burden on the County or Municipality?
6. Is this project consistent with environment goals?

As a result of the prioritization process, a total of four (4) mitigation projects were ranked as "High Priority."

Table 15.1

2022 Mitigation Projects		
Mitigation Projects	Associated Action(s)	High Priority
Project 1: Critical & Public Facilities Mitigation	1, 2	
Project 2: Shoreline Protection Measures	6, 45, 48	
Project 3: Repetitive Roadway Improvements	7	
Project 4: Repetitive & Severe Repetitive Loss Properties	11	✓
Project 5: Critical Facilities Snow Load Capabilities	15	
Project 6: Hazardous Materials Incident Messaging	33	✓
Project 7: Floodplain Ordinance Modifications	46	✓
Project 8: Environmental Justice	51	✓

Project sheets are provided on pages 15-5 to 15-22. The following topics are included on the project sheets.

- Hazard
- Location
- Classification
- Project Title & Mitigation Action Item
- Background/Issue
- Ideas for Integration
- Responsible Agency
- Partners
- Potential Funding
- Cost Estimate
- Benefits (losses avoided)
- Timeline
- Goals and Objectives

<table>
<tr><th colspan="2">Mitigation Project 1</th></tr>
<tr><td>Hazard:</td><td>Coastal Hazards & Climate Change (SLR)</td></tr>
<tr><td>Location(s):</td><td>County, City of Cambridge, Town of Vienna</td></tr>
<tr><td>Classification:</td><td>Property Protection</td></tr>
<tr><td>Project Title/Mitigation Action Item:</td><td>
Critical & Public Facilities Mitigation

Action Item #1: Reviewing the vulnerability analysis for storm surge, coastal flooding, and the shoreline erosion 100-foot risk zone, multiple critical facilities are at-risk to two or more of these hazards. Critical facilities affected by all three hazards include: Taylors Island Volunteer Fire Company, Madison Volunteer Fire Company and EMS Station 500. Facilities affected by storm surge and coastal flooding only include Lakes and Straits Fire Company and Hoopers Island Volunteer Fire Company. The following table lists all critical and public facilities affected by two or more coastal events (hurricane, coastal flooding, sea level rise and shoreline erosion). As listed in the table below, five (5) critical and four (4) public facilities are vulnerable to two or more coastal events. These facilities may have been constructed to mitigate flooding; however, surrounding roads may cause evacuation issues. Additional mitigation measures may be necessary to ensure services provided by these facilities are not disrupted, especially during a hazard event.

Table 6-30
<table>
<tr><th colspan="5">Critical & Public Facilities affected by Multiple Coastal Events</th></tr>
<tr><th>Facility Detail</th><th>Critical or Public Facility</th><th>Hurricane Category (Storm Surge)</th><th>Coastal Flooding - Flood Depth</th><th>Within 100-Foot Risk Zone (from shoreline)</th></tr>
<tr><td>Taylors Island Volunteer Fire Company</td><td>Critical</td><td>1</td><td>1.1</td><td>Yes</td></tr>
<tr><td>Madison Volunteer Fire Company</td><td>Critical</td><td>1</td><td>0.8</td><td>Yes</td></tr>
<tr><td>EMS Station 500</td><td>Critical</td><td>1</td><td>0.5</td><td>Yes</td></tr>
<tr><td>Lakes and Straits Fire Company</td><td>Critical</td><td>1</td><td>2.6</td><td>No</td></tr>
<tr><td>Hoopers Island Volunteer Fire Company</td><td>Critical</td><td>1</td><td>3.3</td><td>No</td></tr>
<tr><td>County Facility</td><td>Public</td><td>1</td><td>1.6</td><td>No</td></tr>
<tr><td>Cambridge Public Work Facilities</td><td>Public</td><td>1</td><td>2.0</td><td>No</td></tr>
<tr><td>County Board of Education</td><td>Public</td><td>1</td><td>2.4</td><td>No</td></tr>
<tr><td>Vienna Public Works</td><td>Public</td><td>1</td><td>4.9</td><td>Yes</td></tr>
</table>
Chapter 6 Coastal Hazards - Page 58

Action Item #2: Retrofit the fire departments located within the special flood hazard areas and the 2 feet projected sea level rise hazard area. Continuity of operations at designated critical facilities is necessary to meet community needs and resiliency goals. The fire departments include:

Taylors Island Volunteer Fire Company
Hooper’s Island Volunteer Fire Company
Madison Volunteer Fire Company/EMS Station 500
Lake and Straits Volunteer Fire Company

</td></tr>
</table>

Mitigation Project 1	
Background/ Issue:	Critical facilities are essential for the delivery of vital services and for the protection of the community. The adverse effects of damaged critical facilities can extend far beyond direct physical damage. Disruption of health care, fire, and police services can impair search and rescue, emergency medical care, and even access to damaged areas. It is important to identify facilities constructed prior to the County's Floodplain Ordinance, which requires first floor elevations to be built at base flood elevation (BFE) plus two (2) feet of freeboard. Mitigation activities, such as elevation equipment, floodproofing, or relocation may be considered at those facilities. The following facilities were constructed prior to the adoption of the Floodplain Ordinance. • County Board of Education – Year Built: 1920 • Taylors Island Volunteer Fire Company – Year Built: 1960 • Hooper's Island Volunteer Fire Company – Year Built: 1960 • Madison Volunteer Fire Company/EMS Station 500 – Year Built: 1954 • County Facility (vacant) – Year Built: 1957 A technical report should be completed to provide information on the first floor and base flood elevations. Mitigation alternatives and a detailed benefit/cost analysis should be completed. Equipment that is located on the first floor of a critical facility is most vulnerable to flooding. Therefore, an assessment of all essential utility systems and equipment should be conducted to determine if elevation is necessary. All essential equipment should be elevated above the highest anticipated flood elevation, or the elevation of the 0.2-percent-annual-chance flood recommended by FEMA, whichever is higher. When elevating equipment is not practical, dry floodproofing may be an option. Dry floodproofing options include, but are not limited to, flood barriers or shields around individual pieces of equipment or areas that contain essential equipment. These barriers must be high enough to protect equipment from floodwater, strong enough to resist flood forces, and sealed well enough to control leakage and infiltration. An analysis to determine the effective dry floodproofing method and design of the dry floodproofing method should be conducted. In addition, public facilities at risk such as sanitary sewer pump stations can be overwhelmed by floodwaters, limiting the sewer system's capacity to pump raw sewage to the wastewater treatment plant. The Cambridge Public Works pump station on Trenton Street is at risk to storm surge and coastal flooding. If the pump station is inundated by floodwater, raw sewage can back-up into residences and buildings and cause raw sewage to be released into the environment.
Ideas for Integration:	Flood Mitigation Plan
Responsible Agency:	Affected Facilities City of Cambridge Town of Vienna Department of Emergency Services
Partners:	Department of Planning & Zoning Department of Public Works Board of Education Maryland Department of Emergency Management Department of Natural Resources (Technical)

Mitigation Project 1	
Potential Funding:	FEMA Building Resilient Infrastructure & Communities (BRIC) Emergency Advance Measures for Flood Prevention Flood Mitigation Assistance
Cost Estimate:	Dependent upon individual structure and necessary retrofitting/relocation.
Benefits (Losses Avoided):	Continued service availability and hazard preparation. Uninterrupted sanitary sewer services for residents/businesses during severe storm events. Public health and environmental health risk mitigated from preventing sanitary sewer overflows.
Timeline:	2-5 years
Goals & Objectives:	Goal 2: Build and support municipal capacity and commitment to become continuously less vulnerable to hazards. Objective 2.2: Provide assistance to municipal officials and help municipalities obtain funding for mitigation planning and project activities. Objective 2.3: Prepare technical reports for critical facilities as necessary. Goal 5: Protect existing and future properties (residential, commercial, public, and critical facilities). Objective 5.1: Utilize the most effective approaches to protect buildings from hazards, including acquisition and elevation. Objective 5.5: Increase the number of critical facilities that have carried out mitigation measures to ensure their functionality in a 1% annual chance flood event. Goal 6: Ensure that public funds are used in the most efficient manner. Objective 6.2: Use public funding to protect public services, and critical and public facilities.

Mitigation Project 2	
Hazard:	Coastal Hazards & Climate Change (SLR)
Location(s):	County, City of Cambridge
Classification:	Structural Projects / Natural Resources Protection
Project Title/Mitigation Action Item:	Shoreline Protection Measures Action Item #6: Using the Coastal Atlas, areas with shoreline erosion rates that are high and very high should be reviewed for living shorelines. Living shorelines connect the land and water to stabilize shorelines, reduce erosion, and provide valuable habitat that enhances coastal resilience. Action Item #45: Identify shorelines lacking the installation of protection measures and are low-lying lands that will become permanently inundated by higher sea levels. Determine mitigation measures such bulkheads, riprap and other shoreline armoring to protect these shorelines. Action Item #48: Create new and restore existing wetlands as a best management practice to increase resiliency by providing storm buffers, drought buffers and sea level rise buffers. Consider projects to create wetlands to increase floodplain holding capacity.
Background/Issue:	The vertical movement of rising waters will lead to increased saturation of soils at the base of banks, which will weaken and eventually result in bank erosion. Due to the effects of wave action slashing away soils at higher points along the shoreline, bank failure will be the result. The consequence of repeated bank failures is the landward withdraw of the upland/shoreline edge. According to Michael Scott, dean of the Henson School of Science and Technology at Salisbury University, shores across Dorchester County have receded by as much as 600 feet since the 1970's and continue to lose ground each day. The relative exposure to storm-induced erosion and flooding is high for most of the county's shorelines. The Neck District, Taylors Island, Hoopers Island, and Crocheron areas have the highest erosion rates. These areas should be assessed for flood risk reduction measures such as living shorelines, breakwaters, or bulkheads. According to Maryland Department of Natural Resources, living shorelines are the result of applying erosion control measures that include a suite of techniques which can be used to minimize coastal erosion and maintain coastal process. Techniques may include the use of fiber coir logs, sills, groins, breakwaters or other natural components used in combination with sand, other natural materials and/or marsh plantings. These techniques are used to protect, restore, enhance or create natural shoreline habitat. Benefits of a living shoreline may include: • Protect shorelines from erosion. • Provide habitat for fish and other living resources. • Improve water quality and store nutrients. • Increase stability over time. • Can outperform hardened shorelines during a storm. • Attract natural wildlife.

Mitigation Project 2	
	 Another example of shoreline protection mitigation measures involves various techniques designed to decrease or halt shoreline erosion. One technique would utilize rock revetments, which are applied directly to the eroding shoreline. Other techniques include segmented breakwaters and wave-damping fences. These are placed in the adjacent open water to decrease a wave's energy before it hits the shoreline and promote sediment buildup. A man-made offshore structure constructed parallel to the shore is called a breakwater. In terms of coastal morphodynamics, it acts similarly to a naturally occurring barrier island by dissipating and reducing the energy of the waves and currents impacting the coast. Wetlands assist in reducing the frequency and intensity of floods by acting as natural buffers, soaking up and storing a significant amount of floodwater. Coastal wetlands serve as storm surge protectors when hurricanes or tropical storms come ashore. Wetland creation involves impounding water with berms and dikes or by excavating depressions in areas that did not previously contain wetland soils or vegetation. Wetland restoration involves returning one of the wetland ingredients, generally water retention, to a degraded or drained wetland site. Erosion undermines waterfront houses, businesses, and public facilities, eventually rendering them uninhabitable or unusable. By moving the shoreline inland, erosion also brings nearby structures ever closer to the water, often putting them at greater risk. Therefore, shorelines at highest risk to erosion need evaluation to determine the most effective protection measure for each site.
Ideas for Integration:	Green Infrastructure Plan Flood Mitigation Plan County and City Comprehensive Plans

Mitigation Project 2	
Responsible Agency:	Department of Planning & Zoning City of Cambridge Planning
Partners:	Department of Public Works Maryland Department of Environment (MDE) Maryland Department of Natural Resources (DNR) U.S. Army Corps of Engineers (USACE) ShoreRivers Eastern Shore Land Conservancy (ESLC) The Nature Conservancy (TNC) CAC PC&D COE Soil Conservation District Conservation Fund
Potential Funding:	NOAA Grant Funding FEMA Building Resilient Infrastructure & Communities (BRIC) Hazard Mitigation Program Grant Emergency Advance Measures for Flood Prevention State of Maryland Department of Natural Resources Chesapeake & Coastal Service Shoreline Conservation Service Wetland Program Development Grants 5 Star Wetland and Urban Waters Restoration Grants
Cost Estimate:	Cost is dependent upon mitigation measure chosen for each project site.
Benefits (Losses Avoided):	Protect coastal communities from storms by reducing wave energy and storm surge, thus lessening costs associated with damages and recovery over time.
Timeline:	Timeline is largely dependent upon project size, location, and support.
Goals & Objectives:	Goal 5: Protect existing and future properties (residential, commercial, public, and critical facilities). Objective 5.1: Utilize the most effective approaches to protect buildings from hazards, including acquisition and elevation. Objective 5.6: Ensure existing high risk residential structures are utilizing retrofitting techniques to mitigate repetitive flooding. Objective 5.7: Fund updated flood models with climate change impacts included. Goal 7: Promote sustainable development to improve the quality of life. Objective 7.1: Establish open space parks and recreational areas in flood hazard areas. Objective 7.2: Provide for the conservation and preservation of natural resources. Conduct public outreach to ensure that the communities understand that these areas may be inundated with water at times and are functioning in a natural capacity for flood water storage and habitat.

Mitigation Project 3	
Hazard:	Coastal Hazards
Location(s):	County, Cambridge, Galestown, Hurlock
Classification:	Property Protection
Project Title/Mitigation Action Item	Repetitive Roadway Improvements Action Item #7: Prioritize the twenty-nine (29) roads identified as having experienced repetitive flooding issues by the Core Planning Team for inclusion in the County's Capital Improvement Plan. Fourteen (14) of the identified roads are also evacuation routes. These roads should take precedence when determining mitigation measures. Repetitive flooding occurs on these roadways due to low elevation of the roadway or stormwater management issues. Upgrade and mitigate evacuation routes when funding from Federal or State sources is available.
Background/Issue:	Dorchester County has a significant history of being impacted by coastal storms. Dorchester County has also experienced flooding laterally outside mapped floodplains with increasing frequency, including both nuisance and urban flooding. Nuisance flooding is defined as high tide flooding that causes a public inconvenience, while urban flooding is associated with precipitation events and is due to a variety of issues related to development. Flood sources include riverine flooding from rivers, creeks and streams, and coastal flooding from the Chesapeake Bay. Approximately 56% of the County lies within the 1%-annual-chance floodplain area. Most of this area is tidal floodplain. The southern portion of the County is the most prone to flooding during high tides. Roadways impacted by nuisance flooding can be significant stressors on infrastructure, emergency response, and public health. Nuisance flooding occurs between the communities of Toddville and Crocheron due to road elevation issues. Other areas identified for nuisance flooding are the areas between the Honga and Hoopersville communities. Tidal flooding affects roadways in this area, which is concerning since these roadways are evacuation routes. Of the 29 identified roadways, 14 are evacuation routes. (Chapter 6 Coastal Flooding – page 6-48) From the listing of the 29 identified roads that experience repetitive flooding issues, the six roads listed below were considered as high importance for mitigation. Inclusion of these road improvements in the County's Capital Improvement Plan would increase the opportunity for mitigation. • North Main Street • Tidal Flooding in the Southern Portion • Wesley Church Road • Elliott Island Road • Maple Dam Road • MD 336 Note, Maryland 336 should be considered for mitigation by the Maryland Department of Emergency Management and Maryland Department of Transportation.
Ideas for Integration:	Flood Mitigation Plan Capital Improvement Plan Nuisance Flood Plan

Mitigation Project 3	
Responsible Agency:	Department of Public Works City of Cambridge Town of Galestown Town of Hurlock Maryland State Highway Administration
Partners:	Department of Emergency Services Town/City Planning Departments
Potential Funding:	BUILD Transportation Grant Program FEMA Building Resilient Infrastructure & Communities (BRIC) Emergency Advance Measures for Flood Prevention
Cost Estimate:	To be determined during the Conceptual Design Phase Process.
Benefits (Losses Avoided):	Access to remote region of the county and alleviates issues with evacuation routes.
Timeline:	2-5 years
Goals & Objectives:	Goal 9: Protect public infrastructure, especially evacuation routes. Objective 9.1: Upgrade or replace public roads and stormwater management features to include mitigation into the project design and construction. Objective 9.2: Improve evacuation routes utilized in flood hazard events to mitigate life-threatening road conditions and road closures. Objective 9.3: Mitigate problem road sections within the County and municipalities. Objective 9.4: Consider evacuation routes in relation to dam inundation areas.

Mitigation Project 4	
Hazard:	Riverine Flooding
Location(s):	County, Cambridge, East New Market
Classification:	Property Protection
Project Title/Mitigation Action Item:	Repetitive & Severe Repetitive Loss Properties Action Item #11: Mitigate repetitive and severe repetitive loss properties identified in Chapter 7 Riverine Flooding. There are 54 repetitive and 3 severe repetitive loss properties located within Dorchester County. The strategy is to eliminate or reduce the damage to property and the disruption of life caused by repeated flooding of the same properties. Depending on the severity of flooding at these locations, another possibility is to elevate the structure, so it is well above the base flood elevation. Acquiring buildings and removing them from the floodplain is not only the most effective flood protection measure available, but also an opportunity to convert a problem area into a community asset and obtain environmental benefits. These properties are listed in Table 7-13 and depicted on Map 7-5, Chapter 7 Riverine Flooding, page 7-21. Prioritize neighborhoods that contain multiple RL and SRL properties, there by developing community wide mitigation projects rather than scattered site projects.
Background/Issue:	Consider the acquisition, reconstruction, relocation, and/or elevation of the most vulnerable flood-prone properties within the County, including but not limited to repetitive loss properties. This acquisition process would include: contacting the property owner and determining the willingness to sell, obtaining property assessment information, and eventually applying for funding. Once a property is acquired, the County should ensure the removal of all structures located on the property and ensure the property remains as open space in perpetuity. Green infrastructure could be incorporated on the acquired property. This would assist water management with protecting, restoring, or mimicking the natural water cycle. Green infrastructure is effective, economical, and enhances community safety and quality of life. An acquisition budget should be based on the median price of similar properties in the community, plus $10,000 to $20,000 for appraisals, abstracts, title opinions, relocation benefits, and demolition. Costs may be lower after a flood. For example, the community may have to pay only the difference between the full price of a property and the amount of the flood insurance claim received by the owner. Create a prioritized list of properties for land acquisition for flood mitigation and conservation. Emphasis should be placed on potential community projects rather than scattered sites. Consider vacant and/or "blighted" flood prone properties.
Ideas for Integration:	Green Infrastructure Plan Flood Mitigation Plan
Responsible Agency:	Department of Emergency Services Department of Planning & Zoning
Partners:	Towns/City Public Works Maryland Department of Emergency Management Federal Emergency Management Agency
Potential Funding:	FEMA Building Resilient Infrastructure & Communities (BRIC) Hazard Mitigation Grant Program Flood Mitigation Assistance

Mitigation Project 4	
Cost Estimate:	Median Price of Similar Properties in the Community plus $10,000-20,000 for additional costs
Benefits (Losses Avoided):	Flood Resiliency Reduced Repetitive Loss Reduced flood insurance premiums Reduce the threat to life and property
Timeline:	1-2 years
Goals & Objectives:	Goal 4: Increase public understanding, support, and demand for hazard mitigation. Objective 4.1: Identify hazard specific issues and needs. Goal 5: Protect existing and future properties (residential, commercial, public, and critical facilities). Objective 5.1: Utilize the most effective approaches to protect buildings from hazards, including acquisition and elevation. Objective 5.2: Enact and enforce regulatory measures to ensure that new development will not increase hazard threats from coastal/riverine flooding, storm surge, sea level rise or the threat of wildfire at the urban/forest interface. Objective 5.4: Reduce the number of houses in the floodplain that are subject to flooding. Objective 5.6: Ensure existing high risk residential structures are utilizing retrofitting techniques to mitigate repetitive flooding. Goal 6: Ensure that public funds are used in the most efficient manner. Objective 6.1: Prioritize new mitigation projects, starting with sites facing the greatest threat to life, health, and property. Objective 6.3:Use public funding on private property where benefits exceed costs. Objective 6.4: Maximize the use of outside funding sources. Objective 6.5: Encourage property-owner self-protection measures.

Mitigation Project 5	
Hazard:	Winter Weather
Location(s):	County, Hurlock, Eldorado, Brookview
Classification:	Property Protection
Project Title/Mitigation Action Item	Critical Facilities Snow Load Capabilities Action Item #15: Evaluate the following critical facilities for snow load capabilities. Continuity of operations at designated critical facilities is necessary to meet community needs and resiliency goals. • Neck District Volunteer Fire Company • Hurlock Volunteer Fire Company • Madison Volunteer Fire Company • Eldorado-Brookview Volunteer Fire Company • Taylors Island Volunteer Fire Company • Hoopers Island Volunteer Fire Company • Choptank Community Health System
Background/Issue:	No two snow events are identical, and the resulting snow loads on nearby buildings from one snow event may be different. One foot of snow on the ground does not necessarily equal one foot of snow on a roof. Further, differing snow load conditions are a function of the variables associated with an individual building. The characteristics of snow can differ significantly from snow event to snow event. Structural engineers use building codes to determine design snow loads on building structures. Currently, the International Building Code (IBC) is used throughout the United States for snow loads. The International Building Code has been adopted as the basic building code for Dorchester County. Roof snow load is defined as the weight of snow on the roof surface used in design of the building structure. It is determined based on multiple factors, which includes ground snow loads. The ground snow loads area used in determining the design snow loads for roofs. According to the 2018 IBC, the ground snow load for Dorchester County is 20 pounds per square foot. The following critical facilities were built prior to 1960, before the International Building Code was enforced, and may be at a higher risk due to age of construction and lack of building codes during the time of construction. • Neck District Volunteer Fire Company – Year Built: 1950 954 Cooks Point Road, Cambridge • Madison Volunteer Fire Company – Year Built: 1954 1154 Taylors Island Road, Madison • Taylors Island Volunteer Fire Company – Year Built: 1960 (Partial Flat Roof) 510 Taylors Island Road, Taylors Island • Hoopers Island Volunteer Fire Company – Year Built: 1960 2754 Hoopers Island Road, Church Creek • Hurlock Volunteer Fire Company – Year Built: 1945 (Flat Roof) 301 Charles Street, Hurlock • Eldorado-Brookview Volunteer Fire Company – Year Built: 1955 5752 Rhodesdale Eldorado Road, Rhodesdale • Choptank Community Health System – Year Built: 1950 503 Muir Street, Cambridge

Mitigation Project 5	
	Preventative measures should be taken in advance of the snow season and not only before an actual snow event. The pre-season building inspection and vulnerability assessment should be followed by implementation of mitigation measures for structural vulnerabilities identified during the investigation. Steps should be taken during a snow event to reduce the risk of snow-induced structural failure.
Ideas for Integration:	Capital Improvement Plan
Responsible Agency:	Affected Volunteer Fire Departments Department of Emergency Services
Partners:	Department of Public Works
Potential Funding:	FEMA Building Resilient Infrastructure & Communities (BRIC) Hazard Mitigation Grant Program (HMPG)
Cost Estimate:	Dependent upon individual structure and necessary retrofitting.
Benefits (Losses Avoided):	Continued service availability and hazard preparation.
Timeline:	2-5 years
Goals & Objectives:	Goal 2: Build and support municipal capacity and commitment to become continuously less vulnerable to hazards. Objective 2.2: Provide assistance to municipal officials and help municipalities obtain funding for mitigation planning and project activities. Objective 2.3: Prepare technical reports for critical facilities as necessary. Objective 2.4: Promote partnerships among the municipalities and the County to develop a countywide approach to mitigation activities and resilience initiatives. Goal 6: Ensure that public funds are used in the most efficient manner. Objective 6.2: Use public funding to protect public services, and critical and public facilities.

Mitigation Project 6	
Hazard:	Human Impacted Hazards
Location(s):	County, Municipalities
Classification:	Emergency Services
Project Title/Mitigation Action Item:	Hazardous Materials Incident Messaging Action Item #33: Prepare a pre-identified mechanism and message for disseminating information quickly to the public when a hazardous materials incident occurs. Information on the incident and recommended protective actions for the public should be included in the message.
Background/Issue:	Hazardous materials can be found in every community. Hazardous materials are shipped every day via land, air, and sea pathways. The bulk of hazardous materials pass through Dorchester County by truck, particularly on U.S. Route 50, which crosses the northern part of the County from west to east. Other highways that are used to transport hazardous materials include: MD State Routes 14, 16, and 331. If released, hazardous materials may cause harm to people, the environment, critical infrastructure, and property. Their potential for harm exists regardless of whether hazardous materials are released by accident, malicious act, fire, or weather-related event. Having a plan in place and pre-identified mechanisms to disseminate information to the public keeps people safe and reduces the burden on the response effort. When a hazardous materials incident occurs, information pertaining to the incident and recommended protective actions by the public must be disseminated quickly. The initial intent is to inform the individuals at risk and share the recommended protective actions they should take. This information should be verified and coordinated with the appropriate responding organizations. When crafting any communication strategies meant for a public audience, it is important to create messages that are detailed, yet understandable. When developing the emergency communication strategy, it is important to incorporate both alert and warning. An alert is meant to grab people's attention and make them aware that an emergency is occurring, and that important information will soon follow. The warning message that follows instructs, clearly and succinctly, what actions residents should take. Standard guidelines should be developed for each outlet utilized for communication (e.g., print media, radio, social media, etc.). The following actions should be considered: • Craft messages to convey how important it may be to evacuate. • Create a "Communication Tree" designed for businesses and residents. • Ensure that all public communications, outreach efforts, signage, etc. is multi-language and/or provides means to translate. • Promote the Citizen Alert System (Everbridge) via social media.
Ideas for Integration:	Citizen Alert System
Responsible Agency:	Department of Emergency Services
Partners:	Local Emergency Planning Committee (LEPC) Department of Public Works – Roads Public Information Office Maryland State Highway Administration

Mitigation Project 6	
	Maryland State Police Maryland Department of Transportation
Potential Funding:	Maryland's Community Resilience Grant Program
Cost Estimate:	Staff Time
Benefits (Losses Avoided):	Effective messaging will mitigate the possibility of injury or loss of life.
Timeline:	Ongoing
Goals & Objectives:	Goal 2: Build and support municipal capacity and commitment to become continuously less vulnerable to hazards. Objective 2.1: Increase awareness and knowledge of hazard mitigation principles and practice among local and municipal public officials. Provide training to employees and community members. Goal 3: Improve coordination and communication with other relevant organizations. Objective 3.1: Establish and maintain lasting partnerships. Objective 3.2: Streamline policies to eliminate conflicts and duplication of effort. Objective 3.3: Incorporate hazard mitigation into activities of other organizations. Goal 4: Increase public understanding, support, and demand for hazard mitigation. Objective 4.1: Identify hazard specific issues and needs. Goal 6: Ensure that public funds are used in the most efficient manner. Objective 6.5: Encourage property-owner self-protection measures. Goal 11: Eliminate or reduce human, environmental, social, and economic loss from natural and technological hazards. Objective 11.2: Identify vulnerable populations and provide resources to these groups based on their unique needs.

Mitigation Project 7	
Hazard:	Climate Change
Location(s):	County
Classification:	Prevention
Project Title/Mitigation Action Item:	Floodplain Ordinance Modifications Action Item #46: Consider the geographic extent of regulated floodplain in relation to increasing storm events and sea level rise. This may include a flood protection level established for the 0.2 percent annual chance floodplain prompting a change to the County's floodplain ordinance.
Background/Issue:	According to the 2018 Sea-level Rise Projections for Maryland, 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, with about a one-in-twenty chance it could exceed 2.0 feet and about a one-in one-hundred chance it could exceed 2.3 feet. Expected impacts of potential sea level rise include inundation of wetlands and lowlands, accelerated coastal erosion, exacerbated coastal flooding, threatened coastal structures, elevated water tables, and increased salinity of rivers, bays, and aquifers. Potential sea level rise can greatly increase the severity of flood events. In low-lying coastal areas, a one-foot rise in sea level translates into a one-foot rise in flood level; intensifying the impact of coastal flood waters and storm surge. Due to its long-term and on-going effect, potential sea level rise will require long range hazard mitigation planning. Potential sea level rise could eventually have implications on future land use planning and may need to be considered for future policy development and comprehensive planning. According to the Dorchester County's Floodplain Management Ordinance Bill No. 2015-1, the Flood Protection Elevation is the base flood elevation plus two feet of freeboard. Freeboard is a factor of safety that compensates for uncertainty in factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, obstructed bridge openings, debris and ice jams, climate change, and the hydrologic effect of urbanization in a watershed. The base flood is the flood having a one percent chance of being equaled or exceed in any given year; the base flood also is referred to as the one percent annual chance (one-hundred-year) flood. The base flood elevation is the water surface elevation of the base flood in relation to the datum specified on the community's Flood Insurance Rate Map. Recurring flooding events provide evidence that areas adjacent to the one percent annual chance floodplain experience flooding and therefore extends risk to people and structures beyond the one percent annual chance floodplain. However, the minimum floodplain management standards do not extend to these locations. The County should consider expanding the flood protection level from the 1 percent annual chance flood area to the 0.2 percent annual chance flood area.
Ideas for Integration:	
Responsible Agency:	Department of Planning & Zoning Town/City Planning
Partners:	Maryland Department of Environment FEMA
Potential Funding:	N/A

Mitigation Project 7	
Cost Estimate:	Staff Time
Benefits (Losses Avoided):	Reduce the risk to people. Provides building standards designed to reduce flood loss for new and existing development.
Timeline:	1-2 years
Goals & Objectives:	Goal 5: Protect existing and future properties (residential, commercial, public, and critical facilities). Objective 5.2: Enact and enforce regulatory measures to ensure that new development will not increase hazard threats from coastal/riverine flooding, storm surge, sea level rise or the threat of wildfire at the urban/forest interface. Objective 5.7: Fund updated flood models with climate change impacts included.

Project 8	
Hazard:	Climate Change
Location(s):	County, Municipalities
Classification:	Public Education and Awareness
Project Title/Mitigation Action Item	Environmental Justice Action Item #51: Focus on minority populations that may be disproportionately impacted by effects of climate change whether it be lower-income neighborhoods where energy upgrades may be less attainable or those seasonal migrant workers who are more susceptible to severe occupational risk hazards in the northern end of the county (i.e., seasonal agricultural workers) during a heatwave.
Background/Issue:	The ability to reach every person in a community is one of the major goals for emergency preparedness and response. To do this, a community must know what subgroups make up its population, where the people in these groups live and work, and how they best receive information. According to EPA's Climate Change and Social Vulnerability in the United States: A Focus on Six Impact Sectors, the most severe harms from climate change fall disproportionately upon underserved communities who are least able to prepare for, and recover from, heat waves, poor air quality, flooding, and other impacts. The analysis indicates that racial and ethnic minority communities are particularly vulnerable to the greatest impacts of climate change. Social vulnerability in relation to the identified hazards are included in each hazard plan chapter. Using this information, prioritize the lower-income neighborhoods and determine appropriate strategies for energy upgrades. In addition, distribute outreach materials through various media outlets detailing how to prepare for a disaster event; how to evacuate if necessary; and provide shelter locations. Outreach materials should also provide assistance in contacting emergency personnel if transportation is needed. In addition, people with existing medical conditions are at increased risk for illness and death from climate change-related impacts on health, including changing exposures to extreme heat, extreme weather events, and poor air quality. Existing medical conditions can make individuals more sensitive to these exposures, increasing the potential for health impacts and worsening symptoms. According to the *Assessing Health Vulnerability to Climate Change: A Guide for Health Departments, t*he Climate and Health Program at the Centers for Disease Control and Prevention (CDC) has developed the Building Resilience Against Climate Effects (BRACE) framework to help health departments prepare for and respond to climate change. The BRACE framework is a five-step process that helps health departments to understand how climate has and will affect human health, and enables health departments to employ a systematic, evidence-based process to customize their response to local circumstances. The first step of the BRACE framework focuses on anticipating climate impacts and assessing associated health vulnerabilities. This guide could be used to identify communities and places vulnerable to climate changes and assist the health department assess and prevent associated adverse health impacts.
Ideas for Integration:	Expanding environmental justice initiatives in Dorchester County beyond energy through the adoption of the CDC BRACE Framework.
Responsible Agency:	Dorchester County Health Department Maryland Department Health

Project 8	
Partners:	EPA – Office of Environmental Justice Department of Emergency Services Department of Social Services Migrate Assistance Groups Retailers DNR & MDE – Expanded Energy (State) – Choptank/Delmarva (DPL) Dorchester County Parks & Recreation (promoting green spaces, splash zones in lower SES neighborhoods) Dorchester County Public Schools (adding youth-centered climate change/environmental hazard curriculums) Eastern Shore Climate Adaption Partnership Minority Community Groups such as faith-based organizations and Hispanic/African American neighborhood community leaders
Potential Funding:	The Environmental Justice Small Grants Program The Environmental Justice Collaborative Problem-Solving (CPS) Cooperative Agreement Program
Cost Estimate:	Dependent upon energy upgrades needed. Public Outreach – Staff Time
Benefits (Losses Avoided):	Ensures every worker has the right to a healthy and safe working environment. Prioritizes those facing the greatest disadvantage when distributing environmental costs and benefits.
Timeline:	1-2 years
Goals & Objectives:	Goal 4: Increase public understanding, support, and demand for hazard mitigation. Objective 4.1: Identify hazard specific issues and needs. Objective 4.2: Heighten public awareness of natural hazards. Objective 4.3: Publicize and encourage the adoption of appropriate hazard mitigation actions. Goal 11: Eliminate or reduce human, environmental, social, and economic loss from natural and technological hazards. Objective 11.2: Identify vulnerable populations and provide resources to these groups based on their unique needs.

Chapter 16 Plan Maintenance & Implementation

Plan Adoption

The Disaster Mitigation Act of 2000 requires that local Hazard Mitigation Plans and any updates be formally adopted by the County Council following review by the Maryland Department of Emergency Management (MDEM) and Federal Emergency Management Agency (FEMA). The Plan and any updates will be subject to a public hearing prior to adoption by the Council.

Plan Update & Continued Public Involvement

The Disaster Mitigation Act of 2000 requires local Hazard Mitigation Plans to be monitored, evaluated, and updated during a five-year cycle. The County's Core Planning Team (CPT), which was instrumental in developing the All-Hazard Mitigation Plan, will continue to meet annually during the five-year cycle to monitor and evaluate mitigation projects and to keep the plan current. Annual status reports will be submitted to the County Council, MDEM, and FEMA to update each group on the progress of various mitigation activities. Copies of these reports will be made available to the general public via the County's website.

The annual status report will detail mitigation activities undertaken over the course of the year and will highlight completed activities. The report will also address the following points:

- Evaluate the goals and objectives to ensure they address current and expected conditions.
- Determine if the nature or magnitude of risk has changed.
- Evaluate whether current resources are adequate for implementing the plan.
- Document any technical, legal or coordination issues.
- Document agency and partner participation along with public involvement.

Copies of the annual status report will be made available to CPT members, LEPC members, local governments, participating agencies and partners, and citizens.

The All-Hazard Mitigation Plan is to be updated and readopted at the end of each five-year cycle. In the event of a significant disaster or any substantial changes in land use or regulations that impact mitigation efforts, more frequent updates may be necessary.

The CPT and Department of Emergency Services will be responsible for overseeing the update to the All-Hazard Mitigation Plan. The process used to update the plan would follow the procedure used to prepare the original plan. This would include participation by the CPT and would also include municipal and citizen involvement. Public comments will be reviewed and discussed by CPT and Department of Emergency Services. These comments will be recorded and where applicable incorporated into the Plan. Public meetings will be advertised in the local newspaper and on the County website. The Plan will be available for public review through the County's website. Copies of the Plan may also be obtained directly through the Dorchester County Department of Emergency Services office.

Implementation

The Disaster Mitigation Act of 2000 also requires that the County implement the Plan through existing programs. This can be accomplished through inclusion of mitigation measures in the Comprehensive Plan, the Land Use and Building Codes, the Floodplain Ordinance and through Federal grant programs, which are identified in the previous section. As these documents are updated, reference to the mitigation measures included in the All-Hazard Mitigation Plan can be amended into various plans and regulations.

APPENDIX A
HAZARD IDENTIFICATION & RISK ASSESSMENT

As part of the plan update process for Dorchester County, a Hazard Identification Risk Assessment (HIRA) has been completed for Dorchester County, Maryland. Results from the Hazard Risk Survey completed by Stakeholders have been integrated into the updated HIRA.

A **risk** is the chance, high or low, that any hazard will occur and the severity or impact from that hazard.

Ten (10) natural hazards have been identified and a hazard risk has been assigned to each. Only natural hazards are included in this assessment as they lend themselves better to data collection related to geographic extent than technological and man-made hazards. A separate risk assessment will be conducted for the technological and man-made hazards (i.e., transportation accident, hazardous material incident, dam failure, fire and explosion, mass power outage) identified in the previous plan version.

Natural Hazard Identification and Risk Assessment Ranking Results		
Hazards	2017 Hazard Ranking	2021 Hazard Ranking
Coastal Hazards	High	High
Thunderstorm	Medium-High	High
Riverine Flood	High	Medium-High
High Wind	Medium-High	Medium-High
Tornado	Medium	Medium-High
Extreme Heat	Medium-High	Medium-High
Drought	Medium	Medium
Winter Weather	Medium-High	Medium
Wildfire	Medium	Medium
Earthquake	Low	Low

The methodology and data used to complete this HIRA has been included on the following pages, which will comprise Appendix A of the Plan Update.

HAZARD IDENTIFICATION & ASSESSMENT (HIRA) METHODOLOGY

To assess the hazard risk for the ten (10) natural hazards identified in this Plan Update a composite score method was undertaken. The composite score method was based on a blend of quantitative and qualitative factors extracted from the National Centers for Environmental Information (NCEI), stakeholder survey, and other available data sources. These included:

- Historical impacts, in terms of human lives and property;
- Geographic extent;
- Historical occurrence;
- Future probability, and;
- Community perspective.

The following eight (8) ranking parameters were used to develop the composite risk score, which provide the hazard ranking results for the ten (10) identified natural hazards. Each parameter was rated on a scale of one (1) to four (4).

Injuries and Death Ranking	
Death	4
N/A	3
Injury	2
None	1
Source: National Centers for Environmental Information	

Property and Crop Damage Ranking	
> 2M	4
501K	3
50k	2
0	1
Source: National Centers for Environmental Information	

Annualized Events Ranking	
2.51	4
1.01	3
0.11	2
0	1
Source: National Centers for Environmental Information	

Probability and Future Ranking	
Highly Likely	4
Likely	3
Occasional	2
Unlikely	1
Source: National Centers for Environmental Information, based upon annualized events	

Community Perspective Ranking	
Very Concerned	4
Concerned	3
Somewhat Concerned	2
Not Concerned	1
Source: Dorchester County Hazard Mitigation Plan Update: Public Survey	

Max Geographical Extent (Hazard Dependent) Ranking								
Ranking	Coastal & Climate Change	Drought	Flood	Thunderstorm	Tornado & Earthquake	Wildfire	Wind	Winter Storm
1	0.00	0	0.00	0-2 events	0-10 events	0	0.00	10”-19”
2	25.00	0.18	10.00	3-5 events	11-17 events	0.4674	60.00	20”-29”
3	50.00	0.3421	20.00	6-8 events	18-22 events	2.1545	74.00	30”-39”
4	75.00	0.49	30.00	>9 events	>23 event	3.9041	95.00	>40”
Source:	*COASTAL: Risk Area*	*DROUGHT: CDL MD*	*FLOOD: DFIRMS*	*THUNDERSTORM: NCDC*	*TORNADO: NCDC EARTHQUAKE: Maryland Geological Survey*	*WILDFIRE: MD DNR Forest Service*	*WIND: ASCE*	*WINTER STORM: National Weather Service*
Calculated Using:	% of Coastal Land Area	% Crop Area	% Area in 100-yr Floodplain	Average number based on: Number of events, 2"> hail and lightning events with Injuries/Deaths	Sum of all tornados weighted by F-scale (F1*1.5, F2*2, F3*3, F4*4); Number of Earthquake Events	Average annual acres burned (%)	ASCE Design Wind Speeds	Average Snowfall
Source: 2016 State of Maryland Hazard Mitigation Plan								

The following weighted risk factors were used in the equation below to determine the composite risk score for each identified hazard.

Weighted Risk Factors		
Injuries	IN	1
Deaths	DT	1
Property Damage	PD	1
Crop Damage	CD	1
Geographic Extent (Hazard Dependent)	GE	1.5
Events (Annualized)	EV	1
Future Probability	FP	1
Community Perspective	CP	1.5

Equation: Composite Score = IN + DT + PD + CD + (GE*1.5) + EV + FP + (CP*1.5)

Hazard Ranking Results: Using the data tables above to populate the parameters, the composite score was determined for each identified hazard. Hazard Rankings were assigned accordingly using the adjacent Composite Score chart.

Composite Score	
Score (>=)	Hazard Ranking
0	Low
15	Medium
20	Medium-High
25	High

The following table provides the hazard risk ranking update results. Thunderstorm and Coastal Storm and Flooding categories were ranked as “High” risk hazards. Flood, Tornado, High Wind, and Extreme Heat were ranked as “Medium-High” risk hazards. Drought, Wildfire, and Winter Weather were ranked as “Medium” risk hazards. Finally, Earthquake was ranked as a “Medium-Low” risk hazard.

Composite Scores										
Hazard	Injuries & Deaths		Property & Crop Damage		Geographic Extent	Total Events Annualized	Future Probability	Community Perspective	Composite Score	HAZARD RANKING
	IN	DT	PD	CD	GE	EV	FP	CP	CS	
Riverine Flood (Flash Flood, Heavy Rain)	0 = 1	0 = 1	0 = 1	0 = 1	57.5% = 3	1.65 = 3	Likely = 3	Very Concerned = 4	21	Medium-High
Drought	0 = 1	0 = 1	0 = 1	$2M = 4	32% = 2	1.3 = 2	Occasional = 2	Somewhat Concerned = 2	17	Medium
Tornado	16 = 2	1 = 4	$5.74M = 4	0 = 1	13 = 2	0.35 = 2	Occasional = 2	Somewhat Concerned = 2	21	Medium-High
Thunderstorm (Thunderstorm Wind, Lightning, Hail)	0 = 1	0 = 1	$1.882 M = 3	0 = 1	109 = 4	2.02 = 3	Highly Likely = 4	Very Concerned = 4	25	High
High Winds	0 = 1	0 = 1	$1.073 M = 3	0 = 1	115 = 4	0.63 = 2	Likely = 3	Very Concerned = 4	23	Medium-High
Wildfire	3 = 2	0 = 1	0 = 1	0 = 1	0.59% = 3	33.6 = 4	Likely = 3	Somewhat Concerned = 2	19.5	Medium
Earthquake	0 = 1	0 = 1	0 = 1	0 = 1	1 = 1	0.01 = 1	Unlikely = 1	Not Concerned = 1	9	Low
Extreme Heat	0 = 1	1 = 4	0 = 1	0 = 1	4	0.16 = 2	Occasional = 2	Somewhat Concerned = 2	20	Medium-High

Hazard	Injuries & Deaths		Property & Crop Damage		Geographic Extent	Total Events Annualized	Future Probability	Community Perspective	Composite Score	HAZARD RANKING
	IN	DT	PD	CD	GE	EV	FP	CP	CS	
Winter Weather (Winter Storm, Blizzard, Ice Storm)	0 = 1	0 = 1	0 = 1	0 = 1	9.5" = 1	1.54 = 3	Likely = 3	Concerned = 3	16	Medium
Coastal Hazards (Tropical Storm, Hurricane, Coastal Flooding)	0 = 1	0 = 1	$2.815 M = 4	$510k = 3	98% = 4	0.87 = 2	Highly Likely = 4	Very Concerned = 4	27	High

DATA TABLES

The following data tables were developed and used to populate five (5) of the eight (8) parameters: Injuries, Death, Property Damage, Crop Damage, and Annualized Events.

