BERLIN MAYOR AND COUNCIL

Monday, February 22, 2021

EFFECTIVE 02/08/2021: SPECIAL NOTICE: All Meetings of the Mayor and Council will be held virtually via Zoom. Meetings will also be streamed live on Facebook for viewing only.

Meeting packets will be posted by 5:00 p.m. on the Wednesday before the meeting.

- Advance questions will be accepted until 12:00 PM/NOON on the day of the meeting. Submit to:
  - Email: info@berlinmd.gov; please use Meeting Questions as your subject
  - Fax: 410-641-2316
  - Mail: Berlin Town Hall, Attn: Meeting Questions, 10 William St., Berlin, MD 21811. Mail should be posted no later close of business on the Friday before the meeting to help ensure delivery.
  - Drop boxes Town Hall – one is at the rear of the building on the parking lot, and the other is at the corner of Bay and Williams Street on the building.
- Questions and Comments during the meeting:
  - Via Zoom during the meeting at the invitation of the Mayor.
  - Questions and comments will not be taken via Facebook.
- You may join the public sessions in one of three ways:
  - Via computer or mobile device with audio.
  - Via computer to watch and phone to hear. Interaction only available via computer/device.
  - Via phone only – no ability to interact.

To join the Zoom Meeting, please go to:

Regular Session - 7:00 PM

Via Computer: https://zoom.us/j/96114493282
Phone: 301-715-8592 (LISTEN ONLY)

To watch the Meeting on Facebook, please click on the blue Facebook icon at the top of any page on the Town website, www.berlinmd.gov, or type @berlinmd in the Facebook search bar.

Your patience and understanding as we work to meet the restrictions on gatherings while still conducting Town business is truly appreciated.

To receive future meeting notifications directly to your email, please sign-up at the bottom of any page on our website.

BERLIN MAYOR AND COUNCIL
Meeting Agenda

Via Zoom
Monday, February 22, 2021

7:00 PM **REGULAR SESSION – Via Zoom** https://zoom.us/j/96114493282 **(PUBLIC link to the meeting)**
Phone: 301-715-8592 (LISTEN ONLY)

1. Approval of the Minutes for:
    a. Executive Session of 02.08.21
    b. Statement of Closure for Executive Session of 02.08.21
    c. Regular Session of 02.08.21

2. Resolution 2021-01: Adopting the Worcester County Hazard Mitigation Plan – Worcester County Emergency Services Emergency Management Director Billy Birch, Town Administrator Jeffrey Fleetwood, and Planning and Zoning Director David Engelhart
   Click here to view plan

3. General Fund Balance and Categories Discussion – Finance Director Natalie Saleh

4. Announcing the date of the tax rate – Mayor Tyndall

5. Town Administrator's Report

6. Departmental Reports

7. Comments from the Mayor

8. Comments from the Council

9. Comments from the Public (Questions or comments will be taken live via Zoom or by submitting your question in writing before Noon on Monday, February 22, 2021.)

10. Comments from the Press (Questions or comments will be taken live via Zoom or by submitting your question in writing before Noon on Monday, February 22, 2021.)

11. Adjournment

Anyone having questions about the meetings mentioned above or needing special accommodations should contact Town Administrator Jeffrey Fleetwood at (410) 641-4002. Written materials in alternate formats for persons with disabilities are made available upon request.
TTY users dial 7-1-1 in the State of Maryland.
TTY users outside Maryland dial 1-800-735-2258

CLOSED SESSION
MAYOR AND COUNCIL OF BERLIN MARYLAND
Monday, February 8, 2021

Due to the Coronavirus/Covid-19 State of Emergency, this meeting was held via Zoom and broadcast live via Facebook.

Present: Mayor Zackery Tyndall, Vice-President Dean Burrell, Councilmembers Jay Knerr, Shaneka Nichols and Jack Orris.
Staff Present: Town Administrator Jeff Fleetwood, Deputy Town Administrator Mary Bohlen, Finance Director Natalie Saleh, and Town Attorney David Gaskill.
Also Present: Ms. Phyllis Kimmel of Phyllis Kimmel Law Office, PLLC

At approximately 6:30 PM, Mayor Tyndall reviewed several protocols for the open meeting portion of the session, noting that members of the public would need to provide their name and address if they wished to comment and that those accessing the meeting via phone only would not be able to participate. He also briefly explained how public questions and comments could be submitted.

The Mayor noted that the purpose of the Closed Session was to hold a discussion with the potential new legal counsel for the Electric Utility and that the session was closed pursuant to Maryland Code; General Provisions Article; Sec 3-305(b)(1) regarding a personnel matter and (7) to consult with legal counsel.

Prior to accepting a motion to close the session, Mayor Tyndall asked for any public comments and, having provided an opportunity for submittals and hearing none, asked for a motion to move into Closed Session. Councilmember Knerr so moved, Council Vice-President Burrell seconded, and the session was closed by unanimous vote (4-0-0 with Councilmember Purnell absent). Mayor Tyndall noted that the Council would return to the Open Session at approximately 7:00 PM.

The live stream to Facebook was discontinued at approximately 6:35 PM.

REMAINDER OF MINUTES REDACTED FOR INCLUSION IN OPEN RECORD

Respectfully Submitted,

Mary T. Bohlen
Deputy Town Administrator

Agenda Item # 16

Closed Session Summary
To be included in the minutes in the next Open Meeting

1. **Statement of the time, place, and purpose of the closed session:**
   a. Time of closed session: February 8, 2021 at 6:30 PM
   b. Place (location) of closed session: Virtual via Zoom with public statement and vote open to the public using Facebook Live
   c. Purpose of the closed session: To discuss potential new legal counsel for the Electric Utility.
   d. Date and time that we will return to public meeting: February 8, 2021 at 7:00 PM
2. **Record of the vote of each member as to closing the session:**
   a. Motion to close meeting made by: J. Knerr
   b. Seconded by: D. Burrell
   c. Members voting in favor: S. Nichols, J. Orris
   d. Members opposed: none
   e. Members abstaining: none
   f. Members absent: T. Purnell
3. **Statutory authority to close session:**
   a. This meeting was closed under the following provisions of General Provisions Article § 3-305(b):
      i. Topic # 1: § 3-305(b)(1) To discuss the appointment, employment, assignment, promotion discipline, demotion, compensation, removal, resignation, or performance evaluation of appointees, employees, or officials over whom this public body has jurisdiction; or any other personnel matter that affects one or more specific individuals; and
      ii. Topic # 7: § 3-305(b)(7) To consult with counsel to obtain legal advice on a legal matter.
4. **Listing of each topic actually discussed, persons present, and each action taken in the session:**

Topic description	Persons present for discussion	Action taken/each recorded vote
Potential new legal counsel for the Electric Utility	Mayor Z. Tyndall, V-P D. Burrell, Councilmembers S. Nichols, J. Orris, Town Admin: J. Fleetwood, Town Attorney: D. Gaskill, Deputy Town Admin. M. Bohlen, Finance Director N. Saleh	Motion to enter into an agreement for legal services with Phyllis Kimmel of Phyllis G. Kimmel Law Office PLLC; approval was unanimous: 4-0-0 with Councilmember Purnell absent
	Present until 6:50 PM: P. Kimmel	

This statement was made by: Mayor Zack Tyndall, presiding officer
List members who have received open meetings training (at least one member must be in attendance during closed session): Mayor Zack Tyndall, Town Administrator Jeff Fleetwood, Deputy Town Administrator Mary Bohlen, Administrative Manager Kelsey Jensen, and Town Attorney David Gaskill.

BERLIN MAYOR AND COUNCIL
Meeting Minutes
Monday, February 8, 2021

7:00 PM REGULAR SESSION – Via Zoom

Present: Mayor Zackery Tyndall, Vice-President Dean Burrell, Councilmembers Troy Purnell, Jack Orris, Shaneka Nichols, and Jay Knerr.
Staff Present: Town Administrator Jeff Fleetwood, Deputy Town Administrator Mary Bohlen, Finance Director Natalie Saleh, Water Resources Director Jamey Latchum, Police Chief Arnold Downing, Electric Utility Director Tim Lawrence, Planning Director Dave Engelhart, Economic and Community Development Director Ivy Wells, Town Attorney David Gaskill, and Administrative Manager Kelsey Jensen.

Due to the Coronavirus/Covid-19 State of Emergency, this meeting was held via Zoom and broadcast live via Facebook. Following a moment of silence and the Pledge of Allegiance, Mayor Tyndall called the meeting to order at approximately 7:05 PM.

Mayor Tyndall stated that the public can participate in the meeting by joining the zoom meeting online, however those joining by phone would only be able to listen. There will be an opportunity to ask questions and comment at the end of the meeting.

1. Approval of the Minutes for:
   a. Executive Session of 01/25/21:
   On the motion of Councilmember, second by Councilmember, the Closed Session Minutes of January 25, 2021 were approved by the following vote:

Name	Counted toward Quorum				
	Aye	No	Abstain	Recused	Absent
Dean Burrell, VP	X				
Troy Purnell	X				
Jack Orris	X				
Shaneka Nichols	X				
Jay Knerr	X				
Voting Tally	5				

   b. Regular Session of 01/25/2021:
   Councilmember Orris noted that there are two changes, both in section four. One was that 'member' should read 'members', the other was when discussing the Councilmembers on the Heron Park Committee the minutes only list Councilmember Orris and Mayor Tyndall and should also include Councilmembers Purnell and Nichols. Councilmember Knerr added that he would like it noted that he asked the Fire Company for a written report with more detail before the meetings.
   On the motion of Councilmember Orris, second by Councilmember Nichols, the Regular Session Minutes of January 25, 2021 with the corrections noted were approved by the following vote:

Name	Counted toward Quorum				
	Aye	No	Abstain	Recused	Absent
Dean Burrell, VP	X				
Troy Purnell	X				
Jack Orris	X				

Shaneka Nichols	X				
Jay Knerr	X				
Voting Tally	5				

2. Motion 2021-04: Motion approving the request for placement of Wood Duck Boxes at Heron Park
Worcester County 4-H Member Ewan Betz and Dave Wilson with Conservation Community Consulting were present via Zoom. Mr. Betz said he sent over all of the information about his project and would like the Mayor and Council to consider his request. Councilmember Knerr said he was very impressed and asked how long the boxes typically last; Mr. Betz indicated 25 years if maintained properly, they are made of cedar. Councilmember Nichols asked if the 4H club would do the annual cleaning; Mr. Betz said he will, and make repairs as needed, but they typically only need cleaned every three years. Mr. Betz then added that he loves birding and seeing the beautiful creatures, he also thinks it will bring more birders to town who may stay to eat and shop in Town. Mayor Tyndall said that would be called secondary economic benefits. Councilmember Nichols asked how many he wanted to install, and where; Mr. Betz said 2-3 and near the edge of the water. Mayor Tyndall said they would like to be informed on when they will be installed. Deputy Town Administrator Mary Bohlen said the Parks Commission has not met since the request came in, but they would be in full favor of this project. Councilmember Knerr asked if they are successful would he add more; Mr. Betz said he would like to add blue bird boxes next year that he makes with his dad. Mayor Tyndall asked him to take photos along the way for the press.

   On the motion of Councilmember Orris, second by Councilmember Purnell, Motion 2021-04 was approved by the following vote:

Name	Counted toward Quorum				
	Aye	No	Abstain	Recused	Absent
Dean Burrell, VP	X				
Troy Purnell	X				
Jack Orris	X				
Shaneka Nichols	X				
Jay Knerr	X				
Voting Tally	5				

3. General Fund and Utility Funds update: Second Quarter update of revenues and expenditures vs. FY21 budget

   Finance Director Natalie Saleh gave the updates from the General Fund and Utility Funds beginning with the General Fund. Councilmember Knerr asked what the franchise fees were; Ms. Saleh said they are for the cable company fees for operating in Berlin. Mr. Fleetwood then mentioned that the Public Works Director position was never filled, so that number has not been expended yet. Mr. Fleetwood also mentioned that the tipping fees are higher than normal likely because more people are home and there is more trash.

   Ms. Saleh then discussed the Utility Funds. Councilmember Knerr asked what the typical bad debt percentage was for the electric service; Ms. Saleh said it is normally 15-20% allowable for that debt.

   Vice-President Burrell asked if these numbers are generated from Tyler; Ms. Saleh said they were. Vice-President Burrell said it would be helpful to see an explanation added to anything that is greater than a 10% difference from budget, only for accounts with over $100,000, he wants the explanation to come from the department head. Councilmember Orris asked about creating an explanation regarding transfers from the general funds. Ms. Saleh said they are budgeted transfers if the fund is not able to keep up, but there have not been any as of right now for FY'21.

Mayor Tyndall added that Ms. Saleh's door is always open, she is a wealth of knowledge when it comes to the budget so please do not hesitate to reach out to her with questions.

4. Discussion of potential sale of a portion of Heron Park
   a. Real property appraisal of Parcel 410
   b. Public interest in purchasing Parcel 57

Mayor Tyndall said this discussion only includes parcels 410 and 57, not the passthrough areas. Town Administrator Jeffrey Fleetwood explained that he had several interested parties contact him regarding purchasing certain parcels of land at Heron Park. One interested party asked if they could have an appraisal done on the parcel; Mr. Fleetwood allowed them to do so at their expense. Parcel 410 appraised at $770,000 and has two buildings on the property, without the building the difference is $110,000. The buildings are currently used for vehicle/equipment storage for the Town.

Mr. Fleetwood said first and foremost the Mayor and Council's interest in selling the property would need to be determined. Town Attorney David Gaskill said the Council would need to make a finding that the parcel is not needed for public use, advertise that, and then have the Council make a Motion stating that it is not needed. Mr. Gaskill then believes a request for proposals for purchase would need to be made public to see who may be interested in purchasing it, and that, before selling, the Town would need to determine if any easements were needed. Mayor Tyndall said that, before moving forward with selling, it would need to be determined what operational impacts would occur regarding the equipment stored in the buildings. Mr. Fleetwood said that lot line adjustments would be needed to retain access to the property if these lots were sold. Councilmember Knerr asked how the property is zoned; Planning and Zoning Director David Engelhart said it is zoned B-2; Councilmember Knerr said he thought Parcel 410 was zoned R1; Mr. Engelhart said it is B-2.
***Upon further investigation and review the day following the meeting, it was determined that the parcels are not zoned B-2, they are R-1.

Vice-President Burrell said he would like to know what vehicles are stored on the property and what it would take/cost to relocate them or create storage elsewhere. Mr. Fleetwood said he would have to get back to him on exactly what is in there, but there are no actual vehicles, it is the stage, snowplows, tractors, and woodchippers.

Councilmember Nichols said she wants to see plenty of parking remaining so if that means lot line adjustments, she wants to see that; Mr. Fleetwood said it is all up to the Council, they can determine stipulations to the sale before selling.

Councilmember Knerr said he does not want to see Parcel 410 go, it is a beneficial piece of property to the Town and has great potential. Councilmember Nichols said she agrees with Councilmember Knerr, but maybe we could sell a portion of that Parcel. Councilmember Nichols then added that she would also be interested to know what the buyer planned to do before selling.

Vice-President Burrell asked if this would need to be a public process. Mr. Gaskill said it is not required but the Mayor and Council can gather public input to gauge interest from the public. Vice-President Burrell said it would be important to hear from the public before determining his stance on selling; Councilmember Orris said he agrees and wants to give the public an opportunity to contribute feelings and suggestions, but feels it is important to have a proper entry to the park which may mean breaking up parcels. Councilmember Purnell said he has heard from people who do and do not want to sell but he wants to hear more from both sides and more residents.

Mr. Gaskill added that gauging interest in selling and having appraisals completed would not mean the Town must sell; the Town can go through with all required steps to sell and back out before selling. Mayor Tyndall asked if interested parties should move forward with any future appraisals to educate the public when determining if they are interested in selling and no Council objected. Mayor Tyndall suggested gauging public input on selling and on specific issues to be addressed with selling. Mayor Tyndall summarized that the Council would like to hear from the public on selling these parcels, with appraised values, potential easements, and a dollar amount to have a building to house the equipment we currently store, and that there would be two public hearings; one to gauge public interest in selling, and one to determine proper easements.

5. Town Administrator's Report – Jeffrey Fleetwood
   Mr. Fleetwood thanked Deputy Town Administrator for her work with Zoom and wished her a Happy Birthday. He also mentioned that there may be some snowy weather activity this week and wanted to give everyone a heads up; Mayor Tyndall reminded everyone to sign up for CodeRed to get alerts about inclement weather.

6. Departmental Reports:
   a. Finance Director – Natalie Saleh
   Ms. Saleh said the budget schedule has been posted online.

   b. Economic and Community Development Director – Ivy Wells
   Ms. Wells said they will have Valentine's Day Crafts available for pick up at the Welcome Center this weekend.

   c. Administrative Manager – Kelsey Jensen
   Ms. Jensen reported that they interviewed four people for the Public Works Superintendent and plan to bring two back to discuss the position in more detail.

7. Comments from the Mayor:
   Mayor Tyndall mentioned that several meetings ago the Council voted in favor of a lobbyist regarding the renewable portfolio standard and how they impact our electric utility customers and he wanted to give everyone an update that it was a very favorable vote from the House Economic Matters Committee and the Senate Finance Committee, and we are headed in the right direction.

8. Comments from the Council:
   Councilmember Orris said he received several compliments about repairs Water Resources has done lately and he would like to thank Mr. Latchum and his crew.

   Vice-President Burrell asked if Ms. Jensen would be in the office tomorrow because he wanted to drop some paperwork off to her; Ms. Jensen said she would be. Mr. Fleetwood added that Ms. Jensen sent the 2020 Financial Disclosure paperwork out to the Mayor, Council, Department Heads, and Board and Commission members if everyone can get that completed as soon as possible; Ms. Jensen added that the Mayor and Council copies require notarization, and she is happy to do that for them.

   Councilmember Knerr said he did some research on skateparks and has seen many other communities apply for and be awarded grants to complete work on a skate park. He does not think we need anything over-the-top but wants to see the Town get started somewhere because of all the desire. Ms. Bohlen noted that grant programs were available, but that the Mayor and some expenditure needed to be made up front for design work, determination of budget and determination of location. The Mayor and Council would also need to indicate what their priority for applying for funds would be.

Councilmember Nichols agreed with Councilmember Knerr and said she thinks we need to get started somewhere and put in the work.

Mayor Tyndall added that he reached out to the organizer for the past skate events in Heron Park and the event coordinator is still interested in hosting but it is labor intensive so he would need volunteers.

9. Comments from the Public – taken via Zoom.
West Street resident Marie Velong asked why impact fees are so far behind; Ms. Saleh said construction has been delayed with COVID and has slowed several projects down. Mr. Engelhart added that they are finally starting to see things get moving again and have started issuing several permits for larger projects. Ms. Velong then asked If you can get another entrance to the park off of Route 113; Mr. Fleetwood said they would need to research that.

Decatur Farms resident Gina Velong asked if the appraisal would be available to the public; Mr. Gaskill said there is no reason why it cannot be shared. Mayor Tyndall asked Town staff to get it posted online for them with tonight's meeting information.

Resident Tony Weeg said he wanted to thank the Council especially Knerr for wanted to protect parcel 410 as he would like to see it become a skate park or seek creative ways to handle the park. He also added that the non-profit plans to assist with the early on costs of the skate park, designs, geo-tech survey, etc.

Lastly, 'Pam', who Mayor Tyndall assumed was Pam Hay, Walnut Hill resident, asked if they will be addressing questions submitted prior to the meeting; Mayor Tyndall said they did receive a set of anonymous questions, but will not address them without a name and street address.

10. Comments from the Press – none.

11. Adjournment:
On the motion of Vice-President Burrell, second by Councilmember Purnell, the Mayor and Council meeting was adjourned at approximately 8:50PM.

Name	Counted toward Quorum				
	Aye	No	Abstain	Recused	Absent
Dean Burrell, VP	X				
Troy Purnell	X				
Jack Orris	X				
Shaneka Nichols	X				
Jay Knerr	X				
Voting Tally	5				

Respectfully Submitted,

Kelsey Jensen
Administrative Manager

Agenda Item # 2

RESOLUTION NO. 2021-01

A RESOLUTION OF THE MAYOR AND COUNCIL OF THE TOWN OF BERLIN ADOPTING THE 2020 WORCESTER COUNTY HAZARD MITIGATION & RESILIENCE PLAN AS THE TOWN OF BERLIN'S HAZARD MITIGATION & RESILIENCE PLAN.

WHEREAS, THE TOWN OF BERLIN, A MUNICIPALITY of Worcester County recognizes the federal Disaster Act of 2000 requiring that all States and local jurisdictions develop, submit, and update hazard mitigation plans that may reduce the impacts of hazards; and

WHEREAS, an adopted hazard mitigation plan is required as a condition of future federal funding for hazard mitigation projects; and

WHEREAS, the Town of Berlin, participated in the planning process along with other units of local government within the County to prepare the 2020 WORCESTER COUNTY HAZARD MITIGATION & RESILIENCE PLAN;

NOW, THEREFORE, BE IT RESOLVED, that the Town of Berlin, hereby adopts the 2020 WORCESTER COUNTY HAZARD MITIGATION & RESILIENCE PLAN as an official plan; and

BE IT FURTHER RESOLVED, that the Worcester County Department of Emergency Services is authorized to submit on behalf of the participating municipalities the adopted 2020 WORCESTER COUNTY HAZARD MITIGATION & RESILIENCE PLAN to the Federal Emergency Management Agency for final review and approval.

Approved this _____ day of _____, 2021 by the Mayor and the Town of Berlin, Maryland, by affirmative vote of _____ to _____ opposed, with _____ abstaining and _____ absent.

_____
Dean Burrell, Sr., Vice President

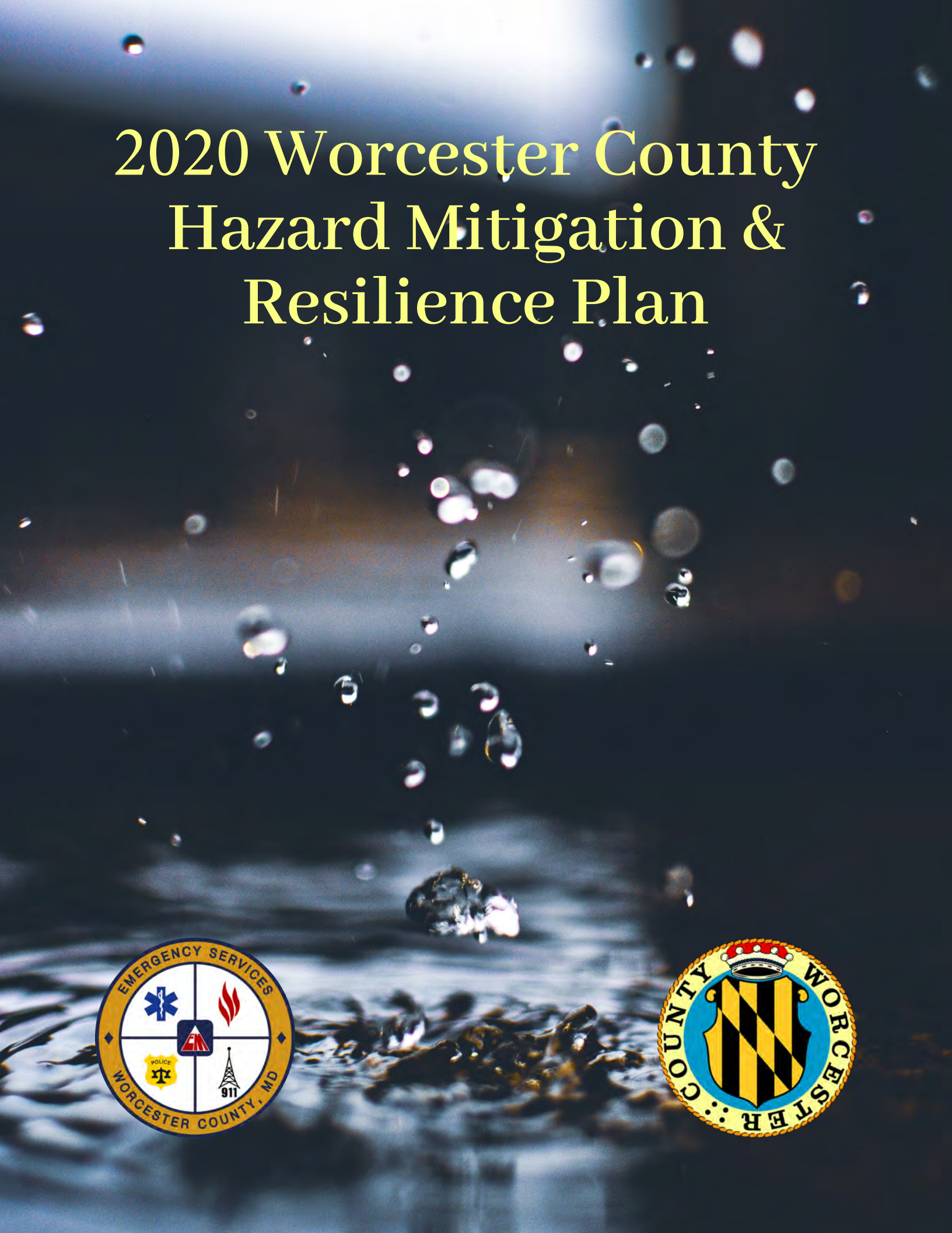
Approved this _____ day of _____, 2021 by the Mayor and Town of Berlin.

ATTEST:

_____
Zackery Tyndall, Mayor

_____
Jeffrey Fleetwood, Town Administrator

2020 Worcester County Hazard Mitigation & Resilience Plan



2020 Worcester County Hazard Mitigation & Resilience Plan

Acknowledgements:

Board of County Commissioners

Joshua C. Nordstrom, District 1
Diana Purnell, District 2
James C. "Bud" Church, District 3
Theodore J. Elder, District 4
Anthony "Chip" W. Bertino, Jr., District 5
Madison J. Bunting, Jr., District 6
Joseph M. Mitrecic, District 7

The Worcester County Hazard Mitigation Planning Committee (HMPC)

Alison Gadoua
Amanda Lewis
Arnold Downing
Billy Birch
Bill Neville
Bill Bradshaw
Bob Mitchell
Bob Rhode
Brian Reynolds
Bruce Morrison
Carolyn M. Clemens
Chip Bertino
Charlene Sharpe
Christina Vickers
Connie Watson
Dale Trotter
Dave Engelhart
Dawn Jones
Deborah Darden
Debra Stevens
Diana Purnell
Diane Downing
Don O'Grince
Doug Dods
Doug Parks
Dr. Collette Horn
Ed Tutor
Edward Werkheiser
Esther Troast
Frank Adkins
Frank Daly
Gary Weber
James Church
James Hamilton
Jeff Fleetwood
Jeff Knepper
Jeff McMahon
Jihane Ambroise
John Tustin
John Viola
Joseph Bucovetsky
Joseph Mitrecic
Joshua C. Nordstrom
Kathy Whited
Kelly Henry
Ken Whited
Kristen Forti
Kristy Kagan
Latoya Purnell
Laura Allen
Madison Bunting
Mark Dunlevy
Mark Titanski
Martin Sullivan
Mary Bohlen
Matt Crisafulli
Melissa Weidner
Michelle Bennett
Mike Thornton
Monica Lea
Phyllis Wimbrow
Randy Barfield
Raymond Knaven
Richard Bowers
Richard W. Clemens
Richard Hoppes
Roberta Baldwin
Robyn Tytomi-Dalton
Russ Harrison
Scott Holland
Shannon Chapman
Steve Tuttle
Ted Elder
Tess Wimbrow
Thomas Piatti
Tim Jerscheld
Todd Nock
Walt West

A Special Thank You to The Local Emergency Planning Committee (LEPC)

James Hamilton
Charlene Sharpe
Christina Vickers
Don O'Grince
Doug Dods
Ed Tutor
Kelly Henry
Monica Lea
Raymond Kovaven
Richard A. Hoppes
Roberta Baldwin
Shannon Chapman
Tim Jerscheld
Billy Birch

Prepared by:

Worcester County Department of Emergency Services &
Smith Planning and Design, LLC

U.S. Department of Homeland Security
Region III
One Independence Mall, Sixth Floor
615 Chestnut Street
Philadelphia, PA 19106-4404

FEMA

May 20, 2020

JaLeesa Tate, CFM
State Hazard Mitigation Officer
Maryland Emergency Management Agency
5401 Rue Saint Lo Drive
Reisterstown, Maryland 21136

Dear Ms. Tate:

The Federal Emergency Management Agency (FEMA) has completed our review of the Worcester County Hazard Mitigation and Resilience Plan, based on the standards contained in 44 Code of Federal Regulations (CFR), Part 201, as authorized by the Disaster Mitigation Act of 2000 (DMA2K). These criteria address the planning process, hazard identification and risk assessment, mitigation strategies and plan maintenance requirements.