FLOOD

Total Flood Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Flood, Flash Flood, and Heavy Rain*					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)
0	0	$0	$0	% in 100-yr Flood Zone (A, AE, AO &VE) = 57.5%	Total = 43 Annual Avg = 1.65
Source: National Centers for Environmental Information, as of February 2021 & 2016 State of Maryland Hazard Mitigation Plan **Note: Data collected for 1950-present, no data available for this event type prior to 1996*					

Flood Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)
0	0	$0	$0	% in 100-yr Flood Zone (A, AE, AO &VE) = 57.5%	Total = 8 Annual Avg = 0.32
Note: Data collected for 1950-present, no data available for this event type prior to 1996 *Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.* *Based on NCEI definitions/criteria: Flood (C). Any high flow, overflow, or inundation by water which causes damage. In general, this would mean the inundation of a normally dry area caused by an increased water level in an established watercourse, or ponding of water, that poses a threat to life or property. If the event is considered significant, it should be entered into Storm Data, even if it only affected a small area. Refer to the Flash Flood event (Section 14) for guidelines for differentiating between Flood and Flash Flood events.*					

Flash Flood Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (2000-2021)
0	0	$0	$0	% in 100-yr Flood Zone (A, AE, AO &VE) = 57.5%	Total = 9 Annual Avg = 0.43
Note: Data collected for 1950-present, no data available for this event type prior to 2000 *Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.* *Based on NCEI definitions/criteria: Flash Flood (C). A life-threatening, rapid rise of water into a normally dry area beginning within minutes to multiple hours of the causative event (e.g., intense rainfall, dam failure, ice jam). Ongoing flooding can intensify to the shorter-term flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters. Flash flooding, such as dangerous small stream or urban flooding and dam or levee failures, requires immediate action to protect life and property. Conversely, flash flooding can transition into flooding as rapidly rising waters abate. The Storm Data preparer uses professional judgment in determining when the event is no longer characteristic of a Flash Flood and becomes a Flood.*					

Heavy Rain Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1998-2021)
0	0	$0	$0	% in 100-yr Flood Zone (A, AE, AO &VE) = 57.5%	Total = 26 Annual Avg = 1.13
Note: Data collected for 1950-present, no data available for this event type prior to 1998 *Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.* *Based on NCEI definitions/criteria: Heavy Rain (C). Unusually large amount of rain which does not cause a Flash Flood or Flood event, but causes damage, e.g., roof collapse or other human/economic impact. Heavy Rain will no longer be acceptable as a means to record low-impact or isolated flood events.*					

DROUGHT

Total Drought Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Drought*					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1998-2021)
0	0	$0	$2.0M	% Crop land cover from 2019 USDA Cropland Data = 32%	Total = 30* Annual Avg = 1.30

Source: National Centers for Environmental Information, as of February 2021, 2016 State of Maryland Hazard Mitigation Plan & USDA Cropland Data-2019
**Note: One event recorded in 1998 that spanned 30 days. A very dry period from July through November resulted in drought-like conditions across much of the Lower Maryland Eastern Shore. This caused significant crop damage and other drought-related problems throughout much of the area.*
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Drought (Z). Drought is a deficiency of moisture that results in adverse impacts on people, animals, or vegetation over a sizeable area. Conceptually, drought is a protracted period of deficient precipitation resulting in extensive damage to crops, resulting in loss of yield. There are different kinds of drought: meteorological, agricultural, hydrological, and social-economic. Each kind of drought starts and ends at different times.

WILDFIRE

Wildfire Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Events (2000-2020)
3	0	$0	$0	Avg Annual Acres Burned = 0.59%	Total = 706 Annual Avg = 33.6/yr.

Source: Data obtained from MD-DNR Forest Service for 2000-2020.

TORNADO

Total Tornado Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Tornado, Funnel Cloud, and Waterspout*					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1984-2021)
16	1	$5.742M	$0	SVRGIS (intensity & frequency) = 1	Total = 13 Annual Avg = 0.35

Source: National Centers for Environmental Information, as of February 2021 & 2016 State of Maryland Hazard Mitigation
Note: Data collected for 1950-present, no data available for this event type prior to 1984.

Tornado Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1984-2021)
16	1	$5.737M	$0	SVRGIS (intensity & frequency) = 1	Total = 11 Annual Avg = 0.29

Note: Data collected for 1950-present, no data available for this event type prior to 1984.
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Tornado (C). A violently rotating column of air, extending to or from a cumuliform cloud or underneath a cumuliform cloud, to the ground, and often (but not always) visible as a condensation funnel. For a vortex to be classified as a tornado, it must be in contact with the ground and extend to/from the cloud base, and there should be some semblance of ground-based visual effects such as dust/dirt rotational markings/swirls, or structural or vegetative damage or disturbance.

Funnel Cloud Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (2002-2021)
0	0	$0	$0	SVRGIS (intensity & frequency) = 1	Total = 1 Annual Avg = 0.05
Note: Data collected for 1950-present, no data available for this event type prior to 2002. *Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.* *Based on NCEI definitions/criteria: Funnel Cloud (C). A rotating, visible extension of a cloud pendant from a convective cloud with circulation not reaching the ground. The funnel cloud should be large, noteworthy, or create strong public or media interest to be entered.*					

Waterspout Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1999-2021)
0	0	$5k	$0	SVRGIS (intensity & frequency) = 1	Total = 1 Annual Avg = 0.04
Note: Data collected for 1950-present, no data available for this event type prior to 1999. *Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.* *Based on NCEI definitions/criteria: Waterspout (M). A rotating column of air, pendant from a convective cloud, with its circulation extending from cloud base to the water surface of bays and waters of the Great Lakes, and other lakes with assigned Marine Forecast Zones. A condensation funnel may or may not be visible in the vortex.*					

WIND

High Wind Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: High Wind and Strong Wind*					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (2006-2021)
0	0	$1.073M	$0	ASCE Wind Design Speed = 115	Total = 10 Annual Avg = 0.63
Source: National Centers for Environmental Information, as of February 2021 & 2019 Building Code Administration *Note: Data collected for 1950-present, no data available for this event type prior to 2006*					

High Wind Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (2006-2021)
0	0	$1.061M	$0	ASCE Wind Design Speed = 115	Total = 7 Annual Avg = 0.47
Note: Data collected for 1950-present, no data available for this event type prior to 2006 *Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.* *Based on NCEI definitions/criteria: High Wind (Z). Sustained non-convective winds of 35 knots (40 mph) or greater lasting for 1 hour or longer, or gusts of 50 knots (58 mph) or greater for any duration (or otherwise locally/regionally defined). In some mountainous areas, the above numerical values are 43 knots (50 mph) and 65 knots (75 mph), respectively. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.*					

Strong Wind Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (2008-2021)
0	0	$12k	$0	ASCE Wind Design Speed = 115	Total = 3 Annual Avg = 0.23

Note: Data collected for 1950-present, no data available for this event type prior to 2008
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Strong Wind (Z). 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. Consistent with regional guidelines, mountain states may have higher criteria. A peak wind gust (estimated or measured) or maximum sustained wind will be entered.

EARTHQUAKE

No NCEI data available for this hazard; however, one (1) earthquake with a magnitude of 3.3 was recorded in Ocean City, Maryland on 10/14/1928.

WINTER WEATHER

Winter Weather Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Winter Storm, Winter Weather, Blizzard, Ice Storm, Frost/Freeze, Heavy Snow and Sleet.*					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)
0	0	$35k	$0	Average snowfall total: 9.5” (1996-present NOAA/NWS)	Total = 79 Annual Avg = 1.54

Source: National Centers for Environmental Information, as of February 2021, 2016 State of Maryland Hazard Mitigation Plan, & NOAA/NWS

Winter Storm Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)
0	0	$0	$0	Average snowfall total: 9.5” (1996-present NOAA/NWS)	Total = 39 Annual Avg = 1.56

Note: Data collected for 1950-present, no data available for this event type prior to 1996
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Winter Storm (Z). A winter weather event that has more than one significant hazard (i.e., heavy snow and blowing snow; snow and ice; snow and sleet; sleet and ice; or snow, sleet and ice) and meets or exceeds locally/regionally defined 12 and/or 24-hour warning criteria for at least one of the precipitation elements. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data. Normally, a Winter Storm would pose a threat to life or property.

Winter Weather Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1999-2021)
0	0	$35k	$0	Average snowfall total: 9.5” (1996-present NOAA/NWS)	Total = 37 Annual Avg = 1.61

Note: Data collected for 1950-present, no data available for this event type prior to 1999.
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Winter Weather (Z). A winter precipitation event that causes a death, injury, or a significant impact to commerce or transportation, but does not meet locally/regionally defined warning criteria. A Winter Weather event could result from one or more winter precipitation types (snow, or blowing/drifting snow, or freezing rain/drizzle). The Winter Weather event can also be used to document out-of-season and other unusual or rare occurrences of snow, or blowing/drifting snow, or freezing rain/drizzle. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.

Ice Storm Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1998-2021)
0	0	$0	$0	Average snowfall total: 9.5" (1996-present NOAA/NWS)	Total = 2 Annual Avg = 0.08

Note: Data collected for 1950-present, no data available for this event type prior to 1998.
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Ice Storm (Z). Ice accretion meeting or exceeding locally/regionally defined warning criteria (typical value is 1/4 or 1/2 inch or more). If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data. The Storm Data preparer should include the times that ice accretion began, met criteria, and accretion ended. If the freezing rain was mixed with other precipitation types, then a Winter Storm event should be used.

Blizzard Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (2010-2021)
0	0	$0	$0	Average snowfall total: 9.5" (1996-present NOAA/NWS)	Total = 1 Annual Avg = 0.08

Note: Data collected for 1950-present, no data available for this event type prior to 2010.
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Blizzard (Z). A winter storm which produces the following conditions for 3 consecutive hours or longer: (1) sustained winds or frequent gusts 30 knots (35 mph) or greater, and (2) falling and/or blowing snow reducing visibility frequently to less than 1/4 mile. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.

COASTAL EVENTS

Total Coastal Events Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Tropical Storm, Hurricanes and Coastal Flooding. There are no Tropical Depressions recorded in the NCEI Database for this county.*					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)
0	0	$3.26M	$510K	% of County in Coastal Land Area = 98%	Total = 22 Annual Avg = 0.87

Source: National Centers for Environmental Information, as of February 2021 & 2016 State of Maryland Hazard Mitigation Plan
Note: Data collected for 1950-present, no data available for this event type prior to 2009

Tropical Storm Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)
0	0	$1.755M	$500K	% of County in Coastal Land Area = 98%	Total = 6 Annual Avg = 0.24

Note: Data collected for 1950-present, no data available for this event type prior to 1996
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Tropical Storm (Z). A tropical cyclone in which the 1-minute sustained surface wind ranges from 34 to 63 knots (39 to 73 mph). A Tropical Storm should be included as an entry when these conditions are experienced in the WFO's (Weather Forecast Office) CWA (County Warning Area).

Hurricane Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)
0	0	$10k	$10K	% of County in Coastal Land Area = 98%	Total = 3 Annual Avg = 0.12

Note: Data collected for 1950-present, no data available for this event type prior to 1996
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Hurricane/Typhoon (Z). A tropical cyclone in which the maximum 1-minute sustained surface wind is 64 knots (74 mph) or greater. In the Atlantic Ocean or the North Pacific Ocean east of the International Date Line, this event would be labeled a Hurricane, and in the North Pacific Ocean west of the International Dateline, this event would be classified as a Typhoon.

Coastal Flooding Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (2009-2021)
0	0	$1.05M	$0	% of County in Coastal Land Area = 98%	Total = 13 Annual Avg = 1.08

Note: Data collected for 1950-present, no data available for this event type prior to 2009
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Coastal Flood (Z). Flooding of coastal areas due to the vertical rise above normal water level caused by strong, persistent onshore wind, high astronomical tide, and/or low atmospheric pressure, resulting in damage, erosion, flooding, fatalities, or injuries. Coastal areas are defined as those portions of coastal land zones (coastal county/parish) adjacent to the waters, bays, and estuaries of the oceans. Farther inland, the Storm Data preparer determines the boundary between coastal and inland areas, where flood events will be encoded as Flash Flood or Flood rather than Coastal Flood. Terrain (elevation) features will determine how far inland the coastal flooding extends.

THUNDERSTORM

Thunderstorm Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Thunderstorm Wind, Lightning, and Hail.*					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1968-2021)
0	0	$1.882M	$0	ASCE Wind Design Speed = 115 2"> hail and lightning events with Injuries/Deaths = 1	Total = 109 Annual Avg = 2.02

Source: National Centers for Environmental Information, as of February 2021, & 2019 Building Code Administration & 2016 State of Maryland Hazard Mitigation Plan
Note: Data collected for 1950-present, no data available for this event type prior to 1968

Thunderstorm Wind Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1968-2021)
0	0	$1.657M	$0	ASCE Wind Design Speed = 115	Total = 86 Annual Avg = 1.62

Note: Data collected for 1950-present, no data available for this event type prior to 1968
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Thunderstorm Wind (C). Winds, 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. Maximum sustained winds or wind gusts (measured or estimated) equal to or greater than 50 knots (58 mph) will always be entered. Events with maximum sustained winds or wind gusts less than 50 knots (58 mph) should be entered as a Storm Data event only if the result in fatalities, injuries, or serious property damage. Storm Data software permits only one event name for encoding severe and non-severe thunderstorm winds. The Storm Data software program requires the preparer to indicate whether the sustained wind or wind gust value was measured or estimated.

Lightning Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (2008-2021)
0	0	$225K	$0	Countywide	Total = 3 Annual Avg = 0.23
Note: Data collected for 1950-present, no data available for this event type prior to 2008 *Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.* *Based on NCEI definitions/criteria: Lightning (C). A sudden electrical discharge from a thunderstorm, resulting in a fatality, injury, and/or damage.*					

Hail Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1958-2021)
0	0	$0	$0	2"> hail and lightning events with Injuries/Deaths = 1	Total = 20 Annual Avg = 0.32
Note: Data collected for 1950-present, no data available for this event type prior to 1958 *Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.* *Based on NCEI definitions/criteria: Hail (C). Frozen precipitation in the form of balls or irregular lumps of ice. Hail 3/4 of an inch or larger in diameter will be entered. Hail accumulations of smaller size, which cause property and/or crop damage or casualties, should be entered. Maximum hail size will be encoded for all hail reports entered.*					

EXTREME HEAT

Total Extreme Heat Hazard Risk Assessment Data Table *Hazards included within this table from NCEI Data: Excessive Heat and Heat*					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)
0	1	$0	$0	% Crop from 2017 Agriculture Census = 32%	Total = 4 Annual Avg = 0.15
Source: National Centers for Environmental Information, as of February 2021 & 2016 State of Maryland Hazard Mitigation Plan *Note: One extreme heat event is recorded that spanned 3 days in 2011. An extended period of excessive heat and humidity occurred across most of the Lower Maryland Eastern Shore from July 21st to July 23rd. High temperatures ranged from 96 to 103 degrees during the afternoons, with heat index values ranging from 110 to 119. Overnight lows only fell into the mid 70's to mid-80's.*					

Excessive Heat Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (2011-2021)
0	0	$0	$0	% Crop from 2017 Agriculture Census = 32%	Total = 1 Annual Avg = 0.09
Note: Data collected for 1950-present, no data available for this event type prior to 2011. *Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.* *Based on NCEI definitions/criteria: Excessive Heat (Z). Excessive Heat results from a combination of high temperatures (well above normal) and high humidity. An Excessive Heat event occurs and is reported in Storm Data whenever heat index values meet or exceed locally/regionally established excessive heat warning thresholds. Fatalities (directly related) or major impacts to human health that occur during excessive heat warning conditions are reported using this event category. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.*					

Heat Hazard Data Table					
Injuries	Deaths	Property Damage	Crop Damage	Geographic Extent	Days with Events (1996-2021)
0	1	$0	$0	% Crop from 2017 Agriculture Census = 32%	Total = 3 Annual Avg = 0.12

Note: Data collected for 1950-present, no data available for this event type prior to 1996
Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone.
Based on NCEI definitions/criteria: Heat (Z). A period of heat resulting from the combination of high temperatures (above normal) and relative humidity. A Heat event occurs and is reported in Storm Data whenever heat index values meet or exceed locally/regionally established advisory thresholds. Fatalities or major impacts on human health occurring when ambient weather conditions meet heat advisory criteria are reported using the Heat event. If the ambient weather conditions are below heat advisory criteria, a Heat event entry is permissible only if a directly related fatality occurred due to unseasonably warm weather, and not man-made environments.

APPENDIX B
2017 MITIGATION ACTION ITEM STATUS UPDATE REPORT

2017 MITIGATION ACTION ITEM STATUS UPDATE REPORT

The purpose of hazard mitigation actions/projects is to reduce or eliminate long-term risk to people and property from hazards and their effects. During this plan update process, 2017 hazard-specific action items were reviewed by Core Planning Team members. As a result, this mitigation status report was developed for the 2022 Plan Update. A progress status and additional details have been provided for each of the 2017 action items.

COMPLETION OF MITIGATION ACTIONS

THE PLAN MUST DESCRIBE THE STATUS OF THE MITIGATION ACTIONS IDENTIFIED IN THE PREVIOUS PLAN BY DESCRIBING THOSE THAT HAVE BEEN COMPLETED OR NOT COMPLETED.

FEMA Local Mitigation Planning Handbook, March 2013

The table on pages B-3 to B-8 lists the mitigation action items that were set forth in the 2017 Dorchester County All-Hazard Mitigation Plan. The table provides the actions status (Complete, Incomplete, Partial, Ongoing) as well as the Responsible Organization and background information on each action item. In addition, status update details were provided in the "2021 Status Update" section. The 2017 Committee members rated each action item as medium or high priority. Action items ranked as a "High" priority by the 2017 Hazard Mitigation Planning Committee are denoted in red text.

Status updates were completed by the 2022 Core Planning Team. Results indicated that 50% of the 2017 mitigation actions are either complete or in-process, while the remaining 50% are incomplete, as shown on the graph below.

A total of 14 actions were included in the All-Hazards Mitigation Plan, of which, 8 were rated as a high priority. Only 7 of these items were determined to be incomplete by the Core Planning Team (CPT). These action items have been furthered reviewed by the CPT and included in the All-Hazards Mitigation Plan.

2017 All-Hazard Mitigation Plan: Mitigation Implementation Actions						
Mitigation Action Item #	Project/ Action	Responsible Organizations	Complete	Incomplete (No Work Completed)	Partial (Some Work Completed)	Ongoing
1	Best Practice Success Story – Elevation Project Press Release	• Department of Emergency Services • Dorchester County Planning & Zoning	○	◉	○	○
Background: Property owners who voluntarily participated in elevating their homes located in the county's special flood hazard area may be willing to allow the County to use photos of their elevation project as an example of "Best Practice." Documenting the various steps taken tocomplete an elevation project, including a series of before, during, and after photos will help to encourage other at-risk property owners to apply for mitigation funding.						
2021 Status Update: DES: No elevation projects were completed in the past 5 years. One project was withdrawn due to the homeowner wanting to move the house 3 feet out of the Flood Zone. However, it was determined the house was not structurally sound for relocation.						
2	Plan Integration	• Dorchester County Planning and Zoning • Dorchester County • Municipalities	○	○	◉	○
Background: During the 2016 HMP update, a Safe Growth Audit was conducted. Recommendations of the Safe Growth Audit included: • Review Priority Funding Areas and other areas designated for future growth. Overlay with hazard areas and natural resources. Identify areas within designated growth areas that are not suitable. This is not a parcel level review, but rather an overlay analysis. • Include goals and policies of the 2017 Hazard Mitigation Plan into the County Comprehensive Plan and Municipal Growth Plans. • Identify natural hazard areas on future land use maps. • Identify movement systems that are designed to function under disaster conditions (e.g., evacuation). • Update Sensitive Areas Element of the 1996 Dorchester County Comprehensive Plan. • Encourage environmental policies to provide incentives to development that is located outside of protective ecosystems. • Review all capital projects to determine hazard vulnerability and potential impacts. Discourage and limit projects that will encourage development in areas vulnerable to natural hazards.						
2021 Status Update: P&Z: CRS Rating Audit completed in November 2020 (Score = 6.0)						

Mitigation Action Item #	Project/ Action	Responsible Organizations	Complete	Incomplete (No Work Completed)	Partial (Some Work Completed)	Ongoing
3	Obtain Contracts for On-Call Services & Generators for Emergency Power Backup	• Department of Emergency Services	○	○	◉	○
Background: While many facilities have generators, the possibility of needing additional generators for back-up and/or back-fill still exists.						
2021 Status Update: Emergency Services researched service contracts, however two of the vendors contacted did not provide information. Since then, a generator has been installed at the Airport as well as transfer switches installed at the Economic Development building and the New North Dorchester High School.						
4	Consistent Public Outreach	• Department of Emergency Services	○	○	○	◉
Background: While public outreach activities have been undertaken, a schedule of activities and more frequent outreach efforts may prove beneficial. Specifically, adding new locations/groups to current efforts and adding additional public outreach activities.						
2021 Status Update: Public Outreach is an ongoing action, however, has been placed on hold due to COVID-19. The Dorchester Banner each year (August) does a preparedness section, which DES provides mitigation and preparedness information for inclusion in the paper.						
5	Support Barrier Island Restoration Projects	• Port of Baltimore • Army Corps of Engineers	○	○	◉	○
Background: These projects are focus on restoring/expanding island habitat to provide hundreds of acres of wetland and terrestrial habitat for fish, shellfish, reptiles, amphibians, birds, and mammals through the beneficial use of dredged material. This will provide direct benefits of improved health, richness, and sustainability to aquatic and wildlife species. In addition, it will provide indirect benefits of navigational safety,education, and passive recreation and perhaps, increased tourism. The conceptual plan for the feasibility study proposes 55 percent wetland and 45 percent upland habitats. Habitat may include submerged aquatic habitat, mudflat, low marsh, high marsh, islands, ponds, channels and upland areas. These projects will also decrease localized island erosion as well as decreases Dorchester County shoreline erosion by reducing wave heights.						
2021 Status Update: The Mid-Chesapeake Bay Island Ecosystem Restoration Project (Mid-Bay Project) is located in Dorchester County. The project will use dredged material from the Chesapeake Bay's shipping channels to restore remote island and wetland habitat near Barren and James Islands which will provide improved health and sustainability to aquatic and wildfire species. Additionally, the restoration project will benefit navigational safety and passive recreation, while providing additional shoreline protection. The project is being completed under a federal/state partnership between US Army Corps of Engineers and Maryland Port Administration. (Mid-Bay Island Ecosystem Restoration Project – Project Newsletter, Spring 2021)						

Mitigation Action Item #	Project/ Action	Responsible Organizations	Complete	Incomplete (No Work Completed)	Partial (Some Work Completed)	Ongoing
6	Substantial Damage/Improvement	• Dorchester County Planning & Zoning	○	◉	○	○
Background: Dorchester County adopted a floodplain ordinance that included substantial damage/improvement and the FEMA Substantial Damage Guidebook. However, clarification is sought on how property damage and restoration calculation is documented. At this time, homeowners provide information that oftentimes lacks proper documentation. Develop an independent third-party source for determining "value" of damage/improvement.						
2021 Status Update: Substantial damage process has not been implemented to-date.						
7	Complete Coastal Aquifer Study	• Dorchester County Public Works • Dorchester County Environmental Health	○	◉	○	○
Background: Policies and implementation strategies that the County should pursue according to the ***Dorchester County Water Resource Element***: • *Use the results to guide future decisions regarding groundwater withdrawals.* • *Work with MDE to identify new sources of drinking water, specifically by evaluating the quality and quantity of water in the County's deeper and less frequently used aquifers.* • *Update the County's building and land development codes to require water-conserving fixtures and appliances for all new development and retrofits.*						
8	Permanent Emergency Generator	• Dorchester County Board of Education • Department of Emergency Services	○	○	◉	○
Background: The new North Dorchester High School is equipped with transfer switch, exterior plug, and equipment pad for portable emergency generator. However, a permanent generator will mitigate this issue.						
2021 Status Update: DES: Emergency Services applied through mitigation grants to purchase a generator; however, the application was denied. The generator was not installed when the school was constructed because the overall project was over budget. Dorchester County will apply again for a FEMA grant and detail the reasons why a generator was excluded from the construction budget.						

Mitigation Action Item #	Project/ Action	Responsible Organizations/Agency	Complete	Incomplete (No Work Completed)	Partial (Some Work Completed)	Ongoing
9	Repetitive Flooding Roads Project	• Dorchester County Public Works	○	◉	○	○
Background: Twenty-nine (29) roads were identified as to having experienced repetitive flooding issues by the HMPC. Prioritize theses roads for inclusion in the County's Capital Improvement Plan would increase the opportunity for mitigation.						
10	Drought Mitigation	• Dorchester County Public Works	○	◉	○	○
Background: Ideas: • Study the re-use of wastewater to recharge the County's aquifers and address saltwater intrusion into the County's aquifers. The County plans to study the feasibility of a water reuse system with MDE. As the largest municipal WWTP in the County, Cambridge should participate in this study. In addition, some of Hurlock is used for spray irrigation. The rest is discharged to Wrights Branch: 1.6 Mg/Day. • Work with partners to host educational programs on low-cost methods to reduce and slow stormwater flows (for example: rain barrels, tree planting, and rain gardens). • Work with partners to identify potential ways to reduce water consumption. Development is concentrated in those areas that will have the least impact on the natural environment, thereby protecting those areas that provide filtering of stormwater runoff.						
11	Stormwater Retrofits	• Dorchester County Planning and Zoning • Dorchester County Public Works	○	◉	○	○
Background: According to the Dorchester County Water Resource Element, stormwater retrofits can help to reduce nonpoint source pollution, particularly in more densely developed areas. The County should identify locations where such retrofits could address concentrations of nonpoint source pollution ("hot spots"), or where retrofits can help to protect environmentally sensitive areas. Future retrofit funds and implementation activities should be targeted to these priority areas.						
2021 Status Update: PW: Incomplete. P&Z: Incomplete. A surveyed list of stormwater retrofit locations have not been identified.						

Mitigation Action Item #	Project/ Action	Responsible Organizations/Agency	Complete	Incomplete (No Work Completed)	Partial (Some Work Completed)	Ongoing
12	Fire Department Relocation/Retrofitting Project(s)	• Each Individual Volunteer Fire Department	○	◉	○	○

Background: The following Volunteer Fire Departments (VFD) are located within the flood hazard area:

- Lakes and Straits Fire Company
  2103 Farm Creek Road
  Flood Depth: 2.6 feet
- Hooper's Island Volunteer Fire Company
  2756 Hooper's Island Road
  Flood Depth: 3.0 feet
- Taylors Island Volunteer Fire Company
  510 Taylors Island Road
  Flood Depth: 1.2 feet
- ~~Lloyds Volunteer Fire Department~~
  ~~1616 Hudson Road~~
  ~~Flood Depth: 1.2 feet~~
- Madison Volunteer Fire Company
  1154 Taylors Island Road
  Flood Depth: 0.8 feet

2021 Status Update:
DES: Note: Lloyds Volunteer Fire Department no longer exists. The fire department closed two years ago. In regard to other fire departments listed, relocating the departments, some cases, would move them out of their response area. Therefore, other mitigation strategies to accommodate their concerns would be necessary.

Mitigation Action Item #	Project/ Action	Responsible Organizations/Agency	Complete	Incomplete (No Work Completed)	Partial (Some Work Completed)	Ongoing
13	Dorchester County Comprehensive Plan Update	• Dorchester County Planning & Zoning • Department of Emergency Services	◉	○	○	○

Background: Update the *1996 Dorchester County Comprehensive Plan* in order to properly monitor development patterns within Dorchester County and its nine municipalities to ensure future development is not susceptible to the identified hazards. On 6 October 2009, the *Dorchester County Water Resources Element* was adopted. This element is an amendment to the 1996 Comprehensive Plan. The plan discusses water recharge in regard to the aquifers being utilized. New development is placing a strain on available water. Therefore, during a drought event, available water is further limited. Furthermore, a comprehensive rezoning update would need to occur concurrently with the update of the comprehensive plan. Additionally, partner with the Planning and Zoning Department for the update of the Comprehensive Plan in order to cross reference of goals, objectives and actions, which will ensure hazard mitigation will be addressed.

2021 Status Update:
P&Z: Anticipated completion date: September 2021.

Mitigation Action Item #	Project/ Action	Responsible Organizations/Agency	Complete	Incomplete (No Work Completed)	Partial (Some Work Completed)	Ongoing
14	Mitigate Repetitive Loss Properties	• Dorchester County Planning & Zoning • Dorchester County Public Works • Department of Emergency Services • Maryland Department of Environment • Federal Emergency Management Agency (FEMA)	○	○	◉	○
Background: There are 46 insured repetitive loss properties located within Dorchester County; 44 residential and 2 commercial structures. These properties not only cost the County or Towns money but also the resident(s) who resided within that structure. The strategy is to eliminate or reduce the damage to property and the disruption of life caused by repeated flooding of the same properties. Depending on the severity of flooding at this location, another possibility is to mitigate the structure, so it is well above the base flood elevation. Therefore, by acquiring buildings and removing them from the floodplain is not only the most effective flood protection measure available, it is also a way to convert a problem area into a community asset and obtain environmental benefits.						
2021 Status Update: PW: Incomplete. DES: Incomplete. Emergency Management receives calls concerning potential elevation projects at least weekly and the EM Planner has worked with the property owners in submitting an NOI to MEMA for grants. One issue encountered by property owners is the inability to pay the 25% match and therefore reconsider the project. Dorchester County has also considered acquisitions; however, the appraisals are lower than what the property owner feels the property is worth and withdraws their request. P&Z: Partial/Incomplete. In December 2020, the Assistant Finance Director was in the process of developing a deed restriction for properties sold in foreclosure, as to not being possible to redevelop.						

APPENDIX C
CRITICAL & PUBLIC FACILITIES

2022 Critical & Public Facilities

During the 2022 Plan Update process, the 2017 Critical and Public Facility database was reviewed and updated. Updated GIS data was obtained from Brandon Vermillion - GIS Specialist, Dorchester County Planning and Zoning. Changes since the previous plan were incorporated into the updated listing. This database was used throughout the hazard vulnerability analysis and loss estimation sections within the Plan.

The inventory of critical and public facilities for the 2022 Dorchester County Hazard Mitigation Plan includes:

Critical & Public Facilities		
Facility Category	Facility Types	Number of Facility
County	Airport	4
	County Government	23
	Library	2
Education	Public & Private Schools	16
	College	2
Emergency	Fire Department	14
	EOC	1
	Police Station	3
	EMS Station	4
Medical	Nursing Home	8
	Hospital	2
	Medical	10
Miscellaneous	Marina/Dock	18
	Boat Ramp	18
	Museum	4
	Community Center	3
	Park	4
	Transportation	1
	Bridge	44
Municipal	Municipal Government	61
	Library	1
Utility	Utility	23
	Communication	6

Source: 2022 Hazard Mitigation GIS Database

Critical & Public Facilities							
Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value
1014007725	County	Airport	Cambridge-Dorchester Airport	5303 Bucktown Road	Cambridge		1500
1014009442	County	Airport	Cambridge-Dorchester Airport	5201 Bucktown Road	Cambridge	1998	69300
1014009442	County	Airport	Cambridge-Dorchester Airport	5201 Bucktown Road	Cambridge	1998	69300
1014009051	County	Airport	Cambridge-Dorchester Airport	Airport Road	Cambridge	1982	1159300
1015011831	County	County Government	Beulah Landfill	New Market Elwood Road	Hurlock		2000
1015011831	County	County Government	Beulah Landfill	Galligher Farm Road	Hurlock		2000
1007173830	County	County Government	Board of Education	1405 Glasgow Street	Cambridge	1975	707700
1007173792	County	County Government	Board of Education	610 Glasgow Street	Cambridge	1940	1734200
1005076056	County	County Government	Board of Education	Blackwater Road	Church Creek	1920	18900
1005076072	County	County Government	County Facility	Lakesville Crapo Road	Crapo	1957	207000
1007172427	County	County Government	Department of Tourism	2 Rose Hill Drive	Cambridge	1999	1358200
1007174489	County	County Government	Dorchester County Circuit Court House	206 High Street	Cambridge	1864	4142100
1007174551	County	County Government	Dorchester County Office Building	501 Court Lane	Cambridge	1968	2581800
1007191715	County	County Government	Dorchester County Office on Aging	2470 Cambridge Beltway	Cambridge	1996	132560
1007154461	County	County Government	Dorchester Health Department	316 Cedar Street	Cambridge	1980	1024000
1007150776	County	County Government	Museum Parking	605 Locust Street	Cambridge		12300
1007174543	County	County Government	Parks & Recreation	Park Lane	Cambridge		68200
1003046222	County	County Government	Parks & Recreation	Middle Street	Vienna		34500
1007158513	County	County Government	Parks & Recreation	Dailsville Road	Cambridge	1975	144100
1015000244	County	County Government	Parks & Recreation	200 Gay Street	Hurlock		55100
1007174497	County	County Government	Parks & Recreation	Lecompte Street	Cambridge		30500
1002029383	County	County Government	Public Works	3960 Linkwood Red Hill Road	East New Market		6000
1014008691	County	County Government	Public Works	Handley Road	Cambridge	1962	373100
1014008772	County	County Government	Public Works - Sanitary District	5501 Mallard Lane	Cambridge		28500
1007192169	County	County Government	Public Works - Sanitary District	Old Route 50	Cambridge		6500
1007173857	County	County Government	St. Clair Head Start/Day Care Center	824 Fairmount Avenue	Cambridge	1953	1833800
1015024429	County	County Government	Warehouse	6898 Gravel Branch Road	Hurlock	2002	143600
1007174470	County	Library	Dorchester Central Library	303 Gay Street	Cambridge	1973	1580100
1007174489	County	Library	Dorchester County Public Law Library	206 High Street	Cambridge		0

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value
1007164548	Education	College	Chesapeake College-Cambridge Center	0 High Street	Cambridge	1950	245600
1007174969	Education	College - State Facility	UMD CES Horn Point Laboratory	2020 Horns Point Road	Cambridge	1950	10556500
1007175337	Education	Private School	Cambridge Christian Academy	612 Locust Street	Cambridge	1881	2152900
1007197861	Education	Private School	Cambridge Montessori School	Cambridge Beltway	Cambridge	1997	347000
1016004464	Education	Private School	Morning Star Youth Academy	1441 Taylors Island Road	Madison	1973	892100
1007177275	Education	Public School	Cambridge-South Dorchester High - Shelter	2475 Cambridge Beltway	Cambridge	1976	16809500
1007173725	Education	Public School	Choptank Elementary School/Maces Lane Middle	1101 Maces Lane	Cambridge	1997	7757300
1007177275	Education	Public School	Dorchester Career and Technology Center	2465 Cambridge Beltway	Cambridge		0
1015011742	Education	Public School	Hurlock Elementary	301 Charles Street	Hurlock	1986	5370700
1007173725	Education	Public School	Mace's Lane Middle	1101 Maces Lane	Cambridge	1997	6929700
1007177275	Education	Public School	Maple Elementary School	5225 Egypt Road	Cambridge		64300
1002029405	Education	Public School	North Dorchester High School	5875 Cloverdale Road	Hurlock	1974	8606300
1002029405	Education	Public School	North Dorchester Middle - Shelter	5745 Cloverdale Road	Hurlock		0
1007173660	Education	Public School	Sandy Hill Elementary	1503 Glasgow Street	Cambridge	1974	4245500
1005076366	Education	Public School	South Dorchester School K-8	3485 Golden Hill Road	Church Creek	1953	2466200
1007173830	Education	Public School	The Judy Center	1405 Glasgow Street	Cambridge	1975	558700
1003046168	Education	Public School	Vienna Elementary	4905 Ocean Gateway	Vienna	1964	1576700
1002031590	Education	Public School	Warwick Elementary	155 Main Street	Secretary	1976	2907600
1007194676	Emergency	EOC	DORC MSP/Sheriff/Detention Center/Sheriff's Office	829 Fieldcrest Road	Cambridge	1991	12573300
1007202725	Emergency	Fire Department/EMS	Cambridge Company 1/EMS Station 100	8 Washington Street	Cambridge	1926	499100
1009199993	Emergency	Fire Department	Church Creek Volunteer Fire Company	1902 Church Creek Road	Church Creek	1970	185800
1002021420	Emergency	Fire Department	East New Market VFD	4020 E New Market Hurlock Road	East New Market	2010	901700
1001001264	Emergency	Fire Department/EMS	Eldorado-Brookview Volunteer Fire Company/EMS Station 200	5752 Rhodesdale Eldorado Road	Rhodesdale	1985	196600
1018000075	Emergency	Fire Department	Elliotts Volunteer Fire Company	2317 Elliott Island Road	Vienna	1970	202100
1006095747	Emergency	Fire Department	Hoopers Island Volunteer Fire Company	2756 Hoopers Island Road	Church Creek	1960	263700

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value
1015011920	Emergency	Fire Department/EMS	Hurlock Volunteer Fire Company/EMS Station 600	300 Charles Street	Hurlock		15600
1010006414	Emergency	Fire Department	Lakes and Straits Fire Company	2103 Farm Creek Road	Wingate	1993	295900
1014008861	Emergency	Fire Department	Linkwood Salem Volunteer Fire Department	3905 Ocean Gateway	Linkwood	1962	345500
1016004499	Emergency	Fire Department/EMS	Madison Volunteer Fire Company/EMS Station 500	1154 Taylors Island Road	Madison	1954	274500
1008184216	Emergency	Fire Department	Neck District Volunteer Fire Company	954 Cooks Point Road	Cambridge	1950	272200
1002029820	Emergency	Fire Department	Secretary Volunteer Fire Company	115 Myrtle Street	Secretary	1985	161500
1004059646	Emergency	Fire Department	Taylors Island Volunteer Fire Company	510 Taylors Island Road	Taylors Isla	1960	231200
1003047946	Emergency	Fire Department	Vienna Volunteer Fire Department	301 Ocean Gateway	Vienna	1992	202000
1007202725	Emergency	Police Station	Cambridge Police Department	8 Washington Street	Cambridge	2007	5398500
1015001984	Emergency	Police Station	Hurlock Police Department	200 Nealson Street	Hurlock	1904	167700
1007173598	Emergency	Police Station	Cambridge Police Department - Substation	615 Pine Street	Cambridge	2001	507600
1007169795	Medical	Hospital	Choptank Community Health System	503 Muir Street	Cambridge	1950	780300
1007199325	Medical	Hospital	Eastern Shore Hospital Center	5262 Woods Road	Cambridge		0
1007286538	Medical	Medical	Aurora Professional Building	8 Aurora Street	Cambridge	1966	110200
1007195834	Medical	Medical	Chesapeake Bay Orthopedics PC	828 Airpax Drive	Cambridge	1993	2005900
1015016302	Medical	Medical	Delmarva Community Services	6210 Shiloh Church Hurlock Road	Hurlock	1957	1103800
1007130724	Medical	Medical	Internal Medicine	300 Dorchester Avenue	Cambridge	1935	224100
1007199287	Medical	Medical	Avenues Recovery Center at Eastern Shore	821 Fieldcrest Road	Cambridge	1999	5229200
1007204469	Medical	Medical	Medical Arts Building	100 Bramble Street	Cambridge	2001	1202800
1007179731	Medical	Medical	Medical Offices	400-408 Byrne Street		1977	493500
1007147554	Medical	Medical	Ms. Shariff M.D.PA	105 Aurora Street	Cambridge	1920	147400
1007112157	Medical	Medical	Rose Hill Family Physicians LLC	319 Dorchester Avenue	Cambridge	1948	620900
1007108141	Medical	Medical	Rossi Humberto A . M.D.	305 Maryland Avenue	Cambridge	1910	70900
1007193599	Medical	Nursing Home	Chesapeake Woods Center	525 Glenburn Avenue	Cambridge	1992	3275900
1015021144	Medical	Nursing Home	Jackson Assisted Living	408 Taylor Avenue	Hurlock	2005	92400
1007179448	Medical	Nursing Home	Signature Health Care Mallard Bay	520 Glenburn Avenue	Cambridge	1976	4633800

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value
1007192509	Medical	Nursing Home	Special Home II Nursing Home	6 Patamoke Way	Cambridge	1985	78100
1007137125	Medical	Nursing Home	Special Home Nursing Home	210 Henry Street	Cambridge	1925	55700
1015001046	Medical	Nursing Home	Survival Place Nursing Home	201 N Main Street	Hurlock	1925	81000
1007117361	Medical	Nursing Home	Glasgow Nursing Home	311 Glenburn Ave	Cambridge	1925	343600
1007145640	Medical	Nursing Home	Pleasant Day Medical Adult Day Care	2474 Cambridge Beltway	Cambridge	1996	963600
1011001572	Miscellaneous	Boat Ramp	Bestpitch Ferry Ramp	Bestpitch Ferry Road	Cambridge		103600
1010006325	Miscellaneous	Boat Ramp	Crocheron Ramp	Crocheron Road	Toddville		19400
1018000148	Miscellaneous	Boat Ramp	Elliott Island Ramp	Wharf Rd	Vienna		178200
1006086608	Miscellaneous	Boat Ramp	Fishing Creek Ramp	2913 Hoopers Island Road	Church Creek	1915	61720
1010006333	Miscellaneous	Boat Ramp	Fishing Point Ramp	Tedious Creek Road	Toddville		10000
1007175183	Miscellaneous	Boat Ramp	Great Marsh Ramp	Somerset Avenue	Cambridge		183100
1016004421	Miscellaneous	Boat Ramp	Madison Bay Ramp	Madison Canning House Road	Madison		64600
1006095852	Miscellaneous	Boat Ramp	Muddy Hook Cove Ramp	Doeller Road	Fishing Creek		17200
1017000020	Miscellaneous	Boat Ramp	New Bridge Ramp	4331 New Bridge Road	Vienna	1920	154350
1008185204	Miscellaneous	Boat Ramp	Ragged Point Marina	Ragged Point Road	Cambridge		328300
1005075432	Miscellaneous	Boat Ramp	Shorter's Wharf Ramp	Maple Dam Road	Cambridge		0
1004059581	Miscellaneous	Boat Ramp	Taylors Island Ramp	Route 16	Taylors Island		182600
1010005434	Miscellaneous	Boat Ramp	Toddville-Farm Creek Ramp	Farm Creek Road	Toddville	1940	61200
1013000964	Miscellaneous	Boat Ramp	Transquaking Ramp	4924 Drawbridge Road	Cambridge		13120
1007146213	Miscellaneous	Boat Ramp	Trenton Street Ramp	225 Trenton Street	Cambridge		262800
1002029456	Miscellaneous	Boat Ramp	Vienna Ramp	Temple Road	Secretary		159300
1005071321	Miscellaneous	Boat Ramp	Wallace Creek Ramp	1439 Hoopers Island Road	Church Creek	1964	349400
1010003431	Miscellaneous	Boat Ramp	Wingate Ramp	Wingate Bishops Head	Wingate		0
	Miscellaneous	Bridge	D-001 Hoopers Island Road/Honga River	Hoopers Island Road			0
	Miscellaneous	Bridge	D-002 Smithville Road/Beaver Dam Creek	Smithville Road			0
	Miscellaneous	Bridge	D-004 Hip Roof Road/Spicer Creek	Hip Roof Road			0
	Miscellaneous	Bridge	D-005 Punch Island Road/St. John Creek	Punch Island Road			0

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value
	Miscellaneous	Bridge	D-009 Bishop Head Road/Goose Creek	Bishop Head Road			0
	Miscellaneous	Bridge	D-012 Maple Dam Road/Blackwater River	Maple Dam Road			0
	Miscellaneous	Bridge	D-013 Wesley Church Road/Farm Creek	Wesley Church Road			0
	Miscellaneous	Bridge	D-015 Key Wallace Drive/Little Blackwater River	Key Wallace Drive			0
	Miscellaneous	Bridge	D-018 Suicide Bridge Road/Warwick River	Suicide Bridge Road			0
	Miscellaneous	Bridge	D-019 Suicide Bridge Road/Cabin Creek	Suicide Bridge Road			0
	Miscellaneous	Bridge	D-021 Drawbridge Road/Transquaking River	Drawbridge Road			0
	Miscellaneous	Bridge	D-022 Drawbridge Road/Chicamacomico River	Drawbridge Road			0
	Miscellaneous	Bridge	D-024 Bestpitch/Transquaking River	Bestpitch Ferry Road			0
	Miscellaneous	Bridge	D-025 Bestpitch Ferry Road/Windmill Island Creek	Bestpitch Ferry Road			0
	Miscellaneous	Bridge	D-026 Decoursey Bridge Road/Transquaking River	Decoursey Bridge Road			0
	Miscellaneous	Bridge	D-029 Blades Road/Hunting Creek	Blades Road			0
	Miscellaneous	Bridge	D-032 Indiantown Road/Chicone Creek	Indiantown Road			0
	Miscellaneous	Bridge	D-035 New Bridge Road/Chimamacomico River	New Bridge Road			0
	Miscellaneous	Bridge	D-036 Elliott Island Road/Pokata Creek	Elliott Island Road			0
	Miscellaneous	Bridge	D-037 Elliot Island Road/Elliott Creek	Elliot Island Road			0
	Miscellaneous	Bridge	Griffith Neck Road/Beaver Dam Creek	Griffith Neck Road			0
	Miscellaneous	Bridge	Harrison Ferry Road/Marshyhope Creek	Harrison Ferry Road			0
	Miscellaneous	Bridge	Langrell Road/Hunting Creek	Langrell Road			0
	Miscellaneous	Bridge	RT 14/Artificial Path (off of Warwick River)	RT 14			0
	Miscellaneous	Bridge	RT 14/Marshyhope Creek	RT 15			0
	Miscellaneous	Bridge	RT 16/Parsons Creek	RT 16			0
	Miscellaneous	Bridge	RT 16/Slaughter Creek	RT 17			0
	Miscellaneous	Bridge	RT 16-New Market Road/Cabin Creek	New Market Road			0