The plan received a "satisfactory" rating for all required criteria and is approvable pending adoption. However, prior to formal approval, Worcester County is required to provide FEMA with a resolution of adoption.

We commend you for your dedication demonstrated in supporting the DMA2K and your commitment to reduce future disaster losses. If you have questions, please contact Sarah Wolfe, Chief, Floodplain Management & Insurance Branch, at (215) 931-5532.

Sincerely,

Sarah Wolfe, Branch Chief
Floodplain Management and Insurance Branch
FEMA Region III

Enclosure:

cc: Kristen Forti, Lead Hazard Mitigation Specialist, MEMA
Billy Birch, Director, Department of Emergency Services, Worcester County

2020 Plan Update Synopsis

The *2020 Worcester County Hazard Mitigation & Resilience Plan* has been updated. Summary highlights by chapter are provided in the table below.

Chapter	Overview
1 - Introduction	Revised the purpose and detailed the planning requirements and planning process involved in the development of the 2020 Hazard Mitigation and Resilience Plan. Detailed organization of the Plan, as well as the composition and members of the Hazard Mitigation Planning Committee (HMPC) and the plan review processes. Added new information on regional planning meetings, Local Emergency Planning Committee Members table, hazard mitigation committee outreach and public stakeholder outreach.
2 - County Profile	Updated data tables pertaining to population projections, population estimates, property assessment, new development, permits, and National Flood Insurance statistics. Added new seasonal peak population figure. Updated new development mapping.
3 – Hazard Identification & Risk Assessment	Renamed this Chapter from *Chapter 3: Vulnerability Assessment* to *Chapter 3: Hazard Identification & Risk Assessment.* Chapter 3 was reorganized and the remaining sections pertaining to Flood Hazard Vulnerability was moved to *Chapter 4: Flood Related Hazards.* Added new probability & future risk and climate impacts sections to this chapter.
4 – Flooding Related Hazards	This chapter has been renamed from *Chapter 4: Riverine Flooding* to *Chapter 4: Flooding Related Hazards.* This chapter includes new information on hazard profiles, historical occurrences, and vulnerability for tropical storm & hurricane, riverine and coastal flood, sea level rise & shoreline erosion. Vulnerability has been assessed based on both coastal and riverine flooding flood inundation areas. New Hazard Impact Tables and Flood Hazard Risk Assessment data tables have been added. Updated Hurricane Storm Surge Inundation Area map. New Hurricane Storm Surge At-Risk Structures map, and FEMA Special Flood Hazard Areas (SFHA) maps were added. Refined HAZUS loss estimates and number of at-risk structures provided for coastal and riverine flood events were added.

4 – Flooding Related Hazards cont.	New sections added within chapter includes Essential Facilities At-Risk to Riverine and Coastal Flood Hazards, Water and Wastewater Facilities At-Risk to Riverine and Coastal Flood Hazards, Riverine & Coastal Flood Debris Generation, and Riverine & Coastal Flood Projected Shelter Needs. Sea Level Rise & Shoreline Erosion was moved from Chapter 5 to Chapter 4. New Rate of Shoreline Erosion and Sea Level Rise Hazard Rank by County tables included. A new section on Social Vulnerability & Flood Related hazards was added with mapping to address all flood related hazards captured within this chapter.
5 – Non-Flood Related Hazards	Sea Level Rise & Shoreline Erosion was moved to Chapter 4. New Hazard Impact Tables and Hazard Risk Assessment data tables have been added for each hazard. Updated information provided on hazard profiles and historical occurrences. Thunderstorms was listed as its own hazard apart from Wind. New tables included: Hazmat Incidents 1994-2018, Wildfire Events 2000-2017, and Southern Eastern Shore Climate Division I Drought Periods. A new section on Social Vulnerability & Non-Flood Related Hazards was added with mapping to address all hazards captured within this chapter.
6 – Capability Assessment	Updated overview and added new sections include: All-Hazards Planning, Building Codes, and Notification and Alarms. Updated capability for each identified hazard. In addition, tables were added for Worcester Hazard Mitigation Funded by FEMA, Critical Facilities Generator Installation & Capabilities, Worcester County Shelter Locations, and Mitigation Actions & Capabilities by Worcester County Health Department under each section.
7 – Jurisdictional Perspective	This is a new chapter in the *2020 Worcester County Hazard Mitigation & Resilience Plan*. The chapter details the physical location, demographics, economy, development trends, hazard event data, National Flood Insurance data, and riverine flood at-risk structures for each jurisdiction. This includes the Town of Berlin, the City of Pocomoke, the Town of Snow Hill, and the Ocean Pines community. Mapping and data tables included. In addition, the 2014 Community Mitigation Strategies Assessment and Results were detailed, and a status table was provided. An additional table was added detailing new Mitigation Action Items. County-wide Mitigation Strategies Assessment & Results are Captured in *Chapter 8: Mitigation Status Report.*
8 – Mitigation Status Report	This is a new chapter in *the 2020 Worcester County Hazard Mitigation & Resilience Plan*. 2014 County-wide Mitigation Strategies Assessment and Results and Table are included within this chapter.

9 – Mitigation Strategies	This is a new chapter in the *2020 Worcester County Hazard Mitigation & Resilience Plan*. New objectives were added to existing goals and two new goals and associated objectives were added as part of the update process. Climate Adaptation & Resilience Strategies were added, as well as updated Repetitive & Nuisance Flooding. An updated new Mitigation Action Items table and six "High" priority projects sheets were identified and detailed.
10 – Plan Maintenance & Implementation	This chapter has been reviewed and updated during the 2020 planning process.

Table of Contents

CHAPTER 1: INTRODUCTION 1-1

EXECUTIVE SUMMARY 1-1
PROMULGATION STATEMENT 1-2
INTRODUCTION 1-2
PURPOSE 1-3
GOALS 1-4
PLANNING REQUIREMENTS 1-5
PLANNING PROCESS 1-5
ORGANIZING RESOURCES 1-6
DATA COLLECTION 1-8
PUBLIC INVOLVEMENT 1-11
HAZARD MITIGATION COMMITTEE OUTREACH 1-13
PUBLIC STAKEHOLDERS OUTREACH 1-14
PLAN ORGANIZATION 1-15
PLAN REVIEW AND ADOPTION PROCESS 1-15

CHAPTER 2: COUNTY PROFILE 2-1

LOCATION 2-1
PHYSICAL 2-1
DEMOGRAPHICS 2-4
ECONOMY 2-6
DEVELOPMENT TRENDS 2-7
MITIGATION RECORD 2-10
NATION FLOOD INSURANCE 2-12

CHAPTER 3: HAZARD IDENTIFICATION & RISK ASSESSMENT 3-1

INTRODUCTION 3-1
RISK ASSESSMENT 3-1
PROBABILITY AND FUTURE RISK 3-3
CLIMATE IMPACTS 3-5

CHAPTER 4: FLOODING RELATED HAZARDS 4-1

INTRODUCTION 4-1
TROPICAL STORMS AND HURRICANES
HAZARD PROFILE 4-4
STORM SURGE 4-7
STORM SURGE ZONES (INUNDATION AREAS) 4-8
TROPICAL STORM & HURRICANE HISTORICAL OCCURRENCES 4-10
TROPICAL STORM & HURRICANE VULNERBILITY ASSESSMENT 4-11
RIVERINE & COASTAL FLOOD
HAZARD PROFILE 4-13
FLOOD HISTORICAL OCCURRENCES 4-14
FLOOD ZONES 4-14
FLOOD HAZARD ZONE REQUIREMENTS 4-17
RIVERINE & COASTAL FLOOD VULNERBILITY ASSESSMENT 4-18
ESSENTIAL FACILITIES AT-RISK TO RIVERINE AND COASTAL FLOOD HAZARDS 4-23
WATER & WASTEWATER FACILITIES AT-RISK TO RIVERINE AND COASTAL FLOOD HAZARDS 4-26
RIVERINE AND COASTAL FLOOD DEBRIS GENERATION 4-26
RIVERINE AND COASTAL PROJECTED SHELTER NEEDS 4-27
NOR'EASTERS

Hazard Profile 4-28
Nor'easter Historical Occurrences 4-28
Sea Level Rise & Shoreline Erosion
Hazard Profile 4-29
Sea Level Rise & Shoreline Erosion Historical Occurrences 4-33
Sea Level Rise & Shoreline Erosion Vulnerability Assessment 4-35
Social Vulnerability & Flood Hazards 4-36

CHAPTER 5: NON-FLOOD RELATED HAZARDS 5-1

Tornado
Hazard Profile 5-1
Tornado Hazard Impacts 5-2
Tornado Historical Occurrences 5-3
Hazardous Materials
Hazard Profile 5-5
Hazardous Material Hazard Impacts 5-5
Hazardous Material Historical Occurrences 5-6
Wildfire
Hazard Profile 5-10
Wildfire Hazard Impacts 5-12
Wildfire Historical Occurrences 5-12
Wind
Hazard Profile 5-15
Wind Hazard Impacts 5-15
Wind Historical Occurrences 5-16
Thunderstorm (Lightning & hail)
Hazard Profile 5-18
Thunderstorm Hazard Impacts 5-18
thunderstorm Historical Occurrences 5-19
Lightning Strike 5-20
Hail 5-21
Winter storm
Hazard Profile 5-22
Winter Storm Hazard Impacts 5-22
Winter Storm Historical Occurrences 5-23
Drought
Hazard Profile 5-25
Drought Hazard Impacts 5-25
Drought Historical Occurrences 5-26
Excessive Heat
Hazard Profile 5-28
Excessive Heat Hazard Impacts 5-28
Excessive Heat Historical Occurrences 5-29
Social Vulnerability & Less Commin Hazards 5-31

CHAPTER 6: CAPABILITY ASSESSMENT 6-1

Overview 6-1
Types of Capabilities 6-1
All-Hazards Planning 6-1
Plan Integration 6-1
Building Codes 6-2
County and Municipal Departments 6-3
Notifications and Alarms 6-3
Flooding Related Hazards – Coastal and Riverine 6-4
Sea Level Rise & Shoreline Erosion 6-6

Tornados 6-7
Toxic Chemicals and Natural Hazards 6-7
Wildfires 6-8
Worcester Hazard Mitigation Projects Funded by FEMA 6-8
Critical Facilities Generator Installation & Capabilities 6-8
Mitigation Actions & Capabilities by Worcester County Health Department 6-9

CHAPTER 7: JURISDICTIONAL PERSPECTIVE 7-1

Introduction 7-1
Town of Berlin
Physical Location 7-3
Demographics 7-3
Economy 7-3
Development Trends 7-4
Hazard Event Data 7-4
National Flood Insurance 7-5
Flood Hazard Vulnerability 7-6
Non-Flood Related Hazards Vulnerability 7-7
City of Pocomoke
Physical Location 7-8
Demographics 7-8
Economy 7-10
Development Trends 7-11
Hazard Event Data 7-11
National Flood Insurance 7-12
Flood Hazard Vulnerability 7-13
Non-Flood Related Hazards Vulnerability 7-13
Town of Snow Hill
Physical Location 7-16
Demographics 7-16
Economy 7-16
Development Trends 7-17
Hazard Event Data 7-17
National Flood Insurance 7-19
Flood Hazard Vulnerability 7-20
Non-Flood Related Hazards Vulnerability 7-21
Ocean Pines
Physical Location 7-23
Demographics 7-23
Economy 7-23
Development Trends 7-24
Hazard Event Data 7-26
National Flood Insurance 7-27
Flood Hazard Vulnerability 7-28
Non-Flood Related Hazards Vulnerability 7-28
2014 Community Mitigation Strategies Assessment and Results 7-30
New Community Mitigation Actions 7-33

CHAPTER 8: MITIGATION STATUS REPORT 8-1

Introduction 8-1
2014 Mitigation Strategies Assessment and Results 8-1
Mitigation Action Status Table 8-2