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value
	Miscellaneous	Bridge	RT 313/Artificial Path	RT 313			0
	Miscellaneous	Bridge	RT 313/Marshyhope Creek	RT 314			0
	Miscellaneous	Bridge	RT 335/ Wallace Creek	RT 335			0
	Miscellaneous	Bridge	RT 335/Artificial Path	RT 335			0
	Miscellaneous	Bridge	RT 335/Blackwater River	RT 335			0
	Miscellaneous	Bridge	RT 335/Buttons Creek	RT 335			0
	Miscellaneous	Bridge	RT 335/Honga River/Bay	RT 335			0
	Miscellaneous	Bridge	RT 50/Chicamacomico River	RT 50			0
	Miscellaneous	Bridge	RT 50/Chicamacomico River	RT 50			0
	Miscellaneous	Bridge	RT 50/Shoal Creek	RT 50			0
	Miscellaneous	Bridge	RT 531/Gales Creek	RT 531			0
	Miscellaneous	Bridge	RT 335/Artificial Path (off of Honga River)	RT 335			0
	Miscellaneous	Bridge	Shore Drive/Shoal Creek	Shore Drive			0
	Miscellaneous	Bridge	State-Choptank River Bridge	RT 50			0
	Miscellaneous	Bridge	State-Market Street/Cambridge Creek	Market Street			0
	Miscellaneous	Bridge	State-Vienna Bridge	RT 50			0
1007193602	Miscellaneous	Community Center	Cambridge MAC Senior Center	Cambridge Beltway	Cambridge	1998	2622900
1001009931	Miscellaneous	Community Center	Cokesbury Community Center	5957 Cokesbury Road	Federalsburg	1953	95000
1007173776	Miscellaneous	Community Center	Dorchester Family YMCA	201 Talbot Avenue	Cambridge	1929	3248100
1007123981	Miscellaneous	Marina/Dock	Cambridge Marine Terminal 6	0 Cemetery Avenue	Cambridge	1976	584600
1007174454	Miscellaneous	Marina/Dock	Cambridge Municipal Yacht Basin	0 Mill Street	Cambridge	1979	1102500
1002022125	Miscellaneous	Marina/Dock	Dock	6325 Snug Harbor Road	East New Market		41500
1005076153	Miscellaneous	Marina/Dock	Dock	Wingate Bishops Head Road	Wingate		183100
1006093043	Miscellaneous	Marina/Dock	Dock	Hoopers Island Road	Fishing Creek		25300
1006094341	Miscellaneous	Marina/Dock	Dock	Doeller Road	Fishing Creek		4800
1006095836	Miscellaneous	Marina/Dock	Dock	Hoopers Island Road	Church Creek		243900
1010000270	Miscellaneous	Marina/Dock	Dock	E Tedious Creek Road	Toddville	1945	58400
1010007194	Miscellaneous	Marina/Dock	Dock	2100 Wingate Bishops Head Road	Wingate	1995	59500
1010006341	Miscellaneous	Marina/Dock	Dock	Wingate Bishops Head Road	Wingate		38700

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value
1013003963	Miscellaneous	Marina/Dock	Dock	Maple Dam Road	Cambridge		12300
1007128169	Miscellaneous	Marina/Dock	Dock	Cedar Street	Cambridge	1988	427900
1007181078	Miscellaneous	Marina/Dock	Marina	Mill Street	Cambridge		168100
1007156162	Miscellaneous	Marina/Dock	Yacht Maintenance Company	Yacht Maintenance Co	Cambridge		134200
1015007176	Miscellaneous	Marina/Dock	Marina	6304 Suicide Bridge Road	Hurlock	1993	1231800
1006086837	Miscellaneous	Marina/Dock	PL Jones Boatyard & Marina	2560 Old House Point Road	Fishing Creek	1988	344400
1004058461	Miscellaneous	Marina/Dock	Slaughter Creek Marina	638 Taylors Island Road	Taylors Island	1975	343800
1010006368	Miscellaneous	Marina/Dock	Warehouse	2343 Farm Creek Road	Toddville		6100
1007168756	Miscellaneous	Museum	County Building	321 High Street	Cambridge	1930	406300
1007174519	Miscellaneous	Museum	Dorchester Arts Center	120 High Street	Cambridge	1900	186500
1004059522	Miscellaneous	Museum	Taylors Island Museum	4212 Hoopers Neck Road	Taylors Island	1920	95100
1003040992	Miscellaneous	Museum	Vienna Heritage Museum	303 Race Street	Vienna	1927	65500
1009199918	Miscellaneous	Park	Church Creek Community Park	4663 Golden Hill Road	Church Creek		0
1007177720	Miscellaneous	Park	Dorchester County Pool	107 Virginia Avenue	Cambridge	1975	758500
1007140711	Miscellaneous	Park	Dorchester County Recreation & Parks	434 Willis Street	Cambridge	1975	188600
1007174772	Miscellaneous	Park	Sailwinds Park	200 Byrn Street	Cambridge	1963	1105500
1014008926	Miscellaneous	Transportation	SHA	2954 Old Route 50	Cambridge	1958	708300
1015012005	Municipal	Library	Hurlock Free Library	222 S Main Street	Hurlock	1972	356700
1007176228	Municipal	Municipal Government	Cambridge City Hall	Academy Street	Cambridge	1979	988300
1007175205	Municipal	Municipal Government	Cambridge Housing Authority	Bradley Avenue	Cambridge	1975	1739500
1007176791	Municipal	Municipal Government	Cambridge Housing Authority	Cornish Drive	Cambridge	1972	6087200
1007174438	Municipal	Municipal Government	Cambridge Public Works	310 Trenton Street	Cambridge	1935	253200
1007174233	Municipal	Municipal Government	Cambridge Utilities	312 High Street	Cambridge	1900	196500
1007175175	Municipal	Municipal Government	Cambridge-City Council	305 Gay Street	Cambridge	1940	212700
1007174462	Municipal	Municipal Government	Cambridge-City Marina	96 Hight Street	Cambridge		552300
1007174799	Municipal	Municipal Government	Cambridge-District Court	310 Gay Street	Cambridge	1917	1119700
1007176120	Municipal	Municipal Government	Cambridge-Office Building	Race Street	Cambridge		17000
1007120672	Municipal	Municipal Government	Cambridge-Parking Lot	Race Street	Cambridge		6300
1007176333	Municipal	Municipal Government	Cambridge-Parking Lot	Muir Street	Cambridge		42900
1007175388	Municipal	Municipal Government	Cambridge-Parking Lot	311 Gay Street	Cambridge		13600

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value
1007175353	Municipal	Municipal Government	Cambridge-Parking Lot	604 Glasgow Street	Cambridge		13700
1007175361	Municipal	Municipal Government	Cambridge-Parking Lot	610 Glasgow Street	Cambridge		17100
1007175434	Municipal	Municipal Government	Cambridge-Parking Lot	420 Race Street	Cambridge		16600
1007175469	Municipal	Municipal Government	Cambridge-Parking Lot	423 Race Street	Cambridge		29000
1007176104	Municipal	Municipal Government	Cambridge-Parking Lot	Race Street	Cambridge		7500
1007176112	Municipal	Municipal Government	Cambridge-Parking Lot	Academy Street	Cambridge		30800
1007176198	Municipal	Municipal Government	Cambridge-Parking Lot	Academy Street	Cambridge		11700
1007176899	Municipal	Municipal Government	Cambridge-Parking Lot	Race Street	Cambridge		5400
1007174217	Municipal	Municipal Government	Cambridge-Public Works	Water Street	Cambridge		20000
1007174241	Municipal	Municipal Government	Cambridge-Public Works	Stone Boundary Road	Cambridge		262000
1007174381	Municipal	Municipal Government	Cambridge-Public Works	Abocoo Lane	Cambridge		20000
1007139160	Municipal	Municipal Government	Cambridge-Public Works	309 Gay Street	Cambridge		9000
1007175396	Municipal	Municipal Government	Cambridge-Public Works	530 Race Street	Cambridge		24600
1007175493	Municipal	Municipal Government	Cambridge-Public Works	Governors Avenue	Cambridge		3000
1007175809	Municipal	Municipal Government	Cambridge-Public Works	Jimson Road	Cambridge		1200
1007176945	Municipal	Municipal Government	Cambridge-Public Works	Woods Road	Cambridge		48000
1007192908	Municipal	Municipal Government	Cambridge-Public Works	Shane Circle	Cambridge		32000
1007174330	Municipal	Municipal Government	Cambridge-Public Works	Glasgow Street	Cambridge		51800
1007174225	Municipal	Municipal Government	Cambridge-Public Works	Nathans Avenue	Cambridge		247700
1007174403	Municipal	Municipal Government	Cambridge-Public Works	High Street	Cambridge		5000
1007174284	Municipal	Municipal Government	Cambridge-Public Works	100 Brohawn Avenue	Cambridge	1930	235800
1007175132	Municipal	Municipal Government	City of Cambridge DPW	705 Leonards Lane	Cambridge	1978	468700
1003046540	Municipal	Municipal Government	DNR	114 Water Street	Vienna	1964	30400
1002032015	Municipal	Municipal Government	East New Market Housing Authority	40 Academy Street	East New Market	1912	1168800
1002029510	Municipal	Municipal Government	East New Market Municipal Building	101 Main Street	East New Market	1940	181100
1002029871	Municipal	Municipal Government	East New Market Town Office	10 Academy Street	East New Market	1960	3800
1002029685	Municipal	Municipal Government	East New Market-Parks & Recreation/Water Tower	Creamery Road	East New Market	1976	224300
1001010034	Municipal	Municipal Government	Galestown-Parks & Recreation	5538 Wheatley Church Road	Rhodesdale	1945	95400
1015016434	Municipal	Municipal Government	Hurlock City Hall	311 Charles Street	Hurlock	1983	339700

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value
1015011769	Municipal	Municipal Government	Hurlock-Office Building	220 S Main Street	Hurlock	1927	123800
1015016582	Municipal	Municipal Government	Hurlock-Office Building	47 Delaware Ave	Hurlock	1990	69500
1015003138	Municipal	Municipal Government	Hurlock-Public Works	300 Pine Street	Hurlock		190000
1015015691	Municipal	Municipal Government	Hurlock-Public Works	49 Delaware Ave	Hurlock		10000
1015011955	Municipal	Municipal Government	Hurlock-Public Works	106 Gay Street	Hurlock		80500
1015012021	Municipal	Municipal Government	Hurlock-Public Works	4820 Jackson Street	Hurlock		18300
1015011947	Municipal	Municipal Government	Hurlock-Public Works	103 Oak Street	Hurlock		5000
1015011963	Municipal	Municipal Government	Hurlock-Public Works	100 Thompson Street	Hurlock		5500
1015004975	Municipal	Municipal Government	Mayor & Council of Hurlock	300 S Main Street	Hurlock	1910	88460
1002029804	Municipal	Municipal Government	Secretary Town Hall	122 Main Street	Secretary	1920	60200
1002029472	Municipal	Municipal Government	Secretary-Parks & Recreation	Popular Street	Secretary		63100
1002278669	Municipal	Municipal Government	Secretary-Public Works	Heritage Road	East New Market		3700
1003047229	Municipal	Municipal Government	Vienna Town Hall/Water Tower	214 Market Street	Vienna	1981	146300
1003046532	Municipal	Municipal Government	Vienna-Parks & Recreation	Water Street	Vienna		4600
1003042812	Municipal	Municipal Government	Vienna-Parks & Recreation	113 Ocean Gateway	Vienna	1930	197200
1003043630	Municipal	Municipal Government	Vienna-Parks & Recreation	115 Ocean Gateway	Vienna	1940	18400
1003046311	Municipal	Municipal Government	Vienna-Public Works	Middle Street	Vienna		4500
1003046656	Municipal	Municipal Government	Vienna-Public Works	Race Street	Vienna		4600
1003047431	Municipal	Municipal Government	Vienna-Public Works	Vienna Henrys Crossroads Road	Vienna		87100
1003044602	Municipal	Municipal Government	Vienna-Public Works	Water Street	Vienna		91900
1016003727	Utility	Communication	Tower #11	4814 Madison Canning House Road	Madison	1937	564100
1014009620	Utility	Communication	Tower #13	3829 Vincent Road	Linkwood	1975	583800
1013001839	Utility	Communication	Tower #14	2946 Greenbrier Road	Cambridge		45860
1001003119	Utility	Communication	Tower #29	6840 Eldorado Road	Federalsburg	1975	19070
1003039161	Utility	Communication Tower	County Tower	Old Route 50	Vienna		0
1004058607	Utility	Communication Tower	County Tower	Smithville Road	Church Creek		0
1007177747	Utility	Utility	Cambridge Wastewater Treatment Plant	1010 Roslyn Avenue	Cambridge	1973	255300
1007174268	Utility	Utility	Cambridge Water Tower	Woods Road	Cambridge		678100

Account ID	Facility Category	Facility Type	Facility Name	Address	City	Year Built	Improvement Value
1007176015	Utility	Utility	Cambridge Water Tower	Trenton Street	Cambridge		165800
1005070228	Utility	Utility	Choptank Electric	1424 Hoopers Island Road	Church Creek		0
1007179383	Utility	Utility	Choptank Electric Cooperative	Race Street	Cambridge		0
1007160097	Utility	Utility	Delmarva Power & Light Electric Substation	402 Cherry Street	Cambridge		0
1007154445	Utility	Utility	Delmarva Power & Light Electric Substation	302 Boundary Ave	Cambridge		0
1007110669	Utility	Utility	GAS Chesapeake Utilities	516 Race Street	Cambridge		0
1007159056	Utility	Utility	GAS Chesapeake Utilities	405 Cherry Street	Cambridge		0
1007174276	Utility	Utility	Municipal Utilities Commission	105 Brohawn Avenue	Cambridge	1959	85400
1002032309	Utility	Utility	Secretary Water Tower	Main Street	Secretary		69400
1012007566	Utility	Utility	TELECOM Communication Tower	Hynson Road	Hurlock		11900
1012003927	Utility	Utility	TELECOM Communication Tower	Payne Road	Hurlock		6700
1001017802	Utility	Utility	TELECOM Communication Tower	5865 Puckum Road	Rhodesdale		7900
1009197354	Utility	Utility	Transfer Station	1957 Brannock Neck Road	Cambridge		0
1005070198	Utility	Utility	Verizon	2425 Lakesville Crapo Road	Crapo		0
1006087817	Utility	Utility	Verizon	2837 Hoopers Island Road	Church Creek		0
1007159129	Utility	Utility	Verizon	413 High Street	Cambridge		0
1007159110	Utility	Utility	Verizon	415 High Street	Cambridge		0
1007159153	Utility	Utility	Verizon	Goodwill Avenue	Cambridge		0
1015001704	Utility	Utility	Verizon	201 Poplar Street	Hurlock		0
1003047849	Utility	Utility	Vienna Wastewater Treatment Plant	113 Levin Dorsey Road	Vienna		0
1002029995	Utility	Utility	Water Treatment Plant	3723 Greenpoint Road	East New Market	1960	43200

APPENDIX D
2022 MITIGATION ACTION ITEMS

2022 Mitigation Action Items

Mitigation action items were developed from conclusions and recommendations listed at the end of each of the hazard chapters. Additionally, mitigation action items that were designated as incomplete were carried over from the 2017 Hazard Mitigation Plan. As a result, a total of 53 mitigation action items have been included in the 2022 Hazard Mitigation Plan.

Identified Hazards & Associated Mitigation Action Items #	
Identified Hazard	Mitigation Action Item #
Coastal Hazards	1 to 10
Riverine Flooding	11 to 13
Winter Weather	14 to 17
Thunderstorm, Hail, Wind & Tornado	18 to 22
Extreme Heat, Drought & Wildfire	23 to 30
Human Impacted Hazards	31 to 38
Emerging Infectious Diseases	39 to 44
Climate Change	45 to 53

2022 Mitigation Action Items				
Mitigation Action Item #	Hazard	Mitigation Action Item	County/ Municipality	Goals & Objectives
1	Coastal Hazards	Reviewing the vulnerability analysis for storm surge, coastal flooding, and the shoreline erosion 100-foot risk zone, multiple critical facilities are at-risk to two or more of these hazards. Critical facilities affected by all three hazards include: Taylors Island Volunteer Fire Company, Madison Volunteer Fire Company and EMS Station 500. Facilities affected by storm surge and coastal flooding only include Lakes and Straits Fire Company and Hoopers Island Volunteer Fire Company. The following table lists all critical and public facilities affected by two or more coastal events (hurricane, coastal flooding, sea level rise and shoreline erosion). As listed in the table below, five (5) critical and four (4) public facilities are vulnerable to two or more coastal events. These facilities may have been constructed to mitigate flooding; however, surrounding roads may cause evacuation issues. Additional mitigation measures may be necessary to ensure services provided by these facilities are not disrupted, especially during a hazard event. o Taylors Island Volunteer Fire Company o Madison Volunteer Fire Company o EMS Station 500 o Lakes and Straits Fire Company o Hoopers Island Volunteer Fire Company o County Facility o Cambridge Public Work Facilities o County Board of Education o Vienna Public Works	County, Cambridge, Vienna	Goal 2 - Obj 2.2, Obj 2.3 Goal 5 - Obj 5.1, Obj 5.5 Goal 6 - Obj 6.2
2	Coastal Hazards & Climate Change (SLR)	Retrofit the fire departments located within the special flood hazard areas and the 2 feet projected sea level rise hazard area. Continuity of operations at designated critical facilities is necessary to meet community needs and resiliency goals. The fire departments include: o Taylors Island Volunteer Fire Company o Hooper's Island Volunteer Fire Company o Madison Volunteer Fire Company/EMS Station 500 o Lake and Straits Volunteer Fire Company	County	Goal 5 -Obj 5.1, Obj 5.5 Goal 6 - Obj 6.2

Mitigation Action Item #	Hazard	Mitigation Action Item	County/ Municipality	Goals & Objectives
3	Coastal Hazards & Riverine Flooding	Promote best practices success story with an Elevation Project Press Release. Property owners who voluntarily participated in elevating their homes located in the County's special flood hazard area may be willing to allow the County to use photos of their elevation project as an example of "Best Practices." Documenting the various steps taken to complete an elevation project, including a series of before, during, and after photos will help to encourage other at-risk property owners to apply for mitigation funding. It is important to note that Dorchester County using FEMA grant funding has undertaken flood elevation projects in coordination with property owners in the past. More recently, two (2) flood elevation projects are currently underway, both of which are being undertaken and funded solely by the property owners. One of which is on Hoopers Island Road and the other is on Parks Road.	County, Cambridge, Church Creek, Eldorado, Secretary, Hurlock, Galestown, Vienna	Goal 5 - Obj 5.1, Obj 5.6
4	Coastal Hazards	Explore flood risk reduction opportunities for structures located before the Limit of Moderate Wave Action (LiMWA). A total of six (6) structures in the Fishing Creek area are within the LiMWA. Breakwaters should be considered in this area. Breakwaters consist of a single structure, or a series of units placed offshore of the project site to reduce wave action on the shoreline. These structures are created with various types of materials but usually employ what is "locally" available. Rock is typically used for construction and has been shown to be very durable when properly designed and installed.	County	Goal 5 -Obj 5.1, Obj 5.6
5	Coastal Hazards	Provide property owners located along shorelines with high erosion rate, the Neck District, Taylors Island, Hoopers Island and Crocheron, with information on potential risk reduction ideas. FEMA's Protect your Property from Coastal Erosion could be used to provided ideas for homeowners.	County	Goal 4 - Obj 4.2 Goal 6 - Obj 6.3, Obj 6.5 Goal 7 - Obj 7.2
6	Coastal Hazards & Climate Change (SLR)	Using the Coastal Atlas, areas with shoreline erosion rates that are high and very high should be reviewed for living shorelines. Living shorelines connect the land and water to stabilize shorelines, reduce erosion, and provide valuable habitat that enhances coastal resilience. Create an "ideal" living shoreline by installing riparian buffers along the tide line using native trees and shrubs; tidal wetlands using grasses, rushes, and sedges at mid-tide elevations and marsh grasses and common three-square at low tide; and underwater grasses in shallow water.	County, Cambridge	Goal 7 - Obj 7.2
7	Coastal Hazards	Prioritize the twenty-nine (29) roads identified as to having experienced repetitive flooding issues by the Core Planning Team for inclusion in the County's Capital Improvement Plan. Fourteen (14) of the identified roads are also evacuation routes. These roads should take precedence when determining mitigation measures. Repetitive flooding occurs on these roadways due to low elevation of the roadway or stormwater management issues. Upgrade and mitigate evacuation routes when funding from Federal or State sources is available.	County, Cambridge, Galestown, Hurlock	Goal 9 - Obj 9.1, 9.2, 9.3 9.4

Mitigation Action Item #	Hazard	Mitigation Action Item	County/ Municipality	Goals & Objectives
8	Coastal Hazards	Use flood resistant materials below the BFE on historic structures, specifically in the "Areas of Concern". When rehabilitating or repairing a damaged historic structure, use flood resistant materials below the BFE to improve the structure's ability to withstand flooding. Guidance for using flood resistant materials can be found in Technical Bulletin, Flood-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Area in accordance with the National Flood Insurance Programs.	County	Goal 4 - Obj 4.1 Goal 6 - Obj 6.4 Goal 10 - Obj 10.1
9	Coastal Hazards	Complete Maryland Historical Trust's (MHT) Architectural Survey Form for Hazard Mitigation Planning for properties in flood hazard areas that are documented in the Maryland Inventory of Historical Properties and/or listed or eligible for listing in the National Register of Historic Places (MIHP/NRHP) and listed on the Recommendations Table in the Historic & Cultural Resources Hazard Mitigation & Risk Plan. Use information obtained to develop appropriate flood mitigation measures that balance protection and preservation. Note: During the Historic & Cultural Resources Hazard Mitigation & Risk Plan development process, sixteen (16) prioritized properties were surveyed using the Architectural Survey Form for Hazard Mitigation Planning.	County, Municipalities	Goal 4 - Obj 4.1 Goal 6 - Obj 6.4 Goal 10 - Obj 10.1
10	Coastal Hazards	Complete/update MIHP forms for buildings not surveyed and endangered by flood hazards and for buildings with old NRHP forms/old MIHP forms in high hazard areas within areas of concern. Areas displaying all three flood hazards (projected sea level rise, 1% annual chance flood hazard area and hurricane storm surge inundation) in relation to un-surveyed buildings built in or prior to 1967 were predominately found in Crapo, Taylors Island, and Madison.	County, Municipalities	Goal 4 - Obj 4.1 Goal 6 - Obj 6.4 Goal 10 - Obj 10.1
11	Riverine Flooding	Mitigate repetitive and severe repetitive loss properties identified in this Chapter. There are 54 repetitive and 3 severe repetitive loss properties located within Dorchester County. The strategy is to eliminate or reduce the damage to property and the disruption of life caused by repeated flooding of the same properties. Depending on the severity of flooding at these locations, another possibility is to elevate the structure, so it is well above the base flood elevation. Acquiring buildings and removing them from the floodplain is not only the most effective flood protection measure available, but also an opportunity to convert a problem area into a community asset and obtain environmental benefits. These properties are listed in Table 7-13 and depicted on Map 7-5. Prioritize neighborhoods that contain multiple RL and SRL properties, there by developing community wide mitigation projects rather than scattered site projects.	County, Cambridge, East New Market	Goal 4 - Obj 4.1 Goal 5 - Obj 5.1, Obj 5.2, Obj 5.4, Obj 5.6 Goal 6 - Obj 6.1, Obj 6.3, Obj 6.4, Obj 6.5
12	Riverine Flooding	In terms of the social vulnerability index, areas with the highest SVI scores shown on Figure 7-4 are the City of Cambridge and the northeast section of the County, which includes the Towns of Secretary, East New Market and Hurlock. Target these areas with warning notifications, specifically the Town of Hurlock, during riverine flood events, which is impacted by the riverine 1% annual chance flood hazard area.	County, Cambridge, Hurlock	Goal 1 - Obj 1.3 Goal 3 - Obj 3.1 Goal 4 - Obj 4.2

Mitigation Action Item #	Hazard	Mitigation Action Item	County/ Municipality	Goals & Objectives
13	Riverine Flooding	Educate the communities at-risk to the 1% annual chance flood hazard areas about flood insurance. Conduct flood insurance workshops for the public. Also conduct flood insurance workshops targeted to flood insurance agents, real estate agents, and area surveyors, include continuing education credits as an initiative for participation.	County, Cambridge, Church Creek, Eldorado, Secretary, Hurlock, Galestown, Vienna	Goal 3 - Obj 3.1, Obj 3.3 Goal 4 - Obj 4.2, Obj 4.5
14	Winter Weather	Ensure there is continuous power at facilities used for shelter operations and at warming centers during a winter weather event. Evaluate current facilities used for shelters or warming centers for generator needs.	County	Goal 6 - Obj 6.2, Obj 6.4
15	Winter Weather	Evaluate the following critical facilities for snow load capabilities. Continuity of operations at designated critical facilities is necessary to meet community needs and resiliency goals. o Neck District Volunteer Fire Company o Hurlock Volunteer Fire Company o Madison Volunteer Fire Company o Eldorado-Brookview Volunteer Fire Company o Taylors Island Volunteer Fire Company o Hoopers Island Volunteer Fire Company o Choptank Community Health System	County, Hurlock, Eldorado, Brookview	Goal 2 - Obj 2.2, Obj 2.3, Obj 2.4 Goal 6 - Obj 6.2
16	Winter Weather	According to the American Heart Association, seniors who have cardiovascular conditions may experience increased side effects in the cold. Lower temperatures and winds can reduce body heat, blood vessels tend to constrict, making it more difficult for oxygen to reach the entire body. Ensure point of contact information for all agencies/departments/organizations involved in senior services is updated annually. Establish a method to track unmet needs for timely resource request during winter storm activations.	County, Municipalities	Goal 1 - Obj 1.3 Goal 3 - Obj 3.2, Obj 3.3 Goal 6 - Obj 6.1 Goal 10 - Obj 10.2, Obj 10.3 Goal 11 - Obj 11.2
17	Winter Weather	In terms of the social vulnerability index, areas with the highest SVI score shown on Figure 8-1 are the City of Cambridge and the northeast section of the County, which includes the Towns of Secretary, East New Market and Hurlock. Target these areas during winter storm activations for needs, such as water, food, warmth, and medical attention.	County, Cambridge, Secretary, East New Market, Hurlock	Goal 1 - Obj 1.3 Goal 3 - Obj 3.1 Goal 4 - Obj 4.2 Goal 11 - Obj 11.2

Mitigation Action Item #	Hazard	Mitigation Action Item	County/ Municipality	Goals & Objectives
18	Thunderstorm, Hail, Wind & Tornado	Protect critical facilities and infrastructure from lightning damage by installing lightning protection devices, such as lightning rods and grounding, on communications infrastructure and other critical facilities. Review the following towers for lightning rods and grounding needs: o Tower #11, 4814 Madison Canning House Road o Tower #13, 3829 Vincent Road o Bucktown Tower , 2946 Greenbrier Road o Tower #29, 6840 Eldorado Road o Vienna Tower, 4710 Ocean Gateway o County Tower, Smithville Road	County	Goal 2 - Obj 2.2, Obj 2.3 Goal 5 - Obj 5.1, Obj 5.5 Goal 6 - Obj 6.2
19	Thunderstorm, Hail, Wind & Tornado	Encouraging wind engineering measures and construction techniques that may include structural bracing, straps and clips, anchor bolts, laminated or impact-resistant glass, reinforced garage doors, window shutters, waterproof adhesive sealing strips, or interlocking roof shingles. Assess critical facilities vulnerability to wind hazards. The major factor to consider is the possibility of these structures failing when subjected to wind that exceed the ASCE Wind Design Speed of 115 mph or to flying debris that penetrates the building. This especially true for facilities constructed prior to 1972 when wind load design criteria was established.	County, Municipalities	Goal 2 - Obj 2.2, Obj 2.3 Goal 5 - Obj 5.3, Obj 5.5 Goal 6 - Obj 6.2
20	Thunderstorm, Hail, Wind & Tornado	Establish standards for all utilities companies regarding tree pruning around lines. Continue working with DNR, Delmarva Power, Choptank Electric, Verizon and other utilities to identify areas where underground lines can be installed in order to mitigate power outages.	County, Municipalities	Goal 3 - Obj 3.3 Goal 6 - Obj 6.4
21	Thunderstorm, Hail, Wind & Tornado	Encourage citizens in the areas with the highest social vulnerability, the City of Cambridge and the northeast section of the County, to sign up for the Emergency Alert Program: https://member.everbridge.net/892807736724055/new.	County, Cambridge, Secretary, East New Market, Hurlock	Goal 1 - Obj 1.3 Goal 2 - Obj 2.1 Goal 4 - Obj 4.2
22	Thunderstorm, Hail, Wind & Tornado	Provide information to farmers on the multiple insurance opportunities available, which assists farmers with losses due to adverse weather conditions, such as the Noninsured Disaster Assistance Program (NAP) and Federal Crop Insurance Program (FCIP).	County, Municipalities	Goal 4 - Obj 4.5 Goal 10 - Obj 10.1
23	Extreme Heat, Drought & Wildfire	Ensure all residents, especially those that are most susceptible to the effects of extreme heat in the northern portion of the county, have information regarding services the county provides during an extreme heat event. Promote the availability of cooling centers and their locations.	County, Cambridge, Secretary, East New Market, Hurlock	Goal 1 - Obj 1.3 Goal 3 - Obj 3.1 Goal 4 - Obj 4.2 Goal 11 - Obj 11.2

Mitigation Action Item #	Hazard	Mitigation Action Item	County/ Municipality	Goals & Objectives
24	Extreme Heat, Drought & Wildfire	Continue to support and promote volunteer fire companies through training and technical assistance for wildfire events. Maryland Department of Natural Resources provides wildfire training: https://dnr.maryland.gov/forests/Pages/fire/wildfiretraining.aspx.	County, Municipalities	Goal 8 - Obj 8.1, Obj 8.2 Goal 10 - Obj 10.2
25	Extreme Heat, Drought & Wildfire	Educate homeowners on ways to protect their home from wildfires and include information on county website. Maryland Department of Natural Resources FireWise program offers information on landscaping for woodland homes; https://dnr.maryland.gov/forests/Documents/fire/Firewise_LandscapingWoodlandsBrochure.pdf	County, Municipalities	Goal 4 - Obj 4.2 Goal 6 - Obj 6.5 Goal 8 - Obj 8.2, Obj 8.3
26	Extreme Heat, Drought & Wildfire	Work with Volunteer Fire Departments to develop community fire response plans.	County, Municipalities	Goal 8 - Obj 8.1, Obj 8.2 Goal 10 - Obj 10.2
27	Extreme Heat, Drought & Wildfire	Promote water saving tips for homeowners and businesses throughout the year. Use social media infographics to remind homeowners of water-saving measures that can be taken specifically during hot summer months.	County, Municipalities	Goal 3 - Obj 3.3 Goal 4 - Obj 4.2
28	Extreme Heat, Drought & Wildfire	Incorporating drought tolerant or xeriscape practices into landscape ordinances to reduce dependence on irrigation. Xeriscaping is the practice of landscaping with minimal use of water. Include this information on the county website and social media campaigns.	County, Municipalities	Goal 3 - Obj 3.3 Goal 6 - Obj 6.4, Obj 6.5
29	Extreme Heat, Drought & Wildfire	Promote the use of permeable driveways and surfaces to reduce runoff and promote groundwater recharge.	County, Municipalities	Goal 3 - Obj 3.3 Goal 6 - Obj 6.3, Obj 6.4, Obj 6.5
30	Extreme Heat, Drought & Wildfire	Work with the Dorchester County Soil Conservation District to educate farmers on constructing windbreaks, which help prevent evaporation from reclaiming salt-affected soil.	County	Goal 3 - Obj 3.3 Goal 4 - Obj 4.1, Obj 4.3 Goal 6 - Obj 6.5
31	Human Impacted Hazards	Encourage volunteer firefighters to attend fire and rescue combat technical training. This will assist when responding to major fires/explosions or HazMat incidents. Work with Maryland Fire and Rescue Institute (MFRI), https://www.mfri.org/, to provide training.	County, Municipalities	Goal 8 - Obj 8.1, Obj 8.2 Goal 10 - Obj 10.2
32	Human Impacted Hazards	Continue mailing flyers to residents within the 'Plume' zone, Taylors's Island. The Department of Emergency Services should continue to ensure flyers are available at the Fire Department and Post Office. In addition, resume annual public meeting schedule.	County	Goal 3 - Obj 3.3 Goal 4 - Obj 4.1 Goal 6 - Obj 6.5

Mitigation Action Item #	Hazard	Mitigation Action Item	County/ Municipality	Goals & Objectives
33	Human Impacted Hazards	Prepare a pre-identified mechanism and message for disseminating information quickly to the public when a hazardous materials incident occurs. Information on the incident and recommended protective actions for the public should be included in the message. Coordination between the county and municipalities for information sharing and dissemination will maximize public outreach efforts.	County, Municipalities	Goal 2 - Obj 2.1 Goal 3 - Obj 3.1, Obj 3.2, Obj 3.3 Goal 4 - Obj 4.1 Goal 6 - Obj 6.5 Goal 11 - Obj 11.2
34	Human Impacted Hazards	Add the review of new transportation safety rules and legislative mandates to the LEPC meeting agenda annually. For instance, the following mandates were added in 2020-2021: o The HM-224I Final Rule to enhance the safe air transportation of lithium batteries. o The HM-215P Final Rule to harmonize with newer international standards and improve the global transportation system by minimizing the regulatory burden. o The HM-265 NPRM proposing to maintain or enhance the safe transportation of hazardous materials by rail, vessel, and highway.	County	Goal 1 - Obj 1.1 Goal 3 - Obj 3.3 Goal 10 - Obj 10.1
35	Human Impacted Hazards	Conduct a hazmat Commodity Flow Study. The bulk of hazardous materials pass through the County by truck, particularly on U.S. Route 50, which crosses the northern part of the County from west to east. Other highways that are used to transport hazardous materials include: MD State Routes 14, 16, and 331. The annual average daily traffic volume for U.S. Route 50 in Cambridge was 26,483 in 2020. Additionally, MD Route 16 at the Cambridge traffic count station, within the Town of East New Market, experiences approximately 6,091 vehicles daily, while Route 331 has a daily average of 3,752 travelers through the Town of Hurlock.	County	Goal 4 - Obj 4.1 Goal 6 - Obj 6.4
36	Human Impacted Hazards	Map inundation areas for each dam in order to identify areas of the county at risk from a dam failure.	County, Galestown	Goal 1 - Obj 1.3, Obj 1.4 Goal 6 - Obj 6.6 Goal 7 - Obj 7.3 Goal 9 - Obj 9.4
37	Human Impacted Hazards	Send mailings to residents within each dam inundation area providing information about the dam and what to do if a dam failure occurs.	County, Galestown	Goal 4 - Obj 4.1, Goal 6 - Obj 6.2, Obj 6.4, Obj 6.5 Goal 9 - Obj 9.4
38	Human Impacted Hazards	Perform a vulnerability assessment to identify hospitals, schools, community buildings, and other assets at risk from a dam failure.	County, Galestown	Goal - Obj 1.3, Obj 1.4 Goal 4 - Obj 4.1, Obj 4.4 Goal 6 - Obj 6.2, Obj 6.4 Goal 9 - Obj 9.4

Mitigation Action Item #	Hazard	Mitigation Action Item	County/ Municipality	Goals & Objectives
39	Emerging Infectious Diseases	Prepare a COVID-19 After-Action Report and Improvement Plan for the Dorchester County's Health Department. The Health Department participated in the Maryland Department of Health's statewide After-Action Report; however, Dorchester County's Health Department is planning an internal hot wash once the COVID cases decrease to minimal numbers or comes to an end.	County	Goal 10 - Obj 10.2, Obj 10.3 Goal 11 - Obj 11.1, Obj 11.2
40	Emerging Infectious Diseases	Update the 2020 Dorchester County Health Department (DCHD) Emerging Infectious Disease (EID)/Infectious Disease Response Plan (IDRP). Following the recent COVID-19 pandemic, modify the EID/IDRP based on recommendations included in the After-Action Report and Improvement Plan.	County	Goal 10 - Obj 10.2, Obj 10.3 Goal 11 - Obj 11.1, Obj 11.2
41	Emerging Infectious Diseases	Encourage residents preparing to travel to call the communicable disease program to obtain information on recommended vaccinations for the destinations individual(s) may be traveling to. DCHD offers a major of the recommended vaccinations.	County, Municipalities	Goal 4 - Obj 4.2 Goal 11 - Obj 11.1, Obj 11.2
42	Emerging Infectious Diseases	Increase the number of staff within the county who have taken ICS Train-the-Trainer courses, to provide availability and flexibility for the training plan. Partner with the Department of Emergency Services to provide the ICS Train-the-Trainer courses to staff.	County	Goal 1 - Obj 1.2 Goal 10 - Obj 10.2, Obj 10.3
43	Emerging Infectious Diseases	Continue to educate the public about infectious disease and protective measures through meetings, handouts, events, signs (ex. Front lobby), commercials, newspaper ads, etc.	County, Municipalities	Goal 4 - Obj 4.2 Goal 11 - Obj 11.1, Obj 11.2
44	Emerging Infectious Diseases	Conduct anthrax and pandemic flu full exercises every other year during the next five (5) year planning cycle.	County	Goal 1 - Obj 1.1, Obj 1.2 Goal 2 - Obj 2.1 Goal 3 - Obj 3.1, Obj 3.2, Obj 3.3 Goal 10 - Obj 10.2, Obj 10.3
45	Climate Change	Identify shorelines lacking the installation of protection measures and are low-lying lands that will become permanently inundated by higher sea levels. Determine mitigation measures such bulkheads, riprap and other shoreline armoring to protect these shorelines.	County, Cambridge	Goal 5 -Obj 5.1, Obj 5.6 Goal 7 - Obj 7.2
46	Climate Change	Consider the geographic extent of regulated floodplain in relation to increasing storm events and sea level rise. This may include a flood protection level established for the 0.2 percent annual chance floodplain prompting a change to the County's floodplain ordinance.	County	Goal 5 - Obj 5.2, Obj 5.7
47	Climate Change	Maintain, identify, and protect new marsh migration corridors. Create habitat mosaics that are more resilient to climate change impacts, such as sea level rise.	County	Goal 7 - Obj 7.2
48	Climate Change	Create new and restore existing wetlands as a best management practice to increase resiliency by providing storm buffers, drought buffers and sea level rise buffers. Consider projects to create wetlands to increase floodplain holding capacity.	County	Goal 7 - Obj 71, Obj 7.2

Mitigation Action Item #	Hazard	Mitigation Action Item	County/ Municipality	Goals & Objectives
49	Climate Change	Develop and include climate change information specific to Dorchester County within a planning document or other media platform for public awareness: o Embed energy and emissions assessments into county planning, which is a prerequisite for being able to adequately implement climate adaption measures in the future. o Assess building usage and emissions. o Assess County owned and operated transportation resources for usage and emissions. o Assess sustainable energy sources, which are critical for moving the needle forward.	County	Goal 2 - Obj 2.1 Goal 3 - Obj 3.3 Goal 4 - Obj 4.1 Goal 10 - Obj 10.1, Obj 10.2
50	Climate Change	Provide information on energy saving measures that residents can use to achieve significant energy savings and reduce electricity consumption.	County, Municipalities	Goal 3 - Obj 3.3 Goal 4 - Obj 4.2
51	Climate Change	Focus on minority populations that may be disproportionately impacted by effects of climate change whether it be lower-income neighborhoods where energy upgrades may be less attainable or those seasonal migrant workers who are more susceptible to severe occupational risk hazards in the northern end of the county (i.e., seasonal agricultural workers) during a heatwave.	County, Municipalities	Goal 4 - Obj 4.1, Obj 4.2 Obj 4.3 Goal 11 - Obj 11.2
52	Climate Change	Dedicate a cooling shelter to be used during extreme heat events. Work with multiple agencies to staff during these events. Dorchester County currently only utilizes public libraries as cooling centers.	County	Goal 10 - Obj 10.2, Obj 10.3 Goal 11 - Obj 11.2
53	Climate Change	Encourage various agencies in the county to share bacteria monitoring updates provided by the Choptank Riverkeeper and ShoreRivers on their various social media outlets.	County, Cambridge	Goal 10 - Obj 10.2

APPENDIX E

CORE PLANNING TEAM & SMALL GROUP MEETING NOTES

DORCHESTER COUNTY
ALL-HAZARD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #1

June 2, 2021 10:00 AM

The following Core Planning Team (CPT) members were present at Meeting #1:

Name	Organization/Department
Steve Garvin	Department of Emergency Services
Herve Hamon	Department Planning & Zoning
Jason Boothe	Department Planning & Zoning
Stephanie Newcomb	Department of Public Works
Susan Banks	Economic Development
Roger Harrell	Health Department
Patrick Comiskey	Cambridge – City Manager
George Hyde	Cambridge – Public Works
Larry White	Cambridge – FEMA/FMA Project Manager
Jason Sandkuhler	Twin Point Cove Group
Gary McQuitty	Hoopersville Group
Bill Christopher	Chamber of Commerce
Kate McClure	Maryland Extension
Tyrique Henry	Department of Social Services
Bill Hildebrand	Maryland Emergency Management Agency (MEMA)

Agenda

- ✓ Hazard Mitigation Overview
- ✓ FEMA Requirements
- ✓ Core Planning Team and Public Participation
- ✓ Project Website and Social Media
- ✓ Hazard Risk Survey Results
- ✓ Development of Action Items and Projects
- ✓ Next Steps

Hazard Mitigation Overview

The 2017 Dorchester County All-Hazard Mitigation Plan (HMP) is in the plan update process. The 2017 Dorchester County HMP is available for review on Dorchester County's website: https://www.dorchestercountymd.com/wp-content/uploads/2018/05/Public-Copy-2017-Dorchester-County-Hazards-Mitigation-Pllan-1-11-18.pdf or the project website: www.dorchestermdhazardplans.org.

Hazard Mitigation is any action taken to permanently reduce or eliminate long-term risk to people and their property from the effects of hazards.

DORCHESTER COUNTY
ALL-HAZARD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #1

June 2, 2021 10:00 AM

FEMA Requirements

- FEMA requires hazard mitigation plans to be updated every five (5) years.
- Core Planning Team/public engagement is vital throughout all stages of the plan development process to be approved by MEMA & FEMA.
- For municipalities to be covered under the Dorchester County All-Hazard Mitigation Plan, they must participate throughout the planning process and formally adopt the plan.
- Cost effective
    - Natural hazard mitigation provides the nation $6 in benefit for every $1 invested. In 2020, FEMA obligated more than $884 million in Hazard Mitigation Assistance grants, which $522 million of the obligated monies went to the top 5 projects: acquisitions, flood control, utility and infrastructure protection, elevations and wind retrofit.

DORCHESTER COUNTY
ALL-HAZARD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #1

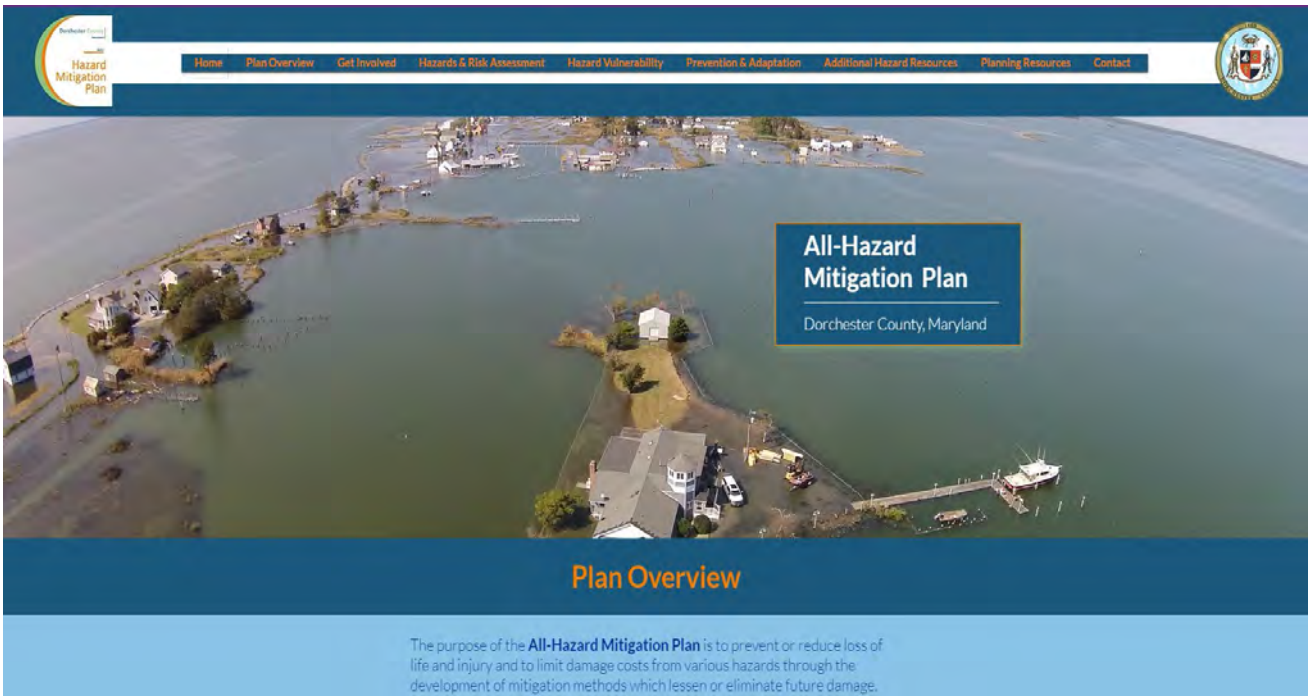
June 2, 2021 10:00 AM

Core Planning Team & Public Participation

- The Core Planning Team (CPT) is comprised of stakeholders from a broad cross-section of the community were invited to participate, including municipalities.
- The CTP will meet approximately 3-4 times during the planning process.
- Stakeholders may have public outreach initiatives that pair well with hazard mitigation. SP&D requests that stakeholders reach out and provide details of these public outreach initiatives for collaboration and documentation.
- SP&D is requesting photos, data, and ideas as they relate to hazard mitigation from stakeholders.