CHAPTER 9: MITIGATION STRATEGIES 9-1

INTRODUCTION 9-1
GOALS AND OBJECTIVES 9-1
CLIMATE ADAPTATION & RESILIENCE STRATEGIES 9-4
REPETITIVE & NUISANCE FLOODING 9-4
MITIGATION ACTIONS 9-6
MITIGATION ACTIONS RANKINGS 9-6
POTENTIAL MITIGATION PROJECTS 9-7
HAZARD MITIGATION HIGH PRIORITY PROJECTS 9-15

CHAPTER 10: PLAN MAINTENANCE & IMPLEMENTATION 10-1

RECOVERY AND RECONSTRUCTION PLANNING 10-1
IMPLEMENTATION AND LEADERSHIP 10-1
PLAN MONITORING AND EVALUATION 10-2

Appendix

Appendix A: HAZUS & HIRA Methodology A1-A2
Appendix B: 2014 Mitigation Actions Status B1-B4
Appendix C: Federal & State Funding Sources C1-C15
Appendix D: HMPC Meeting Minutes D1-D3
Appendix E: Public Meeting Announcements, Minutes & Survey Results E1-E8
Appendix F: NFIP Compliance F1-F7
Appendix G: Sources G1-G5
Appendix H: Safe Growth Audit H1-H12
Appendix I: Vulnerable Populations I1-I11

Tables

Table 1-1: HMPC Members 1-6
Table 1-2: LEPC Members....1-9
Table 1-3: HMPC and Public Stakeholders Meeting Summary 1-12
Table 1-4: HMPC Meeting Summary....1-13
Table 1-5: Public Stakeholder's Outreach Summary 1-14
Table 2-1: Worcester County Population Trends 1930-2018 2-5
Table 2-2: Year-Round Populations of Towns and Census Designated Places 2-5
Table 2-3: Regional Perspective Property Assessment....2-6
Table 2-4: New Development for Unincorporated Areas of Worcester County from 2013 - July 2019 2-7
Table 2-5: Departments and their Roles in the EOP....2-10
Table 2-6: NFIP Insurance Policy Statistics 2-12
Table 2-7: NFIP Available Coverage 2-12
Table 2-8: Worcester County NFIP Insurance Policies - Losses & Payments 2-13
Table 3-1: HIRA....3-1
Table 3-2: USACE National Inventory of Dams – Worcester County, MD....3-2
Table 3-3: Probability & Future Risk 3-3
Table 4-1: Flood Related Hazard Impacts 4-3
Table 4-2: Saffir-Simpson Hurricane Wind Scale 4-4
Table 4-3: Velocity Pressure as a Function of Wind Speed....4-6
Table 4-4: Hurricane, Tropical Storm & Coastal Storm Risk Assessment Data Table 4-10
Table 4-5: Hurricane Storm Surge At-Risk Structures per Community 4-11
Table 4-6: Flood Hazard Risk Assessment Data Table 4-14
Table 4-7: FEMA Flood Zones....4-15
Table 4-8: Riverine At-Risk Structures per Community 4-19
Table 4-9: Riverine Loss Estimations per Community....4-19
Table 4-10: Coastal At-Risk Structures per Community....4-21
Table 4-11: Coastal Loss Estimations per Community 4-21
Table 4-12: Worcester County Essential Facilities At-Risk to 1%-Annual-Chance Flood Event....4-23
Table 4-13: Debris Generation Summary for 1%-Annual-Chance Flood Event 4-27
Table 4-14: Projected Shelter Needs Summary for 1%-Annual-Chance Flood Event 4-27
Table 4-15: 1990 Rate of Shoreline Erosion - Rate of Change....4-33
Table 4-16: Rate of Shoreline Erosion 4-33
Table 4-17: Sea Level Rise Hazard Rank by County 4-35
Table 5-1: Enhanced Fujita (EF) Scale....5-2
Table 5-2: Tornado Hazard Impact....5-2
Table 5-3: Tornado Hazard Risk Assessment Data Table 5-3
Table 5-4 HazMat Hazard Impact 5-5
Table 5-5: HazMat Transportation Incidents....5-6
Table 5-6: HazMat Incidents 1994-2018 5-7
Table 5-7: Fire Danger Rating Description 5-10
Table 5-8: Wildfire Hazard Impact....5-12
Table 5-9: Wildfire Hazard Risk Assessment Data Table 5-12
Table 5-10: Wildfire Events 2000-2017 5-13
Table 5-11: Wind Hazard Impact 5-15
Table 5-12: Wind Hazard Risk Assessment Data Table....5-16
Table 5-13: Thunderstorm Hazard Impact....5-19
Table 5-14: Thunderstorm Hazard Risk Assessment Data Table 5-19

Table 5-15: Winter Storm Hazard Impact 5-22
Table 5-16: Winter Storm Hazard Risk Assessment Data Table 5-23
Table 5-17: Drought Hazard Impact 5-25
Table 5-18: Drought Hazard Risk Assessment Data Table 5-26
Table 5-19: Southern Eastern Shore Climate Division 1 Drought Periods 5-27
Table 5-20: Extreme Heat Hazard Impact 5-28
Table 5-21: Extreme Heat Hazard Risk Assessment Data Table 5-29
Table 5-22: Heat Disorders on High Risk Groups 5-29
Table 6-1: Government Department & Staff Resources 6-3
Table 6-2: Projects Funded by FEMA 6-8
Table 6-3: Generator Capabilities - Critical Facilities 6-8
Table 6-4: Worcester County Shelter Locations 6-9
Table 6-5: Mitigation Actions & Capabilities by Worcester County Health Department 6-9
Table 7-1: Year-Round Populations of the Town of Berlin 7-3
Table 7-2: Berlin Employment Information 7-3
Table 7-3: Berlin Employment by Industry 7-4
Table 7-4: New Development for the Town of Berlin from 2013-2017 7-4
Table 7-5: Town of Berlin Notable Hazard Event Data 7-5
Table 7-6: Town of Berlin NFIP Insurance Policy Statistics 7-5
Table 7-7: Worcester County NFIP Insurance Policies - Losses & Payments 7-6
Table 7-8: Year-Round Populations of the City of Pocomoke 7-9
Table 7-9: Pocomoke Employment Information 7-10
Table 7-10: Pocomoke Employment by Industry 7-10
Table 7-11: New Development for the City of Pocomoke from 2013-2017 7-11
Table 7-12: City of Pocomoke Notable Hazard Event Data 7-11
Table 7-13: City of Pocomoke NFIP Insurance Policy Statistics 7-12
Table 7-14: Worcester County NFIP Insurance Policies - Losses & Payments 7-12
Table 7-15: Year-Round Populations of the Town of Snow Hill 7-16
Table 7-16: Snow Hill Employment Information 7-17
Table 7-17: Snow Hill Employment by Industry 7-17
Table 7-18: New Development for the Town of Snow Hill from 2013-2017 7-17
Table 7-19: Snow Hill Notable Hazard Event Data 7-18
Table 7-20: Snow Hill NFIP Insurance Policy Statistics 7-19
Table 7-21: Worcester County NFIP Insurance Policies - Losses & Payments 7-19
Table 7-22: Year-Round Populations of Ocean Pines 7-23
Table 7-23: Ocean Pines Employment Information 7-23
Table 7-24: Ocean Pines Employment by Industry 7-24
Table 7-25: New Development for Ocean Pines from 2013-2017 7-24
Table 7-26: Ocean Pines Notable Hazard Event Data 7-26
Table 7-27: Worcester County (Unincorporated) NFIP Policy Statistics 7-27
Table 7-28: Worcester County NFIP Insurance Policies - Losses & Payments 7-27
Table 7-29: 2014 Community Mitigation Action Status Table 7-31
Table 7-30: New Municipal Mitigation Actions 7-33
Table 9-1: Potential Roads That Flood During a Nor'easter, Hurricane, or Heavy Rain Events 9-4
Table 9-2: New Mitigation Action Items 9-8

Maps

Map 2-1: Location 2-1
Map 2-2: Stream System 2-2
Map 2-3: Bays 2-3
Map 2-4: Past Development 2-8
Map 2-5: New Development 2-9
Map 4-1: Hurricane Storm Surge Inundation Area 4-9
Map 4-2: Hurricane Storm Surge At-Risk Structures 4-12
Map 4-3: FEMA Special Flood Hazard Areas (SFHA) 4-16
Map 4-4: FEMA Flood Zones 4-18
Map 4-5: At-Risk Structures: Riverine Flood Event 4-20
Map 4-6: At-Risk Structures: Coastal Flood Event 4-22
Map 4-7: Worcester County Essential Facilities 4-25
Map 4-8: Erosion Rate Hazard Ranks 4-34
Map 4-9: Overall Social Vulnerability 4-37
Map 5-1: Tornado Initial Touch Downs and Paths 5-4
Map 5-2: Forestlands 5-11
Map 5-3: Population Over 65 Years Old 5-30
Map 5-4: Population Under the Age of 5 5-30
Map 5-5: Socioeconomic Status: Population Under Poverty Level 5-32
Map 5-6: Household Composition: Aged 65 or Older 5-32
Map 7-1: Town of Berlin 7-6
Map 7-2: City of Pocomoke 7-13
Map 7-3: Town of Snow Hill 7-20
Map 7-4: New Development 7-25
Map 7-5: Ocean Pines 7-28

Figures

Figure 1-1: Planning Process 1-6
Figure 2-1: Seasonal Peak Population 2-3
Figure 3-1: Maryland Impacts on Climate Change 3-5
Figure 4-1: Disaster Declarations for Maryland Jurisdictions 4-2
Figure 4-2: Tropical Storm Paths 4-5
Figure 4-3: Storm Surge Inundation Areas 4-6
Figure 4-4: Storm Surge vs. Storm Tide 4-7
Figure 4-5: FEMA Identification of Coastal Hazard Zones & How Base Flood Elevations Are Affected By Wave Height 4-17
Figure 4-6: Local Topography of Ocean Pines 4-30
Figure 4-7: Worcester County Hurricane Evacuation Zone 4-38
Figure 5-1: 2015-2017 Traffic Volume Map for Worcester County 5-9
Figure 5-2: MEMA Wildfire Risk Map 5-13
Figure 5-4: MEMA Wind Risk Map 5-17
Figure 5-4: MEMA ASCE Design Wind Speeds 5-17
Figure 5-5: Thunderstorm Life Cycle 5-18
Figure 5-6: Weekly by Hour Frequency to Ground Lightning Strikes 5-20
Figure 5-7: Eight Unit Two Story Building Fire Caused by Lightning 5-20
Figure 5-8: Thunderstorms Containing Hail Can Exhibit a Characteristic Green Coloration 5-21
Figure 5-9: Maryland Average Annual Snowfall Map 5-23
Figure 7-1: Town of Berlin Location Map 7-3
Figure 7-2: City of Pocomoke Location Map 7-9
Figure 7-3: Town of Snow Hill Location Map 7-16
Figure 7-4: Ocean Pines Location Map 7-23

CHAPTER 1: INTRODUCTION

Executive Summary

The *2020 Hazard Mitigation & Resilience Plan* (Plan Update) seeks to eliminate or reduce hazard related human, economic, and environmental losses. This is a plan written by and for Worcester County, MD. The plan includes unincorporated areas of Worcester County and the towns of Berlin, Pocomoke and Snow Hill. Ocean City is addressed somewhat; however, Ocean City has its own plan and recently completed the *2017 Ocean City, Maryland Hazard Mitigation Plan*. To that end, the *2014 Worcester County Hazard Mitigation Plan* has been updated to include new data, mapping, *HAZUS Level 2 Enhanced Analysis*, status of 2014 mitigation action items and new Mitigation actions and projects.

As with the 2014 Plan, the Plan Update is intended as a dynamic assessment of natural hazards that will be maintained and updated as needed. It primarily focuses on high risk natural hazards. The plan pays particular attention to the County's coastal location and character. Coastal related hazards including hurricanes, nor'easters, floods, and wind can and have caused significant damage, while threatening life and limb. Therefore, coastal hazards have been identified as high-risk hazards by Worcester County, and prioritized within this Plan Update. Coastal hazards include coastal storms; storm surge; hurricane/tropical storm; nor'easter; potential sea level rise; and shoreline erosion. In addition to coastal hazards, the plan analyzes the County's vulnerability to riverine flooding, tornado, wildfires, wind, drought, extreme heat, thunderstorm, winter storm and hazmat incidents.

For each hazard identified in the Plan Update, a profile, historical occurrences, vulnerability, and mitigation actions have been provided. The intent of the plan is to cultivate a hazard resistant and resilient community through awareness, preparedness, and action-oriented projects. Implementing the items outlined in this plan will heighten awareness and better prepare individuals as well as agencies to help themselves in the event of a disaster.

Finally, with an approved Plan Update, Worcester County and the towns of Berlin, Pocomoke and Snow Hill will remain eligible for funding from several sources including the Maryland Emergency Management Agency (MEMA) and the Federal Emergency Management Agency (FEMA). Funding is available for pre-disaster and post-disaster mitigation projects as well as recovery and reconstruction. This funding is not available without an approved plan.
An updated plan is required every five years. The intent of the Departments of Emergency Services is to keep the plan relevant and current, easing the five-year plan update process. It is therefore essential that those implementing the plan carefully document their process and the results of the mitigation actions taken.

Promulgation Statement

A primary mission of the Worcester County Commissioners is to provide for the safety and well-being of Worcester County citizens and visitors. To further this objective, the plan has been prepared and follows.

The Plan Update provides a proactive strategy against the hazards that endanger the lives and property of Worcester County residents and visitors. Further, the plan evaluates these hazards and presents activities to:

- eliminate or mitigate their effect;
- reduce their negative impact; and
- lessen exposures to them.

The Worcester County Commissioners endorse and promulgate this document as the *2020 Hazard Mitigation & Resilience Plan,* and it shall supersede any previous hazard mitigation plan(s). The departments affected are directed to carry out their responsibilities, to coordinate their activities, and to cooperate with local, state, and federal agencies responsible for emergency assistance to Worcester County.

Introduction

Mitigating risks will enable the County and its communities to withstand extreme events more readily. The *2020 Worcester County Mitigation and Resilience Plan* identifies various hazard types, the associated risk and ways to address vulnerability. Included in the plan are mitigation actions that build resilience. Integration of mitigation planning into existing or new County plans was added to the plan update and plan integration recommendations are specified within *Appendix H: Safe Growth Audit.*

Hazard Mitigation

Hazard mitigation is sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.

Hazard mitigation breaks the cycle of damage, reconstruction and repeat property damage because it occurs before, and after disasters. Emergency response planning prepares a community for the first response to an immediate aftermath of a disaster. Hazard mitigation planning prepares a community for a disaster, through pre-disaster mitigation and prepares a community for long term intentional recovery and reconstruction afterward. With careful selection, mitigation projects can be a cost-effective means of reducing the risk of property and life loss. Over the long term, mitigation saves both money and lives.

Realizing the benefits of mitigation activities and programs, the federal government and the State of Maryland have determined that mitigation should be the cornerstone of the nation's emergency management efforts. The Federal Emergency Management Agency (FEMA) and the

Maryland Emergency Management Agency (MEMA), through grants, encourage local jurisdictions to develop and annually update a hazard mitigation plan. Worcester County has chosen to respond.

Worcester County along with participating communities have also concentrated on resiliency through this planning effort. Increasing the ability of the county and the communities within to recover from disasters and resume operations is of the utmost importance. Focusing on continuity of operations, particularly essential services through emergency back-up power generation, back-up locations for essential facilities, protection of infrastructure, and the potential relocation of critical facilities have been identified during the plan update process.

Resilience

Resilience is the capacity of individuals, communities, businesses, institutions, and governments to adapt to changing conditions and to prepare for, withstand, and rapidly recover from disruptions to everyday life, such as hazard events. Resilience enables communities to adapt to change so that they not only "bounce back" from a disaster, but also "bounce forward" to a safer state.

Purpose

Coastal related hazards are of constant concern for Worcester County as development along the shoreline continues. Population and property are increasingly vulnerable. The Plan Update identifies ways to reduce this vulnerability and improve disaster response through:

1) Hazard Analysis—The Plan Update includes the results of the HAZUS Level 2 Enhanced Analysis for Coastal and Riverine Flood in Chapter 4: Flood Related Hazards.
2) Capability Assessment & Appendix H: Safe Growth Audit —The Plan Update provides a description and analysis of existing local hazard mitigation policies and response capabilities in Chapter 6: Capability Assessment. In addition, opportunities for plan integration have been identified and recommendations have been included in the new plan appendix.
3) Mitigation Actions- The plan sets forth new goals, objectives, mitigation action items, and climate adaptation and resilience recommendations, as well as provides the status update of the 2014 mitigation actions in *Chapter 8: Mitigation Status Report* and *Chapter 9: New Mitigation Strategies.*

In addition, the plan improves the County's eligibility for funding from federal and state agencies for hazard mitigation and disaster relief. This includes the Stafford Disaster Relief and Emergency Act, the Disaster Mitigation Act of 2000, the Flood Mitigation Assistance Program created under the National Flood Insurance Reform Act, the Hazard Mitigation Grant Program, the Pre-Disaster Mitigation Grant Program, and the Maryland Comprehensive Flood Management Grant Program.

"The Hazard Mitigation Grant Program (HMGP**)** provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The

purpose of HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. "*HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act."*

The Disaster Mitigation Act of 2000 requires that communities evaluate their hazard mitigation plan every five years. The way in which this is to be accomplished must be documented in the plan. Through the inclusion of a mechanism to evaluate the plan and the implementation process, the County has institutionalized and sustained the mitigation initiative beyond the creation of the original document.

The Pre-Disaster Mitigation (PDM) grant is also authorized by the Stafford Act. PDM grants assist in emergency preparedness and disaster planning activities with the mitigation of risk to people and property to future events while reducing reliance in federal funding for disaster recovery.

The plan will continue to be used as a tool to inform officials, the private sector, and the general public of the benefits of hazard mitigation and to encourage awareness, participation, and support for such endeavors. However, a fundamental purpose of the plan is to prevent damage rather than react to emergencies. To this end, an up-to-date plan is an indication to the public, as well as local, state, and federal agencies and decision makers that Worcester County is proactive and will continue to act responsibly. The continued cooperation between all levels of government is essential to the success of this plan. Eliminating or reducing hazards now can save many lives and dollars.

Finally, the plan will continue to foster increased cooperation between the many emergency management entities. When hazards threaten to become disasters, political boundaries become meaningless. Neighboring communities help one another deal effectively with hazards. The County, in its emergency management role, is best suited to bring together these communities at the planning stage so that when hazards occur, appropriate assistance can be provided efficiently.

This plan, in conjunction with the Emergency Operations Plan (EOP) identifies, channels and methods for cooperation both inside and outside the County. This includes reviewing the roles and resources available to each entity and setting out appropriate roles for each before, during, and after an emergency.

Goals

Following the guidelines of this plan, Worcester County's hazard mitigation goal is to eliminate or reduce hazard related human economic and environmental losses. The county's three sub-goals are to:

1. Promote long term solutions to repetitive problems to avoid unnecessary or recurring expenditures.
2. Eliminate or reduce department redundancy and improve communication between response entities.
3. Lessen exposures to hazards.

The county continuously strives to become a storm resilient community. A storm resilient community is one that is educated, individually and collectively prepared, and can react to and recover from a storm in an organized manner.

Planning Requirements

This planning effort is 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. Presidential Policy Directives 8 & 21 have guided the resilience portion of the plan, as well.

Disaster Mitigation Act of 2000
DMA 2000 (Public Law 106-390) provides the legal basis for FEMA mitigation planning requirements for State, local and Indian Tribal governments.

Presidential Policy Directives 8 & 21
Presidential Policy Directive (PPD) 8: National Preparedness (2011) defines resilience as the ability to "adapt to changing conditions and withstand and rapidly recover from disruption due to emergencies."
Presidential Policy Directive (PPD) 21: National Preparedness (2013) defines resilience as the ability to "prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions."

Planning Process

The County began the plan update process in April 2019. Smith Planning and Design was contracted to assist the County in the update of the *2014 Worcester County Hazard Mitigation Plan*.

In compliance with the hazard mitigation planning requirements, extensive public participation was sought and encouraged throughout the mitigation plan update process. A Hazard Mitigation Planning Committee (HMPC) was formed in May 2019, and was comprised of various County agencies, non-profit organizations, and representatives from each of the participating communities. The planning process involved eight core components shown in Figure 1 below.

Figure 1-1 – Planning Process

Organizing Resources

The first step in the hazard mitigation plan update process was for Worcester County to organize their resources and ensure that they had adequate technical assistance and expertise to form a hazard mitigation committee. The Worcester County Department of Emergency Services served as the lead agency for the plan and Smith Planning & Design served as technical support. The Hazard Mitigation Planning Committee (HMPC) included representation from key county departments such as Emergency Services, Environmental Programs, Development of Review & Permitting, Public Works, Sheriff's Department, Social Services, Health Department, County Commissioners, as well as representatives from the Towns of Berlin, Snow Hill, Pocomoke, Ocean Pines, and Ocean City. The following listing on Table 1 includes the members of the Hazard Mitigation Planning Committee (HMPC), and/or the Local Emergency Planning Committee (LEPC), and the agency they represent.

Table 1-1: HMPC Members

Name	May 22nd HMPC	July 25th HMPC	July 25th LEPC	Sept 16th HMPC	Department/Agency
	Attendance				
*Alison Gadoua					Town of Snow Hill City County
*Amanda Lewis	✓				Ocean City Emergency Services
*Arnold Downing					Town of Berlin
*Billy Birch	✓			✓	Department of Emergency Services - Director
*Bill Neville	✓				Ocean City Planner
Bill Bradshaw		✓			Department of Development Review & Permitting
Bob Mitchell		✓			Environmental Programs - Director
Bob Rhode	✓				Ocean City Emergency Services
*Brian Reynolds		✓			Citizen Representative - Ocean Pines
*Bruce Morrison		✓			Pocomoke City Mayor

Name	May 22nd HMPC	July 25th HMPC	July 25th LEPC	Sept 16th HMPC	Department/Agency
	Attendance				
*Carolyn M. Clemens		✓			Citizen Representative - Ocean Pines
*Chip Bertino					Worcester County Commissioner
*Charlene Sharpe			✓		The Dispatch
*Christina Vickers	✓	✓	✓	✓	Department of Emergency Services
*Connie Watson					Town of Snow Hill Clerk
*Dale Trotter					Pocomoke City Councilman
*David Engelhart	✓			✓	Town of Berlin Planning Department
Dawn Jones					Department of Social Services
*Deborah Darden					Assateague Island National Seashore Superintendent
Debra Stevens	✓				Health Department
*Diana Purnell					Worcester County Commissioner
*Diane Downing					Pocomoke City Councilwoman
*Don O'Grince			✓		Citizen Representative - St. Paul's by the Sea Episcopal Church
*Doug Dods			✓		Worcester County Sheriff's Office
*Doug Parks		✓		✓	Ocean Pines Board Member
*Dr. Collette Horn					Citizen Representative - Ocean Pines
*Ed Tutor		✓	✓	✓	Department of Development Review & Permitting
Edward Werkheiser	✓	✓			MEMA
*Esther Troast					Pocomoke City Councilwoman
*Frank Adkins		✓		✓	Department of Public Works – Roads Division
*Frank Daly					Citizen Representative - Ocean Pines
*Gary Weber					Town of Snow Hill
*James Church					Worcester County Commissioner
*James Hamilton			✓		Department of Emergency Services - Assistant Director
Jeff Fleetwood					Town of Berlin
Jeff Knepper					Citizen Representative - Ocean Pines
Jeff McMahon					Fire Marshall
*Jihane Ambroise				✓	MEMA
*John Tustin	✓	✓			Department of Public Works
*John Viola					Citizen Representative - Ocean Pines
*Joseph Bucovetsky					FEMA
*Joseph Mitrecic					Worcester County Commissioner
*Joshua C. Nordstrom				✓	Worcester County Commissioner
*Kathy Whited					Commissioners' Chief Administration Officer
Kelly Henry	✓	✓	✓		Department of Development Review & Permitting
*Ken Whited		✓			Worcester County Maintenance Superintendent
*Kristen Forti				✓	MEMA
*Kristy Kagan	✓	✓		✓	Health Department
*Latoya Purnell					Town of Snow Hill
*Laura Allen		✓			Town of Berlin
*Madison Bunting					Worcester County Commissioner
Mark Dunlevy	✓	✓		✓	Department of Development Review & Permitting
*Mark Titanski				✓	Worcester County Sheriff
*Martin Sullivan		✓			Town of Snow Hill
*Mary Bohlen	✓	✓			Town of Berlin
*Matt Crisafulli					Worcester County Sheriff
*Melissa Weidner					Town of Snow Hill City Council
*Michelle Bennett					Citizen Representative - Ocean Pines
Mike Thornton				✓	Pocomoke City EMS Director
*Monica Lea			✓		American Red Cross – Disaster Program Manager
*Phyllis Wimbrow					Department of Development Review & Permitting
*Randy Barfield					Snow Hill Public Works
*Raymond Knaven			✓		Atlantic General Hospital
*Richard Bowers					Ocean City Fire Chief
*Richard W. Clemens		✓			Citizen Representative - Ocean Pines
*Richard Hoppes			✓		Chesapeake Utilities

Name	May 22nd HMPC	July 25th HMPC	July 25th LEPC	Sept 16th HMPC	Department/Agency
	Attendance				
*Roberta Baldwin			✓		Department of Emergency Services
Robyn Tytomi-Dalton	✓	✓		✓	Health Department
*Russ Harrison					Town of Snow Hill WWTP
*Scott Holland					Pocomoke City Councilman
*Shannon Chapman		✓	✓		Department of Social Services
*Steve Tuttle					Citizen Representative - Ocean Pines
*Ted Elder					Worcester County Commissioner
Tess Wimbrow	✓	✓		✓	Department of Development Review & Permitting
Thomas Piatti					Citizen Representative - Ocean Pines
*Tim Jerscheld			✓		Worcester County Fire Service – Stockton Fire Chief
*Todd Nock					Pocomoke City Councilman
*Walt West				✓	National Park Service – Assateaque Island

Note: New HMPC members that did not participate in the *2014 Worcester County Hazard Mitigation Plan* are denoted above with an (*).

New HMPC members from various agencies that were not involved in the 2014 HMPC planning process assisted in the development process and are listed below:

- Assateague Island National Seashore Superintendent;
- American Red Cross;
- Atlantic General Hospital;
- Chesapeake Utilities;
- Ocean Pines;
- St. Paul's by the Sea Episcopal Church;
- The Dispatch;
- Worcester County Commissioner;
- Worcester Count Environmental Programs;
- Worcester County Maintenance Superintendent;
- Worcester County Public Information Officer;
- Worcester County Stockton Fire Department; and
- Worcester County Sheriff.

HMPC Meeting on July 25, 2019

Data Collection

The development of the mitigation plan update began with data collection. A kick-off meeting was held on **May 22, 2019** with the Hazard Mitigation Planning Committee (HMPC). The 2016 Maryland Emergency Management Agency (MEMA) Hazard Identification and Risk Assessment (HIRA) results for Worcester County were reviewed. Coastal hazards were ranked as "High" risk for the County. Committee members comments included changes to the following hazards: Thunderstorm (Lightning and Hail) from "Medium-Low" to "Medium", Tornado from "Medium-Low" to "Medium", and HazMat (Toxic Chemicals) from "Low" to "Medium-Low". Rankings for these hazards were modified due to the increase in

events/incidents per year since the last hazard mitigation planning cycle. Next for the group discussion portion of the meeting, committee members were divided into 5 groups in order to complete a group discussion questionnaire. Discussion topics included: Public Outreach Strategies, Regional Events & Planning, Community Rating System, identification of additional stakeholders, and 2014 mitigation activities. Following the group discussion, committee members reviewed data request and 2014 mitigation actions. For the 2014 mitigation action items, members were asked to provide a status update. Smith Planning and Design distributed data request packets to specific agencies/departments, as applicable. In addition, status updates of 2014 mitigation actions were requested. Finally, information such as permit data, shelter locations, and generator adequacy was requested from various departments and agencies.