Project Website & Social Media

- The project website will be utilized to provide updates, post links, and share new information relating to the Plan Update. This website will be updated throughout the plan development process.
- The project website will be officially launched after CPT review. The link to the draft website: www.dorchestermdhazardplans.org. **Please review the website and provide comments by COB June 18, 2021.**
- The project website will be launched to the public after review.



DORCHESTER COUNTY
ALL-HAZARD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #1

June 2, 2021 10:00 AM

Hazard Risk Survey Results

- Stakeholders were asked to complete a Hazard Risk Survey to gather their perspective on the hazards identified within the plan.
- Hazard Rankings were determined using a composite score method which included variables such as: (1) injuries, (2) deaths, (3) property damage, (4) crop damage, (5) geographic extent, (6) total annualized events, (7) future probability, and (8) community perspective.

  *Equation: Composite Score = IN + DT + PD + CD + (GE*1.5) + EV + FP + (CP*1.5)*
- Community perspective (CP) was determined using stakeholder survey results.
- Full results, including data utilized and methods, are included and is an Appendix of the Plan Update.
- Hazard Identification & Risk Assessment Results:

NATURAL HAZARD IDENTIFICATION AND RISK ASSESSMENT RANKING RESULTS		
Hazards	**2017 Hazard Ranking**	**2021 Hazard Ranking**
Coastal Events	High	High
Thunderstorm	Medium-High	High
Riverine Flood	High	Medium-High
High Wind	Medium-High	Medium-High
Tornado	Medium	Medium-High
Extreme Heat	Medium High	Medium-High
Drought	Medium	Medium
Winter Storm	Medium-High	Medium
Wildfire	Medium	Medium
Earthquake	Low	Low

- Additional Stakeholder Survey Results:
  - Major Fire & Explosion: Concerned
  - On-Site HazMat Incident: Somewhat Concerned
  - Transportation HazMat Incident: Somewhat Concerned
  - Epidemic: Somewhat Concerned
  - Dam Failure: Not Concerned

  NOTE: Epidemic will be changed to Emerging Infectious Disease and will be a new standalone chapter in the Plan Update.

- Social Vulnerability will be a new component to the Plan Update. Core Team members were surveyed to identify groups particularly at risk and results were:
    - Age
    - Socioeconomic Status
    - Medical Issues and Disability

  NOTE: For social vulnerability, the Center for Disease Control (CDC) guidelines will be used.
- Top hazards affecting these groups according to survey results:
    - Coastal Events (Coastal Flooding, Hurricanes, Nor'easter, Sea Level Rise & Shoreline Erosion)
    - Epidemics
    - Extreme Heat

Development of Action Items and Projects

- Mitigation Status Update will be conducted. A fillable PDF form will be provided for completion in Mid-June. Results will be integrated into the Plan Update.
- New ideas will be collected throughout the plan development process. Ideas will be developed into mitigation actions for the Plan Update.
- Prioritization of new mitigation actions will be conducted at the end of the planning process.

Next Steps

- Meeting #1 Notes - distributed to all stakeholders and uploaded to project website.
    - Stakeholders to review and comment on website prior to public launch.
    - **Please review the website and provide comments by COB June 18, 2021 to Steve Garvin, sgarvin@docogonet.com or Michele King, mking@smithp-d.com.**
    - The link to the draft website: www.dorchestermdhazardplans.org.
- Mitigation Action Items Status Update
    - Fillable PDF form distributed to stakeholders for completion.
    - Mid-June
- Project Website:
    - Launch Date: end of June 2021
- Public Survey:
    - Launch Date: end of June 2021
- Targeted Small Group Meetings:
    - July-August 2021

DORCHESTER COUNTY
ALL-HAZARD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #1
June 2, 2021 10:00 AM

- Meeting #2:
    - September 2021

DORCHESTER COUNTY
ALL-HAZARD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #2

September 8, 2021 at 10:00 AM

The following Core Planning Team (CPT) members were present at Meeting #2:

Name	Organization/Department
Dozia Rahilly	Department of Emergency Services
Tori Lynn Faith	Department of Emergency Services
Herve Hamon	Department Planning & Zoning
Stephanie Newcomb	Department of Public Works
Susan Banks	Economic Development
Roger Harrell	Health Department
Hannah Mayhew	Health Department
Chris Hauge	Board of Education
Erin Silva	Salisbury University
Larry White	Cambridge – FEMA/FMA Project Manager
John Sandkuhler	Twin Point Cove Group
Bill Christopher	Chamber of Commerce
Kate McClure	Maryland Extension
Bill Hildebrand	Maryland Emergency Management Agency (MEMA)
Virginia Smith	Smith Planning & Design, Project Consulting Team
Michele King	Smith Planning & Design, Project Consulting Team

Agenda

- ✓ Related Planning Initiatives
- ✓ Small Group Meeting Update
- ✓ Working Draft Chapter Review
- ✓ Mitigation Status Report
- ✓ Core Planning Team and Public Participation
- ✓ Next Steps

For members who would like to review the previous 2017 planning documents:

All-Hazard Mitigation Plan

Flood Mitigation Plan

Related Planning Initiatives

Three presentations were given at the beginning of the meeting and included:

- Eastern Shore Economic Recovery Project - Erin Silva, Salisbury University
  - The project website is: https://recovery.delmarvaindex.org/.
- Cambridge Shoreline Resilience Plan - Larry White, Project Manager
  - The project website is: www.makecambridgeresilient.org.
- Coastal Community Resiliency Studies for Hoopersville, Twin Points Cove & Hurst Creek - Herve Hamon, Dorchester County Director of Planning & Zoning

- Project information is included on the Dorchester County All-Hazard Mitigation Plan website: www.dorchestermdhazardplans.org under the "**Additional Hazard Projects**" tab.

For those members unable to attend the meeting, PowerPoint presentations along with meeting notes were distributed via email. Also, the meeting recording is available on the project website under the "**Get Involved**" tab.

Small Group Meeting Update

Municipal questionnaires were developed for each municipality. The questionnaires were provided to the municipalities by email as well as direct mailings. Individual meetings for municipal representatives to discuss the questionnaire and any projects currently underway or planned were offered. To date we have received one completed questionnaire, but we will continue to work with the municipalities to obtain the information.

We also held a small group meeting with public health representatives on July 22, 2021. The new working draft chapter was reviewed by participants and modified accordingly. The working draft chapter to discuss the new emerging infectious disease chapter.

Working Draft Review

- **New Chapter 12 Emerging Infectious Disease** – main chapter components
  - Hazard Profile & Risk
  - Vulnerability
  - Capability
  - Centers for Disease Control & Prevention
    - The CDC recommends the "12 guiding principles" to be consider when developing and implementing mitigation strategies.
    - During the development of this chapter, the 2020 Dorchester County Health Department (DCHD) Emerging Infectious Disease (EID)/Infectious Disease Response Plan (IDRP) was reviewed. To demonstrate the Health Department adherence to each principle, excerpts from the Health Department's Plan were incorporated with each of the corresponding principles.
  - Conclusions & Recommendations
    - Mitigation actions and recommendations were developed with the public health small group.
- The working draft chapter was distributed to the Core Planning Team following this meeting.

DORCHESTER COUNTY
ALL-HAZARD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #2

September 8, 2021 at 10:00 AM

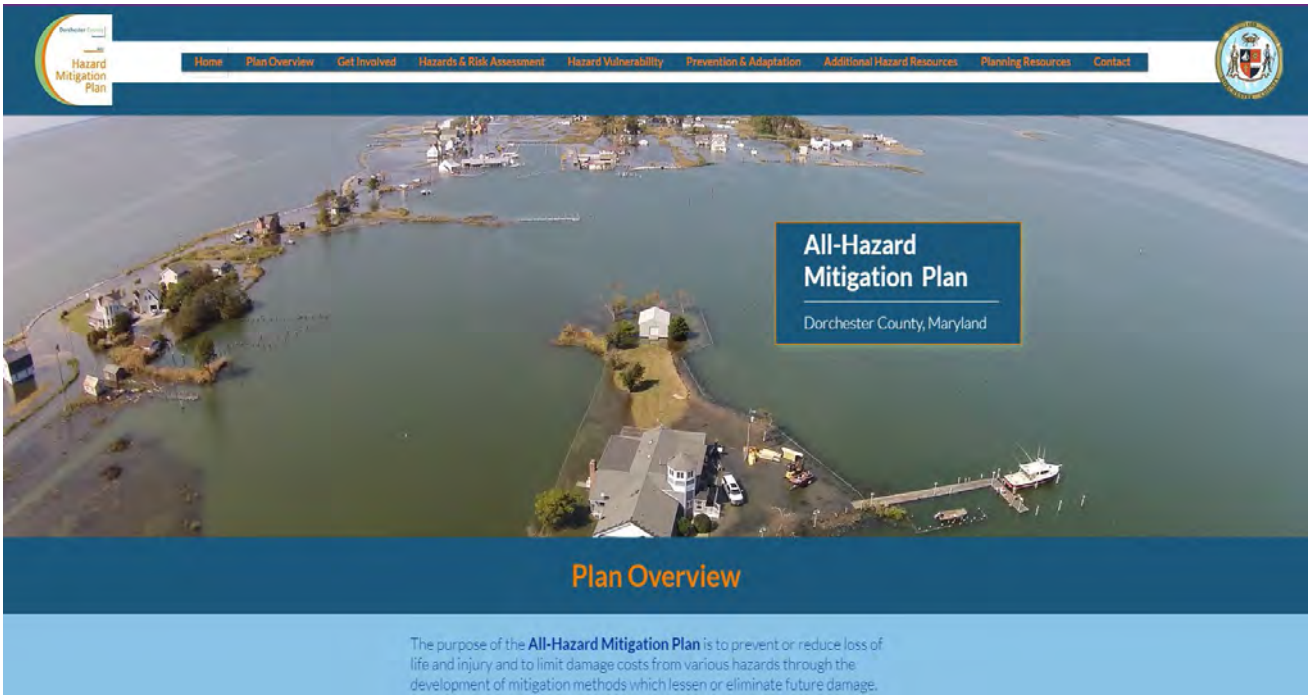
Appendix B 2017 Mitigation Action Item Status Update Report

- Appendix B was developed and provided July 7, 2021, for CPT review.
- Results indicated that 50% of the 2017 mitigation actions were either complete or in-process.
- 3 actions items were determined incomplete and will be reviewed further by the CPT and included in the 2021 Plan update.

Stakeholder & Public Participation

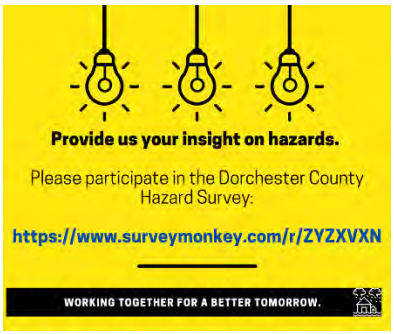
In order to maximize public participation, we are asking the Core Planning Team to continue promoting the project website and the public survey through social media or meetings.

- The project website provides updates, additional resource links, and share new information relating to the Plan Update. This website will be updated throughout the plan development process.
- The link to the project website: www.dorchestermdhazardplans.org.



DORCHESTER COUNTY
ALL-HAZARD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #2
September 8, 2021 at 10:00 AM

- Public Survey
  - The social media graphic for promoting the public survey was previously provided.
  - A new social media graphic has been created and is provided with the meeting notes.
  - CPT members were requested to provide an email indicating that the graphic was posted by their agency/department. Smith Planning & Design is tracking all outreach efforts.



  - CPT members are requested to provide an email indicating any collaboration or mentioning of the hazard mitigation plan with any partners.
  - Please email Michele King, mking@smithp-d.com, with the date and outreach activity.
  - All information provided is included in the Dorchester County All-Hazards & Flood Mitigation Planning, Training, and Outreach Initiatives, excerpt shown below.

Dorchester County All-Hazard & Flood Mitigation Planning, Training, and Outreach Initiatives				
Date	**Meeting, Training, or Outreach Activity**	**Target Audience**	**Materials Provided**	**Comments/Input**
10-Feb-21	Project Kick-Off Mtg.	Project Manager	Project SOW & Timeline	Discussed outreach strategy and development of project website. HMP & FMP Core Planning Team listing review and update will be completed.
9-Mar-21	Cambridge Shoreline Resilience Plan	Stakeholder Meeting	Agenda & Meeting Notes	Steve Garvin represented Dorchester DES and conveyed information about county all-hazards and flood mitigation planning efforts.
19-Mar-21	Cambridge Shoreline Resilience Plan	Stakeholder	Survey	Steve Garvin provided input for Dorchester DES
13-Apr-21	Cambridge Shoreline Resilience Plan	Stakeholder Meeting	Agenda & Meeting Notes	Steve Garvin provided input for Dorchester DES and status updated of county all-hazards and flood mitigation planning efforts.
13-Apr-21	GIS Data Coordination	GIS Speicalist	Dropbox Link	GIS Data Transfer Established
25-May-21	Cambridge Shoreline Resilience Plan	Stakeholder Field Visit	Project Site (5) Fact Sheets & Presentation	Steve Garvin provided input for Dorchester DES and potential opportunities for collaboration with the county all-hazards and flood mitigation planning efforts.
2-Jun-21	Draft Website Content	Core Planning Team & Public	Flood Specific Content	Hazard Vulnerability Tab - Flood Risk Report & Map & Hazard Resources Tab

DORCHESTER COUNTY
ALL-HAZARD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #2

September 8, 2021 at 10:00 AM

Next Steps

- Meeting #2 Notes - distributed to all stakeholders and uploaded to project website.
  - The meeting was recorded and will be included on the project website under the "**Get Involved**" tab.
  - PowerPoint presentations are included with the meeting notes.
- Working Draft Chapter Review – Hazard Specific Chapters
  - Chapter 12 Emerging Infectious Disease distributed with meeting notes.
  - To make the review of this Plan Update manageable, we will be sending out draft chapters for your review and comment on a regular basis.
  - If you wish to review the plan update as a completed draft rather than by "working draft" chapters, no problem, a completed Draft Plan Update will be provided near the end of this process for your review and comment.
- Municipal Questionnaires Submittal & Meetings
  - We will continue to work with municipalities to collect information for inclusion in the plan update.
- Mapping & Graphics – Project Website
  - As draft chapters are developed, mapping and graphics from each chapter will be included on the project website under the "**Hazard Vulnerability**" tab.
- CPT Meeting #3 - Mitigation Strategies Workshop

DORCHESTER COUNTY
ALL-HAZARD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #3
March 10, 2022 at 10:00 AM

The following Core Planning Team (CPT) members were present at Meeting #3:

Name	Organization/Department
Dozia Rahilly	Department of Emergency Services
James Windsor	Department of Emergency Services
Herve Hamon	Department Planning & Zoning
Susan Webb	Department Planning & Zoning
Jason Boothe	Department Planning & Zoning
Sonny Willey	Department of Public Works
Hannah Mayhew	Health Department
Tracey Gordy	Maryland Department of Planning
Debbie Herr-Cornwell	Maryland Department of Planning
Kate McClure	UMD Sea Grant Extension Program
Bill Hildebrand	Maryland Emergency Management Agency (MEMA)
Virginia Smith	Smith Planning & Design, Project Consulting Team
Michele King	Smith Planning & Design, Project Consulting Team

Agenda

- ✓ Plan Status Update
- ✓ Mitigation Action Item Workshop
- ✓ Next Steps

Plan Status Update

The project website, launched summer of 2021, has received hundreds of unique visitors; https://www.dorchestermdhazardplans.org/. The website is posted on Dorchester County's DES Facebook.

The public survey currently has over 100 unique responses. Preliminary results indicate the public is most concerned with Coastal Hazards and Emerging Infectious Diseases, while being least concerned about Winter Weather, Dam Failure and Wildfire.

Core Planning Team members are encouraged to post links to the project website and survey on their social media outlets. We will continue to collect outreach planning, training, and initiatives throughout the plan development process. Please provide social media outlet information and date of postings to Michele King, SP&D (mking@smithp-d.com).

DORCHESTER COUNTY
ALL-HAZARD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #3
March 10, 2022 at 10:00 AM

In addition, each of the natural hazards identified in the plan was update and sent to Core Planning Team (CPT) members for review. Data, text, vulnerability assessments, and mapping have been updated with the best available data. Two new chapters (highlighted in **orange**) were developed for the plan update.

- Coastal Hazards
- Riverine Flooding
- Winter Weather
- Thunderstorm, Hail, Wind & Tornado
- Extreme Heat, Drought & Wildfire
- Human Impacted Hazards
- **Emerging Infectious Diseases**
- **Climate Change**

Plan chapters are available for public review on the project website under the "**Public Plan Review & Comment**" tab.

Goals and objectives were reviewed during the meeting and updated (**attached**). For those members who were unable to attend, please review. If there are any modifications, please send by **March 23, 2022**.

Mitigation Action Item Workshop

Mitigation action items were developed during the plan update process. Additionally, mitigation action items that were designated as incomplete were carried over from the 2017 HMP. A total of 53 mitigation action items have been included in the 2022 HMP (**attached**).

During the workshop, mitigation action items were reviewed and prioritized by the Core Planning Team (CPT). CPT members were lead through a three-step process, which included both individual and group work discussion. At the end of the process, CPT members identified eleven (11) mitigation action items that are a priority for completion during the next five-year planning cycle.

Project sheets have been developed for the 11 action items (**attached**). The following topics are included on the project sheets.

- Hazard
- Location
- Project Title & Mitigation Action Item
- Background/Issue
- Ideas for Integration
- Responsible Agency
- Partners
- Potential Funding
- Cost Estimate
- Benefits (losses avoided)
- Timeline
- Goals and Objectives

DORCHESTER COUNTY
ALL-HAZARD MITIGATION PLAN UPDATE
CORE PLANNING TEAM MEETING #3

March 10, 2022 at 10:00 AM

Prioritization Process

After reviewing the mitigation projects sheets (**attached**), CPT members will be provided with a link to the Prioritization Survey. This online survey will be used as a tool for ranking purposes by CPT members. A series of yes/no questions, typically 6 questions, will be asked per action item. The basis for this online project priority survey method is the STAPLEE evaluation method uses seven criteria for evaluating a mitigation action: Social, Technical, Administrative, Political, Legal, Economic, and Environmental.

Next Steps

- Meeting #3 Notes- Distributed to all stakeholders and uploaded to project website.
- Prioritization of Projects by CPT Members (Online Survey) - Distribute **Wednesday, March 16th** with a return date of **Wednesday, March 23rd**)
- Completion of Chapter 15 - Mitigation Actions including projects (Completion **Friday, March 25th**)
- Draft Plan distribution to committee members. Please keep in mind all hazard chapters and other plan components have been distributed over the past few months for review and comment. This will essentially be the second opportunity for committee review and comment.
- MDEM Submittal
- FEMA Review
- County Adoption
- Municipal Adoption - Jurisdictions with land use authority.

Meeting Date: July 19, 2021

Time: 1:00PM

SLR and Coastal Flooding Impacts on Development- Matt Pluta

Herve Hammon, Katlyn Schmitt, Erik Fisher, Matt Pluta. Bethany Lynn Ward,

1. Does the county consider the projections and impacts of 2' of SLR during your review and approval process for building applications? If yes, how so?
   Freeboard requirement BFE +2ft, storage and such at BFE

2. Does the county consider the state's Coastal Resilience Action Boundary (CRAB) in your review and approval process for building applications?
   Herve has attended training. Both he and his environmental planner use this tool frequently showing this to permit applicants.

   Substantial improvement must be elevated to BFE +2ft. This is enforced and DC Planning has been audited and they passed. They are still at CRS rating of 6.

3. What citing and design criteria does the county require for proposed buildings in areas that will be impacted by nuisance flooding and/or SLR?
   Talk about elevation, but not education about flood resistant materials, (dry flood proofing vs. wet flood proofing) a pamphlet for distribution would be helpful.

4. What resources would help the county evaluate the impacts of SLR on proposed development?
   Dynamic mapping with vertical and geographic extent.

Herve Comments:

Dynamic analysis with different scenarios would be helpful, adding a foot of water at a time.

Conveying messaging to realtors, they need to provide all of the information about these properties.

Mid-Shore Board of Realtors- Matt will send agenda, as he will be speaking at an upcoming event.

Herve indicated the most vulnerable: Crappo & Toddsville (small population communities)

When a house goes into foreclosure a moratorium on development to determine if structure should be removed and open space or redeveloped.

Economic growth big topic for County. Difficult discussions. Sewer connections being looked at due to failing septic systems and/or pits. MDE- Any development is now being looked at to determine viability of system,

Older house and then redevelopment for new structure using the previous house footprint.

Sub-divisions are more in the non-hazard areas of the County. This is happening more on single lot basis.

Critical Area Regulations direct size and location of buffers.

Potential analysis could include water resources (water & septic) with hazard risk areas. Develop criteria to determine properties that would be most at-risk due to vulnerability and potential failing systems.

Communicating risk by showing maps.

Updated precipitation model for Maryland, County level data, August 12th webinar

Stormwater issues and ponding due to flat topography.

Small Group Meeting with Planning & Zoning

Attendees: Roger Short, Travis Jackson, Jason Boothe, Herve Hamon

As of 2019, Dorchester has a CRS Rating of 6

Do you plan on maintaining this rating or go for a lower rate, like a 5?

Maintaining,

Maintaining - Maintaining will be difficult considering the manpower necessary for the program. P&Z will be evaluating where they are now with CRS and what needs to be done to continue. Political climate is an issue too.

Agricultural buildings are currently an issue

- State is suggesting county adopt more stringent codes for ag structures
- Large amount of Ag in floodplain and do not meet regulations – found loopholes
- No specific language specifically in code for agriculture
- State suggested code language similar to Allegany County
    - P&Z not in complete agreement with ALCO language for all ag buildings

NEW ACTION – Update language in floodplain management code stating limitations and framework on agricultural structures in the floodplain.

New RLP information obtained? Cross checking with listing in the 2017 listing? Sending mailings to the current listing?

Jason will request RLP listing and obtain updated NFIP Policy and Claims data. Jason will provide data to SP&D.

P&Z working on progress report to submit to MDE by October 15, 2021. Herve is working on responses, Jason is gathering all Elevation Certificates to submit as an attachment, and another staff member is preparing letters to mail to the 560 properties listed in Appendix G, Table 4. Letters will be sent by October 15, 2021.

In 2019, 230 letters were issued to Floodprone properties.

Are elevation certificates still being maintained? Website only provides up to 2018. Can we have certificates for 2019, 2020, and 2021. Is there GIS data associated with the elevation certificates? This would inform us what level of flooding may occur at the property and level of damage. If first floor is higher, then flood insurance cost could be reduced.

All elevations certificates obtained in 2019 and 2020 were submitted to MDE, Kevin Wagner.

No GIS data is associated with the elevation certificates.

Any elevations or acquisition projects planned for the next 5 years?

No acquisition projects have occurred or are planned.

2 elevation projects are currently underway. Both are voluntary elevations.

- Hoopers Island Road
- Parks Road

Do you plan to regulate outside the Special Flood Hazard Area? Take in account the 0.2% annual chance flood geographic extent?

No, regulating outside the SFHA will not happen.

P&Z would like to refine existing floodplain codes.

Current flood protection level is 2 feet above base flood elevation, any plans of increasing this to 3 feet?

No, flood protection level will remain at 2 feet above BFE.

NEW MITIGATION ACTIONS

- Flood insurance brochures (FIB): Do they already have this or are they interested in this as a new action item?
    - Up to 25 points for including flood insurance information with building permits or other direct distribution

P&Z does have brochures but typically refers citizens to FEMA brochures. They are not distributed with projects or building permits.

NEW ACTION – Reexamine and revise flood insurance brochures. Distribute with substantial improvement projects and building permits.

Under 611.b Activity Credit Criteria, where the section continues on page 610-5, subsections (a) and (b) are replaced with the following:

- (Describe the methods and warning devices used to disseminate emergency warnings to the general public that are credited under EWD. Studies have shown that flood damage can be reduced by 30% if people have 24 hours of warning during which to prepare for an event;
- Include specific flood response actions that are taken at the different flood levels or flash-flood-impact areas that are credited under FRO. This correlates the identified flood levels with emergency evacuation/rescue planning tasks, such as 1-foot depth— evacuate foot traffic; 2- or 3-feet depth—high-water vehicles only; 4- to 6-foot depth—boat evacuation; over 9 feet—helicopter evacuations on call. Additional points area given if this includes specific equipment and personnel needed for each.

Is there a flood exercise or drill planned within the next five years? Can we add this as an action item in the HMP? The exercise/drill must be HSEEP compliant and include an AAR/IP

Flood exercises or drills have not been conducted by P&Z. P&Z thinks this is more of a DES action.

P&Z does think this should be included as a new mitigation action item.

Under 611.b Activity Credit Criteria, where the section continues on page 610-7

- There must be at least one exercise and evaluation of the flood warning and response plan each year that is compliant with the National Incident Management System (NIMS). This process is

described in the Homeland Security Exercise Evaluation Program. The exercise can be for a flood, levee failure, dam failure, or hurricane. This criterion can be met if the plan is implemented in response to an actual flood-related event or threat of a levee failure. In either case, there must be an evaluation of the performance of the plan and recommendations for needed change, as is usually documented in an after-action report/ improvement plan. This criterion is part of the national emergency preparedness cycle.

Next Steps

- Update Appendix G with new RLP and NFIP data
- Revise mapping
- Send to P&Z for review
- Examine western portion of Neck District – high concentration of properties in floodplain

Dorchester County Coordination Call- Thursday, January 27th at 2PM

Dozia Rahilly- DC DES, Herve Hamon- DC P&Z, Michele King- SP&D &

Ginny Smith- SP&D

Flood Risk Reduction Community Workshop

Date: March 22nd or 23rd, 2022

Time: 5:30-8:00PM

Location: Dorchester Center for the Arts

Purpose: To provide an opportunity for property owners to obtain information on various flood risk reduction options, grant, and technical assistance opportunities.

Presenters:

1. Stephen Allan, AICP
   Office of Planning, Education and Outreach
   Maryland Historical Trust
2. MDEM- TBD (Blake Langford to confirm MDEM Speaker) Add notes to speaker to include Dorchester County specific comments: types of projects FEMA is currently funding, burden on property owner for application and matching funds, and realistic expectations of grant application approval rate.
3. Jason Stick, Silver Jackets
   U.S. Army Corps of Engineers- Baltimore District
4. Kevin Wagner, MDE (NFIP & CRS)
   Community Assistance Program Manager
5. Sasha Land, Chesapeake & Coastal Service- Department of Natural Resources
   Coastal Planner
6. Matt Pluta, Director of Riverkeeper Programs
   Choptank Riverkeeper, ShoreRivers

Open House & Break-Out Stations

- Cambridge Project- Larry White, Project Manager
- Hoopersville Project- Herve to Inform
- Twin Point Cove Project- Herve to Inform
- MyCoast Maryland- Sasha Land, DNR
- Dorchester County Hazard Mitigation Plan- Michele King, SP&D and Jimmy Windsor, Dorchester County Dept. of Emergency Services
- Dorchester County CRS & Flood Insurance -Travis Jackson, Dorchester County Assistant Building Inspector

- Who will man the Hoopersville Project & the Twin Point Cove Project Stations?
- Will you have posters/displays for the Station(s)?

Dorchester County All-Hazards Mitigation Plan & Flood Mitigation

The ***Flood Risk Reduction Community Workshop*** will be documented as a public outreach event in both planning documents.

- Mitigation Workshop: March 10th at 9:00 AM (Meeting location needed.)
- Upload Working Draft Plan Chapters following HMPC review and comment on project website with public comment form. Dozia has approved this course of action

APPENDIX F
MUNICIPAL INPUT

Municipal Input

Municipal representatives participated in two or more of plan update activities. Examples of municipal plan update activities are provided below.

Documentation of Municipal Plan Update Activities		
Municipality	Documentation Example #1	Documentation Example #2
City of Cambridge	Attended Meetings 1 & 2 – *Appendix E*	Participated in the Municipal Survey
Town of Church Creek	Participated in the Municipal Survey	Completed Municipal Questionnaire
Town of East New Market	Completed Municipal Questionnaire	Participated in the Municipal Survey
Town of Eldorado	Completed Municipal Questionnaire	Participated in the Municipal Survey
Town of Galestown	Completed Municipal Questionnaire	Participated in the Municipal Survey
Town of Hurlock	Participated in the Municipal Survey	Completed NFIP Survey – *Appendix I*
Town of Secretary	Completed Municipal Questionnaire	Completed NFIP Survey – *Appendix I*
Town of Vienna	Completed Municipal Questionnaire	Participated in the Municipal Survey

Q1

Please provide organization, agency or department that you represent.

City of Cambridge MD

Q2

If you are representing a municipality, please indicate which community.

Cambridge

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Drought - A drought is essentially a deficiency of precipitation over a period of time resulting from a weather pattern that brings no moisture into an area. Dorchester County normally receives 40-44 inches of precipitation per year, about average for the state. However, that does not mean the County is immune to drought. Water supply can be affected, particularly where groundwater is relied on to supply community systems, as is the case in Dorchester County.	**Concerned**
Tornado - Under the right temperature and moisture conditions, intense thunderstorms can produce tornadoes in areas of differential heating such as occurs on the Eastern Shore. According to the National Center for Environmental Information (NCEI) data, since 1984, Dorchester County has experienced (11) eleven tornado events.	**Somewhat Concerned**
Thunderstorm - Dorchester County is affected primarily by thunderstorm activity through the interaction of warm and cool air masses along frontal systems. Thunderstorms are more common in the spring when frontal zones are passing over the County from west to east and during the summer months when warm, moist air is lifted over the eastern shore by differential heating of the land and surrounding water.	**Concerned**
High Wind - High and strong wind events can also occur in the County without the presence of thunderstorms. There are several reasons as to how wind can occur without the presence of thunderstorms, such as low pressure systems, cold fronts, remnants of hurricanes, and other meteorological causes. High wind events as characterized by the Nation Weather Service are winds that are over 50 knots (57.5 mph) and strong wind events are less than 50 knots.	**Somewhat Concerned**
Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Since more than 40% of Dorchester County's land surface is covered by forests, and another 25% is covered with wetland species, wildfire is a major concern.	**Somewhat Concerned**
Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. Dorchester County averages 13 inches of snowfall annually, according to the National Weather Service.	**Not Concerned**
Major Fire & Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. Dorchester County is at risk due to the clustering of commercial and industrial structures in the Cambridge and Hurlock communities. Additionally, all municipalities share the threat of fire to residential, commercial or other structures. The municipalities of Cambridge and Vienna have the possibility of fire/explosion transportation related incidents due to their location along Route 50.	**Concerned**
Extreme Heat - According to the National Weather Service, when temperature and humidity together exceed certain levels (85 F and 100% humidity, 90 F and 70% humidity, or 110 F and 30% humidity) heatstroke is likely if exposure continues for many hours. Dorchester County normally averages close to the same temperature and humidity during the summer months as Baltimore and Washington DC. However, along the coast, the temperature and humidity are more closely related to the Tidewater Area in Virginia where there are fewer days with those conditions.	**Somewhat Concerned**

	Level of Concern
On-Site HazMat Incident - A hazardous material may be defined as a substance or material, which, due to its chemical, physical or biological nature, poses a threat to life, health or property if released from a confined setting. On-site HazMats are a concern for Dorchester County. The county maintains a record of each site and the material(s) stored at the site. These sites include water and sewage treatment plants, and a number of manufacturing, wholesale and retail concerns in Cambridge and Hurlock areas.	**Somewhat Concerned**
Transportation HazMat Incident - Hazardous materials are constantly being moved in Maryland on interstate highways, rail systems and on shipping lanes in the Chesapeake Bay and its tributaries. The bulk of hazardous materials pass through the County by truck, particularly on Route 50, which crosses the northern part of the County from west to east. Other highways that are used to transport hazardous materials include: State Routes 14, 16, and 331.	**Concerned**
Epidemic - Epidemics can be considered as part of a broad hazard category that could be termed “public health emergencies.” In addition to disease epidemics, such events can take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service.	**Somewhat Concerned**
Fire/Explosion - fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. Dorchester County is at risk due to the clustering of commercial and industrial structures in the Cambridge and Hurlock communities	**Concerned**
Dam Failure - A dam failure is simply an uncontrolled release of water from a reservoir through a dam as a result of structural failures or deficiencies in the dam. According to the USACE National Inventory of Dams, four (4) dams are located in Dorchester County.	**Somewhat Concerned**
Earthquake - Motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust affecting roadways and foundations of buildings. Although no earthquake epicenters have been documented within Dorchester County, all of the county could be affected by earthquakes occurring in neighboring states. The most significant event to affect Dorchester County was the 2011 Virginia Earthquake.	**Not Concerned**

Q4

Please indicate your level of concern for each flood related hazard.

	Level of Concern
Riverine Flooding	**Very Concerned**
Hurricane	**Very Concerned**
Nor'easter	**Very Concerned**
Coastal Flooding	**Very Concerned**
Sea Level Rise	**Very Concerned**
Shoreline Erosion	**Very Concerned**

Q5

In terms of social vulnerability, do you feel that a specific group or groups in the County are particularly at risk for or could be harmed by any of the hazards events listed in question 6? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

Socioeconomic status,

Age,

Medical issues and disability

Q6

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

Coastal Events,

Riverine Flooding,

Drought,

Tornado,

Epidemics,

Wind,

Wildfires,

On-site HazMat Incident,

Extreme Heat ,

Fire/Explosion

Q7

Does your agency/department/organization have any mitigation action idea(s) for the next 5 years to incorporate into the hazard mitigation plan? If so, please provide the the action(s) below.

Flood Mitigation Planning and Project Designs for the City of Cambridge that is in progress to address sea level rise and major storms.

Dorchester County Hazard Mitigation Municipal Survey

Q1

Are you a resident of Dorchester County?

Yes

Q2

Please select which community you are representing.

Church Creek

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. Dorchester County averages 13 inches of snowfall annually, according to the National Weather Service.	**Very Concerned**
Thunderstorm - Dorchester County is affected primarily by thunderstorm activity through the interaction of warm and cool air masses along frontal systems. Thunderstorms are more common in the spring when frontal zones are passing over the County from west to east and during the summer months when warm, moist air is lifted over the eastern shore by differential heating of the land and surrounding water.	**Somewhat Concerned**
High Wind - High and strong wind events can also occur in the County without the presence of thunderstorms. There are several reasons as to how wind can occur without the presence of thunderstorms, such as low pressure systems, cold fronts, remnants of hurricanes, and other meteorological causes. High wind events as characterized by the Nation Weather Service are winds that are over 50 knots (57.5 mph) and strong wind events are less than 50 knots.	**Very Concerned**
Tornado - Under the right temperature and moisture conditions, intense thunderstorms can produce tornadoes in areas of differential heating such as occurs on the Eastern Shore. According to the National Center for Environmental Information (NCEI) data, since 1984, Dorchester County has experienced (11) eleven tornado events.	**Somewhat Concerned**
Extreme Heat - According to the National Weather Service, when temperature and humidity together exceed certain levels (85 F and 100% humidity, 90 F and 70% humidity, or 110 F and 30% humidity) heatstroke is likely if exposure continues for many hours. Dorchester County normally averages close to the same temperature and humidity during the summer months as Baltimore and Washington DC. However, along the coast, the temperature and humidity are more closely related to the Tidewater Area in Virginia where there are fewer days with those conditions.	**Somewhat Concerned**
Drought - A drought is essentially a deficiency of precipitation over a period of time resulting from a weather pattern that brings no moisture into an area. Dorchester County normally receives 40-44 inches of precipitation per year, about average for the state. However, that does not mean the County is immune to drought. Water supply can be affected, particularly where groundwater is relied on to supply community systems, as is the case in Dorchester County.	**Concerned**
Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Since more than 40% of Dorchester County's land surface is covered by forests, and another 25% is covered with wetland species, wildfire is a major concern.	**Very Concerned**
Major Fire & Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. Dorchester County is at risk due to the clustering of commercial and industrial structures in the Cambridge and Hurlock communities. Additionally, all municipalities share the threat of fire to residential, commercial or other structures. The municipalities of Cambridge and Vienna have the possibility of fire/explosion transportation related incidents due to their location along Route 50.	**Somewhat Concerned**
On-Site HazMat Incident - A hazardous material may be defined as a substance or material, which, due to its chemical, physical or biological nature, poses a threat to life, health or property if released from a confined setting. On-site HazMats are a concern for Dorchester County. The county maintains a record of each site and the material(s) stored at the site. These sites include water and sewage treatment plants, and a number of manufacturing, wholesale and retail concerns in Cambridge and Hurlock areas.	**Somewhat Concerned**

	Level of Concern
Transportation HazMat Incident - Hazardous materials are constantly being moved in Maryland on interstate highways, rail systems and on shipping lanes in the Chesapeake Bay and its tributaries. The bulk of hazardous materials pass through the County by truck, particularly on Route 50, which crosses the northern part of the County from west to east. Other highways that are used to transport hazardous materials include: State Routes 14, 16, and 331.	**Somewhat Concerned**
Emerging Infectious Disease -Emerging Infectious Diseases can be considered as part of a broad hazard category that could be termed “public health emergencies.” In addition to disease epidemics, such events can take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service.	**Somewhat Concerned**
Dam Failure - A dam failure is simply an uncontrolled release of water from a reservoir through a dam as a result of structural failures or deficiencies in the dam. According to the USACE National Inventory of Dams, four (4) dams are located in Dorchester County.	**Somewhat Concerned**
Earthquake - Motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust affecting roadways and foundations of buildings. Although no earthquake epicenters have been documented within Dorchester County, all of the county could be affected by earthquakes occurring in neighboring states. The most significant event to affect Dorchester County was the 2011 Virginia Earthquake.	**Somewhat Concerned**

Q4

Please indicate your level of concern for each hazard.

	Level of Concern
Riverine Flooding	**Somewhat Concerned**
Hurricane	**Very Concerned**
Nor'easter	**Somewhat Concerned**
Coastal Flooding	**Somewhat Concerned**
Sea Level Rise	**Somewhat Concerned**
Shoreline Erosion	**Somewhat Concerned**

Q5

Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)

Coastal Events,

Winter Weather,

High Wind,

Drought

Q6

Are you concerned with any other hazards not identified in this survey?

Respondent skipped this question

Q7

In terms of social vulnerability, do you feel that a specific group or groups in the County are particularly at risk for or could be harmed by any of the hazards events listed in questions 5 and 6? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

Respondent skipped this question

Q8

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

Respondent skipped this question

Q9

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

Respondent skipped this question

2022 Dorchester County
All-Hazard & Flood Mitigation Plans

Questionnaire

Please complete the questions below for the **Town of East New Market**. This information will be included within the 2022 Dorchester County All-Hazard & Flood Mitigation Plans. FEMA requires participation by all municipalities who plan to adopt the 2022 Plan. To that end, we request that a representative(s) from your jurisdiction complete this questionnaire.

New Mitigation Ideas

Do you have any mitigation action items for your jurisdiction for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

The town would like install a warning siren at the East New Market Volunteer Fire Department for the purposes of alerting volunteer personnel to 911 Emergency Calls. In addition the siren would be used for alerting the citizens in the town of East New Market and surrounding area of Severe Weather such as Tornadoes and other extreme weather events. This would include public meetings at the fire department at least twice a year for residents to let them hear what the siren sounds like for specific events as well as new developments regarding public safety.
Applying for grants to purchase special equipment the town and volunteer fire department need to be better prepared for hazards within the local jurisdiction.

Capability Assessment

In order to determine current capabilities, the following questions have been developed for your review and input. Questions have been included under the following groups: Planning and Regulatory, Administrative and Technical, Financial, and Education and Outreach.

Planning and Regulatory

1. Has the East New Market amended Comprehensive Plan 2012 been updated? If not, are there plans to update the CMP 2012 within the next 5 years?

Not as of yet. Plans are in the works to update the plan.

2. Does your jurisdiction have an emergency operations plan? If so, what year was it adopted?

It does not, but has been discussed within the past 6 months to develop one.

3. Does your jurisdiction have a continuity of operations plan? If so, what year was it adopted?

It does not to my knowledge.

4. What Building Code/Year is your municipality using?

2018 International Building Code

5. Does your jurisdiction issue have land use authority- issue building permits?

Yes

6. Does your jurisdiction have an adopted floodplain ordinance; or do you use Dorchester County's? If you use your own, what year was it adopted? Does your ordinance include freeboard (e.g., 1ft above Base Flood Elevation)?

Use the county ordinance.

7. Has your jurisdiction acquired land for open space or public recreation?

Yes

Administrative and Technical

Please complete as you are able.

Government Department & Staff Resources															
Community	Land Use Authority	Land Use/ Development Planning		Public Works & Engineering		Emergency Services (Includes Police & Fire)		Floodplain Manager		GIS		Fiscal Staff		Planning Commission	
	Yes/No	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff
East New Market	Yes	Yes	1	Yes	1	Yes	35	No		No		Yes	1	Yes	3

1. Does your jurisdiction use a hazard warning/notification system? If so, what is the name of thesystem?

Rely on the County 911 Center.
Stated yes above to Emergency Services, although completely volunteer.

Financial

1. Does your jurisdiction plan to expend funding, including grant funding, on hazard mitigation and resilience projects within the next five years? If so, please provide amount and project description.

No, but may look into this depending on what the county may do in the future.

2. Does your jurisdiction have the ability to levy taxes for specific purposes? If so, please explain.

No

3. Do you use the Community Development Block Grant? If so, how has your community used this funding or plan to use this funding?

Yes, Senior Apartments on Academy Street. Various projects needed for the historic building.

4. Has your jurisdiction completed flood acquisitions or elevation projects? If so, please provide funding source, year and project description(s).

No

Education and Outreach

1. Does your jurisdiction work with any local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, and vulnerable populations, etc.?

No

2. Does your jurisdiction have any ongoing public education or information program (e.g., responsible water use, fire safety, household emergency preparedness, or environmental education)?

No

Q1	**Yes**
Are you a resident of Dorchester County?	
Q2	**East New Market**
Please select which community you are representing.	

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. Dorchester County averages 13 inches of snowfall annually, according to the National Weather Service.	**Not Concerned**
Thunderstorm - Dorchester County is affected primarily by thunderstorm activity through the interaction of warm and cool air masses along frontal systems. Thunderstorms are more common in the spring when frontal zones are passing over the County from west to east and during the summer months when warm, moist air is lifted over the eastern shore by differential heating of the land and surrounding water.	**Somewhat Concerned**
High Wind - High and strong wind events can also occur in the County without the presence of thunderstorms. There are several reasons as to how wind can occur without the presence of thunderstorms, such as low pressure systems, cold fronts, remnants of hurricanes, and other meteorological causes. High wind events as characterized by the Nation Weather Service are winds that are over 50 knots (57.5 mph) and strong wind events are less than 50 knots.	**Somewhat Concerned**
Tornado - Under the right temperature and moisture conditions, intense thunderstorms can produce tornadoes in areas of differential heating such as occurs on the Eastern Shore. According to the National Center for Environmental Information (NCEI) data, since 1984, Dorchester County has experienced (11) eleven tornado events.	**Concerned**
Extreme Heat - According to the National Weather Service, when temperature and humidity together exceed certain levels (85 F and 100% humidity, 90 F and 70% humidity, or 110 F and 30% humidity) heatstroke is likely if exposure continues for many hours. Dorchester County normally averages close to the same temperature and humidity during the summer months as Baltimore and Washington DC. However, along the coast, the temperature and humidity are more closely related to the Tidewater Area in Virginia where there are fewer days with those conditions.	**Not Concerned**
Drought - A drought is essentially a deficiency of precipitation over a period of time resulting from a weather pattern that brings no moisture into an area. Dorchester County normally receives 40-44 inches of precipitation per year, about average for the state. However, that does not mean the County is immune to drought. Water supply can be affected, particularly where groundwater is relied on to supply community systems, as is the case in Dorchester County.	**Somewhat Concerned**
Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Since more than 40% of Dorchester County's land surface is covered by forests, and another 25% is covered with wetland species, wildfire is a major concern.	**Somewhat Concerned**
Major Fire & Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. Dorchester County is at risk due to the clustering of commercial and industrial structures in the Cambridge and Hurlock communities. Additionally, all municipalities share the threat of fire to residential, commercial or other structures. The municipalities of Cambridge and Vienna have the possibility of fire/explosion transportation related incidents due to their location along Route 50.	**Concerned**
On-Site HazMat Incident - A hazardous material may be defined as a substance or material, which, due to its chemical, physical or biological nature, poses a threat to life, health or property if released from a confined setting. On-site HazMats are a concern for Dorchester County. The county maintains a record of each site and the material(s) stored at the site. These sites include water and sewage treatment plants, and a number of manufacturing, wholesale and retail concerns in Cambridge and Hurlock areas.	**Somewhat Concerned**

	Level of Concern
Transportation HazMat Incident - Hazardous materials are constantly being moved in Maryland on interstate highways, rail systems and on shipping lanes in the Chesapeake Bay and its tributaries. The bulk of hazardous materials pass through the County by truck, particularly on Route 50, which crosses the northern part of the County from west to east. Other highways that are used to transport hazardous materials include: State Routes 14, 16, and 331.	**Concerned**
Emerging Infectious Disease -Emerging Infectious Diseases can be considered as part of a broad hazard category that could be termed “public health emergencies.” In addition to disease epidemics, such events can take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service.	**Concerned**
Dam Failure - A dam failure is simply an uncontrolled release of water from a reservoir through a dam as a result of structural failures or deficiencies in the dam. According to the USACE National Inventory of Dams, four (4) dams are located in Dorchester County.	**Not Concerned**
Earthquake - Motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust affecting roadways and foundations of buildings. Although no earthquake epicenters have been documented within Dorchester County, all of the county could be affected by earthquakes occurring in neighboring states. The most significant event to affect Dorchester County was the 2011 Virginia Earthquake.	**Not Concerned**

Q4

Please indicate your level of concern for each hazard.

	Level of Concern
Riverine Flooding	**Somewhat Concerned**
Hurricane	**Concerned**
Nor'easter	**Somewhat Concerned**
Coastal Flooding	**Not Concerned**
Sea Level Rise	**Not Concerned**
Shoreline Erosion	**Not Concerned**

Q5

Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)

High Wind,

Tornado,

Drought,

Major Fire & Explosion,

Transportation HazMat Accident,

On-Site HazMat Incident,

Thunderstorm,

Emerging Infectious Disease

Q6

Are you concerned with any other hazards not identified in this survey?

Respondent skipped this question

Q7

In terms of social vulnerability, do you feel that a specific group or groups in the County are particularly at risk for or could be harmed by any of the hazards events listed in questions 5 and 6? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

Age,

Medical Issues and Disability

Q8

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

Winter Weather,

Tornado,

Extreme Heat,

Major Fire/Explosion,

Transportation HazMat Incident,

On-site HazMat Incident,

Emerging Infectious Diseases

Q9

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

Make known what hazards there are to all applicable parties. Fire departments, town officials and other government agencies and share them on an equal basis so nothing is hidden. Then use this information for budget planning, training and pre-planning.

2022 Dorchester County All-Hazard & Flood Mitigation Plans

Questionnaire

Please complete the questions below for the **Town of Eldorado**. This information will be included within the 2022 Dorchester County All-Hazard & Flood Mitigation Plans. FEMA requires participation by all municipalities who plan to adopt the 2022 Plan. To that end, we request that a representative(s) from your jurisdiction complete this questionnaire.

2017 Mitigation Actions Items

The following mitigation action items were included in the 2017 Plans. Please provide a status for each action item and provide status update details, as available.

Mitigation Action Item #	Project/ Action	Responsible Organizations	Complete	Incomplete (No Work Completed)	Partial (Some Work Completed)	Ongoing
25	**Municipal Participation in CRS**	• Dorchester County Planning & Zoning	○	●	○	○
Background: Provide technical assistance and support to encourage municipal participation in the Community Rating System (CRS). In 2017, Dorchester County had a CRS rating of 8. None of the seven (7) municipalities participate in CRS, however all participate in the NFIP. Except for Galestown, each municipality includes flood insurance policy holders.						
2021 Status Update:						

New Mitigation Ideas

Do you have any mitigation action items for your jurisdiction for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

NO

Capability Assessment

In order to determine current capabilities, the following questions have been developed for your review and input. Questions have been included under the following groups: Planning and Regulatory, Administrative and Technical, Financial, and Education and Outreach.

Planning and Regulatory

1. Does your jurisdiction have an emergency operations plan? If so, what year was it adopted?

   NO

2. Does your jurisdiction have a continuity of operations plan? If so, what year was it adopted?

   NO

3. What Building Code/Year is your municipality using?

   CURRENT DORCHESTER COUNTY'S

4. In the 2017 Plan, it was noted that your jurisdiction does not have land use authority or issue building permits. Is this still correct information?

   YES

5. Does your jurisdiction have an adopted floodplain ordinance; or do you use Dorchester County's? If you use your own, what year was it adopted? Does your ordinance include freeboard (e.g., 1ft above Base Flood Elevation)?

   DORCHESTER COUNTY'S

6. Has your jurisdiction acquired land for open space or public recreation?

   NO

Administrative and Technical

Please complete as you are able.

Government Department & Staff Resources															
Community	Land Use Authority		Land Use/ Development Planning		Public Works & Engineering		Emergency Services (Includes Police & Fire)		Floodplain Manager		GIS		Fiscal Staff		Planning Commission	
	Yes/No	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff
Eldorado	NO	NO		NO		NO		NO		NO		NO		NO			

1. Does your jurisdiction use a hazard warning/notification system? If so, what is the name of thesystem?

   NO

Financial

1. Does your jurisdiction plan to expend funding, including grant funding, on hazard mitigation and resilience projects within the next five years? If so, please provide amount and project description.

   NO

2. Does your jurisdiction have the ability to levy taxes for specific purposes? If so, please explain.

   NO

3. Do you use the Community Development Block Grant? If so, how has your community used this funding or plan to use this funding?

   NO

4. Has your jurisdiction completed flood acquisitions or elevation projects? If so, please provide funding source, year and project description(s).

   NO

Education and Outreach

1. Does your jurisdiction work with any local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, and vulnerable populations, etc.?

   NO

2. Does your jurisdiction have any ongoing public education or information program (e.g., responsible water use, fire safety, household emergency preparedness, or environmental education)? NO

Q1

Are you a resident of Dorchester County?

Yes

Q2

Please select which community you are representing.

Eldorado

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. Dorchester County averages 13 inches of snowfall annually, according to the National Weather Service.	**Somewhat Concerned**
Thunderstorm - Dorchester County is affected primarily by thunderstorm activity through the interaction of warm and cool air masses along frontal systems. Thunderstorms are more common in the spring when frontal zones are passing over the County from west to east and during the summer months when warm, moist air is lifted over the eastern shore by differential heating of the land and surrounding water.	**Somewhat Concerned**
High Wind - High and strong wind events can also occur in the County without the presence of thunderstorms. There are several reasons as to how wind can occur without the presence of thunderstorms, such as low pressure systems, cold fronts, remnants of hurricanes, and other meteorological causes. High wind events as characterized by the Nation Weather Service are winds that are over 50 knots (57.5 mph) and strong wind events are less than 50 knots.	**Somewhat Concerned**
Tornado - Under the right temperature and moisture conditions, intense thunderstorms can produce tornadoes in areas of differential heating such as occurs on the Eastern Shore. According to the National Center for Environmental Information (NCEI) data, since 1984, Dorchester County has experienced (11) eleven tornado events.	**Concerned**
Extreme Heat - According to the National Weather Service, when temperature and humidity together exceed certain levels (85 F and 100% humidity, 90 F and 70% humidity, or 110 F and 30% humidity) heatstroke is likely if exposure continues for many hours. Dorchester County normally averages close to the same temperature and humidity during the summer months as Baltimore and Washington DC. However, along the coast, the temperature and humidity are more closely related to the Tidewater Area in Virginia where there are fewer days with those conditions.	**Not Concerned**
Drought - A drought is essentially a deficiency of precipitation over a period of time resulting from a weather pattern that brings no moisture into an area. Dorchester County normally receives 40-44 inches of precipitation per year, about average for the state. However, that does not mean the County is immune to drought. Water supply can be affected, particularly where groundwater is relied on to supply community systems, as is the case in Dorchester County.	**Somewhat Concerned**
Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Since more than 40% of Dorchester County's land surface is covered by forests, and another 25% is covered with wetland species, wildfire is a major concern.	**Somewhat Concerned**
Major Fire & Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. Dorchester County is at risk due to the clustering of commercial and industrial structures in the Cambridge and Hurlock communities. Additionally, all municipalities share the threat of fire to residential, commercial or other structures. The municipalities of Cambridge and Vienna have the possibility of fire/explosion transportation related incidents due to their location along Route 50.	**Somewhat Concerned**

	Level of Concern
On-Site HazMat Incident - A hazardous material may be defined as a substance or material, which, due to its chemical, physical or biological nature, poses a threat to life, health or property if released from a confined setting. On-site HazMats are a concern for Dorchester County. The county maintains a record of each site and the material(s) stored at the site. These sites include water and sewage treatment plants, and a number of manufacturing, wholesale and retail concerns in Cambridge and Hurlock areas.	**Somewhat Concerned**
Transportation HazMat Incident - Hazardous materials are constantly being moved in Maryland on interstate highways, rail systems and on shipping lanes in the Chesapeake Bay and its tributaries. The bulk of hazardous materials pass through the County by truck, particularly on Route 50, which crosses the northern part of the County from west to east. Other highways that are used to transport hazardous materials include: State Routes 14, 16, and 331.	**Somewhat Concerned**
Emerging Infectious Disease -Emerging Infectious Diseases can be considered as part of a broad hazard category that could be termed “public health emergencies.” In addition to disease epidemics, such events can take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service.	**Concerned**
Dam Failure - A dam failure is simply an uncontrolled release of water from a reservoir through a dam as a result of structural failures or deficiencies in the dam. According to the USACE National Inventory of Dams, four (4) dams are located in Dorchester County.	**Not Concerned**
Earthquake - Motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust affecting roadways and foundations of buildings. Although no earthquake epicenters have been documented within Dorchester County, all of the county could be affected by earthquakes occurring in neighboring states. The most significant event to affect Dorchester County was the 2011 Virginia Earthquake.	**Not Concerned**

Q4

Please indicate your level of concern for each hazard.

	Level of Concern
Riverine Flooding	**Concerned**
Hurricane	**Somewhat Concerned**
Nor'easter	**Concerned**
Coastal Flooding	**Concerned**
Sea Level Rise	**Somewhat Concerned**
Shoreline Erosion	**Concerned**

Q5

Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)

Riverine Flooding,

Winter Weather,

High Wind,

Thunderstorm

Q6

Are you concerned with any other hazards not identified in this survey?

Respondent skipped this question

Q7

In terms of social vulnerability, do you feel that a specific group or groups in the County are particularly at risk for or could be harmed by any of the hazards events listed in questions 5 and 6? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

Medical Issues and Disability

Q8

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

Riverine Flooding,

Winter Weather,

High Wind

Q9

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

More education

2022 Dorchester County All-Hazard & Flood Mitigation Plans

Questionnaire

Please complete the questions below for the **Town of Galestown**. This information will be included within the 2022 Dorchester County All-Hazard & Flood Mitigation Plans. FEMA requires participation by all municipalities who plan to adopt the 2022 Plan. To that end, we request that a representative(s) from your jurisdiction complete this questionnaire.

2017 Mitigation Actions Items

The following mitigation action items were included in the 2017 Plans. Please provide a status for each action item and provide status update details, as available.

Mitigation Action Item #	Project/ Action	Complete	Incomplete (No Work Completed)	Partial (Some Work Completed)	Ongoing
9	Repetitive Flooding Roads Project	○	○	○	●

Background: One (1) road was identified as to having experienced repetitive flooding issues by the Town of Galestown.

- Newhart Mill Road (near Wheatly Church Road) - Flooding due to stormwater issues during rainfall events

2021 Status Update:

New Mitigation Ideas

Do you have any mitigation action items for your jurisdiction for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

Capability Assessment

In order to determine current capabilities, the following questions have been developed for your review and input. Questions have been included under the following groups: Planning and Regulatory, Administrative and Technical, Financial, and Education and Outreach.

Planning and Regulatory

1. Does your jurisdiction have an emergency operations plan? If so, what year was it adopted?

use county plan

2. Does your jurisdiction have a continuity of operations plan? If so, what year was it adopted?

use county plan

3. What Building Code/Year is your municipality using?

current county plan

4. In the 2017 Plan, it was noted that your jurisdiction does not have land use authority or issue building permits. Is this still correct information?

Yes

5. Does the county enforce the Floodplain Ordinance for Galestown?

Received Council's approval to enter into an agreement with the Mayor and Commissioners of the Towns of Vienna, Brookview, Eldorado, Galestown and Church Creek in which the Town officials adopt the County's Floodplain Ordinance which authorizes County staff to enforce this ordinance within those municipal limits.

Yes

6. Has your jurisdiction acquired land for open space or public recreation?

Have Playground area

Administrative and Technical

Please complete as you are able.

Government Department & Staff Resources															
Community	Land Use Authority	Land Use/ Development Planning		Public Works & Engineering		Emergency Services (Includes Police & Fire)		Floodplain Manager		GIS		Fiscal Staff		Planning Commission	
	Yes/No	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff
Galestown	N	N		N		N		N				Y	1	Y	1

1. Does your jurisdiction use a hazard warning/notification system? If so, what is the name of thesystem?

None

Financial

1. Does your jurisdiction plan to expend funding, including grant funding, on hazard mitigation and resilience projects within the next five years? If so, please provide amount and project description.

no plans

2. Does your jurisdiction have the ability to levy taxes for specific purposes? If so, please explain.

have town tax surplus

3. Do you use the Community Development Block Grant? If so, how has your community used this funding or plan to use this funding?

No

4. Has your jurisdiction completed flood acquisitions or elevation projects? If so, please provide funding source, year and project description(s).

county did in 2008??

Education and Outreach

1. Does your jurisdiction work with any local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, and vulnerable populations, etc.?

No

2. Does your jurisdiction have any ongoing public education or information program (e.g., responsible water use, fire safety, household emergency preparedness, or environmental education)?

Give Pamplets at town meetings

Q1

Please provide organization, agency or department that you represent.

Respondent skipped this question

Q2

If you are representing a municipality, please indicate which community.

Hurlock

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Drought - A drought is essentially a deficiency of precipitation over a period of time resulting from a weather pattern that brings no moisture into an area. Dorchester County normally receives 40-44 inches of precipitation per year, about average for the state. However, that does not mean the County is immune to drought. Water supply can be affected, particularly where groundwater is relied on to supply community systems, as is the case in Dorchester County.	**Somewhat Concerned**
Tornado - Under the right temperature and moisture conditions, intense thunderstorms can produce tornadoes in areas of differential heating such as occurs on the Eastern Shore. According to the National Center for Environmental Information (NCEI) data, since 1984, Dorchester County has experienced (11) eleven tornado events.	**Somewhat Concerned**
Thunderstorm - Dorchester County is affected primarily by thunderstorm activity through the interaction of warm and cool air masses along frontal systems. Thunderstorms are more common in the spring when frontal zones are passing over the County from west to east and during the summer months when warm, moist air is lifted over the eastern shore by differential heating of the land and surrounding water.	**Very Concerned**
High Wind - High and strong wind events can also occur in the County without the presence of thunderstorms. There are several reasons as to how wind can occur without the presence of thunderstorms, such as low pressure systems, cold fronts, remnants of hurricanes, and other meteorological causes. High wind events as characterized by the Nation Weather Service are winds that are over 50 knots (57.5 mph) and strong wind events are less than 50 knots.	**Very Concerned**
Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Since more than 40% of Dorchester County's land surface is covered by forests, and another 25% is covered with wetland species, wildfire is a major concern.	**Concerned**
Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. Dorchester County averages 13 inches of snowfall annually, according to the National Weather Service.	**Somewhat Concerned**
Major Fire & Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. Dorchester County is at risk due to the clustering of commercial and industrial structures in the Cambridge and Hurlock communities. Additionally, all municipalities share the threat of fire to residential, commercial or other structures. The municipalities of Cambridge and Vienna have the possibility of fire/explosion transportation related incidents due to their location along Route 50.	**Very Concerned**
Extreme Heat - According to the National Weather Service, when temperature and humidity together exceed certain levels (85 F and 100% humidity, 90 F and 70% humidity, or 110 F and 30% humidity) heatstroke is likely if exposure continues for many hours. Dorchester County normally averages close to the same temperature and humidity during the summer months as Baltimore and Washington DC. However, along the coast, the temperature and humidity are more closely related to the Tidewater Area in Virginia where there are fewer days with those conditions.	**Concerned**

	Level of Concern
On-Site HazMat Incident - A hazardous material may be defined as a substance or material, which, due to its chemical, physical or biological nature, poses a threat to life, health or property if released from a confined setting. On-site HazMats are a concern for Dorchester County. The county maintains a record of each site and the material(s) stored at the site. These sites include water and sewage treatment plants, and a number of manufacturing, wholesale and retail concerns in Cambridge and Hurlock areas.	**Concerned**
Transportation HazMat Incident - Hazardous materials are constantly being moved in Maryland on interstate highways, rail systems and on shipping lanes in the Chesapeake Bay and its tributaries. The bulk of hazardous materials pass through the County by truck, particularly on Route 50, which crosses the northern part of the County from west to east. Other highways that are used to transport hazardous materials include: State Routes 14, 16, and 331.	**Somewhat Concerned**
Epidemic - Epidemics can be considered as part of a broad hazard category that could be termed “public health emergencies.” In addition to disease epidemics, such events can take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service.	**Very Concerned**
Fire/Explosion - fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. Dorchester County is at risk due to the clustering of commercial and industrial structures in the Cambridge and Hurlock communities	**Very Concerned**
Dam Failure - A dam failure is simply an uncontrolled release of water from a reservoir through a dam as a result of structural failures or deficiencies in the dam. According to the USACE National Inventory of Dams, four (4) dams are located in Dorchester County.	**Not Concerned**
Earthquake - Motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust affecting roadways and foundations of buildings. Although no earthquake epicenters have been documented within Dorchester County, all of the county could be affected by earthquakes occurring in neighboring states. The most significant event to affect Dorchester County was the 2011 Virginia Earthquake.	**Not Concerned**

Q4

Please indicate your level of concern for each flood related hazard.

	Level of Concern
Riverine Flooding	**Concerned**
Hurricane	**Concerned**
Nor'easter	**Somewhat Concerned**
Coastal Flooding	**Somewhat Concerned**
Sea Level Rise	**Somewhat Concerned**
Shoreline Erosion	**Concerned**

Q5

In terms of social vulnerability, do you feel that a specific group or groups in the County are particularly at risk for or could be harmed by any of the hazards events listed in question 6? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

Age,

English language proficiency,

Medical issues and disability

Q6

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

Winter Weather,

Drought,

Tornado,

Epidemics,

Wind,

Thunderstorm,

Extreme Heat ,

Fire/Explosion

Q7

Does your agency/department/organization have any mitigation action idea(s) for the next 5 years to incorporate into the hazard mitigation plan? If so, please provide the the action(s) below.

Control and elimination of storm water

2022 Dorchester County All-Hazard & Flood Mitigation Plans

Questionnaire

Please complete the questions below for the **Town of Secretary**. This information will be included within the 2022 Dorchester County All-Hazard & Flood Mitigation Plans. FEMA requires participation by all municipalities who plan to adopt the 2022 Plan. To that end, we request that a representative(s) from your jurisdiction complete this questionnaire.

2017 Mitigation Actions Items

The following mitigation action items were included in the 2017 Plans. Please provide a status for each action item and provide status update details, as available.

Mitigation Action Item #	Project/ Action	Responsible Organizations	Complete	Incomplete (No Work Completed)	Partial (Some Work Completed)	Ongoing
25	**Municipal Participation in CRS**	• Dorchester County Planning & Zoning	○	○	○	○
Background: Provide technical assistance and support to encourage municipal participation in the Community Rating System (CRS). In 2017, Dorchester County had a CRS rating of 8. None of the seven (7) municipalities participate in CRS, however all participate in the NFIP. Except for Galestown, each municipality includes flood insurance policy holders.						
2021 Status Update:						

New Mitigation Ideas

Do you have any mitigation action items for your jurisdiction for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

Capability Assessment

In order to determine current capabilities, the following questions have been developed for your review and input. Questions have been included under the following groups: Planning and Regulatory, Administrative and Technical, Financial, and Education and Outreach.

Planning and Regulatory

1. Has the Secretary's Comprehensive Plan 2010 been updated? If not, are there plans to update the CMP 2010 within the next 5 years?

   No it has not been updated. No current plans to update. MD Dept. of Planning does this for us.

2. Does your jurisdiction have an emergency operations plan? If so, what year was it adopted?

3. Does your jurisdiction have a continuity of operations plan? If so, what year was it adopted?

4. What Building Code/Year is your municipality using?

   we use the same as the county.

5. Does your jurisdiction issue have land use authority- issue building permits?

6. Does your jurisdiction have an adopted floodplain ordinance; or do you use Dorchester County's? If you use your own, what year was it adopted? Does your ordinance include freeboard (e.g., 1ft above Base Flood Elevation)?

   We have our own and it was adopted January 20, 2015 and it does include freeboard (2 ft. above Base Flood Elevation)

7. Has your jurisdiction acquired land for open space or public recreation?

Administrative and Technical

Please complete as you are able.

Government Department & Staff Resources															
Community	Land Use Authority	Land Use/ Development Planning		Public Works & Engineering		Emergency Services (Includes Police & Fire)		Floodplain Manager		GIS		Fiscal Staff		Planning Commission	
	Yes/No	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff
Secretary															

1. Does your jurisdiction use a hazard warning/notification system? If so, what is the name of the system?

   No

Financial

1. Does your jurisdiction plan to expend funding, including grant funding, on hazard mitigation and resilience projects within the next five years? If so, please provide amount and project description.

   No

2. Does your jurisdiction have the ability to levy taxes for specific purposes? If so, please explain.

   Yes. They set the tax rate for real estate and corporation taxes.

3. Do you use the Community Development Block Grant? If so, how has your community used this funding or plan to use this funding?

   Yes. we have used it in the past for infrastructure

4. Has your jurisdiction completed flood acquisitions or elevation projects? If so, please provide funding source, year and project description(s).

   No

Education and Outreach

1. Does your jurisdiction work with any local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, and vulnerable populations, etc.?

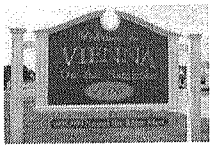
   No

2. Does your jurisdiction have any ongoing public education or information program (e.g., responsible water use, fire safety, household emergency preparedness, or environmental education)?

   No

2022 Dorchester County All-Hazard & Flood Mitigation Plans

Questionnaire



Please complete the questions below for the Town of Vienna. This information will be included within the 2022 Dorchester County All-Hazard & Flood Mitigation Plans. FEMA requires participation by all municipalities who plan to adopt the 2022 Plan. To that end, we request that a representative(s) from your jurisdiction complete this questionnaire.

2017 Mitigation Actions Items

The following mitigation action items were included in the 2017 Plans. Please provide a status for each action item and provide status update details, as available.

Mitigation Action Item #	Project/ Action	Responsible Organizations	Complete	Incomplete (No Work Completed)	Partial (Some Work Completed)	Ongoing
25	**Municipal Participation in CRS**	• Dorchester County Planning & Zoning	○	○	○	◉
Background: Provide technical assistance and support to encourage municipal participation in the Community Rating System (CRS). In 2017, Dorchester County had a CRS rating of 8. None of the seven (7) municipalities participate in CRS, however all participate in the NFIP. Except for Galestown, each municipality includes flood insurance policy holders.						
2021 Status Update:						

New Mitigation Ideas

Do you have any mitigation action items for your jurisdiction for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

Capability Assessment

In order to determine current capabilities, the following questions have been developed for your review and input. Questions have been included under the following groups: Planning and Regulatory, Administrative and Technical, Financial, and Education and Outreach.

Planning and Regulatory

1. Has the Vienna Comprehensive Plan 2003 been updated? If not, are there plans to update the CMP 2003 within the next 5 years?

   NO
   Yes

2. Does your jurisdiction have an emergency operations plan? If so, what year was it adopted?

   NO

3. Does your jurisdiction have a continuity of operations plan? If so, what year was it adopted?

   NO

4. What Building Code/Year is your municipality using?

   2009

5. Does your jurisdiction issue have land use authority- issue building permits?

   yes

6. Does the county enforce the Floodplain Ordinance for Vienna?

   Received Council's approval to enter into an agreement with the Mayor and Commissioners of the Towns of Vienna, Brookview, Eldorado, Galestown and Church Creek in which the Town officials adopt the County's Floodplain Ordinance which authorizes County staff to enforce this ordinance within those municipal limits.

7. Has your jurisdiction acquired land for open space or public recreation?

   ~~No~~ yes

Administrative and Technical

Please complete as you are able.

Government Department & Staff Resources															
Community	Land Use Authority		Land Use/ Development Planning		Public Works & Engineering		Emergency Services (Includes Police & Fire)		Floodplain Manager		GIS		Fiscal Staff		Planning Commission	
	Yes/No	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff	Yes/ No	# of Staff
Vienna															

1. Does your jurisdiction use a hazard warning/notification system? If so, what is the name of the system?

~~NO~~ Yes - fire Siren

Follow Dor Co

Financial

1. Does your jurisdiction plan to expend funding, including grant funding, on hazard mitigation and resilience projects within the next five years? If so, please provide amount and project description.

?

2. Does your jurisdiction have the ability to levy taxes for specific purposes? If so, please explain.

NO

3. Do you use the Community Development Block Grant? If so, how has your community used this funding or plan to use this funding?

Yes

4. Has your jurisdiction completed flood acquisitions or elevation projects? If so, please provide funding source, year and project description(s).

NOT Completed

Education and Outreach

1. Does your jurisdiction work with any local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, and vulnerable populations, etc.?

NO

2. Does your jurisdiction have any ongoing public education or information program (e.g., responsible water use, fire safety, household emergency preparedness, or environmental education)?

NO

Dorchester County Hazard Mitigation Municipal Survey

Q1	**Yes**
Are you a resident of Dorchester County?	
Q2	**Vienna**
Please select which community you are representing.	

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. Dorchester County averages 13 inches of snowfall annually, according to the National Weather Service.	**Concerned**
Thunderstorm - Dorchester County is affected primarily by thunderstorm activity through the interaction of warm and cool air masses along frontal systems. Thunderstorms are more common in the spring when frontal zones are passing over the County from west to east and during the summer months when warm, moist air is lifted over the eastern shore by differential heating of the land and surrounding water.	**Concerned**
High Wind - High and strong wind events can also occur in the County without the presence of thunderstorms. There are several reasons as to how wind can occur without the presence of thunderstorms, such as low pressure systems, cold fronts, remnants of hurricanes, and other meteorological causes. High wind events as characterized by the Nation Weather Service are winds that are over 50 knots (57.5 mph) and strong wind events are less than 50 knots.	**Concerned**
Tornado - Under the right temperature and moisture conditions, intense thunderstorms can produce tornadoes in areas of differential heating such as occurs on the Eastern Shore. According to the National Center for Environmental Information (NCEI) data, since 1984, Dorchester County has experienced (11) eleven tornado events.	**Very Concerned**
Extreme Heat - According to the National Weather Service, when temperature and humidity together exceed certain levels (85 F and 100% humidity, 90 F and 70% humidity, or 110 F and 30% humidity) heatstroke is likely if exposure continues for many hours. Dorchester County normally averages close to the same temperature and humidity during the summer months as Baltimore and Washington DC. However, along the coast, the temperature and humidity are more closely related to the Tidewater Area in Virginia where there are fewer days with those conditions.	**Very Concerned**
Drought - A drought is essentially a deficiency of precipitation over a period of time resulting from a weather pattern that brings no moisture into an area. Dorchester County normally receives 40-44 inches of precipitation per year, about average for the state. However, that does not mean the County is immune to drought. Water supply can be affected, particularly where groundwater is relied on to supply community systems, as is the case in Dorchester County.	**Very Concerned**
Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Since more than 40% of Dorchester County's land surface is covered by forests, and another 25% is covered with wetland species, wildfire is a major concern.	**Concerned**
Major Fire & Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. Dorchester County is at risk due to the clustering of commercial and industrial structures in the Cambridge and Hurlock communities. Additionally, all municipalities share the threat of fire to residential, commercial or other structures. The municipalities of Cambridge and Vienna have the possibility of fire/explosion transportation related incidents due to their location along Route 50.	**Very Concerned**
On-Site HazMat Incident - A hazardous material may be defined as a substance or material, which, due to its chemical, physical or biological nature, poses a threat to life, health or property if released from a confined setting. On-site HazMats are a concern for Dorchester County. The county maintains a record of each site and the material(s) stored at the site. These sites include water and sewage treatment plants, and a number of manufacturing, wholesale and retail concerns in Cambridge and Hurlock areas.	**Concerned**

	Level of Concern
Transportation HazMat Incident - Hazardous materials are constantly being moved in Maryland on interstate highways, rail systems and on shipping lanes in the Chesapeake Bay and its tributaries. The bulk of hazardous materials pass through the County by truck, particularly on Route 50, which crosses the northern part of the County from west to east. Other highways that are used to transport hazardous materials include: State Routes 14, 16, and 331.	**Very Concerned**
Emerging Infectious Disease -Emerging Infectious Diseases can be considered as part of a broad hazard category that could be termed “public health emergencies.” In addition to disease epidemics, such events can take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service.	**Very Concerned**
Dam Failure - A dam failure is simply an uncontrolled release of water from a reservoir through a dam as a result of structural failures or deficiencies in the dam. According to the USACE National Inventory of Dams, four (4) dams are located in Dorchester County.	**Somewhat Concerned**
Earthquake - Motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust affecting roadways and foundations of buildings. Although no earthquake epicenters have been documented within Dorchester County, all of the county could be affected by earthquakes occurring in neighboring states. The most significant event to affect Dorchester County was the 2011 Virginia Earthquake.	**Concerned**

Q4

Please indicate your level of concern for each hazard.

	Level of Concern
Riverine Flooding	**Concerned**
Hurricane	**Very Concerned**
Nor'easter	**Very Concerned**
Coastal Flooding	**Concerned**
Sea Level Rise	**Concerned**
Shoreline Erosion	**Very Concerned**

Q5

Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)

Coastal Events,

Winter Weather,

High Wind,

Tornado,

Drought,

Transportation HazMat Accident,

On-Site HazMat Incident,

Earthquake,

Thunderstorm,

Extreme Heat,

Wildfire,

Emerging Infectious Disease

Q6

Are you concerned with any other hazards not identified in this survey?

Respondent skipped this question

Q7

In terms of social vulnerability, do you feel that a specific group or groups in the County are particularly at risk for or could be harmed by any of the hazards events listed in questions 5 and 6? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

Socioeconomic Status,

Age,

Medical Issues and Disability

Q8

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

Winter Weather,

Tornado,

Extreme Heat,

Major Fire/Explosion,

High Wind,

Transportation HazMat Incident,

On-site HazMat Incident,

Emerging Infectious Diseases,

Thunderstorm,

Earthquake

Q9

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

Respondent skipped this question

APPENDIX G
PUBLIC OUTREACH DOCUMENTATION

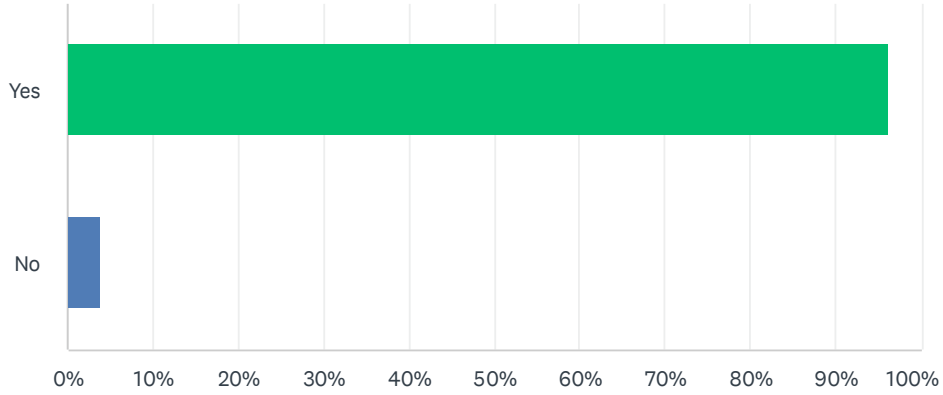
Dorchester County All-Hazard & Flood Mitigation Planning, Training, and Outreach Initiatives				
Date	Meeting, Training, or Outreach Activity	Target Audience	Materials Provided	Comments/Input
4-Jun-21	Website Update	Public	Project Website "Hazard Risk Assessment" tab update	Appendix A Hazard Risk & Identification Assessment Methodology was added to "Hazard Risk Assessment" for public review.
21-Jun-21	Website Link on County Website & News Release	Public	Link to Project Website & News Release	Public Survey
6-Jul-21	Social Media Post on Facebook	Public	Project Website	Emergency Services posted the website link on their Facebook page
7-Jul-21	Social Media Post on Facebook	Public	Public Survey	Emergency Services posted the public survey link on their Facebook page
12-Jul-21	Social Media Post on Facebook	Public	Project Website & Public Survey	DC Health Department posted the link to the project website and public survey on their Facebook page
13-Jul-21	Social Media Post on Facebook	Public	Public Survey	Emergency Services posted the public survey link on their Facebook page
28-Jul-21	Press Release for Star Democrat	Public	Project Website & Public Survey	Notice about the All-Hazard Mitigation Plan Update and provided the project website and public survey link.
28-Jul-21	Website Update	Public	Project Website "Hazard Resources" and "Hazards & Risk Assessment" tab updates	"Know Your Risk" Infographics, MyCoast "How to Use App" Infographic, "Protect Against A Flood" and NFIP information and infographic included on the "Hazard Resources" tab. "Know How Deep Water Is" infographic included on "Hazards & Risk Assessment" tab.

Date	Meeting, Training, or Outreach Activity	Target Audience	Materials Provided	Comments/Input
2-Aug-21	Newspaper Article	Public	Dorchester Star Article	The Dorchester Star posted an article about the update of the Hazard Mitigation Plan, the project website, and provided the link to the public survey. https://www.myeasternshoremd.com/dorchester_star/news/dorchester-updating-all-hazard-mitigation-plan/article_7f4ac249-3122-5490-9318-6bbe86a1f315.html
4-Aug-21	Social Media Post on Facebook	Public	Public Survey	Emergency Services posted the public survey link on their Facebook page
9-Sep-21	Website Update	Public	Project Website "Get Involved - Meetings" tab updates	Meeting Notes and Recording were added to the September 8th Meeting block
13-Sep-21	Website Update	Public	Project Website	A new tab titled "Public Plan Review & Comment" was added. This tab provides the public an opportunity to comment on working draft plan chapters.
13-Sep-21	Website Update	Public	Project Website	New draft Chapter 12 was added to "Public Plan Review & Comment" for public review.
16-Sep-21	Social Media Post on Facebook	Public	Public Survey	DC Health Department posted the link to the public survey on their Facebook page
27-Sep-21	Website Update	Public	Project Website "Plan Overview" tab update	Flood Mitigation Plan was added to the Plan Overview page.
27-Sep-21	Website Update	Public	Project Website "Prevention & Adaptation" tab update	The 2017 Mitigation Action Status Update Report was added to the Prevention & Adaptation tab.
30-Sep-21	DC Economic Development - Dorchester Currents	Public	Public Survey Promotion	Public Survey promoted in Dorchester Currents. Currents is the e-newsletter of the Dorchester Economic Development Office.

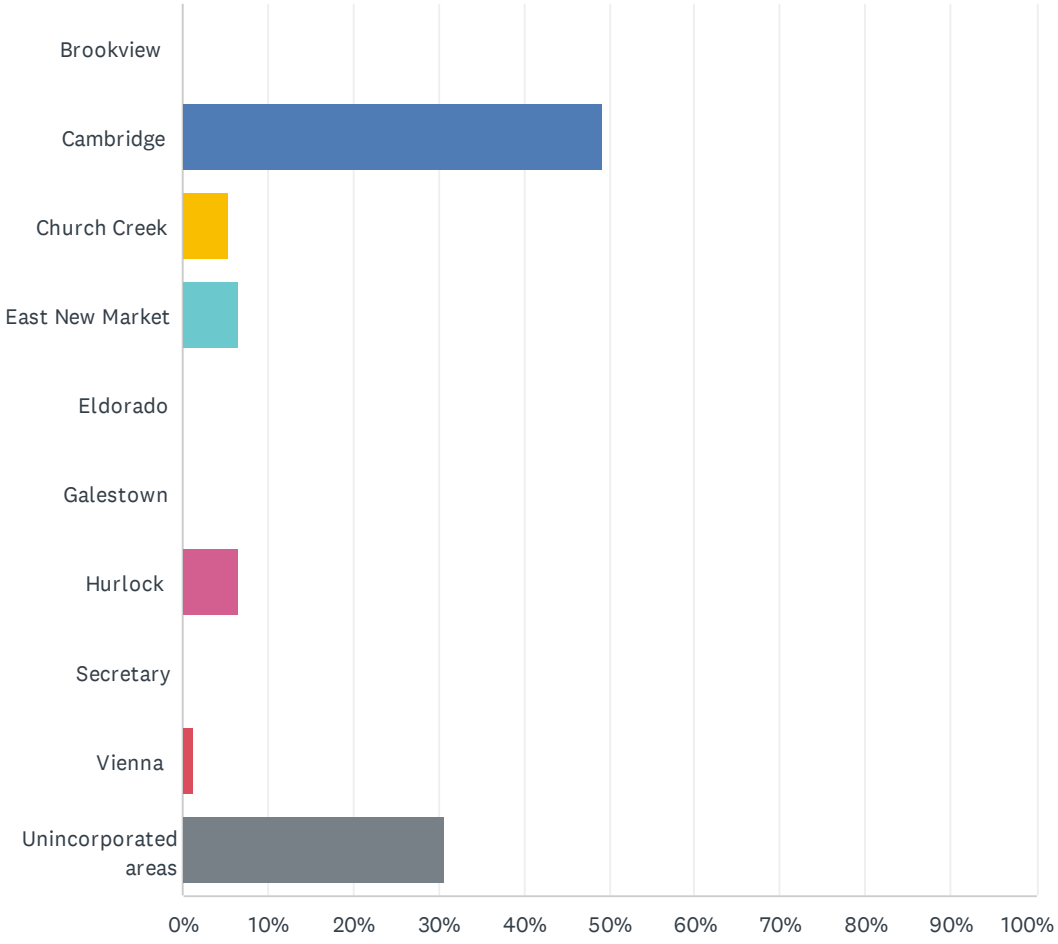
Date	Meeting, Training, or Outreach Activity	Target Audience	Materials Provided	Comments/Input
18-Oct-21	Website Update	Public	Project Website "Hazard Vulnerability" tab update	The Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) for Dorchester County was added to the Hazard Vulnerability tab.
18-Oct-21	Website Update	Public	Project Website "Prevention & Adaptation" tab update	The Maryland Historical Trust Hazard Mitigation Planning for historic and cultural resources was added to the Prevention & Adaption tab.
18-Oct-21	Website Update	Public	Project Website "Hazard Resources" tab update	The University of Maryland Center for Environmental Science (UMCES) public seminars were added to the Hazard Resources tab.
18-Oct-21	Social Media Post on Facebook - County Manager	Public	Project Website	Notice about the All-Hazard Mitigation Plan Update and provided the project website.
15-Nov-21	Social Media Post on Facebook	Public	Project Website	Emergency Services posted the project website link on their Facebook page. This link has been pinned to the top of their page.
30-Nov-21	Website Update	Public	Project Website	New draft Chapters 8 & 9 were added to "Public Plan Review & Comment" for public review.
2-Dec-21	Website Update	Public	Project Website "Hazard Vulnerability" tab update	A new section under the Hazard Vulnerability tab titled "Recent Storm Events" was added. This section provides information on the recent tornado and flood events.
2-Dec-21	Webinar with Maryland Insurance Administration	Public	Flood Map Demonstration, Flood Protection Ideas	During this presentation, consumers can expect to learn where they can find flood maps, how they can use flood maps, and the importance of understanding the flood risks.
8-Dec-21	Website Update	Public	Project Website	New draft Chapters 10 &11 were added to "Public Plan Review & Comment" for public review.
25-Feb-22	Website Update	Public	Project Website	New draft Chapters 6 & 7 were added to "Public Plan Review & Comment" for public review.
1-Mar-22	Website Update	Public	Project Website	New draft chapter added to "Public Plan Review & Comment" for public review.

Date	Meeting, Training, or Outreach Activity	Target Audience	Materials Provided	Comments/Input
16-Mar-22	Website Update	Public	Project Website	Mitigation Action Item Workshop Notes and advertisement for the Flood Risk Reduction Community Workshop included to the "Get Involved" tab.
22-Mar-22	Hazard Mitigation Plan Mitigation Workshop & Flood Risk Reduction Community Workshop	Public	Flood Risk Reduction Community Workshop	County & City of Cambridge held a Flood Risk Reduction Community Workshop in Cambridge for the public. A station was set up for the Hazard Mitigation Plan in order to provide information to the public about the plan and way to get involved. Surveys were available at the station for the public.
24-Mar-22	Website Update	Public	Project Website	Presentations given during the Flood Risk Reduction Community Workshop were included to the "Get Involved" tab.

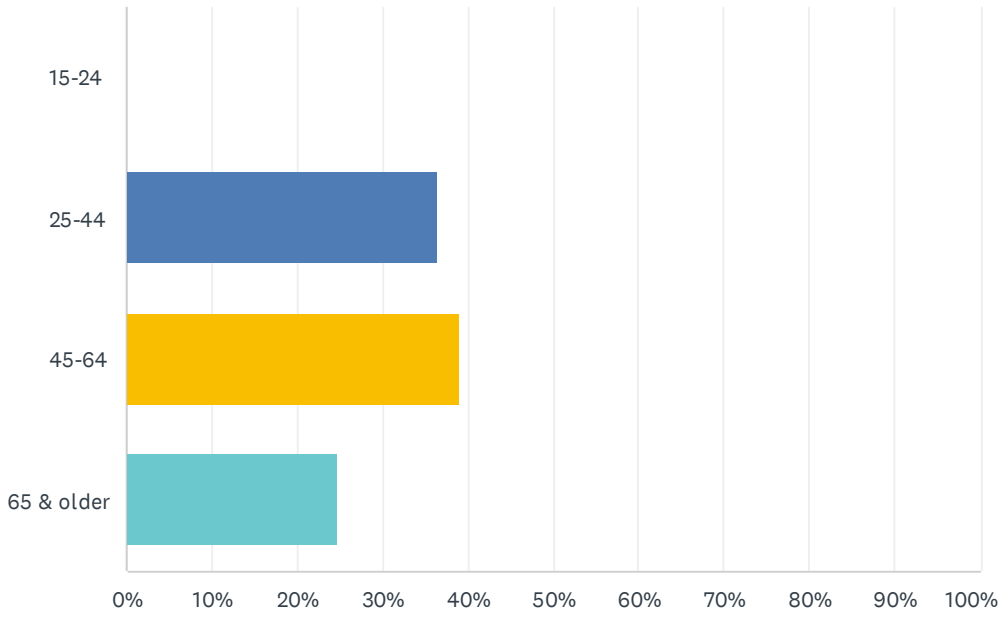
Q1 Are you a resident of Dorchester County?



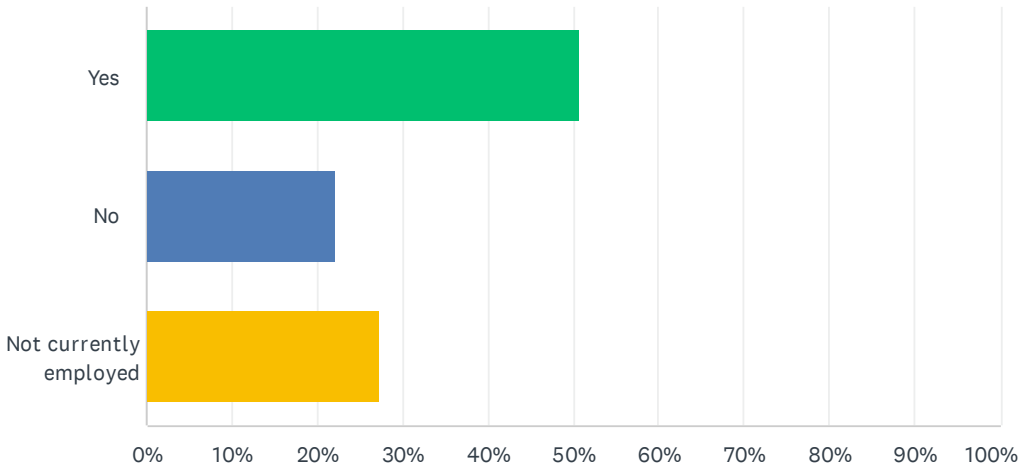
Q2 Please provide the community where you currently live.