Smith Planning & Design (SP&D) along with Worcester County Department of Emergency Services (DES) staff attended the Worcester County Local Emergency Planning Committee (LEPC) on **July 25, 2019**. SP&D along with DES staff discussed the overview and status of the hazard mitigation planning process. Committee members were asked to complete the HazMat Hazard Impact Assessment, shown in *Chapter 3: Vulnerability Assessment*. In addition, current hazmat preparedness and response capabilities were discussed. Finally, ideas for new mitigation actions were identified, listed in *Chapter 9: Mitigation Strategies*. The following listing on Table 2 includes the members of the LEPC and the agency they represent.

Table 1-2: LEPC Members

Name	Department/Agency
James Hamilton	Worcester County Department of Emergency Services - Chair
Billy Birch	Department of Emergency Services - Director
Bob Mitchell	Environmental Programs - Director
Charlene Sharpe	The Dispatch
Christina Vickers	Worcester County Department of Emergency Services
Don O'Grince	St. Paul's by the Sea Episcopal Church
Doug Dods	Worcester County Sheriff's Office
Ed Tutor	Worcester County Department of Development Review & Permitting – Director
Kelly Henry	Worcester County Department of Development Review & Permitting – Technical Services Division
Monica Lea	American Red Cross, Disaster Program Manager
Raymond Kovaven	Atlantic General Hospital
Richard A. Hoppes	Chesapeake Utilities
Roberta Baldwin	Department of Social Services
Shannon Chapman	Department of Social Services
Tim Jerscheld	Worcester County Fire Service

During the Hazard Mitigation Planning Committee (HMPC) held on **July 25, 2019**, SP&D discussed several public outreach initiatives and a HMPC and Public Stakeholders Meeting Summary table was provided detailing information on all meetings and outreach efforts completed to date. This will be included in *Chapter 1: Introduction* of the Plan. Also, a public opinion survey was developed and aimed to ensure the County is prepared for all kinds of hazards. The Department of Emergency Services is placing special emphasis on understanding citizens' concerns regarding hazards. The survey is being used to collect insight and perspective and was linked to the Worcester County Department of Emergency Services website. In addition, a Citizen

Alert & Notification flyer was developed and distributed to increase the number of residents utilizing the CodeRED Notification System. This system provides citizens with warnings, such as severe weather, via voice calls, text messages or emails. Committee members were encouraged to distribute this information during meeting(s) or outreach events.

Finally, committee members were divided into 4 groups. Discussion topics were broken down into 2 tasks:

- **Task 1: Items for Review & Comment**
  - o Hazard Identification & Risk Assessment
  - o Probability & Future Risk
  - o Group Discussion Questionnaire Results
  - o Goals & Objectives
- **Task 2: Items for Completion**
  - o Safe Growth Audit
  - o Mitigation Actions – Status Table
  - o Hazard Impact Sheets

The meeting concluded with each group providing new mitigation action ideas developed during the group discussion.

During the final HMPC meeting held on **September 16, 2019**, the public opinion survey results were reviewed. The public opinion survey was made available on the Worcester County Department of Emergency Services webpage. Next, an overview of the results from the flood vulnerability assessment were discussed. An overview of Enhanced Hazus analysis results which detailed the number of structures at-risk to both riverine and coastal flood events, projected loss estimates and essential facilities vulnerable to flooding was provided. Enhanced Hazus analysis results are included in *Chapter 4: Flood Related Hazards* of the 2020 Plan.

Next, SP&D reviewed the 2014 Mitigation Action Status Report with committee members. Also, each community provided a status on those mitigation action items developed by and specific to their community. New mitigation action items that were developed over the course of the plan development process were distributed to the committee. Members were divided into two groups to review all mitigation action items. After review, the mitigation action items were numbered and posted for members to select five action items that were of "High Priority" from their perspective. However, in order for all HMPC members to participate in the prioritization process, a mitigation action prioritization online tool was distributed via email and detailed in Chapter 9, page 9-15. Prioritized mitigation action items have been integrated into the 2020 Plan. Those action items ranked as a "High Priority" were developed into projects in *Chapter 9: Mitigation Strategies*.

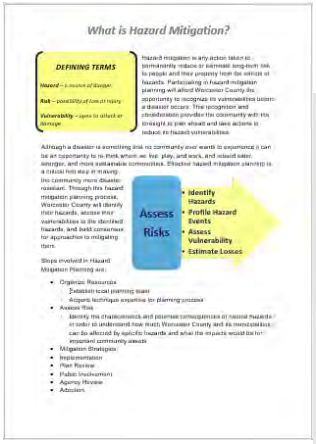
HMPC Meeting on September 16, 2019

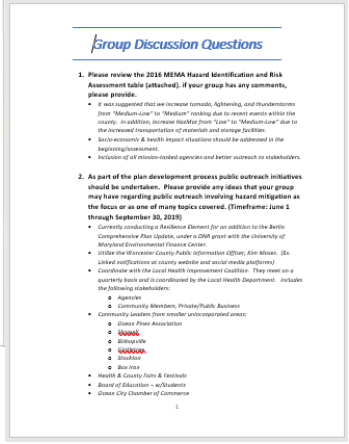
Public Involvement

A special emphasis was placed on public involvement during the *2020 Hazard Mitigation & Resilience Plan* update. Key representatives participated in numerous Hazard Mitigation Committee meetings, Community Meetings, Fire Chief and Fire Associations Meetings, and Local Emergency Planning Committee Meetings to help guide the plan development process. In addition, Hazard Mitigation Surveys were made available to the public online via the county website. Finally, "How To" Flyers for Citizens Alerts and Notifications and numerous Press Releases were issued to educate residents and keep them informed of the Hazard Mitigation Planning process. These meetings and materials are shown on Table 1-3 below.

Table 1-3: HMPC and Public Stakeholders Meeting Summary				
2019 Dates	**Meeting/ Outreach**	**Target Audience**	**Materials Provided**	**Comments/ Input**
May 22nd	HMPC Kick-Off Meeting	HMPC-Stakeholders (See Listing- Plan Chapter 1)	"What is Hazard Mitigation" Handout, 2016 MEMA HIRA, NFIP-CRS Factsheet, Group Questionnaire, & 2014 Mitigation Strategies	HIRA Results-Adjustments, Public Outreach Strategy, Regional Involvement Ideas, Mitigation Strategies Status Updates
June 3rd	HMP Initial Press Release	General Public	County Website & Media Outlets	N/A
June 4th	Hazard Mitigation Survey	General Public	County Website: https://www.surveymonkey.com/r/P28Y7T9	Survey Results
June 4th	HMPC Meeting Minutes	HMPC Members	Meeting Notes & participants, "What is Hazard Mitigation" Handout, 2016 MEMA HIRA, NFIP-CRS Factsheet	N/A
June 5th	Citizen Alert & Notification Flyer	HMPC & General Public	"How To" Sign-Up Flyer	Distribution by HMPC Members at various outreach events
June	Fire Association Meeting	Fire Dept. Personnel	Hazard Mitigation Planning Process & Opportunities, Fire Dept. Flood Hazard Survey	Survey Distribution
June	HMP 2nd Press Release	General Public	County Website & Media Outlets	Advertise July HMPC Meeting-Open to the Public
July 8th	Hazard Mitigation Online Survey	Worcester County CERT Members	County Website: https://www.surveymonkey.com/r/P28Y7T9	Survey Results
July 24th	Fire Chief's Meeting	Fire Dept. Personnel	Hazard Mitigation Planning Process Update & Survey Status/Results	Completed Surveys
July 25th	LEPC Meeting	General Public & LEPC Members	HIRA Results, Public Outreach Initiatives, HazMat Impact Table	HazMat Impact Table
July 25th	HMPC Meeting	General Public & HMPC Members	Public Outreach Initiatives, Group Discussion Questionnaire Results, Goals & Objectives, Safe Growth Audit, Mitigation Actions Status Report, Hazard Impact Sheets	Completed Hazard Impact Sheets
July 31st	HMPC Meeting Minutes	HMPC Members	Meeting Notes/Participant Listing, Citizen Alert & Notification Flyer, Group Discussion Questionnaire Results, Goals & Objectives	N/A
August 26th	HMP 3rd Press Release	General Public	County Website & Media Outlets	Advertise September HMPC Meeting-Open to the Public
Sept. 16th	HMPC Meeting	General Public & HMPC Members	"What Is Hazus", New Mitigation Action Items Table, Mitigation Action Items Ideas Handout	Enhanced Hazus Results, Mitigation Action Items & Prioritization
Sept. 18th	HMPC Meeting Minutes	HMPC Members	Meeting Notes/Participant Listing	N/A
Sept. 20th	Prioritization Survey	HMPC Members	Survey Link: https://www.surveymonkey.com/r/Y2SJD8N	Survey Results

Hazard Mitigation Committee Outreach





A series of regular Committee meetings resulted in the development of an effective and current countywide Hazard Mitigation & Resilience Plan. The Committee was actively involved in reviewing previously identified hazards within the communities, from the 2014 Hazard Mitigation Plan and in the review of the new hazard data gathered during the Plan update process. Hazard data coupled with local knowledge from various HMPC members was utilized to assess the county's vulnerabilities to natural hazards. In addition, a Level 2 Enhanced HAZUS Analysis was conducted as part of the update process. Following this assessment, the HMPC reviewed the status of the 2014 Mitigation Strategies' recommendations to reduce and prevent potential damage from these hazards. Following the Mitigation Strategies review, the HMPC then worked together to update, review, and select the most appropriate and feasible mitigation measures to address the County's hazards for the *2020 Hazard Mitigation & Resilience Plan.* The draft plan was finalized and submitted to MEMA for review and comment in 2019. These meeting are shown on Table 1-4 below.

Table1-4: HMPC Meeting Summary

2019 Dates	Meeting/ Outreach	Target Audience	Materials Provided	Comments/ Input
May 22nd	HMPC Kick-Off Meeting	HMPC-Stakeholders (See Listing- Plan Chapter 1)	"What is Hazard Mitigation" Handout, 2016 MEMA HIRA, NFIP-CRS Factsheet, Group Questionnaire, & 2014 Mitigation Strategies	HIRA Results-Adjustments, Public Outreach Strategy, Regional Involvement Ideas, Mitigation Strategies Status Updates
June 4th	Meeting Minutes	HMPC Members	Meeting Notes, "What is Hazard Mitigation" Handout, 2016 MEMA HIRA, NFIP-CRS Factsheet	N/A
July 25th	LEPC Meeting	General Public & LEPC Members	HIRA Results, Public Outreach Initiatives, HazMat Impact Table	HazMat Impact Table
July 25th	HMPC Midpoint Meeting	General Public & HMPC Members	Group Discussion Questionnaire Results, Goals & Objectives, Safe Growth Audit, Mitigation Actions Status Report, Hazard Impact Sheets	Completed Hazard Impact Sheets, New Mitigation Action Items
July 31st	Meeting Minutes	HMPC Members	Meeting Notes/Participant Listing, Citizen Alert & Notification Flyer, Group Discussion Questionnaire Results, Goals & Objectives	N/A
Sept. 16th	HMPC Strategy Meeting	General Public & HMPC Members	"What Is Hazus", New Mitigation Action Items Table, Mitigation Action Items Ideas	Enhanced Hazus Results, Mitigation Action Items & Prioritization
Sept. 18th	Meeting Minutes	HMPC Members	Meeting Notes/Participant Listing	N/A

Public Stakeholders Outreach

Key representatives participated in numerous Community Meetings, Fire Chief and Fire Associations Meetings, and Local Emergency Planning Committee Meetings to help guide the plan development process. In addition, Hazard Mitigation Surveys were open to the public in order to obtain a community perspective on hazards that impact or may impact Worcester County. Finally, "How To" Flyers/Citizens Alerts and Press Releases were issued to educate residents and keep them informed of the Hazard Mitigation Planning process. These meetings and outreach are shown on Table 1-5 below.