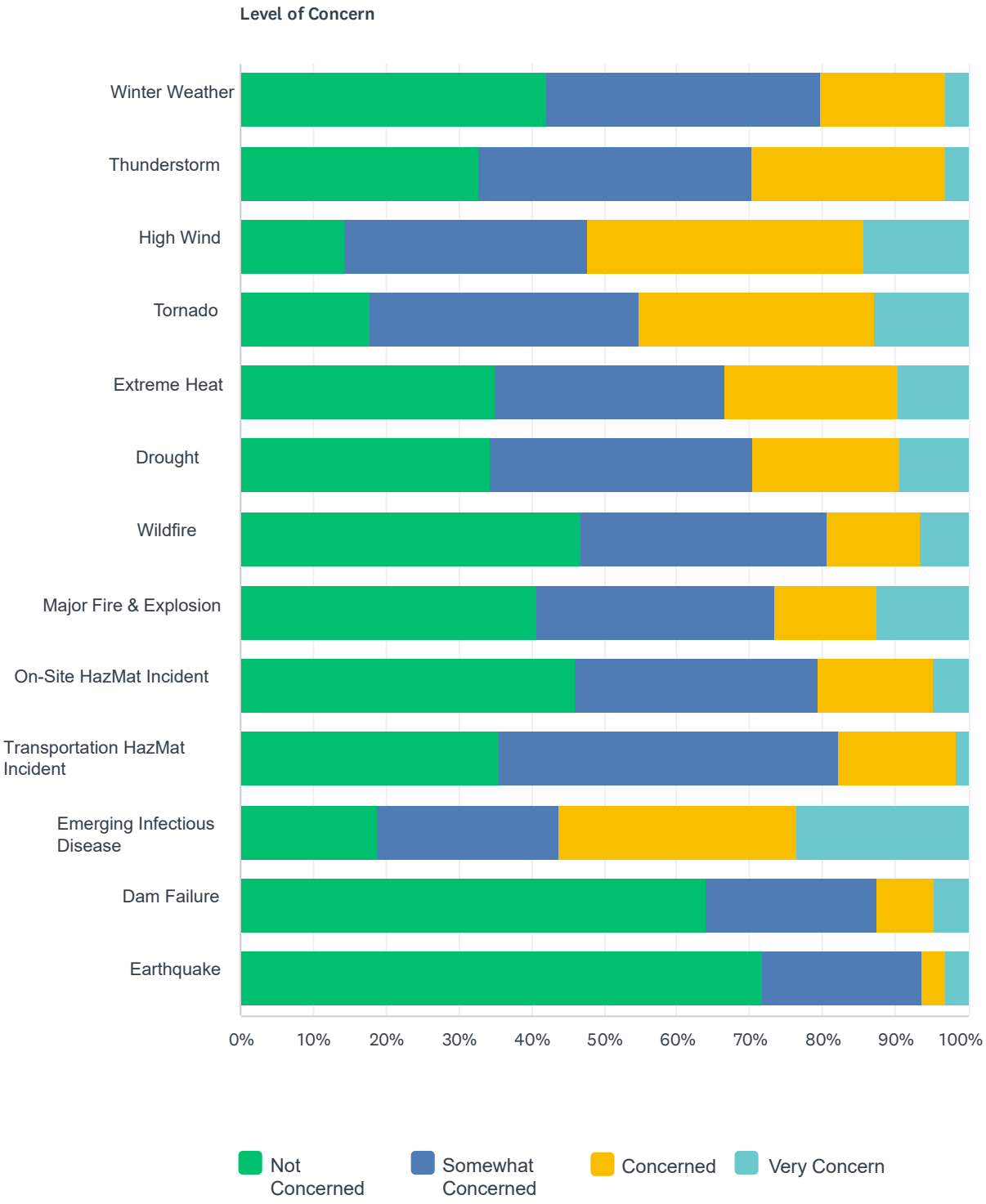
Q3 In what age group do you belong?



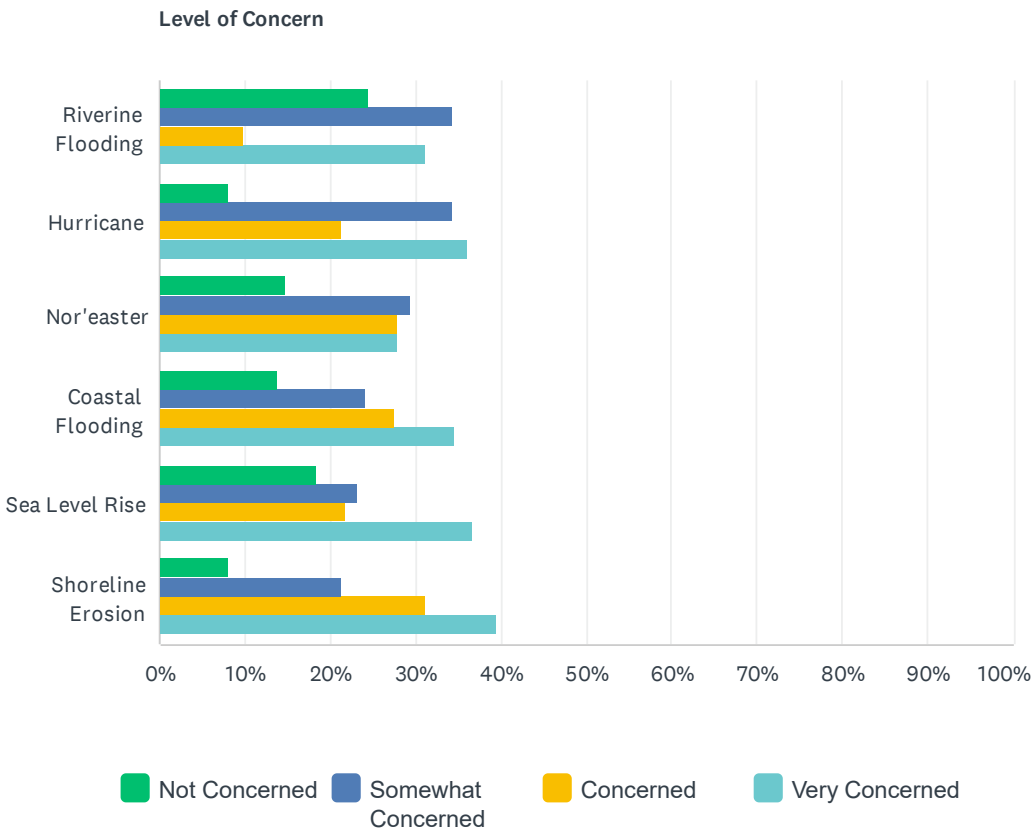
Q4 Do you work in Dorchester County?



Q5 Please indicate your level of concern for each hazard using the drop down menu.

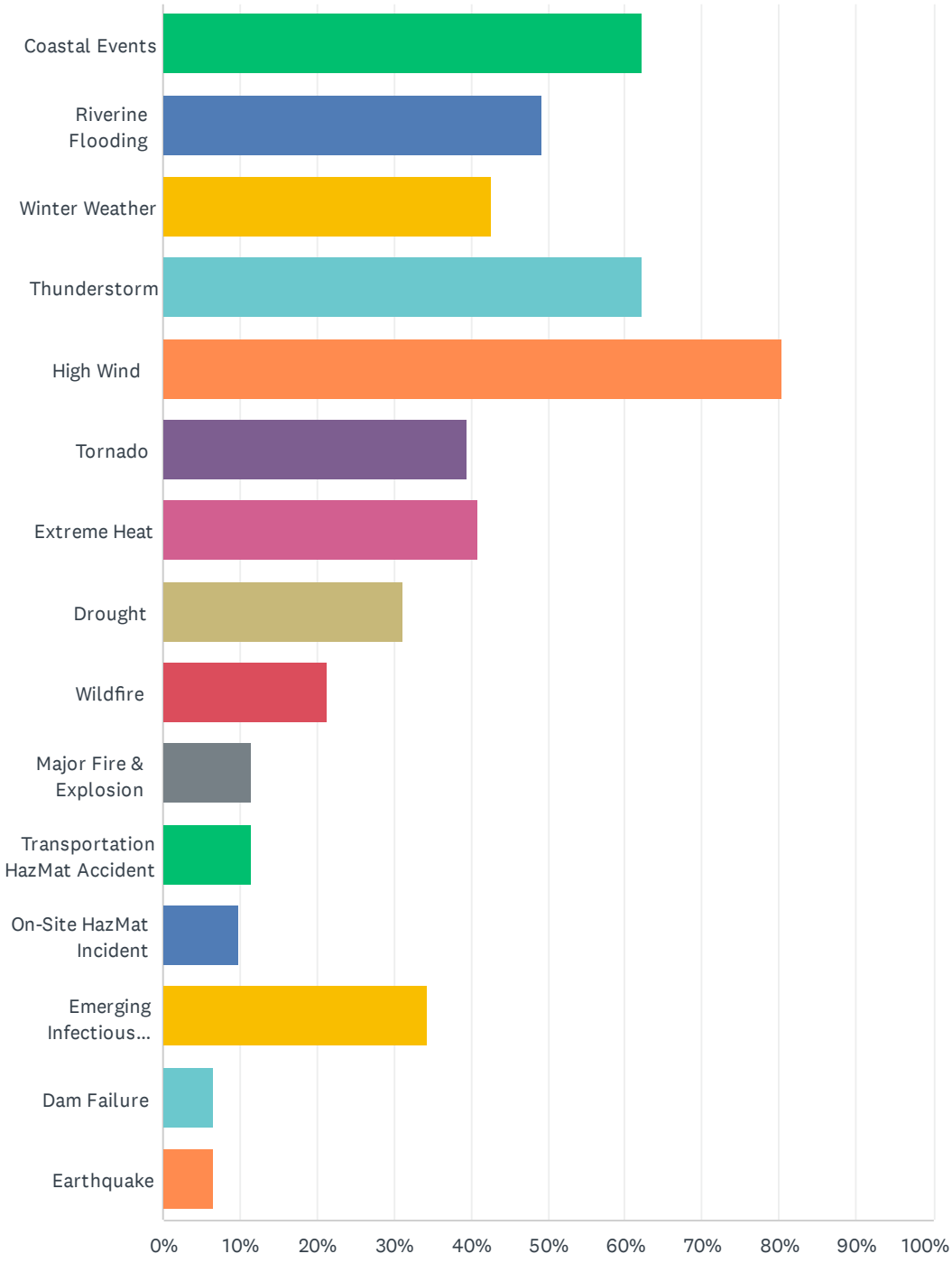


Q6 Please indicate your level of concern for each hazard.

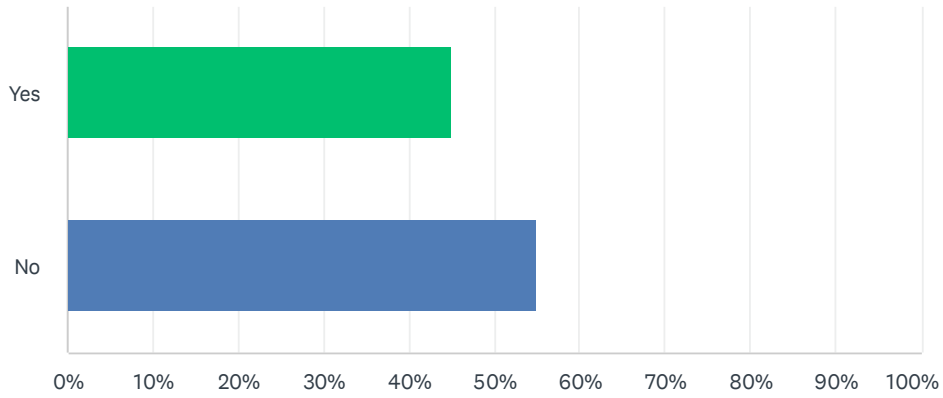


Q7 Please choose from the below list to indicate which hazard events you feel may particularly affect your community.

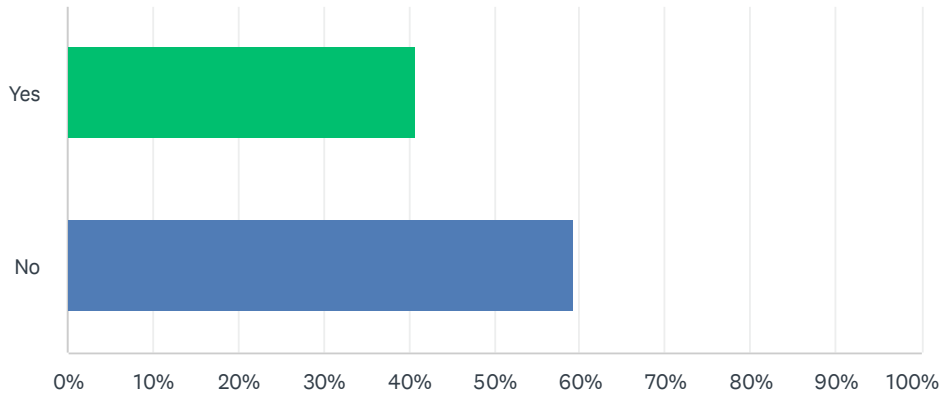
(Please check all that apply.)



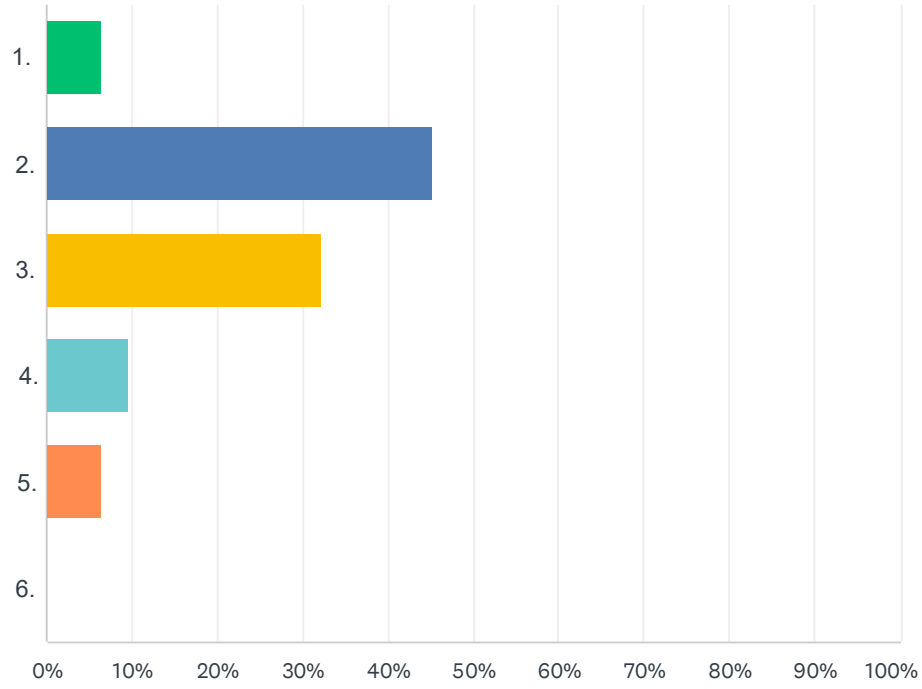
Q9 Is your property located in a floodprone area?



Q10 Do you have flood insurance?

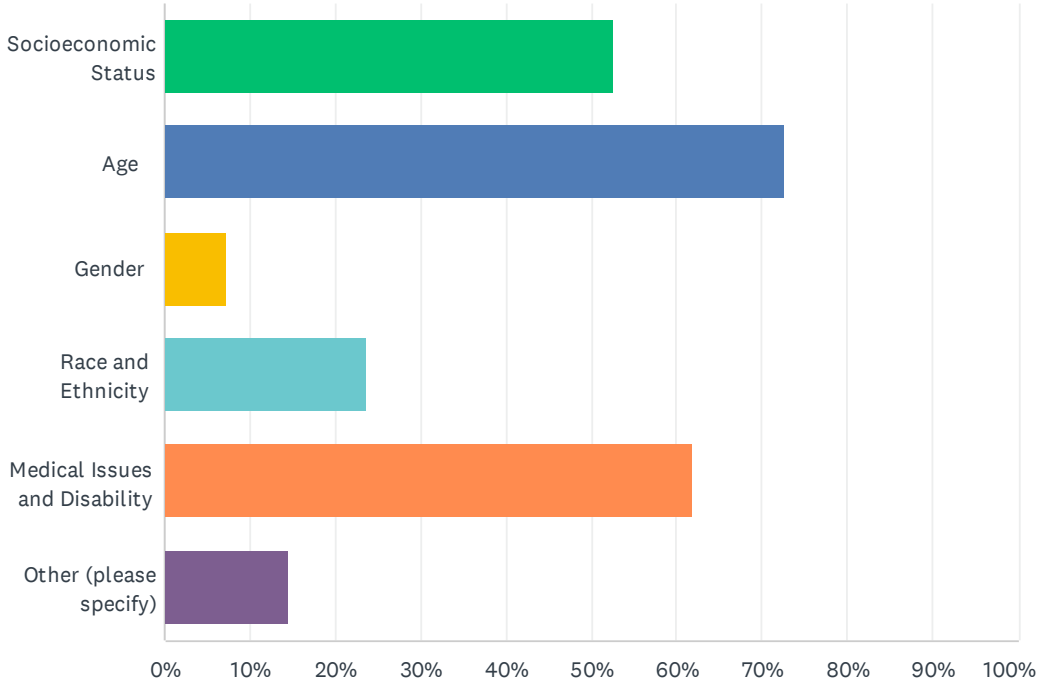


Q11 If you do not have flood insurance, please select the reason that may apply.

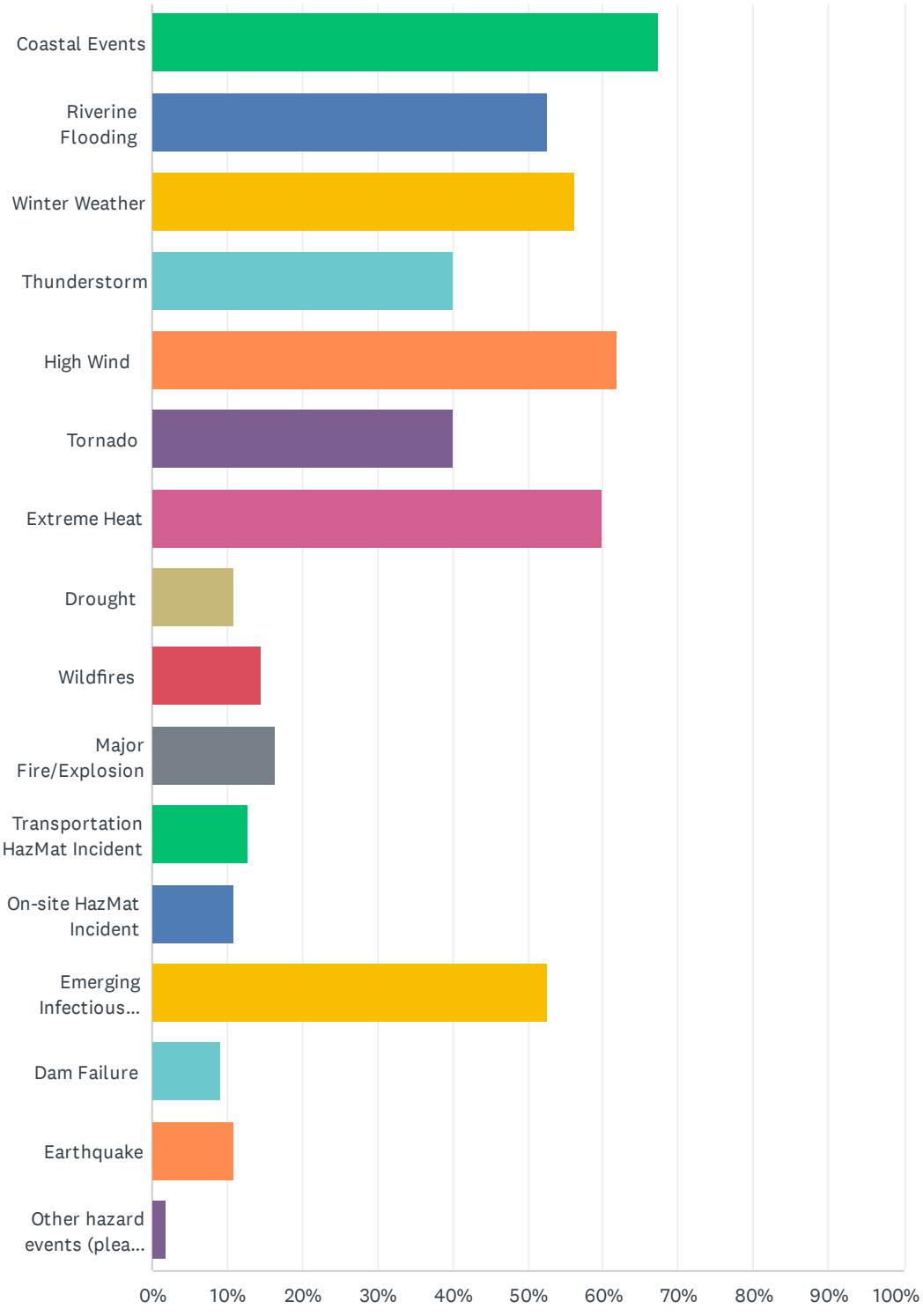


ANSWER CHOICES
1. It is too expensive
2. Property is not in a Special Flood Hazard Area
3. My property is located on high ground
4. Not familiar with it/don't know about it
5. I believe my homeowners insurance will cover me
6. Insurance company will not provide

Q12 In terms of social vulnerability, do you feel that a specific group or groups in the County are particularly at risk for or could be harmed by any of the hazards events listed in questions 5 and 6? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.



Q13 Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

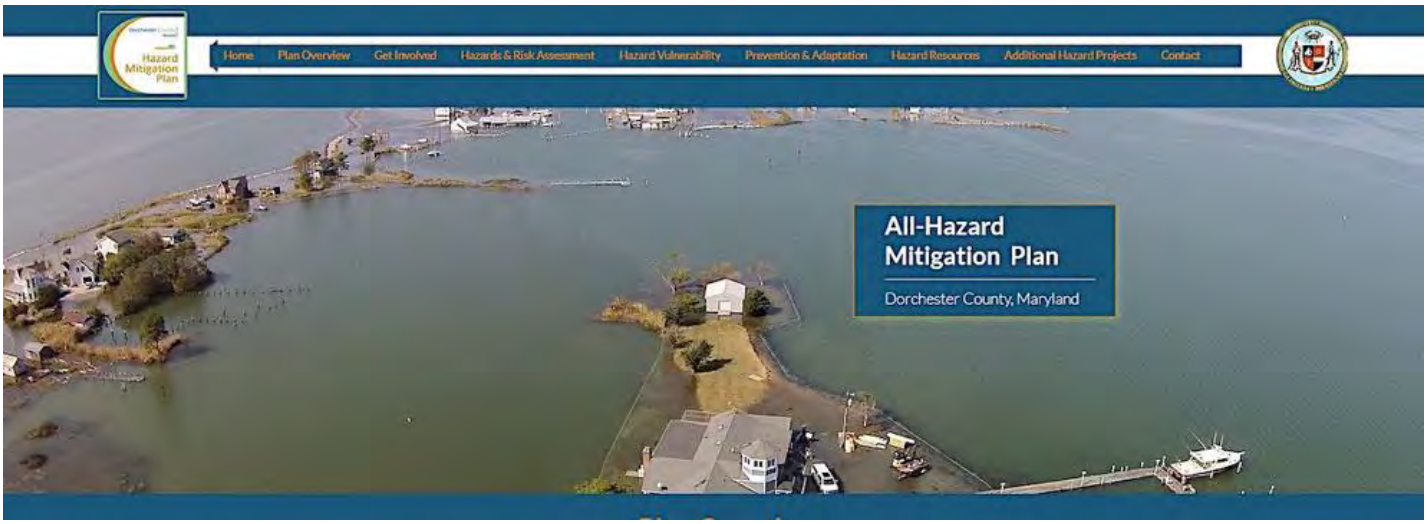


https://www.myeasternshoremd.com/dorchester_star/news/dorchester-updating-all-hazard-mitigation-plan/article_7f4ac249-3122-5490-9318-6bbe86a1f315.html

FEATURED

Dorchester updating All-Hazard Mitigation Plan

Aug 2, 2021



CAMBRIDGE — Dorchester County is engaged in updating the All-Hazard Mitigation Plan. This effort will result in the development of both short-term and long-term strategies to address hazards that impact Dorchester County both today and tomorrow.

The All-Hazard Mitigation Plan forms the foundation for Dorchester County long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. The purpose of this plan is to identify, plan, and implement cost-effective hazard mitigation measures through a comprehensive approach known as hazard mitigation planning. The Federal Emergency Management Agency requires hazard mitigation plans to be updated every five years.

Participation in this planning effort is encouraged. Please visit the project website at www.dorchestermdhazardplans. or contact the Department of Emergency Services for more information.

The Department of Emergency Services is seeking input on stakeholders' concerns regarding hazards. This survey is being used to collect your insight and perspective on hazards identified in the plan.

The online survey link is: https://www.surveymonkey.com/r/ZYZXVXN.

Maryland
INSURANCE ADMINISTRATION

Maryland
Department of
the Environment

Lunch with *MIA*

Do You Know Your Flood Risk?

Join ***MIA***, the **Maryland Insurance Administration**, and the **Maryland Department of the Environment** for a short, informational session on Flood Maps. During this presentation, consumers can expect to learn where they can find flood maps, how they can use flood maps, and the importance understanding the flood risks. e will also review what steps consumers can take to help protect their property from flood damage. e promise you'll learn something. We hope to see you there!

Date: December 2nd, 2021

Time: 12:00pm

Registration Link: ow.ly/ZMQ050GBe6m

Zoom Meeting #: 160 471 5834

Zoom Call-In Information: 833-568-8864

Zoom Link: ow.ly/b7xT50Gq5Ne

FLOOD RISK REDUCTION COMMUNITY WORKSHOP

March 22, 2022
5:30 PM – 8:30 PM
Dorchester Center for the Arts located at 321 High Street Cambridge, MD
Hosted by: The City of Cambridge and Dorchester County

Purpose: To provide an opportunity for property owners to obtain information on various flood risk reduction options, grant, and technical assistance opportunities.

Public Meeting Agenda

5:30-6:00 PM Open House- Please visit the various display stations and speak to subject matter experts in the Gallery Area and Second Floor Performance Hall.

Open House Display Stations

- Make Cambridge Resilient Flood Mitigation Project- Larry White, Project Manager
- Hoopersville Resiliency Study- Anna Johnson, PE, BayLand Consultants & Designers
- Twin Point Cove Resiliency Study- John Ouellette, Versar
- Dorchester County Hazard Mitigation Plan- Michele King, SP&D & Jimmy Windsor, Dorchester County Dept. of Emergency Services
- CRS & Flood Insurance -Travis Jackson, Dorchester County Assistant Building Inspector
- Mid-Chesapeake Bay Island Ecosystem Restoration Project- Kristen Keene, MDOT Maryland Port Administration
- MyCoast Maryland- Sasha Land and Kate Vogel- Coastal Planners, Chesapeake & Coastal Service,

6:00-6:10 Welcome & Introductions
Larry White, Make Cambridge Resilient Flood Mitigation Project Manager and Herve' O. Hamon, Dorchester County Director of Planning and Zoning

6:10-7:00 Presentations- Second Floor Performance Hall

Techniques to Reduce Flooding for Homes and Businesses - This presentation will introduce techniques for modifying residential and commercial buildings to reduce flooding.
Presenter: Jason Stick, Geographer U.S. Army Corps of Engineers - Baltimore District Technical Assistance Branch

Floodplain Management: We're All in This Together! - This presentation will provide an overview of the National Flood Insurance Program (NFIP) and how it can be a resilience tool to reduce flood risk in the community. We'll cover the three key components of the NFIP: Flood Risk Mapping, Floodplain Management Regulations and Mitigation Actions, and Flood Insurance. We'll also talk about the NFIP's Community Rating System (CRS) that benefits Dorchester County residents by reducing the cost of their flood insurance.
Presenter: Kevin G. Wagner, Community Assistance Program Manager, Maryland Department of the Environment

Using River-Friendly Yard Practices to Mitigate Flooding - This presentation will provide information on River-Friendly Yards practices, resources, and ShoreRivers' rebate program, so you can leave ready to make positive change in your own backyard.
Presenter: Matt Pluta, Director of Riverkeeper Programs- Choptank Riverkeeper, ShoreRivers

7:00-7:30 Break- Please visit the various display stations and speak to subject matter experts in the Gallery Area and Second Floor Performance Hall.

7:30-8:30 Presentations Continued- Second Floor Performance Hall (see next page)

MyCoast MD; Be a voice for your community; Take pictures; Submit a Report; Inspire Action! - MyCoast Maryland is a portal to collect and analyze photos of flooding and storm damage. Photos are linked to data about weather and tides to create reports that help government agencies, business owners, and residents understand impacts in your community and encourage action to reduce localized flooding.
Presenters: Sasha Land and Kate Vogel- Coastal Planners, Chesapeake & Coastal Service, Department of Natural Resources

FEMA Hazard Mitigation Assistance Grants – This presentation provides information on FEMA's hazard mitigation assistance funding for eligible mitigation measures that reduce disaster losses. Mitigation project grant applications are developed by local governments and submitted to the Maryland Department of Emergency Management (MDEM). MDEM is responsible for selecting local mitigation projects from around the State that aligns with MDEM's mitigation priorities for submittal to FEMA. FEMA grant programs for flood mitigation include Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA), and Building Resilient Infrastructure and Communities (BRIC).
Presenter: Adam Cox, Lead Hazard Mitigation Specialist, Maryland Department of Emergency Management.

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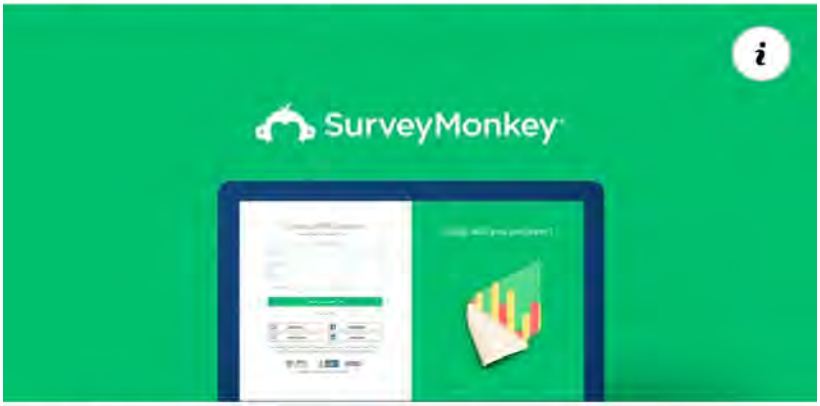
Jul 7 ·

Provide us with your insight on hazards.
Let's work together for a better future

Please participate in the Dorchester County Hazard Survey:
https://www.surveymonkey.com/r/ZYZXVXN.



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Dorchester County Health Department-Emergency Preparedness
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We are seeking input from our community members on our planned all-hazards approach for emergencies here in Dorchester County....
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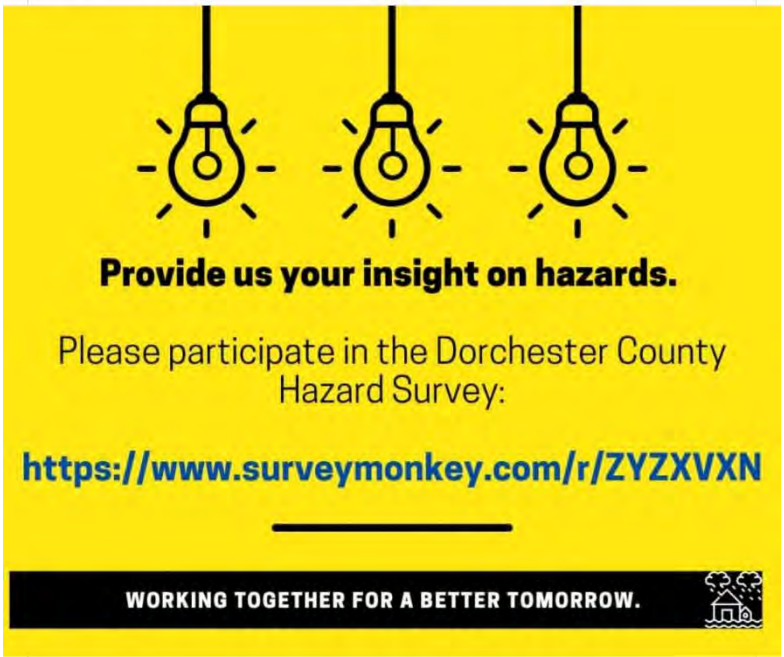

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Dorchester County Health Department-Emergency Preparedness

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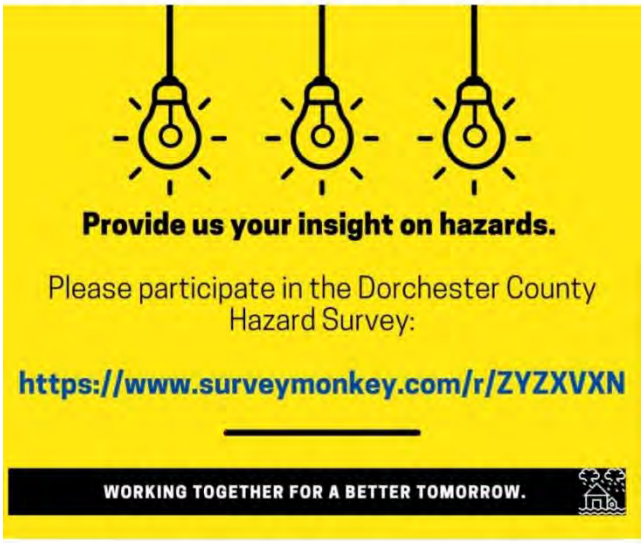
We are seeking input from our community members on our planned all-hazards approach for emergencies here in Dorchester County.

The Hazard and Flood Mitigation Plans helps Dorchester County form a long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. The purpose of these plans is to identify, plan, and implement cost-effective hazard mitigation measures through a comprehensive approach known as hazard mitigation planning. For more information on specific topics addressed in these plans and our approach, please go to the following website:
https://www.dorchestermdhazardplans.org/

To provide your valued input, please participate in the Dorchester County Hazard Survey by clicking here: https://www.surveymonkey.com/r/ZYZXVXN



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APPENDIX H
FUNDING SOURCES

The following is a list of Federal, State, and Foundation Grants that may assist in implementing local Hazard Mitigation Plans.

Disclaimer: This information is subject to change at any time, contact the federal or state agency for current grant status. Database last updated March 16, 2022

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Animals: Emergency Haying and Grazing	USDA Farm Service Agency Emergency and Non-insured Assistance Programs FSA USDA 1400 Independence Ave, SW Washington, DC 20013 202-720-4053	agriculture; Conservation Reserve Program; CRP; disaster; drought; farm; FSA; haying; grazing; livestock; natural disaster; rural; USDA	Haying and grazing on Conservation Reserve Program (CRP) acreage to provide emergency relief to livestock producers due to certain natural disasters. Emergency haying and grazing on CRP acreage to provide relief to livestock producers in areas affected by a severe drought or similar natural disaster.	No information provided	Producers must be enrolled in the USDA Farm Service Agency's Conservation Reserve Program. For more information on the program, visit: https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/index	Anytime
Building Blocks for Sustainable Communities	U.S. Environmental Protection Agency (EPA) Office of Community Revitalization (MC 1807T) 1200 Pennsylvania Ave NW Washington, D.C. Abby Hall at hall.abby@epa.gov or 202-631-5915 https://www.epa.gov/smartgrowth/building-blocks-sustainable-communities	EPA; local government; nonprofits; smart growth	Applications should focus on regional projects that address a disaster risk faced by those communities. Projects should align with and support related efforts and local hazard mitigation plans. Eligible applicants: local, county, or tribal governments, nonprofit organizations.	N/A	This program provides technical assistance to communities using a variety of tools (e.g. smart growth, climate change, disaster resiliency and recovery, etc.). The EPA provides technical assistance through uses teams of experts who conduct workshops in communities related to the tools. Grant focus changes yearly.	November 20, 2020
Capital Project Financial Assistance / Water Quality Improvement Projects (Maryland Water Quality Financing Administration, MWQFA)	Maryland Department of the Environment (MDE) For assistance, please contact Elaine Dietz at elaine.dietz@maryland.gov https://mde.maryland.gov/programs/water/WQFA/Pages/index.aspx	Chesapeake Bay; drinking water; MS4; MWQFA; restoration; revolving loan; septic system; sewer extension; stormwater; wastewater; wastewater treatment; water quality	Water Quality State Revolving Loan Fund – Low interest rate loan and loan principal forgiveness (if eligible) for publicly-owned treatment works projects and publicly or privately-owned non-treatment works projects. Drinking Water State Revolving Fund – Low interest rate loan and loan principal forgiveness (if eligible) for public or privately-owned drinking water projects. Bay Restoration Fund Wastewater Program - Grant funds for · ENR upgrade at major or minor wastewater treatment plants · Improvements to existing wastewater conveyance systems · Sewer extension to connect homes on septic systems to a BNR/ENR wastewater treatment plant · Nitrogen reducing BAT upgrade at shared community septic systems · Stormwater (MS4) projects by local governments with a system of charges Water Supply Financial Assistance - Grant funds not to exceed $1.5 million for drinking projects at publicly-owned facilities, based on system size, compliance, and affordability.	No information provided; N/A for loans	If you previously applied for financial assistance and your project was only partially or not funded, a new/updated application is required. (Applicants with stormwater projects to meet MS4 permits may (and are strongly encouraged to) submit multiple BMP projects that will start construction within 12 – 18 months of notification of funding as a "program" of projects using a single funding application, as opposed to submitting individual BMP projects in separate applications.) Projects in construction prior to MDE's verification of competitive procurement and compliance with all programmatic requirements will not be funded. Do not submit applications for projects in construction that have not already have had these reviews completed by MDE.	TBD

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Certified Local Government (CLG) Program	Maryland Historical Trust (MHT) 100 Community Place, 3rd Floor Crownsville, MD 21032 Nell Ziehl, Chief, Office of Planning, Education and Outreach, nell.ziehl@maryland.gov 410-514-7625	archaeology; archeology; CLG; certified local government; cultural resources; documentation; education; evaluation; heritage; historic; historic building; historic preservation; historic structure; nomination; NPS; National Park Service; NRHP; National Register of Historic Places; planning; preservation; preservation planning; research; studies; training	There are two grant tracks: Education and Training and Projects. Education and Training grants are available for attendance at training, workshops, and conferences. Project grants are available for research, survey, documentation, conservation, planning and educational activities involving historic, architectural, archeological or cultural resources (i.e., the tangible remains of Maryland's past). Only Certified Local Governments are eligible to apply for funding.	N/A	Education and Training Grant awards do not exceed $1,000 per Certified Local Government and Program Grants do not exceed $25,000. Individual awards for Program Grants generally range from $5,000 to $15,000. Hazard mitigation planning for cultural resources (historic structures, historic communities, archeological sites) in CLGs may be fundable under this program. Contact Program Administrator prior to submitting a hazard mitigation planning grant to verify project eligibility.	January or February
State Clean Water Commerce Act Grant	Maryland Department of the Environment (MDE) Walid.Saffouri walid.saffouri@maryland.gov 410-537-3757 https://mde.maryland.gov/programs/water/WQFA/Pages/index.aspx	Chesapeake Bay; Clean Water Act; environmental; nutrient reduction; sediment load reduction; sediment; sediment reduction; water quality	This bill reauthorizes and modifies the Clean Water Commerce Act (CWCA) through June 30, 2030, and requires the Maryland Department of the Environment (MDE) to transfer $20.0 million annually from the Bay Restoration Fund (BRF) Wastewater Account to the Clean Water Commerce Account (CWC Account), a new account within BRF established by the bill. The CWC Account must be used to purchase “environmental outcomes” to help the State achieve the Chesapeake Bay Total Maximum Daily Load (TMDL). The bill establishes requirements for the provision and verification of environmental outcomes, among other things. MDE may adopt implementing regulations. The bill takes effect June 1, 2021, and terminates June 30, 2030.	No information provided	MDE may enter into any contract until June 30, 2030. The contract may last as long as the expected life of the environmental practice resulting from nutrient load reductions.	TBD
Community Assistance Program - State Support Services Element (CAP-SSSE)	Maryland Department of the Environment 160 South Water Street Frostburg, MD 21532 For more information contact: Kevin Wagner Community Assistance Program Coordinator kevin.wagner@maryland.gov 301-689-1495 https://www.fema.gov/community-assistance-program-state-support-services-element	flood; flooding; flood insurance; flood mitigation; flood openings; flood risk reduction; floodplain management; floodplain mapping; floodplain regulations; hazard mitigation; NFIP; technical assistance	The Maryland Department of the Environment will provide technical assistance on the National Flood Insurance Program (NFIP). Assist with questions about construction in the floodplain, flood insurance, and floodplain mapping to local governments and municipalities.	N/A	N/A	N/A
Community Development Block Grant / Disaster Recovery	U.S Department of Housing and Urban Development (HUD) Office of Block Grant Assistance 451 7th Street, SW Washington, DC 20410-7000 202-708- 1112 www.hudexchange.info/programs/cdbg-dr/	CDBG-DR; community; communities; disaster; economic revitalization; housing; HUD; infrastructure; recovery	State and local governments may apply for funding. Eligible activities include "…necessary expenses related to disaster relief, long-term recovery, and restoration of infrastructure, housing, and economic revitalization." Each activity must meet these three requirements: (1) Address a disaster-related impact (direct or indirect) in a Presidentially-declared area for the covered disaster (2) Be a CDBG eligible activity and (3) Meet a CDBG national objective	No information	Citizen participation procedures must be followed. At least 70 percent of funds must be used for activities that principally benefit persons of low and moderate income. Formula grants to States for non-entitlement communities.	After a Presidential Disaster Declaration

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Community Legacy Program	Maryland Department of Housing and Community Development (DHCD) Contacts vary by region. Community Legacy Contact List available here: https://dhcd.maryland.gov/Communities/Pages/programs/CL.aspx	acquisition; business; business retention; community; community development; communities; demolition; development; DHCD; economic revitalization; improvements; open space; revitalization; Sustainable Communities; sustainable; sustainability	Projects should help the local government's implementation of their Sustainable Communities Action Plan. Typical projects/activities include (but are not limited to): mixed-use development consisting of residential, commercial and/or open space; business retention, expansion and attraction initiatives; streetscape improvements; increasing homeownership and home rehabilitation among residents; residential and commercial façade improvement programs; real estate acquisition, including land banking, and strategic demolition.	State - 100%	Projects must be located in a one of Maryland's designated Sustainable Communities. Eligible applicants are local governments, community development organizations (county councils, community development corporations, main street organizations, downtown partnerships), and groups of local governments sharing a common purpose or goal. There is a Neighborhood Intervention component of the Community Legacy program, to not exceed 15 percent of the Community Legacy fund.	Late Spring
Comprehensive Flood Management Grant Program (FMG)	Maryland Department of the Environment (MDE) 1800 Washington Blvd Baltimore, MD 21230 For more information, please contact Cheryl Reilly at cheryl.reilly@maryland.gov	acquisition; capital projects; elevation; flood; flood control; flood damage; flood management plan; flood mitigation; MDE; mitigation; plan; planning relocation; watershed management; watershed studies; watershed	The grant funds the development of local flood management plans, studies of watersheds, and supports capital projects for flood control and watershed management. This program also provides grants to Maryland counties and municipalities after flood events to implement flood control projects, and for acquisition of flood-damaged owner-occupied dwellings. Elevation and relocation of homes are also eligible for funding. Acquired land is converted to open space in perpetuity.	When federal funds do not participate in the cost of a project, the FMG may fund up to 75% of the cost of the project and the local share would be 25%. If federal funds are participating in the project cost, the FMG can provide 50% of the match requirement and the local share would be 50%.	Only county and municipal governments are eligible to receive grants. During the 2019 Session of the Maryland General Assembly HB 428/SB 269 was passed, which requires at least $3 million in both fiscal year 2021 and fiscal year 2022, and for fiscal year 2023 at least $2 million be appropriated.	The solicitation period is typically from December 1 through January 31. Complete applications and supporting documents are due to MDE before the close of the solicitation period
Conservation Reserve Program	USDA Farm Services Administration (FSA) https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/	agriculture; conservation; CRP; erosion; habitat; habitat restoration; land conservation; open space; protection; restoration; soil erosion protection; soil erosion; USDA; water quality; wildlife habitat	For land to be eligible it must be: Cropland that has been planted or considered planted to an agricultural commodity 4 of the 6 years between 2008 and 2013; and Physically and legally capable of being planted in a normal manner to an agricultural commodity. Alfalfa or other multiyear grasses and legumes grown in a rotation, not to exceed 12 years, also may be eligible. Also, cropland must meet one of the following criteria: Have a weighted average Erodibility Index of eight, or greater; Be expiring CRP; or Be located in a national or State conservation priority area.	N/A	Contracts for land enrolled in CRP are 10-15 year in length.	The General CRP signup runs from Jan. 31, 2022 to March 11, 2022, and the Grassland CRP signup runs from April 4, 2022 to May 13, 2022. The Continuous CRP Signup is ongoing.
Continuing Authorities Program (CAP)	U.S. Army Corps of Engineers (USACE) 441 G Street, NW Washington, DC 20314 202-761-0011 https://www.nae.usace.army.mil/Missions/Public-Services/Continuing-Authorities-Program/	beaches; beach erosion; beneficial use of dredged materials; channel clearing; dredged materials; environmental; erosion; flood control; hazard mitigation; hazard protection; natural hazards; storm damage reduction; navigation improvements; mitigation; protection; public services; public works; streams; streambank; shoreline; USACE; water resources	USACE will plan, design, and implement certain types of water resources projects. Activities are section-dependent: streambank and shoreline erosion protection of public works and non-profit public services; beach erosion and hurricane and storm damage reduction; navigation improvements; shore damage prevention or mitigation caused by Federal navigation projects; beneficial uses of dredged materials; flood control; aquatic ecosystem restoration; removal of obstructions, clearing channels for flood control; project modifications for the improvement of the environment	The feasibility phase is Federally funded up to $100,000, any remaining feasibility costs are shared 50/50 with the Non-Federal sponsor. The implementation phase costs phase are shared per the authorizing legislation for that section.	A local sponsor must identify the problem and request assistance. Small flood control projects are also available. Baltimore District, USACE General Information: 1-800-434-0988	Anytime

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Emergency Advance Measures for Flood Prevention	U.S. Army Corps of Engineers (USACE) 441 G Street, NW Washington, DC 20314 202-761-0011	advance measures; contamination; disaster; drought; emergency operations; emergency; water; flood control; flood response; post-flood response; preparedness; rehabilitation; response; shoreline protection; USACE	The USACE is authorized to undertake activities including disaster preparedness, Advance Measures, emergency operations (Flood Response and Post Flood Response), rehabilitation of flood control works threatened or destroyed by flood, protection or repair of federally authorized shore protective works threatened or damaged by coastal storm, and provisions of emergency water due to drought or contaminated source.	No information provided	There must be an immediate threat of unusual flooding present before advance measures can be considered. Any work performed under this program will be temporary in nature and must have a favorable benefit cost ratio.	Governor of State must request assistance
Emergency Watershed Protection (EWP) Program - Recovery Assistance	Natural Resources Conservation Service (NRCS) 1400 Independence Avenue SW Washington, DC 20250 Shawn Anderson, Acting EWP Program Manager, shawn.anderson@wdc.usda.gov, 202-720-5795	debris removal; conservation; erosion protection; EWP; levee repair; NRCS; recovery; streams; streambank erosion; streambank protection; USDA; watershed	Debris removal from stream channels, roads culverts, and bridges; reshape and protect eroded streambanks; correct damaged drainage facilities; establish vegetative cover on critically eroding lands; repair levees and structures; repair conservation practices	Federal - 75% Non-Federal - 25%	Public and private landowners can apply for assistance for EWP Program – Recovery projects through a local sponsor, or a legal subdivision of state or tribal government. Eligible sponsors include cities, counties, towns, conservation districts, flood and water control districts, or any federally-recognized Native American tribe or tribal organization. Does not fund operation and maintenance work or repair private or public transportation facilities or utilities. Any work performed under this program cannot adversely affect downstream water rights and funds cannot be used to install measures not essential to the reduction of hazards.	TBD - Post disaster
Emergency Watershed Protection (EWP) Floodplain Easement Program - Floodplain Easement Option (EWPP-FPE)	Natural Resources Conservation Service (NRCS) Emergency Watershed Protection Program–Floodplain Easement (EWPP-FPE) Program Manager Jeff Williams Easement Programs Division, jeff.williams3@usda.gov 202-720-6268 Contact Local NRCS Field Office: www.nrcs.usda.gov/wps/portal/nrcs/main/md/contact/local/	acquisition; demolition; easements; EWP; EWPP-FPE; floodplain; floodplain enhancement; floodplain restoration; NRCS; open space; relocation; restoration; USDA	Permanent easements are available for eligible lands: Agricultural or open lands; lands primarily used for residential house. Individuals and communities can directly contact NRCS about this program.	N/A	A project sponsor is required for lands primarily used for residential housing and for the purchase of the remaining lot after structures are removed. NRCS may purchase EWPP-FPE permanent easements in floodplains for the following reasons: 1) The land has been damaged by flooding at least once during the previous calendar year or subject to flood damage at least twice within the previous 10 years. 2) Other lands within the floodplain may be eligible if they contribute to the restoration of floodwater storage and flow, offer a way to control erosion, or improve the practical management of the floodplain easement. 3) Lands that would be inundated or adversely impacted as a result of a dam breach. 1If FPE is being offered as recovery for a specific natural disaster, at least one instance of flooding must have occurred because of that natural disaster.	Anytime

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Federal Emergency Management Agency, Flood Mitigation Assistance Program (FMA)	Maryland Emergency Management Agency (MEMA) 5401 Rue Saint Lo Drive Reisterstown, MD 21136 Contact: mitigation.mema@maryland.gov	aquifer; critical facilities; FEMA; FMA; flood; flood control; flood damage; flood mitigation; flood mitigation plan; flood protection; floodwater storage; floodwater diversion; HMA; infrastructure; MEMA; mitigation; NFIP; plan; planning; protection; recovery; repetitive loss; RL; restoration; sanitary sewer system; severe repetitive loss; streams; stream restoration; SRL; stormwater; stormwater management; water system; wetlands; wetland restoration	Infrastructure protective measures; floodwater storage and diversion; utility protective measures; stormwater management; wetland restoration/creation; aquifer storage and recovery; localized flood control project to protect critical facility; floodplain and stream restoration; water and sanitary sewer system protective measures	Federal - 75% Non-Federal - 25% RL: Federal - 90% Non-Federal - 10% SRL: Federal - 100% Non-Federal - 0% Small, Impoverished Community: Federal - 90% Non-Federal - 10% RL = Repetitive Loss Property SRL = Severe Repetitive Loss Property	Projects must be cost effective, located in a participating NFIP Community (In good standing), align with the applicable FEMA-approved hazard mitigation plan, and meet all environmental and historic preservation (EHP) requirements. Repetitive and Severe Repetitive Loss properties are a high priority. Program is nationally competitive. *Subapplicants must submit a Notice of Intent (NOI) to MEMA to apply for funding under this grant and must coordinate with MEMA prior to submission.* MEMA submits all grants for the State of Maryland (including sub-grants to local governments). Applicants (the State of Maryland) and subapplicants (local government) must have a FEMA approved hazard mitigation plan as of the application deadline and at the time of obligation of funding for project grants. Some projects may require the property be covered by a flood insurance policy for the life of the structure upon project completion.	Application Opening: Sept. 30, 2021 Application Deadline: Jan.28, 2022, 3 p.m. EST
Federal Emergency Management Agency, Hazard Mitigation Grant Program (HGMP)	Maryland Emergency Management Agency (MEMA) 5401 Rue Saint Lo Drive Reisterstown, MD 21136 Contact: mitigation.mema@maryland.gov	acquisition; code enforcement; demolition; disaster; elevation; FEMA; flood; flood risk reduction; floodproofing; generators; hazard mitigation; hazard mitigation plan; hazard mitigation planning; hazard mitigation project; HMA; HMGP; management costs; mitigation; MEMA; NFIP; planning; plans; protection; reconstruction; relocation; retrofitting; safe rooms; soil stabilization; wildfire; wildfire mitigation; wind retrofit; 5 percent initiative	Acquisition, demolition, relocation, elevation, reconstruction, dry floodproofing, generator purchase, flood risk reduction projects, retrofitting, safe room construction, wind retrofits (1- and 2-family residences), soil stabilization, wildfire mitigation, hazard mitigation planning, management costs, post-disaster code enforcement, 5 percent initiative projects, hazard mitigation planning related planning activities	Federal - 75% Non-Federal - 25%	Projects must be cost effective, environmentally sound and solve a problem. Subapplicants must submit a Notice of Intent (NOI) to MEMA to apply for funding under this grant and must coordinate with MEMA prior to submission. *MEMA submits all grants for the State of Maryland (including sub-grants to local governments). Applicants (the State of Maryland) and subapplicants (local government) must have a FEMA approved hazard mitigation plan at the time of obligation of funding for project grants. Some projects may require the property be covered by a flood insurance policy for the life of the structure upon project completion.*	After a Presidential Disaster Declaration

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Federal Emergency Management Agency, Building Resilient Infrastructure and Communities (BRIC)	Applications are processed through the FEMA GO system. To access the system, go to https://go.fema.gov/. Hard copies of the NOFO can be downloaded at Grants.gov or For a hardcopy of the full NOFO, please submit a request to: Kayed Lakhia Director, Hazard Mitigation Assistance Division, Mitigation Directorate Federal Insurance and Mitigation Administration Federal Emergency Management Agency 400 C Street, SW Washington, DC 20472	acquisition; demolition; elevation; FEMA; flood; flood risk reduction; floodproofing; generators; hazard mitigation; hazard mitigation plan; hazard mitigation planning; hazard mitigation project; HMA; management costs; mitigation; MEMA; NFIP; PDM; planning; plans; protection; reconstruction; relocation; retrofitting; safe rooms; soil stabilization; wildfire; wildfire mitigation; wind retrofit	To achieve these principles, FEMA will provide financial assistance to eligible BRIC Applicants for the following activities: (1) Capability- and Capacity-Building (C&CB) – activities which enhance the knowledge, skills, expertise, etc., of the current workforce to expand or improve the administration of mitigation assistance. This includes activities in the following sub-categories: building codes activities, partnerships, project scoping, mitigation planning and planning-related activities, and other activities; (2) Mitigation Projects – cost-effective projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure; and (3) Management Costs – financial assistance to reimburse the Recipient and subrecipient for eligible and reasonable indirect costs, direct administrative costs, and other administrative expenses associated with a specific mitigation measure or project in an amount up to 15 percent of the total amount of the grant award, of which not more than 10 percent of the total award amount may be used by the Recipient and 5 percent by the subrecipient for such costs. FEMA will also provide non-financial Direct Technical Assistance to communities to build a community's capacity and capability to improve its resiliency to natural hazards and to ensure stakeholders are capable of building and sustaining successful mitigation programs, submitting high-quality applications, and implementing new and innovative projects that reduce risk from a wide range of natural hazards.	Federal - 75% Non-Federal - 25% Small Impoverished Community: Federal - 90% Non-Federal - 10% Insular Areas: For insular areas, including American Samoa, Guam, the Northern Mariana Islands, and the U.S. Virgin Islands, FEMA automatically waives the non-federal cost share for the Recipient when the non-federal cost share for the entire award is under $200,000. If the non-federal cost share for the entire award is $200,000 or greater, FEMA may waive all or part of the non-federal cost share at the request of the Recipient. The Recipient may request the waiver in its Application.	The Building Resilient Infrastructure and Communities (BRIC) program makes federal funds available to states, U.S territories, Indian tribal governments, and local communities for pre-disaster mitigation activities. The guiding principles of the program are to (1) support state and local governments, tribes, and territories through capabilityand capacity-building to enable them to identify mitigation actions and implement projects that reduce risks posed by natural hazards; (2) encourage and enable innovation while allowing flexibility, consistency, and effectiveness; (3) promote partnerships and enable high-impact investments to reduce risk from natural hazards with a focus on critical services and facilities, public infrastructure, public safety, public health, and communities; (4) provide a significant opportunity to reduce future losses and minimize impacts on the Disaster Relief Fund; and (5) support the adoption and enforcement of building codes, standards, and policies that will protect the health, safety, and generalwelfare of the public, take into account future conditions, and have long-lasting impacts on community risk reduction, including for critical services and facilities and for future disaster costs.	Application Opening: Sept. 30, 2021 Application Deadline: Jan.28, 2022, 3 p.m. ESTT
Fire Management Assistance Program Fire Management Assistance Grant	Federal Emergency Management Agency (FEMA) FEMA Region III 615 Chestnut Street One Independence Mall, Sixth Floor Philadelphia, PA 19106-4404 215-931-5500	disaster; FEMA; fire; fire control; forests; grassland; grassland mitigation; management; mitigation; private land; public land; wildfire	Provides real-time assistance for the suppression of any fire on public (non-Federal) or privately owned forest or grassland that threatens to become a major disaster. Eligible costs may include, but are not limited to, expenses for: field camps, equipment use, equipment repair and replacement, tools, materials, supplies, and mobilization and demobilization activities.	Federal - 75% State - 25%	Prior to award, the State must demonstrate that the total eligible costs for the declared fire meet or exceed the individual fire cost threshold.	After Fire Management Assistance declaration
Oil Spill Liability Trust Fund	U.S. Coast Guard (USCG) Director, USCG National Pollution Funds Center Stop 7605 2703 Martin Luther King Jr. Avenue, SE Washington, DC 20593-7605 202-795-6000 Visit this website for more information: https://www.uscg.mil/Mariners/National-Pollution-Funds-Center/Response/	cleanup; contamination; disposal; haz mat; hazardous materials; NPFC; oil spill; Oil Spill Act; OPA; removal; USCG	Compensation may be available under the Oil Spill Act (OPA) if the claim meets the requirements and all costs and damages from the spill are documented. Funding can be used for Federal removal costs including payment to cleanup contractors, overtime for government personnel, equipment used in removal operations, testing to identify the type and source of oil, disposal of recovered oil and oily debris, and preparation of associated cost documentation.	Reimbursement for eligible activities, cost share does not apply	These agencies/organizations can access the fund: all Federal on-scene coordinators (FOSCs); Federal, State, local, and Tribal government agencies assisting the FOSC; natural resources trustees (designated by the President of the United States, state, territorial governor, or Indian tribal governing authority), claimants (individuals, corporations, and government entities) can submit claims for uncompensated removal costs and OPA damages caused by the oil spill to the USCG's National Pollution Funds Center (NPFC) if the responsible party (RP) does not satisfy their claims.	Anytime

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Local Government Infrastructure Program	Maryland Department of Housing and Community Development (DHCD) Charles Day, Program Manager 7800 Harkins Road Lanham, MD 20706 301-429-7891	DHCD; equipment; facilities; infrastructure; infrastructure improvements; landscaping; loan; public services; public safety; public land; refinancing; stormwater; sidewalks; street lighting; vehicles; water treatment; water storage	Project must support an essential physical element of a municipality's public service system. Projects may include (but are not limited to): street lighting, landscaping, sidewalks, and public space improvements; public safety vehicles and equipment; water production, treatment, storage, and distribution systems; stormwater control, and sewer collection and treatment facilities; government office and meeting facilities; police, fire, transportation, education, health, recreation, maintenance, and other service related facilities; refinancing of existing debt for eligible projects as listed above.	N/A (loan) Through funding raised through tax-exempt bonds issued on behalf of counties, municipalities, and/or their instrumentalities, the State uses the bond proceeds to issue a *loan* to the local government (interest rate depends on market conditions at time of loan issuance).	All Maryland counties, municipalities and/or their agencies are eligible, provided they have legal authority necessary for: constructing, operating and maintaining the proposed project; pledging security for and repaying the proposed loan, and; pledging income tax payments and various other shared revenue from the state. Local governments must secure local legislative approval(s) to incur the debt, certify the capacity to inspect the project's construction progress, and agree to submit periodic status reports. Additionally, they must ensure adequacy and sufficiency in the project's design and construction, and they must meet credit requirements sufficient to satisfy rating agencies and secure a favorable credit rating.	Applications accepted on an ongoing basis
Maryland Business Recovery Loan Program	Maryland Department of Housing and Community Development (DHCD) Neighborhood BusinessWorks Program 7800 Harkins Road, 4th Floor Lanham, MD 20706 Colleen Cord-Malone Business Lending Programs, Manager II 301-429-7517 Toll Free: 1-800-756-0119 colleen.cord-malone@maryland.gov Aisha K. Taylor Business Lending Programs, Loan Underwriter 301-429-7721 Toll free: 1-800-756-0119 aisha.taylor@maryland.gov	DHCD; disaster; equipment; fixtures; furniture; inventory; leasing expenses; loan; lost revenue; lost operating expenses; nonprofits; recovery; renovation; repair; replacement; small business; working capital	Renovations; repairs and replacement of furniture, fixtures, and equipment; inventory replacement; loss of revenue/operating and leasing expense assistance; certain other costs associated with recovery of a small business, including working capital. Eligible businesses include: retail, manufacturing, goods and services. Business must be located in Baltimore City, Baltimore County, Frederick County, Howard County, or Washington County.	N/A (loan)	Offers assistance up to $50,000 (amount based on damage assessment) at an interest rate of zero percent (0%). Higher amounts will be considered on a case-by-case basis. Financing may be used in conjunction with other financing, insurance proceeds, etc., and the target loan term is 1-5 years, depending on loan size and affordability.	Available when activated after state declaration of emergency.
Maryland Disaster Housing Assistance Program	Maryland Department of Housing and Community Development (DHCD) Gregory Hare Deputy Director, Multifamily Housing 7800 Harkins Road, Lanham, MD 20706 301-429-7775	assistance; DHCD; disaster; disaster assistance; emergency assistance; emergency rental assistance; housing; housing assistance; housing voucher; MDHAP; rental assistance; voucher	Eligible recipients: Families or individuals are assisted on a referral basis through referrals made by MEMA, DHR, local government human resources or emergency management offices, or other designated disaster relief agencies. Generally, all families or individuals displaced by a natural disaster are eligible and can be referred to the program.	None: State funds 100% of costs	The term of the voucher is 90 days, extensions will be considered if the home is not ready for occupancy at the end of 90 days.	Available when activated after state declaration of emergency.

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Maryland Energy Administration (MEA), Resilient Maryland	Questions and feedback regarding the Resilient Maryland program should be directed to Brandon Bowser, CHP & Energy Resilience Program Manager, at BrandonW.Bowser@Maryland.gov or via phone at (443) 306-0304.	MEA; clean; efficient; affordable; energy; vulnerable populations.	At a minimum, eligible projects must: Be located within the State of Maryland; Clearly demonstrate the organizational and/or societal benefits of system implementation; Include an Applicant contribution that can be at a minimum an amount of donated work hours (excluding administrative duties related to Grant reporting); Demonstrate clean energy systems that achieve greenhouse gas reductions; and Permit showcasing of project findings and installations by MEA to the public. Applicants must be in Good Standing with the Maryland State Department of Assessments and Taxation (SDAT), when applicable.	Resilient Maryland is provided to help organizations identify potential ways to incorporate DERs into organizational energy management plans that improve resilience and sustainability, reduce energy burden, and safeguard essential infrastructure, services, and businesses from prolonged power outages. In its FY22 year, the program is seeking projects that pursue creative solutions, incorporate innovation, explore potentially replicable and scalable project models, and enhance energy equity to Maryland communities experiencing vulnerabilities and challenges.		Round 2 Program Application Deadline: 5:00 P.M. EST, Thursday, March 31, 2022
Maryland Energy Administration (MEA), Combined Heat and Power (CHP) Grant Program	Questions or comments regarding the CHP Grant Program should be directed to Brandon Bowser, CHP & Energy Resilience Program Manager. He can be reached via email at BrandonW.Bowser@Maryland.gov or via phone at (443) 306-0304.	CHP; capital costs; energy resilience; energy efficiency; renewable natural gas; RNG;	Commercial businesses, Nonprofit organizations, Critical infrastructure, Industrial and manufacturing, Chemical and pharmaceutical, Institutional (colleges, universities, etc.), Public and private education, Multifamily housing, Agricultural, Maryland State and local government	Anticipated Program Budget: $3.6 million, restrictions apply. For more information, please see the Funding Opportunity Announcement below	The FY22 CHP Grant Program is provided to further the statewide adoption of CHP technologies that bring energy efficiency, resilience, and enhanced sustainability to Maryland's businesses, supply chains, essential services, critical infrastructure, communities, and institutions. CHP technologies, when strategically implemented, produce energy for the sites they serve in the most efficient manner. This reduces the release of greenhouse gases when compared to emissions for utility-supplied energy. They also help diversify the State's electricity grid and give their implementers more energy autonomy, particularly when they are grid-interconnected and configured to operate in grid outage situations.	Program Application Deadline: Friday, February 11, 2022, 5:00 P.M. EST Accepts applications annually.
Maryland Housing Rehabilitation Program (Single Family; 1-4 Family Rental Units)	Maryland Department of Housing and Community Development (DHCD) Special Loan Programs 7800 Harkins Road, Lanham, 3rd Floor, MD 20706 E: DHCD.SpecialLoans@maryland.gov P: (301) 429-7409 | Toll Free (Maryland Only): 1-844-369-4150 TTY 711 or 1-800-735-225	DHCD; homeowners; landlords; loan; single family; rehabilitation; rental properties	Eligible Applicants: Household income of owner-occupants of single family homes and all residents of financed rental housing cannot exceed 80 percent of the statewide or Washington, D.C. Metropolitan Statistical Area median income.	Community/Campus Microgrid	$100,000	Open and ongoing

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Maryland Sea Grant (NOAA)	NOAA, Sea Grant Maryland Fredrika Moser, Director moser@mdsg.umd.edu Michael Allen, Associate Director for Research and Administration mallen@mdsg.umd.edu 301-405-7500 www.mdsg.umd.edu/funding-opportunities	aquaculture; climate change; coastal; coastal ecosystems; ecosystems; economy; economic equity; equity; estuary; fisheries; land use; natural hazards; nutrient reduction; outreach; pollution abatement; research; resiliency; resilience; resilient communities; resilient economies; resiliency; restoration; seafood safety; sediment; sediment reduction; socioeconomic equity; social equity; sustainable; sustainability; sustainable fisheries; sustainable aquaculture; watershed; water quality	Eligible activities are research proposals that provide scientific and socioeconomic information that can inform policy decisions for fisheries management and sustainable aquaculture, climate change adaptation, coastal community resilience, and ecosystem restoration in coastal systems in Maryland. Projects must demonstrate a connection between the proposed research and the focus areas and strategies (one or more) highlighted in the RFP. A proposal must demonstrate integration among its scientific approaches, research outcomes, and outreach plan. Eligible applicants: Principal Investigators (PIs) must be affiliated with an academic institution or research laboratory in Maryland or the District of Columbia. Co-Principal Investigators (Co-PIs) on projects can be from institutions outside of Maryland or the District of Columbia. Single investigators and multiple investigator research teams from different institutions are encouraged to apply. Maryland Sea Grant extension personnel are welcome to serve as Co-PIs or senior personnel but are restricted from requesting salary support.	N/A	N/A	TBD
National Estuary Program (NEP) Coastal Watersheds Grant Program	EPA & Restore America's Estuaries Suzanne Simon NEP Coastal Watersheds Grant Program Director ssimon@estuaries.org 413-695-8922 https://estuaries.org/initiatives/watershedgrants/	adaptation; aquatic; aquatic invasive species; climate adaptation; climate change; climate vulnerability; comprehensive conservation and management plan; CCMP; ecosystems; estuary; green infrastructure; habitat; invasive species; nutrient reduction; pollution reduction; restoration; TMDL; water quality; wetlands	Activities may include: protecting and restoring up to 100,000 acres of estuarine habitat; protecting and restoring estuarine water quality in NEP study areas; supporting core Clean Water Act programs; conducting vulnerability assessments and/or implementing climate adaptation strategies in over 50% of NEP study areas and collaborating with other EPA programs and with agencies like NOAA to build regional, local, and tribal coastal community resilience to impacts of climate change on coastal ecosystems, public health, and economies; building local capacity to reach out to and involve urban community residents who typically may not have had access to water bodies in NEP study areas nor have been actively engaged in urban water body protection and restoration. Eligible applicants include: state agencies; public and nonprofit agencies; institutions; organizations and individuals (Section 320(g)(l)). Profit making organizations are not eligible for grants.	Please refer to: https://estuaries.org/wp-content/uploads/2022/02/2022-CWG-RFP-FINAL-3-1-2022.pdf	RAE will select grantees through a two-step process: 1) letters of intent (LOI); and 2) full proposals by invitation only. Project funding will range between $75,000 and $250,000, resulting in roughly three to ten total subawards per funding year depending on the breakdown of the requests. Projects must occur in their entirety within the geographic areas shown below and on this interactive map, which is located at: http://arcg.is/1u19zq.	Deadlines 1. Letters of Intent: due by 5:00 p.m. PT/8:00 p.m. ET on Friday, May 27, 2022 2. Full proposals by invitation only: due by 5:00 p.m. PT/8:00 p.m. ET on Friday, September 23, 2022
National Flood Insurance Program (NFIP)	Maryland Department of the Environment (MDE) 1800 Washington Blvd Baltimore, MD 21230	financial protection; flood; flood insurance; floodplain; floodplain regulations; insurance; MDE; NFIP; regulations	Provides financial protection by enabling persons to purchase insurance against floods, mudslide or flood related erosion. *Anyone can purchase flood insurance. You do NOT need to be in a regulatory floodplain to purchase flood insurance.*	Community Resiliency Hub	$10,000	Anytime

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National Flood Insurance Program - Increased Cost of Compliance (ICC)	Maryland Department of the Environment (MDE) 1800 Washington Blvd Baltimore, MD 21230	acquisition; compliance; demolition; elevation; flood; flood damage; flood insurance; floodplain; floodplain regulations; floodproofing; ICC; increased cost of compliance; insurance; MDE; mitigation; NFIP; regulations; relocation; repetitive loss; RL; SFHA; substantial damage	Increased Cost of Compliance (ICC) coverage is one of several resources for flood insurance policyholders who need additional help rebuilding after a flood. It provides up to $30,000 to help cover the cost of mitigation measures that will reduce flood risk. ICC coverage is a part of most standard flood insurance policies available under the Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program (NFIP).	*Subject to funding availability and may be adjusted by MEA.	In addition to being insured under the NFIP, a building must meet one of two conditions to be eligible to receive ICC coverage; it must have been either 1) determined to be substantially damaged or 2) meet the criteria of a repetitive loss structure.	After a building in the SFHA is declared substantially damaged or meets the definition of a Repetitive Loss property
Neighborhood BusinessWorks Program	Maryland Department of Housing and Community Development (DHCD) Business Lending Team 7800 Harkins Road Lanham, MD 20706 dhcd.businesslending@maryland.gov 301-429-7408	acquisition; commercial; community; communities; construction; development corporations; DHCD; loan; mixed use; new construction; nonprofits; Priority Funding Areas; rehabilitation; residential; SBA; soft costs; small business; Sustainable Communities; sustainable; sustainability	Eligible projects and uses of funds include: mixed-use projects combining residential and commercial uses in the same building; new construction or rehabilitation; machinery and equipment; certain other costs associated with opening or expanding a small business; real estate acquisition; manufacturing; service providers, and; retail. Projects must be located in a designated Maryland Sustainable Community or Priority Funding Area. Priority is given to projects that strengthen neighborhood commercial districts and are part of a greater revitalization strategy. Eligible applicants include Maryland-based small businesses (as defined by the SBA), local development corporations, and nonprofit organizations.			Open and ongoing
Historic Preservation Non-Capital Grant Program	Maryland Historical Trust (MHT) 100 Community Place, 3rd Floor Crownsville, MD 21032 Contacts: Archeology - Matt McKnight, 410-697-9572 matthew.mcknight@maryland.gov Architectural Survey - Heather Barrett, 410-697-9536 heather.barrett@maryland.gov All other projects - Karen Golder, 410-697-9550 karen.golder@maryland.gov	archaeology; archeology; architecture; conservation; cultural resources; documentation; education; historic; historic building; historic preservation; historic structure; MHT; planning; research; survey	Non-Capital grants are available for research, survey, documentation, conservation, planning and educational activities involving historic, architectural, archeological or cultural resources (i.e., the tangible remains of Maryland's past). It is strongly recommended that you contact MHT staff to discuss the project prior to submission of an application.	Entities seeking additional capital support for the equipment and installation of the planned DER system are encouraged to explore other MEA programs that provide funding for equipment and installation incentives. Information on these programs and links to their respective webpages are available in the FY22 Resilient Maryland Funding Opportunity Announcement (FOA) in the Eligibility Requirements section below.	The Historic Preservation Non-Capital Grant Program provides grants of up to $75,000 to nonprofits (state and federal government entities may apply as nonprofits) and local jurisdictions. Local jurisdictions must provide a dollar-for-dollar match in cash or in-kind contributions.	FY 22 DEADLINE June 22, 2021 – Intent to Apply Due July 30, 2021 – Completed Application Due

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Small Business Administration (SBA) Predisaster Mitigation Loan Program	Small Business Administration (SBA) James Rivera, Office of Disaster Assistance 409 3rd Street, SW, STE 6050 Washington, DC 20416 202-205-6734	business; disaster; economic injury; equipment; homeowners; inventory; loan; military duty; mitigation; machinery; operating expenses; personal property; real estate; SBA	Business or home must have been affected by disaster. Eligible activities include: repairs and replacements of physical assets damaged in a declared disaster(real estate and personal property) and small business operating expenses (machinery and equipment, economic injury, inventory), and active military duty.	Grants will be awarded on a competitive basis. Award announcements for these funds are expected sometime in quarter 1 (Q1) of 2021.		After SBA disaster declaration
Strategic Demolition Fund - Statewide	Maryland Department of Housing and Community Development (DHCD) Contacts vary by region. Regional Contact List available here: https://dhcd.maryland.gov/Communities/Documents/SRP/PM-Map-ContactInfo.pdf	community; communities; demolition; DHCD; Sustainable Communities; sustainable; sustainability	Eligible projects include: demolition of derelict structures; site acquisition and assembly to create redevelopment-sized parcels for solicitation or planned development; site development, and; construction-level architectural and engineering designs.	State - 100%	Projects must be located within in a designated Maryland Sustainable Community except Baltimore City. The programs helps catalyze activities that accelerate economic development and job production in existing Maryland communities, aims to improve the economic viability of grey field development, which often faces more barriers than sprawling, green field development. The fund focuses on those projects that can have a high economic and revitalization impact in their existing communities.	Varies - once per State Fiscal Year
Strategic Demolition Fund - Project C.O.R.E.	Maryland Department of Housing and Community Development (DHCD) Contacts vary by region. Regional Contact List available here: https://dhcd.maryland.gov/Communities/Documents/SRP/PM-Map-ContactInfo.pdf	Baltimore; CORE; community; communities; DHCD; demolition; Sustainable Communities; sustainable; sustainability	Eligible projects include: demolition of derelict structures; site acquisition and assembly to create redevelopment-sized parcels for solicitation or planned development; site development, and; construction-level architectural and engineering designs. Lead applicants for Strategic Demolition Fund - Project C.O.R.E. are: Maryland Stadium Authority and nonprofit community development organizations working Baltimore City.	State - 100%	Projects must be located within Baltimore City. The programs helps catalyze activities that accelerate economic development and job production in existing Maryland communities, aims to improve the economic viability of grey field development, which often faces more barriers than sprawling, green field development. The fund focuses on those projects that can have a high economic and revitalization impact in their existing communities.	Varies - once per State Fiscal Year
Transportation: Emergency Relief Program	Federal Highway Administration (FHA) 1200 New Jersey Avenue Washington, DC 20590 202-366-4043	bridges; critical infrastructure; damage; disaster; DOT; Federal aid roads; Federal land; FHWA; highway; infrastructure; MDOT; repair; roads; route; transportation	Repair work within the right of way along federal aid highways is generally eligible. Engineering, right of way, and indirect costs may also be eligible. Funding is intended to address immediate needs and to restore damaged facilities to pre-disaster conditions. Permanent construction can cover repairs to bring facilities to current standards and expected traffic requirements. Improvements (betterments) may be eligible if costs are justified.	Emergency Repairs conducted within 180 days of disaster: Federal - 100% Non federal - 0% Emergency Repairs conducted after 180 days of disaster: Federal - 80-90% Non federal - 20-10%	Application is submitted by the MDOT for damages to Federal-aid highway routes, and by the applicable Federal agency for damages to roads on Federal lands. Cause of damages can be due to a natural disaster or a catastrophic failure of bridges or other infrastructure due to external causes. Cost threshold: estimated Federal share for all repairs for an event should be at least $700,000 and each individual repair should be at least $5,000 to be eligible.	After serious damage to Federal-aid roads or roads on Federal lands caused by a natural disaster or by catastrophic failure.
U.S Economic Development Administration (EDA), Public Works and Development Facilities	U.S. Department of Commerce Economic Development Administration Curtis Center 601 Walnut Street, Ste 140 South Philadelphia, PA 19106-3323 215-597-4603	access roads; critical infrastructure; economic development; EDA; infrastructure; port improvements; rail spurs; roads; sewer; technology; water	Water and sewer, Industrial access roads, rail spurs, port improvements technological and related infrastructure	Federal - 50-70% Non-Federal - 30-50%	Documenting economic distress, job impact and projects that is consistency with a Comprehensive Economic Development Strategy are important funding selection criteria.	Quarterly Basis
U.S. Economic Development Administration, Economic Adjustment Program	U.S. Department of Commerce Economic Development Administration Curtis Center 601 Walnut Street, Ste 140 South Philadelphia, PA 19106-3323 215-597-4603	critical facilities; economic development; EDA; improvements; public facilities; reconstruction; research	Improvements and reconstruction of public facilities after a disaster or industry closing. Research studies designed to facilitate economic development.	Federal - 50-70% Non-Federal - 30-50%	Documenting economic distress, job impact and proposing a project that is consistent with a Comprehensive Economic Development Strategy are important funding selection criteria.	Anytime

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Watershed and Flood Prevention Operations Program	Natural Resources Conservation Service (NRCS) 1400 Independence Avenue, SW Washington, DC 20250 J'Que C. Jones, Maryland State Conservation Engineer jque.jones@wdc.usda.gov 443-482-5543	conservation; erosion; erosion control; flood; flood control; flood damage; flood prevention; land management; natural hazards; natural resources protection; NRCS; protection; sediment; sediment control; sediment reduction; USDA; water quality; watershed; watershed management; watershed protection	NRCS offers financial and technical assistance for these purposes: erosion and sediment control; watershed protection; flood prevention; water quality improvements; rural, municipal, and industrial water supply, water management, fish and wildlife habitat enhancement, and hydropower sources. Federal, state, local, and tribal government entities eligible to apply.	Varies due to project type.	Watershed area must not exceed 250,000 acres. Capacity of a single structure is limited to 25,000 acre-feet of total capacity and 12,500 acre-feet of floodwater detention capacity.	January or February
Watershed Rehabilitation	Natural Resources Conservation Service (NRCS) 1400 Independence Avenue, SW Washington, DC 20250 Jesse Wilson National Watershed Rehabilitation Program Manager jesse.wilson@wdc.usda.gov 202-720-0189	dam; dam rehabilitation; NRCS; plan; planning; rehabilitation; watershed; watershed plan; watershed rehabilitation; USACE	Rehabilitation of aging dams reaching the end of their 50-year design lives.	Cost share exists, but not quantified	Requires development of a watershed plan to address environmental impacts, costs, benefits, planned conservation practices, and responsibilities of each party to complete the rehabilitation project. NRCS provides financial and technical assistance to project sponsors and assists them with the planning, design, and construction of the project.	Anytime
RAISE Discretionary Grants U.S. DoT	U.S. Department of Transportation (US DOT) Office of Infrastructure Finance and Innovation Office of the Secretary of Transportation 1200 New Jersey Ave, SE Washington, DC 20590 United States Email: RAISEgrants@dot.gov Phone: 202-366-0301 https://www.transportation.gov/RAISEgrants/about	bridges; capital projects; DOT; freight rail; infrastructure; intermodal; local government; metropolitan planning organizations; MPO; passenger rail; port authorities; ports; port infrastructure; rail; roads; state government; transportation; transit agencies; Tribal government	The Rebuilding American Infrastructure with Sustainability and Equity, or RAISE Discretionary Grant program, provides a unique opportunity for the DOT to invest in road, rail, transit and port projects that promise to achieve national objectives. Previously known as the Better Utilizing Investments to Leverage Development (BUILD) and Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grants, Congress has dedicated nearly $9.9 billion for thirteen rounds of National Infrastructure Investments to fund projects that have a significant local or regional impact.	RAISE Grants may be used for up to 80 percent of the costs of projects located in an urban area and up to 100 percent of the costs of a project located in a rural area. For a project located in an urban area, total Federal assistance for a project receiving a RAISE grant may not exceed 80 percent. Non-Federal financial contributions can include		NOFO release: Spring Application Due: Summer
Alcoa Foundation Grant Program	Alcoa World Location Grants Coordinator 100 Bethlehem Blvd Edgemere, MD 21219 Alcoa Forgings & Extrusions Location Grants Coordinator 1954 Halethorpe Farms Rd, #800 Halethorpe, MD 21227 410-737-6980 Alcoa Concrete & Masonry Location Grants Coordinator 4908 46th Ave Hyattsville, MD 20781 301-699-9300 Alcoa Concrete & Masonry Location Grants Coordinator 786 Sunny Chapel Rd Odenton, MD 21113 301-912-3515	adaptation; Alcoa; capital projects; biodiversity; climate adaptation; climate change; emissions reduction; environmental; environmental literacy; habitat; habitat protection; habitat restoration; natural resources; nonprofits; prevention; protection; resilience; resiliency; restoration; recycling; STEM; sustainability	Promote prevention and resilience of climate change and restore and preserve biodiversity. Projects or organizations must serve communities where Alcoa has operating plants or offices: Edgemere, Halethorpe, Hyattsville, Odenton. Nonprofit-focused, local governments may apply if funds are used for charitable purposes.	N/A	Minimum grant award is $15,000. Projects must fall with Alcoa Foundation themes and subthemes.	Anytime

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Chesapeake Initiative	Campbell Foundation Chesapeake Office 410 Severn Avenue, Suite #210 Annapolis, MD 21403 410-990-0900	capacity building; capital campaign; Chesapeake Bay; environmental; habitat; habitat preservation; habitat restoration; nonprofits; preservation; nutrient reduction; restoration;	Activities that promote the health of the Chesapeake Bay region. Grants may be used for general support, capacity building, capital campaigns, and more. Nonprofits only.	N/A	More information, including a list of past grantees and projects is available here: https://www.campbellfoundation.org/chesapeake-what-we-fund/	Cycle 1 - Late Winter/Early Spring Cycle 2 - Late Summer/Early Fall
Capacity Building Grant **Coordination & Collaboration Grant**	Climate Resilience Fund https://www.climateresiliencefund.org/	adaptation; capacity building; climate adaptation; climate change; climate resiliency; collaboration grants; coordination grants; environmental; resiliency; resilience; sustainability;	Two grant tracks: Capacity Building and Coordination & Collaboration. Climate resilience planning; policy guidance; adaptation training; funding to facilitate the use of climate service tools and resources. Nonprofits only.	N/A	View past grantees and projects here: https://www.climateresiliencefund.org/grants	No information provided, contact organization
Community Support	Coca-Cola Foundation, Inc. Learn more: https://www.coca-colacompany.com/shared-future/communities Apply here: https://coca-cola.smartsimple.com/s_Login.jsp	capital projects; clean water; environmental; gray water; nonprofits; water; water capture; water conservation; water quality; recycling; reuse	Eligible projects align with these three Priority Areas: empowering women (economic empowerment and entrepreneurship); protecting the environment (access to clean water, water conservation, and recycling); and enhancing communities (education, youth development, other community and civic initiatives). Nonprofits only.	N/A	Fundable project include, but are not limited to: access to clean water, water conservation, recycling; capital projects; nonprofits; capital projects like water capture and grey water reuse.	Anytime
Conservation Acquisition Revolving Fund **Conservation Loans** **Natural Capital Investment Fund** **Working Forest Fund**	Conservation Fund, the 1655 N. Fort Myer Drive, Suite 1300 Arlington, VA 22209 703-525-6300 webmaster@conservationfund.org	acquisition; conservation; environmental; forests; forest management; loan; plans; revolving loan; stewardship	Land acquisition and conservation; development and implementation of sustainable forest management plans; transfer of forestland to private ownership.	N/A (revolving fund; loan)	Revolving Fund for land acquisition (conservation). Conservation loans. Working Forest Fund provides bridge capita for projects.	Anytime
U.S. Natural Climate Solutions Accelerator Grant	Nature Conservancy, The (TNC) www.nature.org/ncsaccelerator Contact: NCSAccelerator@TNC.org	adaptation; agriculture; carbon storage; climate change; coastal; coastal wetlands; conservation; emissions reduction; environmental; forests; grassland; greenhouse gas reduction; land management; natural climate solutions; NCS; nature based solutions; nonprofits; reforestation; restoration; soil health; wetlands	Carbon capture through natural climate solutions (NCS). Examples include, but are not limited to: improving soil health, reforestation, coastal wetlands restoration, and other management practices for natural and working lands (forests, agricultural lands, grasslands, wetlands).	N/A	Applicants may request up to $250,000 per project. Nonprofit organizations only.	Early 2020
Acres for America	National Fish & Wildlife Foundation (NFWF) Kimberly Shriner Coordinator, Conservation Programs Kimberly.Shriner@nfwf.org https://www.nfwf.org/acresforamerica/Pages/home.aspx	acquisition; conservation; open space; connecting land; connectivity; easements; forests; habitat; local economy; local government; migration; migration routes; migratory; local government; nonprofits; open space; ranching; recreation; state government; Tribal government	Land conservation of critical habitats, connecting protected lands to unify wild places and protect migration routes; provide access for people to enjoy the outdoors; ensure the future of local economies that depend upon forestry, ranching, and recreation. Project must be linked to a national or state conservation priority. Eligible applicants: nonprofits; state government agencies; local governments; municipal governments; Indian tribes, and educational institutions.	1:1 Cost share - Federal/Applicant (cash, in-kind contribution of goods and services, and/or donated land value) Federal funds may be used as a match	Competitive grant: full proposal is by invite-only. Acquired land goes into a perpetual conservation easement.	RFP Due April 13, 2021.

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Atlantic Flyway Shorebird Initiative	National Fish & Wildlife Foundation (NFWF) C. Scott Hall Senior Scientist, Bird Conservation, Scott.Hall@nfwf.org https://www.nfwf.org/amoy/Pages/home.aspx	American oystercatcher; Atlantic; birds; Chesapeake Bay; beaches; coastal; business; conservation; dunes; educational institutions; habitat; habitat management; individuals; international organizations; migration; migratory; migratory birds; North Atlantic; ocean; red knot; restoration; shorebirds; whimbrel;	Focus is on conserve and restore the habitat of the American oystercatcher, red knot, and whimbrel and improve habitat management. Eligible applicants: nonprofits; state government agencies; local governments; municipal governments; Indian tribes, educational institutions, businesses, unincorporated individuals, and international organizations.	1:1 Cost share - Federal/Applicant (match - cash and/or in-kind services)	The majority of awards will range between $50,000 and $250,000.	RFP Due April 13, 2021.
Bring Back the Native Fish	National Fish & Wildlife Foundation (NFWF) Hannah Karlan, Coordinator, Regional Programs https://www.nfwf.org/bbn/Pages/home.aspx	American shad; assessment; Chesapeake Bay; Chesapeake Bay watershed; Delaware watershed; connectivity; conservation; environmental; habitat; habitat restoration; instream habitat; instream; marine; marine resources; local government; native fish; nonprofits; restoration; riparian; riparian habitat; river herring; rivers; schools; special districts; state government; streams; Tribal government; universities; water quality; watershed	Conservation strategies for native fish of eastern U.S. rivers, especially river herring and American shad in the Chesapeake and Delaware watersheds, particularly: restoring connectivity, riparian and instream habitat, and water quality. Invasive species management; and the development of decision support tools and innovative approaches to fish conservation, including landscape-scale assessments, piloting innovative restoration techniques, and identification of key flow restoration thresholds that enhance fish habitat and water quality in low-flood systems.	1:1 Cost share - Federal/Applicant (matching - cash, in-kind donations and/or volunteer labor)	Grant awards generally range from $50,000 to $100,000.	RFP Due May 4, 2021.
Central Appalachia Habitat Stewardship Program	National Fish & Wildlife Foundation (NFWF) Amanda Bassow, Director, Northeastern Regional Office Amanda.Bassow@nfwf.org John Wright, Manager, Northeastern Regional Office John.Wright@nfwf.org https://www.nfwf.org/centralapps/Pages/home.aspx	Appalachia; assessment; cerulean warbler; connectivity; diversity; eastern brook trout; eastern hellbender; educational institutions; environmental; forests; forest management; freshwater; freshwater mussels; golden winged warbler; habitat; habitat diversity; habitat restoration; Laurel Highlands; local government; mussels; native birds; native fish; nonprofits; planning; restoration; riparian; rivers; species; state government; streams; technical assistance; Tribal government; trout; warbler; water quality; wood thrush	Restoration of forest blocks and forest management (assessment/planning - forest management decision support tools). Outreach and technical assistance to engage private landowners in adopting forest management practices. Create forest demonstration projects to accelerate adoption of forest management to improve species habitat and diversity. Eligible applicants: nonprofit organizations, state agencies, local governments, municipal governments, tribal governments, and educational institutions.	Federal/Non-Federal match: 1:1 (match - cash, contributed goods and services, volunteer hours, and/or property raised/or secured and spent for the project during the period of performance)	The program supports projects in portions of the Appalachian regions of Maryland (Garrett County - Laurel Highlands). Grants will range from $50,000 to $200,000.	RFP Due April 12, 2021.
Chesapeake Bay Stewardship Fund	National Fish & Wildlife Foundation (NFWF) Jake Reilly, Program Director, Chesapeake Bay jake.reilly@nfwf.org Stephanie Heidbreder, Manager, Chesapeake Programs stephanie.heidbreder@nfwf.org https://www.nfwf.org/chesapeake/Pages/home.aspx	Chesapeake Bay; Chesapeake Bay watershed; habitat; habitat restoration; nutrient reduction; restoration; sediment; sediment reduction; water quality; watershed	See below under Innovative Nutrient and Sediment Reduction Grants and Small Watershed Grants		There are two competitive grant programs; the Innovative Nutrient and Sediment Reduction Grant Program and the Small Watershed Grants Program. These programs benefit the communities, farms, habitats and wildlife of the Chesapeake Bay region.	