Table 1-5: Public Stakeholder's Outreach Summary

2019 Dates	Meeting/ Outreach	Target Audience	Materials Provided	Comments/ Input
January 25th	Winterfest EMS	General Public	Community Preparedness	N/A
February 22nd	Worcester Technical HS MCAC Trip	Preparedness Community	Community Preparedness	N/A
April 3rd	SkyWarn Class - Salisbury	General Public	Community Preparedness	N/A
April 21st-April 25th	Hurricane Conference (New Orleans)	General Public	Hurricane Preparedness	N/A
June 3rd	HMP Initial Press Release	General Public	County Website & Media Outlets	N/A
June 4th	Hazard Mitigation Survey	General Public	County Website	Survey Results
June 5th	Citizen Alert & Notification Flyer	HMPC & General Public	"How To" Sign-Up Flyer	Distribution by HMPC Members at various outreach events
June 13th – June 16th	Ocean City Air Show	General Public	Community Preparedness	N/A
June 18th	Worcester County Health Department Student Safety/First Aid Program	General Public	Community Preparedness	N/A
June 20-June 23rd	Ocean City Jelly Fish Festival	General Public	Community Preparedness	N/A
June 26th	Fire Association Meeting	Fire Dept. Personnel	Hazard Mitigation Planning Process & Opportunities, Fire Dept. Flood Hazard Survey	Survey Distribution

July 8th	Hazard Mitigation Survey	Worcester County CERT Members	https://www.surveymonkey.com/r/P28Y7T9	Survey Results
July 9th	HMP 2nd Press Release	General Public	County Website & Media Outlets	Advertise July HMPC Meeting-Open to the Public
July 24th	Fire Chief's Meeting	Fire Dept. Personnel	Hazard Mitigation Planning Process Update & Survey Status/Results	Completed Surveys
August 1st – 3rd	Great Pocomoke Fair	General Public	"Know your Zone" Program and "Code Red" Alerting System Flyers	N/A
August 3rd	Blessing of the Combines	General Public	"Know your Zone" Program and "Code Red" Alerting System Flyers	N/A
August 9th	Wor-Wic LE Exercise w/OC Command	Preparedness & Responder Community	Community Preparedness	
August 19-August 26th	4-H Zombie Apocalypse Preparedness Program	General Public	"Know your Zone" Program and "Code Red" Alerting System Flyers	N/A
September 13th – 14th	Worcester County Fair	General Public	"Know your Zone" Program and "Code Red" Alerting System Flyers	N/A

Source: *Worcester County Department of Emergency Services*

Plan Organization

The organization of the Plan begins with a description of the planning area followed by a listing of hazards identified by both the HMPC and the Resilience Stakeholder Committee as having had or have a potential to impact Worcester County. These hazards have been profiled and assessed for risk and vulnerability in the chapters that follow. Finally, the plan examines current community capabilities and identifies mitigation strategies that may be implemented to mitigate hazards and improve community resilience.

Plan Review and Adoption Process

The draft Plan was distributed for review and comment to all stakeholders on the Hazard Mitigation Planning Committee listed on Table 1.1, which included ten (10) citizen representatives. This stakeholder review occurred in October 2019. In addition, the draft Plan was posted for citizen review and comment on the Worcester County website at: http://www.co.worcester.md.us/departments/emergency. A press release strongly encouraging public input on the draft Plan was issued in November 2019, and is included in Appendix D. All review comments were incorporated into the draft Plan.

Following the local review and comment process, the revised Plan was submitted to the Maryland Emergency Management Agency (MEMA) and the Federal Emergency Management Agency in November 2019.

On May 20, 2020 Worcester County Emergency Services received a letter from MEMA notifying the county that FEMA had approved the plan pending local adoption. With this assurance the County Commissioners began the local adoption process. The local adoption

process included one public meeting to discuss the plan followed by a two-week public review and comment period. A second public meeting, which included a formal hearing to adopt the Plan, was held on ??.

CHAPTER 2: COUNTY PROFILE

Location

The physical characteristics of a community, including both the natural and built environment, will greatly affect its vulnerability to hazards. Therefore, a basic understanding of Worcester County's geography, climatology, and land use practices offers insight into its overall vulnerability. Furthermore, analysis of the County's economic situation and population patterns aids in determining areas that are highly vulnerable.

Physical

Worcester County lies in the middle of the three-state region known as the Delmarva Peninsula, so named for the states of Delaware, Maryland, and Virginia. The Delmarva Peninsula is the largest peninsula on the East Coast totaling 170 miles in length and 70 miles in width. Worcester County is the seventh largest county in Maryland, having a land area of 490 square miles. It has an irregular shape with its greatest dimensions of approximately thirty miles north and south and twenty-five miles east and west. To the north it is bounded by Sussex County, Delaware, to the south by Accomack County, Virginia, to the west by Wicomico and Somerset Counties, Maryland, and to the east by the Atlantic Ocean.

Map 2-1

Source: Smith Planning and Design

Water has always played an important part in the affairs of the county. The 31 miles of beach give Maryland its only ocean

frontage, with the Coastal Bays providing protected waters for shellfish and small boats. In the west, the Pocomoke River affords small-craft navigation to the Chesapeake Bay.

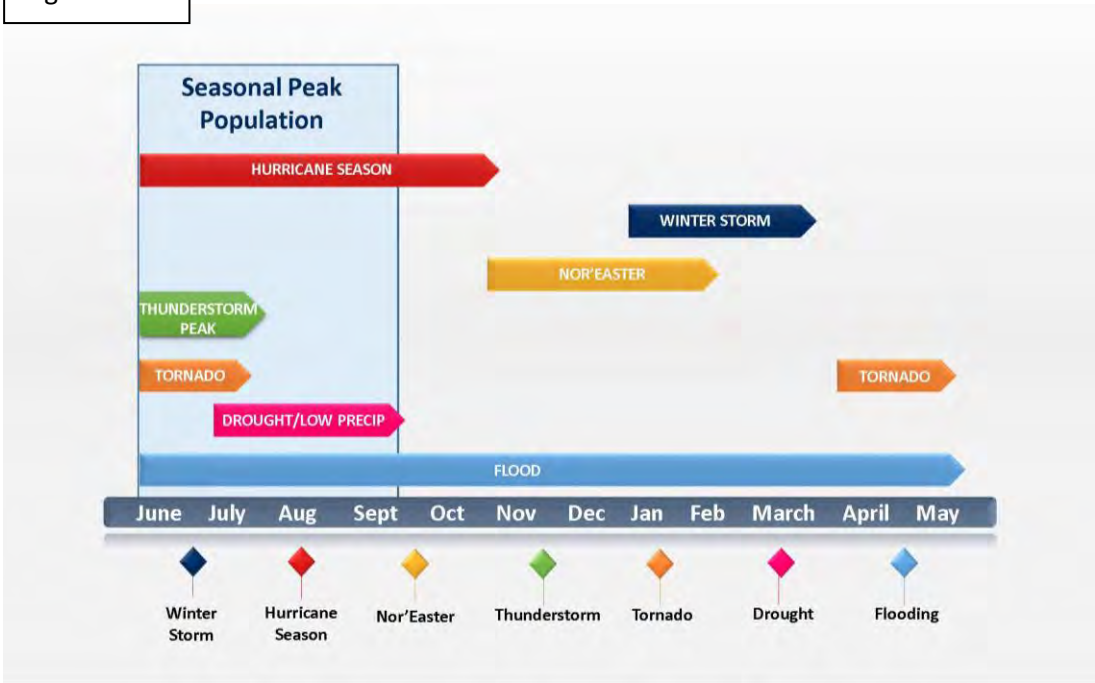
Surface drainage is provided by many short Coastal Bay tributaries in the east, and the Pocomoke River and its tributaries drain the remaining two-thirds of the County. Land elevations range from sea level to about sixty feet, with most of the land lying between twenty- and forty-feet above sea level. The topography is level to gently rolling.

Map 2-2

The coastal county includes the two barrier islands of Assateague Island to the south and Ocean City to the north. According to the *2017 Town of Ocean City Hazard Mitigation Plan*, Ocean City and the national and state seashore parks on Assateague draw over 300,000 people on summer weekends. From 1990-2015, Ocean City has a 25-year average of 326,658 with a maximum annual variance of 6%. Annually, eight to ten million people visit Worcester County.

Measuring the seasonal or total population is a difficult task for a resort community. Obviously, the summer has the highest populations. It is important to note that population of Ocean City fluctuates greatly seasonally which impacts evacuation planning and emergency services. As summer is the most populous season, coinciding with the peak of the hurricane season, evacuation plans must account for the seasonal population shifts. Furthermore, other hazards such as peak thunderstorm season and tornadoes must be considered in relation to the seasonal peak population.

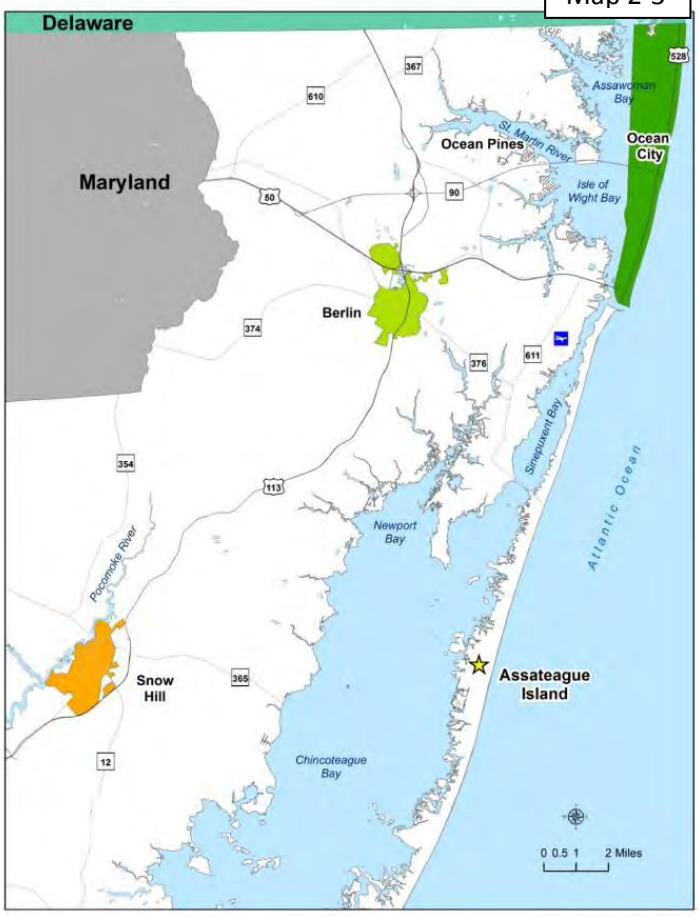
Figure 2-1



Source: 2017 Town of Ocean City Hazard Mitigation Plan

The barrier islands enclose five bays; from north to south, these are: Assawoman Bay, Isle of Wight Bay, Sinepuxent Bay, Newport Bay, and Chincoteague Bay. All of these bays have some degree of coastal development and along Assawoman Bay and Isle of Wight Bay development is extensive. For example, the community of Ocean Pines on the Isle of Wight Bay is built on filled wetlands. The year-round residential population of Ocean Pines is 11,710 according to the 2010 U.S. Census Bureau. Ocean City backs up to Isle of Wight Bay and Assawoman Bay. According to the *Town of Ocean City, Maryland Comprehensive Annual Financial Report, FY18*, in 2018, year-round residents for Ocean City totaled 6,927, while the average summer population totaled 276,812. This influx in seasonal population is included in the *2017 Town of Ocean City Hazard Mitigation Plan*, *Town of Ocean City Emergency Operations Plan*, and *2017 Town of Ocean City Comprehensive Plan Update.*

Map 2-3



Source: Smith Planning and Design

Two major tidally influenced rivers are located in the county. The Pocomoke River has two areas with urban development: Pocomoke City and Snow Hill. The second river, the St. Martin is the main tributary of the Isle of Wight Bay. There is significant development along its southern shore and the northern shore has estate development. The St. Martin River headwaters branch towards the northernmost portion of the county into agricultural and rural areas ending in Delaware.

There are smaller tidally influenced waterways. Several are Isle of Wight Bay tributaries and have significant development currently or proposed new development. These are Manklin Creek, Herring Creek, Turville Creek and Trappe Creek according to the *2006 Worcester County Comprehensive Plan.*

"Hazard Mitigation works best as a policy objective of local planning when it is so completely integrated into the comprehensive plan that it becomes a normal assumption behind all daily planning activities."

Source: American Planning Association, Planning for Post-Disaster Recovery and Reconstruction http://wwww.fema.gov/library

Transportation in Worcester County is served by US 13, US 113, and US 50 making Worcester County easily accessible. Route 12 provides access to the county seat, Town of Snow Hill. Access to Assateague Island is by rural two-lane highways (MD 376 and MD 611) while Ocean City is served by US 50 (dual highway), MD 90 (two lane-controlled access) and MD/DE 54 and DE 1 to the north (two lane rural highway and local highway respectively).

Two airports provide Worcester County with public general aviation access. The Salisbury-Ocean City Wicomico Regional Airport in Wicomico County and the Ocean City Municipal Airport on MD 611 are both publicly owned airports for public use that have control towers. Private airports include Bunting's Field near Berlin, Carey Field near Bishopville, Guy's Field near Pocomoke and Davis Field near Pittsville.

Demographics

The population of the County has grown remarkably since mid-century. In fact, at 51,454 residents, the population has more than doubled since 1970. Statewide, Worcester County was only surpassed in population percentage increase by Calvert County. With a 9.5% increase of 4,911 people since the last census, this trend is expected to continue. More than half of the County's population (23,297) lives in the northeastern quadrant. This area contains the communities of: Berlin, Ocean Pines, West Ocean City and Ocean City. These areas are expected to accommodate much of the County's future growth. According to the Maryland Department of Planning, Projections and State Data Center, estimated population total projections for Worcester County from 2020-2045 will continue to increase over the next twenty-five years. These projections are shown in Table 2-1.