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Innovative Nutrient and Sediment Reduction Grants	National Fish & Wildlife Foundation (NFWF) https://www.nfwf.org/programs/chesapeake-bay-stewardship-fund/innovative-nutrient-and-sediment-reduction-grants	agriculture; agricultural runoff; Chesapeake Bay; Chesapeake watershed; collaboration; connectivity; conservation; educational institutions; estuary; estuarine habitat; farms; floodplain; floodplain connection; freshwater habitat; green infrastructure; habitat; habitat improvement; habitat restoration; local government; management; local government; Native American Tribal groups; nonprofits; nutrient management; nutrient reduction; partnership; planning; pollution reduction;	Through collaboration and partnership, projects that conduct watershed and habitat planning; manage upland agricultural runoff through farm-scale conservation systems and solutions; manage upland urban runoff through green stormwater infrastructure improvements; and/or restore riparian and freshwater habitats through forested buffers, estuarine and tidal habitat restoration, conservation, and management; floodplain and wetland reconnection, stream restoration, and habitat improvement. Eligible applicants include: nonprofit organizations, state government agencies, local governments, municipal governments, Indian tribes, and educational institutions.	1:1 match (Federal / Non-Federal)	This is a competitive grant focused on achieving success through collaboration and partnerships among stakeholders focused on improving water quality in the Chesapeake Bay watershed. All eligible projects must occur wholly within the Chesapeake Bay watershed (which only excludes the western half of Garrett County), and projects located within NFWF's Targeted Rivers and Watersheds will be prioritized. These locations were identified by NFWF as having significant opportunities for shared water quality improvement, habitat restoration and species recovery outcomes.	Annually awarded.
Small Watershed Grants	National Fish & Wildlife Foundation (NFWF) Jake Reilly, Program Director, Chesapeake Bay Jake.Reilly@nfwf.org Stephanie Heidbreder, Manager, Chesapeake Program, Stephanie.Heidbreder@nfwf.org https://www.nfwf.org/programs/chesapeake-bay-stewardship-fund/small-watershed-grants	American black duck; capacity building; Chesapeake; Chesapeake Bay; Chesapeake watershed; connectivity; conservation; eastern brook trout; eastern oyster; educational institutions; erosion; green infrastructure; habitat; habitat planning; habitat protection; habitat restoration; K-12; livestock exclusion; local government; marshes; marsh restoration; local government; Native American Tribal groups; nonprofits; nutrient reduction; planning; protection; oyster reefs; restoration; river herring; sediment; sediment reduction; shoreline erosion; state government; stormwater; stormwater improvements;	Projects that: manage upland agricultural runoff through farm-scale conservation systems and solutions; manage upland urban runoff through green stormwater infrastructure Improvements including the adoption of new technologies and management approaches; restore riparian and freshwater habitats through forested buffers, floodplain and wetland reconnection, and stream restoration and habitat improvements; increase habitat integrity for Eastern Brook Trout; improve riparian management through livestock exclusion; conserving high-quality riparian corridors; restore large-scale oyster reefs; restoring river herring habitat connectivity; restore and conserve wetland and tidal marsh habitat for American Black Duck; manage shoreline erosion and marsh loss; build capacity for landscape-scale watershed and habitat outcomes, and conduct watershed and habitat planning, prioritization, design, and permitting. SWG-I Eligible Applicants: nonprofit organizations, local governments, municipal governments, Indian tribes, K-12 educational institutions SWG-PTA Eligible Applicants: nonprofit organizations, state	There are no non-federal matching requirements for the 2022 SWG program, though NFWF strongly encourages applicants to describe federal and non-federal contributions to the proposed project.	There are two programs under this grant: SWG-Implementation (SWG-I) and SWG-Planning and Technical Assistance (SWG-PTA). All eligible projects must occur wholly within the Chesapeake Bay watershed. Projects located within NFWF's Targeted Rivers and Watersheds will be prioritized.	Small Watershed Grants 2022 Request for Proposals Due February 7, 2022.
Fisheries Innovation Fund	National Fish & Wildlife Foundation (NFWF) Erika Feller, Director, Marine and Coastal Conservation Erika.Feller@nfwf.org https://www.nfwf.org/fisheriesfund/Pages/home.aspx	aquaculture; business; capacity building; bycatch reduction; educational institutions; environmental; fisheries; individuals; international organizations; local government; marine; marine aquaculture; mitigation; monitoring; local government; Native American Tribal groups; nonprofits; operations; planning; protection; recreational fisheries; reporting; risk reduction; seabed; siting; state government; Tribal governments	Projects should develop or pilot innovative ideas and implement proven ideas at-scale for bycatch reduction and capacity building; address needs identified for recreational fisheries in the NOAA Fisheries National Saltwater Recreational Fisheries Policy Implementation Plan; planning projects and implementation of risk mitigation strategies that help minimize risk factors for marine aquaculture and protect the seabed; planning to improve siting of marine aquaculture operations and avoid environmental risks; and projects that implement regional-scale electronic monitoring and reporting strategies. Eligible applicants include: nonprofit organizations; state government agencies; local governments; municipal governments; Indian tribes; educational institutions; businesses; international organizations, and unincorporated individuals.	1:1 match (Federal / Non-Federal) Non-Federal can be cash and in-kind	The Fisheries Innovation Fund releases two requests for proposals (RFPs) each year to work towards sustainable fisheries in the United States: a Fisheries Innovation Fund RFP and an Electronic Monitoring and Reporting Grant Program RFP. Can be used for all commercial or recreational fisheries in the U.S., but priority is given to projects in the New England groundfish fishery, the Gulf of Mexico reef fish fishery, and the Gulf of Alaska halibut and groundfish fisheries. Marine aquaculture projects can be proposed for fisheries anywhere in the U.S., but priority is given to projects within the four priority areas: New England, Southern California, the Gulf of Mexico, and Alaska.	Fisheries Innovation Fund and Electronic Monitoring and Reporting Grant Program due July

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Fishing for Energy	National Fish & Wildlife Foundation (NFWF) Michelle Pico, Program Director Marine Conservation, Pico@nfwf.org https://www.nfwf.org/fishingforenergy/Pages/home.aspx	blue crabs; Chesapeake Bay; coastal; commercial; conservation; derelict fishing gear; derelict fishing gear removal; education and outreach; educational institutions; for-profit; habitat; habitat improvement; individuals; local government; locating derelict gear; marine; local government; Native American Tribal groups; prevention; removal; state government; Tribal governments	Identification of gear accumulation sites and species/habitat concerns for removal; removal of accumulated gear; development of prevention strategies for abandonment of gear; planning that links conservation activities with removal of derelict gear; outreach to raise awareness of the effects of derelict gear on the environment and engagement with local public and fishing communities. Eligible applicants include: nonprofit organizations; state or territorial government agencies; local government; municipal governments; Indian tribes; educational institutions; commercial (for profit) organizations, or unincorporated individuals.	Non-Federal match not required, but encouraged	This is a competitive grant, targeting coastal waters. Priority is given to projects within five focus areas, one of which is the Chesapeake Bay with targeted benefits to the blue crab. Awards generally fall within $30,000 to $300,000.	RFP Due April 13, 2021
Five Star and Urban Waters Restoration Grant Program	National Fish & Wildlife Foundation (NFWF) Carrie Clingan, Program Director, Community Stewardship and Youth Carrie.Clingan@nfwf.org Chloe Elberty, Coordinator, Community Stewardship Programs Chloe. Elberty@nfwf.org https://www.nfwf.org/fivestar/Pages/home.aspx	BMPs; best management practices; capacity building; coastal; conservation; education and outreach; educational institutions; green infrastructure; habitat; habitat restoration; invasive species; invasive species removal; livestock fencing; local government; local government; Native American Tribal groups; nonprofits; partnership; riparian; restoration; runoff; stormwater; stormwater improvements; stormwater management; stormwater runoff; state	Projects must involve five or more partners (public and private entities, including the applicant). Eligible activities include, but are not limited to: restoration or creation of wetlands, coastal or riparian areas; outreach, education, and/or training involving the restoration or creation activities that advance local watershed and conservation goals. Eligible applicants include: nonprofit organizations, state government agencies, local governments, municipal governments, Indian tribes and educational institutions.	1:1 match (Federal / Non-Federal) at a minimum (in-kind staff contributions, volunteer time, work performed, materials and services donated, cash or other tangible contributions are allowed for the non-federal match)	Under this grant program, three sub-programs are applicable to areas in Maryland: US EPA Five Star Restoration Training Program - available to all communities. The Urban Waters Federal Partnership, US EPA/USDA Forest Service Funding has two eligible locations: the Anacostia Watershed and the Patapsco Watershed (Baltimore Region). The US FWS Urban Partner Funding is available to locations in Maryland within +/- 25 miles of the Service lands or nearby offices in Baltimore City and Washington, D.C. Grant awards under the entire Five Star and Urban Waters Restoration Grant Program range from $20,000 to $50,000, with roughly 40-50 grants award per year.	Proposal due January
Hurricane Sandy Coastal Resiliency Competitive Grant Program (CLOSED*)	National Fish & Wildlife Foundation (NFWF) Amanda Bassow, Director, Northeastern Regional Office Amanda.Bassow@nfwf.org Lynn Dwyer, Program Director, Northeast-Coastal Lynn.Dwyer@nfwf.org Claire Flynn, Manager, Northeastern Region Claire.Flynn@nfwf.org https://www.nfwf.org/hurricanesandy/Pages/home.aspx	coastal hazards; coastal storms; disaster; disaster funding; ecosystem protection; ecosystems; education; flood; hazard mitigation; habitat; habitat protection; mitigation; natural hazards; outreach; protection; resiliency; resilience; sea level rise; storm surge; wave velocity reduction	Reduce impacts of coastal storms, sea level rise and associated natural hazards on coastal and inland communities; strengthen ecological integrity and functionality of coastal/inland ecosystems to protect communities and enhance fish and wildlife and their associated habitats; conduct outreach/education to enhance understanding of impacts of storm events; and identify cost-effective resilience tools to mitigate the effects of future storms.	N/A	**Obviously closed, only included here to show that NWFW does occasionally offer grants for disaster assistance. Four projects were award in Maryland: two in central Maryland, one in Southern Maryland, and one on the Eastern Shore .*	N/A
Monarch Butterfly and Pollinators Conservation Fund - Habitat Improvement	National Fish & Wildlife Foundation (NFWF) Todd Hogrege, Director, Central Regional Office Todd.Hogrefe@nfwf.org Crystal Boyd, Manager, Pollinator Programs Crystal.Boyd@nfwf.org https://www.nfwf.org/monarch/Pages/home.aspx	butterfly; conservation; educational institutions; federal government; habitat; habitat conservation; habitat restoration; local government; milkweed; monarch butterfly; local government; Native American Tribal groups; native plants; nonprofits; open space; pollinators; restoration; Tribal governments	Restore or enhance monarch butterfly and pollinator habitat; increase native milkweed and native plant resources supply. Eligible applicants include: nonprofit organizations, US federal government agencies, state government agencies, local governments, municipal governments, Indian tribes and educational institutions.	1:1 match (Federal / Non-Federal) Non-Federal can be cash, in-kind contributions of staff and volunteer time, work performed, materials and services donated, or other tangible contributions to the project objectives and outcomes	Competitive grant. Project must be within the monarch butterfly range in the U.S. Priority is given to projects East of the Rockies in these states: Arkansas, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, Texas, and Wisconsin. Priority is given to projects in the West located on or adjacent to working lands, important monarch butterfly overwintering sites, and US Forest Service and Bureau of Land Management lands.	RFP Due April 13, 2021

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
National Coastal Resilience Fund	National Fish & Wildlife Foundation (NFWF) Jessica Grannis, Program Director, Coastal Resilience Arielle Mion, Program Manager, Coastal Resilience https://www.nfwf.org/coastalresilience/Pages/home.aspx	assessment; barrier islands; beaches; capacity building; coastal; coastal erosion; coastal storms; commercial; connectivity; conservation; coral reefs; design; dunes; educational institutions; fish; flood; flooding; floodplain; forests; for-profit; habitat; habitat protection; instream restoration; instream; local government; marshes; marsh restoration; monitoring; local government; Native American Tribal group; natural systems; nonprofits; oyster reefs; permitting; project monitoring; protection;	Projects that create, expand, and restore natural system in areas that will both increase protection for communities from coastal storms, sea level rise, flood, and coastal erosion, while improving habitat for fish and wildlife species. The grant supports three focus areas: project preliminary design and site assessment; project final design and permitting; and project restoration and monitoring. Eligible applicants include: nonprofit organizations; state and territorial government agencies, local governments, municipal governments, Native Tribal governments, educational institutions, and commercial (for-profit) organizations.	1:1 match (Federal / Non-Federal) Non-Federal match = cash and/or in kind services	Eligible project areas include all coastal Hydrologic Unit Code (HUC) 8 watersheds that drain to the sea and any adjacent HUC 8 Watersheds that are particularly low-lying or tidally influenced. Project awards (in 2019) expected to range from $125,000 to $3,000,000.	Pre-Proposal due April Proposal due May
Emergency Coastal Resilience Fund (CLOSED*)	National Fish & Wildlife Foundation (NFWF) Jay Jensen, Director, Southern Regional Office Jay.Jensen@nfwf.org Suzanne Sessine, Program Director, Southern Coastal Programs Suzanne.Sessine@nfwf.org https://www.nfwf.org/coastalresilience/emergency/Pages/home.aspx	aquatic; aquatic connectivity; beaches; beach restoration; capacity building; coastal; coastal ecosystems; coastal plain; coastal storms; connectivity; coral reefs; debris flow; design; disaster; disaster declaration; dunes; dune restoration; ecosystems; educational institutions; fish; flood; floodplain; floodplain restoration; flooding; forests; habitat; habitat protection; habitat restoration; instream restoration; instream; local government; marshes; marsh restoration; local government; Native American Tribal group; nonprofits; oyster reef; passage improvements; planning; protection; recovery; reforestation; resiliency;	Ecosystem restoration projects, and the construction of natural, nature-based and green-gray (hybrid) infrastructure to improve community resilience and conserve natural areas. Projects may include, but are not limited to, marsh, beach and dune restoration, living shorelines, stream restoration, including aquatic connectivity projects that reduce flood risk, and innovative stormwater management. In limited instances this program may consider projects that advance community planning and technical assistance to address barriers and increase the capacity of eligible communities to implement projects where there is a demonstrated need in an affected geography. Eligible applicants include: nonprofit organizations, state and territorial government agencies, local governments, municipal governments, Native American tribal governments, and educational institutions.	N/A	**Closed. Similar program to the Hurricane Sandy Coastal Resiliency Competitive Grant Program. The ECRF was established to increase the resilience of coastal communities located within federally declared disaster areas impacted by hurricanes Florence and Michael, Typhoon Yutu and wildfires in 2018. Included on this list to show that disasters may be funded through a similar program and that potential applicants should check the NFWF website for emergency funds after a Presidential Disaster Declaration after a major disaster. The grant funds projects located in the Coastal Plain Physiographic Province in Maryland.*	N/A
Non-Tidal Wetlands Grant Program	Chesapeake Bay Trust https://cbtrust.org/grants/non-tidal-wetlands/ Non-Tidal Wetland Program Grants Manager: Sarah Koser, skoser@cbtrust.org, 410-974-2941, ext. 106	CBT; Chesapeake Bay Trust; creation; conservation; endangered species; faith-based organizations; for-profit; habitat; improvements; local government; nonprofits; nontidal; nontidal wetlands; preservation; protection; restoration; threatened species; wetlands; wetlands creation; wetlands preservation; wetlands protection; wetlands restoration	Activities include, but are not limited to: projects that create wetlands; improving the functions of existing wetlands (especially farmed wetlands, partially drained wetlands, or wetlands providing habitat for threatened or endangered species); preservation/protection of existing wetlands if part of a project that includes wetlands creation or restoration. Eligible applicants: nonprofit organizations, local government, for-profit entities, faith-based organizations "and more."	Not required, but cash or in-kind services match is strongly encouraged	Award amounts of up to $500,000. Eligible Locations: Primary watersheds - Isle of Wight Bay; Secondary watersheds - West River, Severn River, Magothy River, South River, Western Branch, Patuxent River (lower), Assawoman Bay, Sinepuxent Bay, Newport Bay; Tertiary watersheds - Youghiogheny River, Casselman River, Northeast River, Deep Creek Lake, Little Youghiogheny River, Eastern Bay, Brighton Dam, Rocky Gorge Dam, Lower Chester River, Miles River	This grant program is expected to open in Spring 2022

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Green Streets, Green Jobs, Green Towns (G3) Grant Program	Chesapeake Bay Trust https://cbtrust.org/grants/green-streets-green-jobs-green-towns/ G3 Program Grants Manager: Jeffrey Popp, jpopp@cbtrust.org, 410-974-2941, ext. 103	CBT; charrette; Chesapeake Bay; Chesapeake Bay Trust; community; communities; community associations; design; G3; green infrastructure; green streets; implementation; local government; neighborhood associations; nonprofits; planning; project design; project implementation; runoff; stormwater; stormwater runoff; urban; vacant lots; visioning; white paper	Activities include, but are not limited to: green street project design, implementation of green street projects, white papers on innovative ideas for green infrastructure, charrettes to vision/plan a green street project with key stakeholders (incl. citizens). Eligible applicants: nonprofit organizations, local governments, neighborhood/community associations	Not required, but cash or in-kind services match is strongly encouraged	Applicants applying for implementation/construction and greening of vacant lots must use the G3 Implementation Project Calculator. Grant funding can be applied anywhere in the Chesapeake Bay watershed portion of EPA Region 3. Program goals: reduce stormwater runoff, increase number and amount of green spaces in urban areas, improve the health of local streams and the Chesapeake Bay, enhance quality of life and community livability. Award amounts of up to $15,000 for conceptual plans; up to $30,000 for engineered designs, up to $100,000 for implementation projects, up to $50,000 for greening communities and urban vacant lots, up to $20,000 for white papers.	Annual - Spring.
Outreach and Restoration Grant Program	The Chesapeake Bay Trust 108 Severn Avenue Annapolis, MD 21403 (410) 974-2941 https://cbtrust.org/grants/outreach-and-restoration/	agricultural; agricultural best management practices; best management practices; BMPs; community; communities; community engagement; connectivity; engagement; floodplain; floodplain connection; forests; green infrastructure; habitat; habitat establishment; habitat improvement; invasive plant removal; invasive species; meadow; meadow habitat; native plantings; native plants; outreach; plant removal; rain barrels; rain garden; reforest; restoration;	Activities such as community outreach and engagement increase stewardship ethic of natural resources; restoration activities that demonstrate restoration techniques and engage citizens in the restoration and protection of the Chesapeake Bay and its rivers. Eligible applicants: nonprofit organizations, community and homeowner associations, faith-based organizations, "and more"	Not required, but cash or in-kind services match is strongly encouraged	Grant sponsored in partnership with City of Baltimore Dept of Public Works, Charles Co, Harford Co, Howard Co, the City of Gaithersburg, Queen Anne's Co, and the City of Salisbury and funds projects in partner areas and throughout Maryland. Applicants can request funds from one of the following tracks. Track 1: Outreach/Knowledge Building Projects (up to $30,000) Track 2: Behavior Change Projects (up to $50,000) Track 3: Restoration Projects (up to $50,000) Track 4: Outreach and Restoration Projects (up to $75,000).	Late Summer / Early Fall
Watershed Assistance	The Chesapeake Bay Trust https://cbtrust.org/grants/watershed-assistance/ Questions & Technical Support: Emily Stransky, estransky@cbtrust.org, 410-974-2941, ext.101	action plan; agricultural; agricultural water quality best management practices; BMPs; best management practices; bioretention cells; CBT; Chesapeake Bay; Chesapeake Bay Trust; living shorelines; local government; LID; low impact development; marshes; marsh creation; nonprofits; ordinances; plan; planning; program development; rain garden; streams; stream restoration; stormwater; stormwater management; water quality; water quantity; watershed; watershed action plan; watershed assessment; watershed characterization; watershed planning; watershed restoration; wetlands; wetlands restoration; zoning	Project design for watershed restoration projects identified in WIP milestones, which may include, but are not limited to: bioretention cells, large-scale rain gardens, other low impact development stormwater techniques, environmental site designs, stream restoration, wetland and marsh creation, and agricultural water quality best management practices. Watershed Planning and Program Development projects identified in the existing programmatic milestones submitted to MDE by local governments, including, but not limited to watershed characterization, survey, and stakeholder engagement; creation of watershed action plans; policy development or enhancement to support watershed action plans (e.g. development/enhancement of ordinances or other tools); and development for new programs, enhancement of existing programs, or establishing new institutional frameworks that promote internal and external stakeholder coordination. Eligible applicants; nonprofits, local governments	Not required, but cash or in-kind services match is strongly encouraged	Projects must support implementation of local milestones developed to advance the Watershed Implementation Plan (WIP) strategies. Type 1: Project Design Generally, requests are up to $100,000 for design of stormwater best management practices Generally, requests are up to $150,000 for design of stream restoration practices Type 2: Watershed Planning and Program Development Generally, requests are up to $75,000	Late Summer / Early Fall

Funding Program Name	Contact Information	Key Words	Eligible Activities	Cost Share Requirements	Other Program Characteristics	Application Due Date
Exelon Grant	https://www.exeloncorp.com/community/grants	afterschool programs; arts; beautification; clean energy; conservation; education; endangered species; environmental; environmental quality; events; green infrastructure; health; human services; local government; mathematics; membership dues; neighborhoods; nonprofits; preservation; program development; program support; science; STEM; workforce skills; water quality	The grant funds programs that deliver measurable, sustainable improvements in the communities served by Exelon in four areas: education, environment, arts & culture, and neighborhood development. Funds may be used to an event, dues/membership or in-kind requests, and program support/development. Eligible applicants: 501c3 nonprofit organizations; only those organizations which do not discriminate based on age, political affiliation, national origin, ethnicity, gender, gender identity, sexual orientation, disability, HIV/AIDS status or religious belief. Grants are only available to nonprofits in the communities where Exelon has facilities. Grants are only available to organizations that have not received a grant from Exelon or its subsidiaries within the past 12 months. Although only nonprofits are called out as eligible applicants, local governments are among the list of past grant recipients.	No information provided	Education: Programs that encourage students to stay in school and develop their full potential, promote math and science, improve workforce skills, and encourage personal development through scholarships, mentoring and internships. Environment: Programs that improve the quality of our environment; promote environmental education, conservation and preservation; develop cleaner sources of energy; protect endangered species; and beautify neighborhoods. Arts & Culture: Cultural institutions with broad public exposure and programs designed to make arts and culture more accessible to a wider and more diverse audience. Neighborhood Development: The company makes a limited amount of grants to local nonprofit organizations for programs and nonprofit organizations that support a range of offerings from health and human services to after-school programming .	Anytime

APPENDIX I
PLAN SOURCES

Chapter 2 Planning Process

Prepared by Federal Emergency Management Agency. Hazard Mitigation Grant Program (HMGP)

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Chapter 3 County & Municipal Profile

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Prepared for Maryland Department of Natural Resources. Sea Level Rise: Technical Guidance for Dorchester County. 2008

Prepared by the Town of Vienna Planning and Zoning Commission and Nutter Associates, Community Planners. 2009 Amendment to the Vienna Municipal Growth Element. 2009

Prepared by Church Creek Planning Commission and Maryland Department of Planning 2005 Church Creek Comprehensive Development Plan. October 17, 2005

Prepared by Jakubiak & Associates, Inc. for the City of Cambridge. 2018 Cambridge Comprehensive Plan. 2018

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Prepared by the Town of East New Market Planning Commission. 2010 Comprehensive Development Plan. 2010 and 2012 Land Use Amendment for East New Market, Maryland. 2012.

Prepared by the Town of Hurlock. Town of Hurlock, Maryland – Comprehensive Plan. 2009

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Prepared by US Census. 2020 (2000 & 2010 households): American Community Survey 5-Year Estimates (2020 households).

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Chapter 6 Coastal Events

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Prepared by MDEM and FEMA. State of Maryland Flood Risk Report – Dorchester County, MD. 2019

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Prepared by Maryland Department of Natural Resources, The Nature Conservancy, and e Chesapeake and Coastal Services. 2016 Maryland Coastal Resiliency Assessment. 2016

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Prepared by Maryland Department of Natural Resources. Nuisance Flood Plan Development Guidance. October 2019

Prepared by Smith Planning and Design. 2018 Dorchester County Historic & Cultural Resources Hazard Mitigation & Risk Plan. 2018

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Prepared by FEMA. National Flood Insurance Program Flood Mitigation Measures for Multi-Family Buildings; FEMA P-2037. October 2019

Prepared by The National Academies Press – Sciences Engineering Medicine. Mitigating Shore Erosion Along Sheltered Coasts - Chapter: 3 Methods for Addressing Erosion. 2007

Chapter 7 Riverine Flooding

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Chapter 8 Winter Weather

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Prepared by Maryland Emergency Management Agency. 2021 State of Maryland Hazard Mitigation Plan. 2021

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Chapter 9 Thunderstorm, Hail, Wind & Tornado

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Prepared by Maryland Emergency Management Agency. 2021 State of Maryland Hazard Mitigation Plan. 2021

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Prepared by FEMA. Risk Reduction Measures for Dams. 2020

Chapter 12 Emerging Infectious Disease

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Front. Public Health. Effects of Pandemic Outbreak on Economies: Evidence From Business History Context. 12 March 2021

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APPENDIX J

REGION 3 HAZARD MITIGATION PLAN GUIDANCE CHECKING IN ON THE NFIP – COMMUNITY WORKSHEETS

Dorchester County NFIP Community Questionnaire

Floodplain Identification & Mapping

1. Who is your FPA or floodplain manager? Please provide office/agency name, position title, and contact information.	Mr. Herve Hamon, Director of Planning and Zoning & FPA Dorchester County 501 Court Lane, Room 111 Cambridge, Maryland 21613 410-228-3234 hhamon@docogonet.com
2. Where do you keep your FIRM and FIS report?	Hard copies of the FIRM, FIS, & LOMC's are available in the Dorchester County's Department of Planning and Zoning Office. Digital versions are available for review at www.mdfloodmaps.net and https://dorchestercountymd.com/planning-zoning/maps-gis-data
3. Has your community adopted the most recent FIRM? When was the adoption? Where is that information stored? Has your community updated the floodplain ordinance language to include the current FIRM and FIS?	Dorchester County adopted the most recent FIRM in March of 2015. Dorchester County's Floodplain Management Ordinance language, located in Chapter 155 of the County Code, and Bill No. 2015-1, is in compliance with the current FIRM and FIS and is located both online and in the Department of Planning and Zoning office.
4. Does your jurisdiction support requests for map updates?	Yes. Dorchester County reviews and provides support for LOMC application.
5. Is there a specific agency/department responsible for compiling these updates and tracking LOMCs?	Yes, the Dorchester County Department of Planning and Zoning tracks and compiles updates for LOMC's.
6. Do you collect updated technical or scientific data and modeling? How do you share this with FEMA?	Yes. Dorchester County collects and reviews technical and/or scientific modeling data when applicable. Copies are provided to FEMA during the LOMC process.
7. Does your jurisdiction provide assistance with local floodplain determinations? If yes, specify how.	Yes. Dorchester County assists homeowners and potential applicants in determining if their property is located within or near the SFHA by providing mapping resources and information, both lateral and vertical determination information.
8. Do the people/agencies responsible for using these tools in your community have the access they need? Which tools does your community rely on?	Yes. Dorchester County utilizes multiple tools for NFIP information dissemination and education, including the Dorchester County website, floodplain management personnel, and other tools such as www.mdfloodmaps.com and www.floodsmart.gov.
Floodplain management requires that you understand the mapping and data side when working with the public.	

Floodplain Management

1. Does your jurisdiction issue permits for all proposed development in the SFHA? What office/position is responsible?	Yes. Dorchester County Department of Planning and Zoning is responsible for permit issuance within the SFHA.
2. Does your jurisdiction require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres? If so, what department or office is responsible?	Yes. Any new development/subdivision lots within the SFHA is prohibited, unless it is demonstrated that new structures cannot be located out of the floodplain and shall be designed in accordance with the Dorchester County Floodplain Ordinance. Dorchester County Department of Planning & Zoning is responsible.
3. How does your community identify substantially improved structures? When do they intervene?	The Department of Planning & Zoning requires documentation to be submitted regarding substantially improved structures, including market value, damage assessments, engineer certifications, etc. for compliance with floodplain management requirements.
4. Does your community have a coordinated process to determine substantial damage and to permit repair and improvement? Does the jurisdiction conduct substantial damage assessments in the SFHA? Does your community have a plan for who will conduct substantial damage assessments and a procedure for assessment?	Yes. The Dorchester County Floodplain Management Ordinance specifies that the FPA shall administer the requirements related to work on existing structures that are located within the SFHA and have been substantially damaged, and to notify owners of substantially damaged structures to obtain permits and prohibit non-compliant repair of damaged buildings. The FPA and/or authorized/designated County Representative conducts damage assessments.
5. Does your jurisdiction require Elevation Certificates for new or substantially improved structures? If yes, how is it documented and which office/agency/department is responsible?	Yes. Applicants for construction within the SFHA must submit an Elevation Certificate prepared by a licensed engineer or surveyor. The Dorchester County Department of Planning and Zoning reviews the applications and certificates.
6. How does the jurisdiction enforce the floodplain ordinance sections? How does the jurisdiction address SI/SD violations?	The Dorchester County FPA makes periodic inspections of properties, structures, and utilities for compliance with the ordinance and can issue violations, stop work orders, and penalties. The Department of Planning and Zoning is responsible for enforcing violations.
7. Has your jurisdiction had a Community Assistance Visit? If so, were any corrective actions required?	
8. Does your jurisdiction have or is considering higher ordinance standards than the NFIP? Please describe the higher standards and where they are documented.	Dorchester County Flood Protection Elevation is the base flood elevation plus two feet of freeboard. No additional regulations are planned at this time.
9. Are any local officials/departments in your community interested in a training? What topics relate most to your community?	

Floodplain management reduces flood risk and protects floodplain health.

Flood Insurance

1. How does the jurisdiction educate community members about the availability and value of flood insurance?	Dorchester County Planning and Zoning and/or the FPA educates the community and property owners regarding the value of flood insurance through press releases, public service announcements, and/or direct contact with property owners within the SFHA.
2. Does the jurisdiction inform community property owners about changes to the FIRM that would impact their insurance rates?	Yes, the Dorchester County and/or the FPA notifies property owners within the SFHA regarding changes to the FIRM through press releases, public service announcements, social media posts, and where applicable, direct correspondence.
3. How does the jurisdiction provide general assistance to community members regarding insurance issues?	The FPA and Dorchester County is available to advise, assist and answer any questions of community members regarding the NFIP program and/or floodplain regulations.
4. Does the jurisdiction keep track of the number of residential and non-residential structures in the SFHA? How many structures are in the SFHA in your community?	Yes. A database of the number of residential and non-residential structures is maintained by the County. According to the FEMA NFIP Insurance Report, there are 1,243 NFIP policies within the unincorporated areas of Dorchester County. (October 2021)
5. Does the jurisdiction have any levees or levee systems in its jurisdiction?	?
6. Is the levee or levee system certified and accredited?	?
7. Is the levee or levee system a Provisionally Accredited Levee (PAL)?	?
8. Is the levee or levee system part of the USACE Rehabilitation and Inspection Program?	?
9. Does your community have any Major Dams or High Hazard Dams, and if so, have you applied for FEMA's High Hazard Potential Dam grant?	Dorchester County does not have any major or high hazard dams within its jurisdiction. The County has not applied for FEMA's High Hazard Potential Dam grant.
Flood risk communication to the public is vital for a community to be truly resilient.	

City of Cambridge NFIP Community Questionnaire

Floodplain Identification & Mapping

1. Who is your FPA or floodplain manager? Please provide office/agency name, position title, and contact information.	Ms. Patricia Escher, Division Manager of Planning and Zoning & FPA City of Cambridge 1025 Washington Street Cambridge, Maryland 21613 410-228-1955 pescher@choosecambridge.com
2. Where do you keep your FIRM and FIS report?	Hard copies of the FIRM, FIS, & LOMC's are available in the City of Cambridge Department of Planning and Zoning Office. Digital versions are available for review at www.mdfloodmaps.net, and the County's website at https://dorchestercountymd.com/planning-zoning/maps-gis-data
3. Has your community adopted the most recent FIRM? When was the adoption? Where is that information stored? Has your community updated the floodplain ordinance language to include the current FIRM and FIS?	The City of Cambridge adopted the most recent FIRM in March of 2015. The City's Floodplain Management Ordinance No. 1045 is in compliance with the current FIRM and FIS and is located both online and in the Department of Planning and Zoning office.
4. Does your jurisdiction support requests for map updates?	Yes. The City of Cambridge reviews and provides support for LOMC application.
5. Is there a specific agency/department responsible for compiling these updates and tracking LOMCs?	Yes, the City of Cambridge Department of Planning and Zoning tracks and compiles updates for LOMC's.
6. Do you collect updated technical or scientific data and modeling? How do you share this with FEMA?	Yes. The City of Cambridge collects and reviews technical and/or scientific modeling data when applicable. Copies are provided to FEMA during the LOMC process.
7. Does your jurisdiction provide assistance with local floodplain determinations? If yes, specify how.	Yes. The City of Cambridge assists homeowners and potential applicants in determining if their property is located within or near the SFHA by providing mapping resources and information, both lateral and vertical determination information.
8. Do the people/agencies responsible for using these tools in your community have the access they need? Which tools does your community rely on?	Yes. The City of Cambridge utilizes multiple tools for NFIP information dissemination and education, including the Dorchester County website, floodplain management personnel, and other tools such as www.mdfloodmaps.com and www.floodsmart.gov.
Floodplain management requires that you understand the mapping and data side when working with the public.	

Floodplain Management

1. Does your jurisdiction issue permits for all proposed development in the SFHA? What office/position is responsible?	Yes. The City of Cambridge Department of Planning and Zoning is responsible for permit issuance within the SFHA.
2. Does your jurisdiction require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres? If so, what department or office is responsible?	Yes. Any new development/subdivision lots within the SFHA is prohibited, unless it is demonstrated that new structures cannot be located out of the floodplain and shall be designed in accordance with the City of Cambridge Floodplain Ordinance No. 1045. The City's Department of Planning & Zoning is responsible.
3. How does your community identify substantially improved structures? When do they intervene?	The Department of Planning & Zoning requires documentation to be submitted regarding substantially improved structures, including market value, damage assessments, engineer certifications, etc. for compliance with floodplain management requirements.
4. Does your community have a coordinated process to determine substantial damage and to permit repair and improvement? Does the jurisdiction conduct substantial damage assessments in the SFHA? Does your community have a plan for who will conduct substantial damage assessments and a procedure for assessment?	Yes. The City of Cambridge Floodplain Management Ordinance specifies that the FPA shall administer the requirements related to work on existing structures that are located within the SFHA and have been substantially damaged, and to notify owners of substantially damaged structures to obtain permits and prohibit non-compliant repair of damaged buildings. The FPA and/or authorized/designated City Representative conducts damage assessments.
5. Does your jurisdiction require Elevation Certificates for new or substantially improved structures? If yes, how is it documented and which office/agency/department is responsible?	Yes. Applicants for construction within the SFHA must submit an Elevation Certificate prepared by a licensed engineer or surveyor. The City of Cambridge Department of Planning and Zoning reviews the applications and certificates.
6. How does the jurisdiction enforce the floodplain ordinance sections? How does the jurisdiction address SI/SD violations?	The City of Cambridge FPA makes periodic inspections of properties, structures, and utilities for compliance with the ordinance and can issue violations, stop work orders, and penalties. The Department of Planning and Zoning is responsible for enforcing violations.
7. Has your jurisdiction had a Community Assistance Visit? If so, were any corrective actions required?	
8. Does your jurisdiction have or is considering higher ordinance standards than the NFIP? Please describe the higher standards and where they are documented.	
9. Are any local officials/departments in your community interested in a training? What topics relate most to your community?	

Floodplain management reduces flood risk and protects floodplain health.

Flood Insurance

1. How does the jurisdiction educate community members about the availability and value of flood insurance?	The City of Cambridge Planning and Zoning and/or the FPA educates the community and property owners regarding the value of flood insurance through press releases, public service announcements, and/or direct contact with property owners within the SFHA.
2. Does the jurisdiction inform community property owners about changes to the FIRM that would impact their insurance rates?	Yes, the City of Cambridge and/or the FPA notifies property owners within the SFHA regarding changes to the FIRM through press releases, public service announcements, social media posts, and where applicable, direct correspondence.
3. How does the jurisdiction provide general assistance to community members regarding insurance issues?	The FPA and the City of Cambridge is available to advise, assist and answer any questions of community members regarding the NFIP program and/or floodplain regulations.
4. Does the jurisdiction keep track of the number of residential and non-residential structures in the SFHA? How many structures are in the SFHA in your community?	Yes. A database of the number of residential and non-residential structures is maintained by the City. According to the FEMA NFIP PIVOT database, there are 173 NFIP policies within the City of Cambridge.
5. Does the jurisdiction have any levees or levee systems in its jurisdiction?	
6. Is the levee or levee system certified and accredited?	
7. Is the levee or levee system a Provisionally Accredited Levee (PAL)?	
8. Is the levee or levee system part of the USACE Rehabilitation and Inspection Program?	
9. Does your community have any Major Dams or High Hazard Dams, and if so, have you applied for FEMA's High Hazard Potential Dam grant?	The City of Cambridge does not have any major or high hazard dams within its jurisdiction. The City has not applied for FEMA's High Hazard Potential Dam grant.
Flood risk communication to the public is vital for a community to be truly resilient.	

NEXT STEPS

- What are your short- and long-term action items?
    - Conduct flood insurance training/workshops for the public, real estate agents, surveyors, and insurance agents. Consider offering continuing education credits for professionals.

The Town of Secretary NFIP Community Questionnaire

Floodplain Identification & Mapping

1. Who is your FPA or floodplain manager? Please provide office/agency name, position title, and contact information.	Mr. Gary L. Burkey, Town Commission President & FPA Town of Secretary 122 Main Street Secretary, Maryland 21664 410-943-3113 townofsecretary@gmail.com
2. Where do you keep your FIRM and FIS report?	Hard copies of the FIRM, FIS, & LOMC's are available in the Town of Secretary Office – Community Map Repository. Digital versions are available for review at www.mdfloodmaps.net and/or https://dorchestercountymd.com/planning-zoning/maps-gis-data
3. Has your community adopted the most recent FIRM? When was the adoption? Where is that information stored? Has your community updated the floodplain ordinance language to include the current FIRM and FIS?	The Town of Secretary adopted the most recent FIRM in March of 2015. The Town of Secretary's Floodplain Management Ordinance (Adopted: January 20, 2015) language is in compliance with the current FIRM and FIS and is located for review in the Town office.
4. Does your jurisdiction support requests for map updates?	Yes. The Town of Secretary reviews and may provide support for LOMC applications.
5. Is there a specific agency/department responsible for compiling these updates and tracking LOMCs?	Yes, the Town of Secretary tracks and compiles updates for LOMC's.
6. Do you collect updated technical or scientific data and modeling? How do you share this with FEMA?	Yes. The Town of Secretary collects and reviews technical and/or scientific modeling data when applicable. Copies are provided to FEMA during the LOMC process.
7. Does your jurisdiction provide assistance with local floodplain determinations? If yes, specify how.	Yes. The Town of Secretary assists homeowners and potential applicants in determining if their property is located within or near the SFHA by providing mapping resources and information, both lateral and vertical determination information.
8. Do the people/agencies responsible for using these tools in your community have the access they need? Which tools does your community rely on?	Yes. The Town of Secretary utilizes multiple tools for NFIP information dissemination and education, including the County website, floodplain management personnel, and other tools such as www.mdfloodmaps.com and www.floodsmart.gov.

Floodplain management requires that you understand the mapping and data side when working with the public.

Floodplain Management

1. Does your jurisdiction issue permits for all proposed development in the SFHA? What office/position is responsible?	Yes. The Town of Secretary FPA is responsible for permit issuance within the SFHA.
2. Does your jurisdiction require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres? If so, what department or office is responsible?	Yes. Any new development/subdivision lots within the SFHA is prohibited, unless it is demonstrated that new structures cannot be located out of the floodplain and shall be designed in accordance with the Town of Secretary Floodplain Ordinance. The Town of Secretary is responsible.
3. How does your community identify substantially improved structures? When do they intervene?	The Town of Secretary FPA requires documentation to be submitted regarding substantially improved structures, including market value, damage assessments, engineer certifications, etc. for compliance with floodplain management requirements.
4. Does your community have a coordinated process to determine substantial damage and to permit repair and improvement? Does the jurisdiction conduct substantial damage assessments in the SFHA? Does your community have a plan for who will conduct substantial damage assessments and a procedure for assessment?	Yes. The Town of Secretary Floodplain Management Ordinance specifies that the FPA shall administer the requirements related to work on existing structures that are located within the SFHA and have been substantially damaged, and to notify owners of substantially damaged structures to obtain permits and prohibit non-compliant repair of damaged buildings.
5. Does your jurisdiction require Elevation Certificates for new or substantially improved structures? If yes, how is it documented and which office/agency/department is responsible?	Yes. Applicants for construction within the SFHA must submit an Elevation Certificate prepared by a licensed engineer or surveyor. The Town of Secretary reviews the applications and certificates.
6. How does the jurisdiction enforce the floodplain ordinance sections? How does the jurisdiction address SI/SD violations?	The Town of Secretary FPA makes periodic inspections of properties, structures, and utilities for compliance with the ordinance and can issue violations, stop work orders, and penalties. The Town of Secretary's FPA and the code enforcement officer is responsible for enforcing violations.
7. Has your jurisdiction had a Community Assistance Visit? If so, were any corrective actions required?	??
8. Does your jurisdiction have or is considering higher ordinance standards than the NFIP? Please describe the higher standards and where they are documented.	The Town of Secretary Flood Protection Elevation is the base flood elevation plus two feet of freeboard. No additional regulations are planned at this time.
9. Are any local officials/departments in your community interested in a training? What topics relate most to your community?	Yes, the Town of Secretary personnel are always interested in additional training in reviewing and administering the requirements of the NFIP.
Floodplain management reduces flood risk and protects floodplain health.	

Flood Insurance

1. How does the jurisdiction educate community members about the availability and value of flood insurance?	The Town of Secretary personnel and/or the FPA educates the community and property owners regarding the value of flood insurance through press releases, public service announcements, and/or direct contact with property owners within the SFHA.
2. Does the jurisdiction inform community property owners about changes to the FIRM that would impact their insurance rates?	Yes, the Town of Secretary and/or the FPA notifies property owners within the SFHA regarding changes to the FIRM through press releases, public service announcements, social media posts, and where applicable, direct correspondence.
3. How does the jurisdiction provide general assistance to community members regarding insurance issues?	The FPA and the Town of Secretary personnel are available to advise, assist and answer any questions of community members regarding the NFIP program and/or floodplain regulations.
4. Does the jurisdiction keep track of the number of residential and non-residential structures in the SFHA? How many structures are in the SFHA in your community?	Yes. A database of the number of residential and non-residential structures is maintained by the Town. According to the FEMA NFIP Insurance Report, there are twenty-one (21) NFIP policies within the Town of Secretary.
5. Does the jurisdiction have any levees or levee systems in its jurisdiction?	No. The Town of Secretary does not have any levees or levee systems in its jurisdiction.
6. Is the levee or levee system certified and accredited?	N/A
7. Is the levee or levee system a Provisionally Accredited Levee (PAL)?	N/A
8. Is the levee or levee system part of the USACE Rehabilitation and Inspection Program?	N/A
9. Does your community have any Major Dams or High Hazard Dams, and if so, have you applied for FEMA's High Hazard Potential Dam grant?	The Town of Secretary does not have any major or high hazard dams within its jurisdiction. The Town has not applied for FEMA's High Hazard Potential Dam grant.
Flood risk communication to the public is vital for a community to be truly resilient.	

NEXT STEPS

- What are your short- and long-term action items?
    - Develop a website that allows the public to easily access the floodplain ordinance and mapping products.