Table 2-1: Worcester County Population Trends 1930 – 2018		
Year	**Population**	**% Change from Prior Period**
1930	21,624	-
1940	21,245	-1.7
1950	23,148	8.2
1960	23,733	2.4
1970	24,442	2.9
1980	30,889	20.9
Year	**Population**	**% Change from Prior Period**
1990	35,028	11.8
2000	46,543	24.7
2010	51,454	9.5
*2018	51,823	0.7
*2020	53,100	-
*2025	55,750	2020-2025 - 0.98
*2030	57,950	2025-2030 - 0.78
*2035	60,450	2030-2035 - 0.85
*2040	61,600	2035-2040 - 0.38
*2045	62,750	2040-2045 - 0.37

*Source: 2010 U.S. Census & Population Division, U.S. Census Bureau, release date April 18, 2019 - Prepared by the Maryland Department of Planning, Projections and State Data Center Unit, April 2019. *U.S. Census Bureau, American Fact Finder 2018 Population Estimates. *Maryland Department of Planning, Projections and State Data Center, August 2017*

Table 2-2: Year-Round Populations of Towns and Census Designated Places				
	U.S. Census 4/1/2010	**Population Estimates 7/1/2018**	**Population Change**	**Percent Change**
Berlin	4,485	4,818	333	7.4
Ocean City	7,102	6,927	-175	-2.5
Pocomoke	4,184	4,042	-142	-3.4
Snow Hill	2,103	2,038	-65	-3.1
Ocean Pines	11,710	-	-	-
Girdletree	149	-	-	-
Newark	336	-	-	-
Stockton	92	-	-	-
County Total	51,454	51,823	369	0.7

Source: 2010 U.S. Census & Population Division, U.S. Census Bureau, release date April 18, 2019 - Prepared by the Maryland Department of Planning, Projections and State Data Center Unit, April 2019. U.S. Census Bureau, American Fact Finder 2018 Population Estimates.
Shaded Area – Data Not Available

According to the 2018 U.S. Census Population Estimates, approximately 14,421 of the County's residents are age 65 or older, while 2,176 of the population is under the age of 5 years old. As reported by the U.S. Census Bureau, 2017 American Community Survey 5-Year Estimates, approximately 5.2% of the Worcester County's population is non-English speaking. There is a

total of 56,031(vacant & non-vacant) housing units and 15,774 owner-occupied housing units with an average household size of an owner-occupied house unit is 2.35.

Economy

Tourism and recreation continue to be strong and growing components of the economy. The economy is based primarily on tourism, retail and services, along with construction and manufacturing. Agriculture, timber harvest and fishing are also very important to the economy and have distinct historical importance. The tourism and hospitality industries are focused at the northern end of the county. The rural and coastal character is a major economic draw for Worcester County.

According to the Worcester County Economic Development, economic indicators (developed using 2016 statistics) for Worcester County continue to be at an advantage compared to its adjacent counties. As shown in the Regional Perspective Property Assessment below, the total number of assessable properties for Worcester County is higher at 65,149 compared to Wicomico County at 45,063 and Somerset County at 15, 963. In addition, the assessed value total of residential and commercial properties for Worcester County is $14,204,409,402 compared to a substantially lower amount for Wicomico and Somerset Counties.

Table 2-3: Regional Perspective Property Assessment

Real Property Tax Base (FY2015)	Total Number of Assessable Properties	Assessed Value Residential	Assessed Value Commercial	Assessed Value Total (R+C)	Commercial as % of Total
Worcester	65,149	$11,904,424,657	$2,300,084,745	$14,204,409,402	15.86%
Wicomico	45,063	$4,044,033,362	$1,413,909,616	$5,457,942,978	24.63%
Somerset	15,963	$974,409,827	$247,586,867	$1,221,996,694	18.10%
Maryland	2,221,358	$502,278,631,751	$190,912,423,966	$663,191,055,717	23.82%

Source: Maryland State Department of Assessment and Taxation; AIMS 1 and AIMS 2, Report for July 1, 2016.

The tourism industry is strongly focused on the coastal portion of the County stresses the importance of buffering this area from the harmful impacts of natural hazards. A major interruption in the flow of tourism would reverberate throughout the economy. In addition, a catastrophic event in the coastal area could potentially result in a larger loss of life and property than anywhere else in the County. However, the unincorporated areas of the County are less affected by tourism. As evidenced by Table 2-4, a minimal increase in newly developed commercial condominiums occurred in the unincorporated areas of Worcester County. In fact, the Town of Ocean City's economy is dominated by one industry, tourism. According to the *2017 Town of Ocean City Hazard Mitigation Plan*, the tourism industry is comprised of three sectors: accommodations, food and beverage, and retail and services. According to the *Town of Ocean City, Maryland Comprehensive Annual Financial Report, FY18*, hotel and rental sales increased 1.21% in FY 2018. Food and beverage sales increased 0.23% for the fiscal year. Ocean City remains a premier mid-Atlantic resort that is convenient from metropolitan areas. The Town

has continued to dedicate over 44% of hotel room taxes to increased advertising of Ocean City as a resort destination. While the Worcester County Hazard Mitigation Plan Update recognizes and integrates with the *2017 Town of Ocean City Hazard Mitigation Plan,* specific hazard information and mitigation strategies for this area of the County was included in the Ocean City Plan.

Development Trends

Tables 2-4 details new development for the years 2013-July 2019. Total commercial and residential development has fluctuated in Worcester County from 95 units in 2013 to an increase of 178 units in 2016 to slowly decreasing to 86 in July 2019.

Table 2-4: New Development for Unincorporated Areas of Worcester County from 2013 – July 2019

	Commercial	Commercial Condominium	Residential	Residential Condominium	TOTAL
2013	10	8	76	1	95
2014	12	0	134	20	166
2015	10	0	128	26	164
2016	18	5	116	39	178
2017	9	0	120	15	144
2018	10	0	138	6	154
July 2019	12	0	74	0	86
TOTAL	81	13	786	107	987

Source: Worcester County Department of Development Review & Permitting – Technical Services and Smith Planning and Design and MD 2015 Property View Database

2017 Town of Ocean City Hazard Mitigation Plan

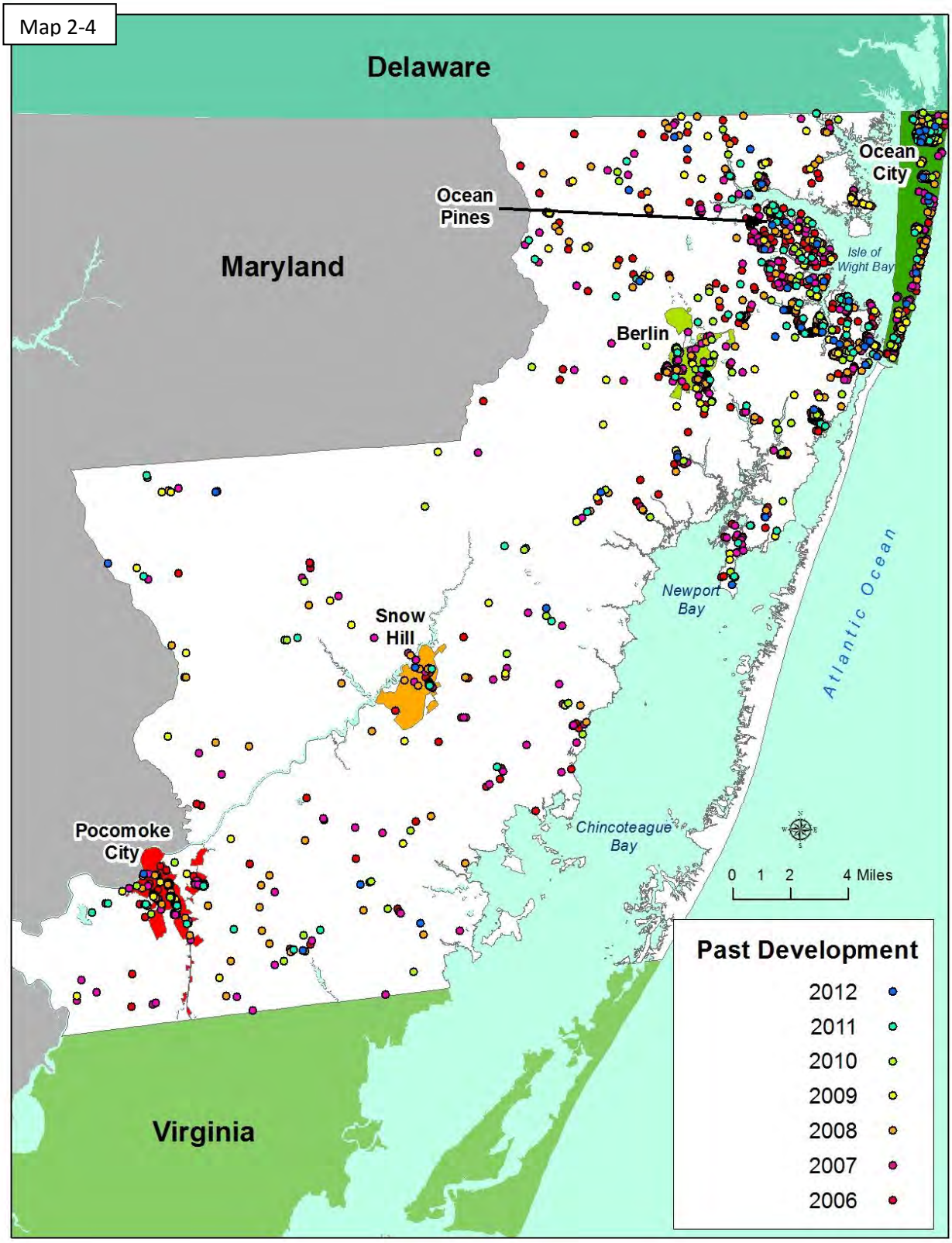
1.4 Development Trends

It is estimated that 95% to 98% of the land of Ocean City is developed, and this lack of vacant land dictates that future growth and development will consist primarily of redevelopment. This trend is going, with many older structures being razed and replaced with new, modern structures. Redevelopment such as this bodes well for the hazard resistance of structures in the future, because as older structures that may not have been built to current code requirements are removed and replaced with code compliant buildings, the new buildings will be less prone to damage. The town's codes serve as a primary means of mitigation, since they require, among other things, greater than minimum structure elevation, foundation requirements, and open space protection. The Ocean City of the future will be much better able to withstand all hazards, assuming strict enforcement of codes and new code adoption continues.

Source: *2017 Town of Ocean City Hazard Mitigation Plan: Section I –Resource Organization*

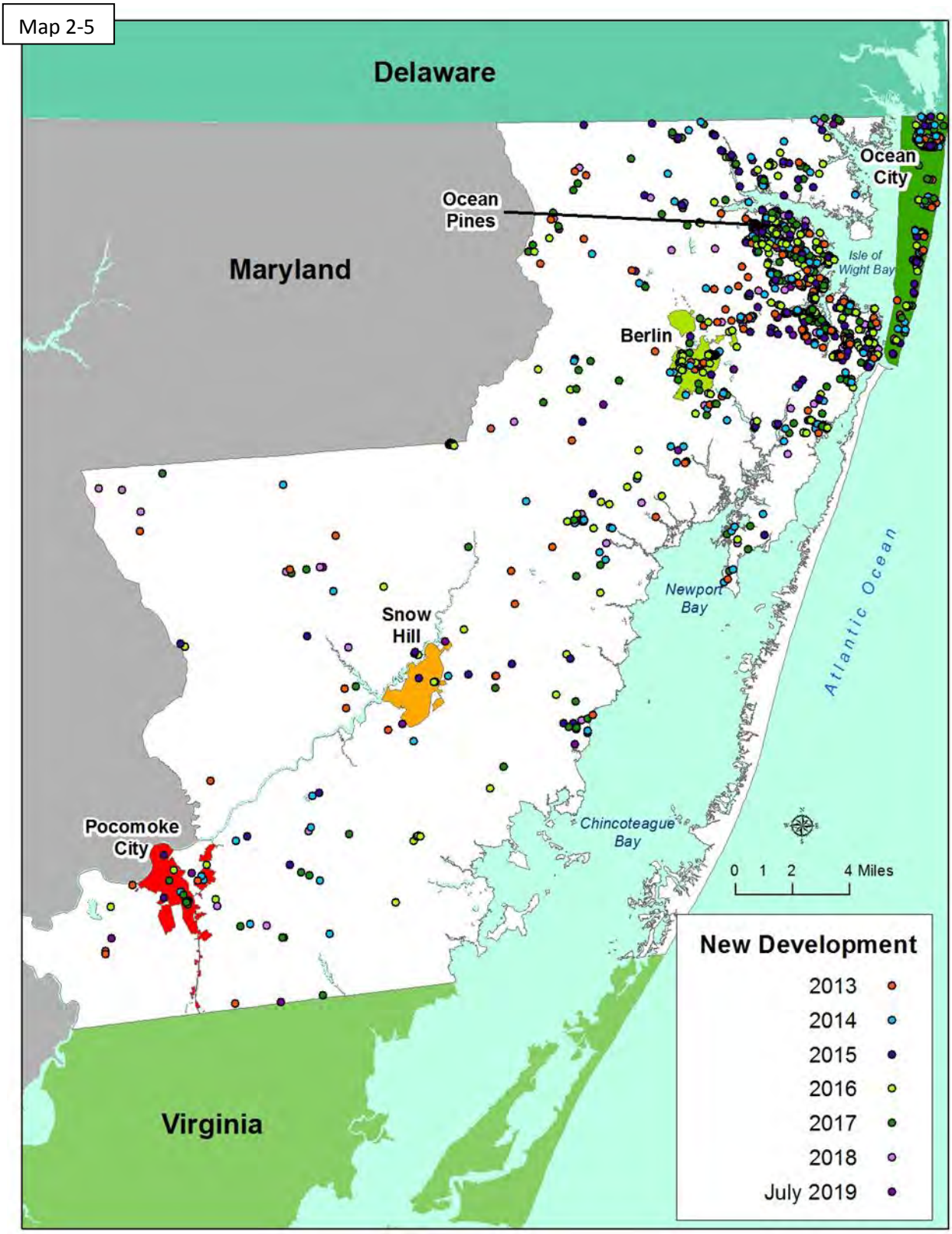
Development between the years 2006 to 2012 is depicted by year on Map 2-4. New development constructed between 2013 to July 2019 is depicted on Map 2-5. New development has occurred predominantly in the northern portion of the County, in and around existing urban development. A large portion of this new and past development has occurred around the area of the Isle of Wright Bay, as indicated in both Maps 2-4 and 2-5. Coastal development has continued; thereby impacts from natural hazards may be greater than before due to the increase in housing stock and commercial development. Specifically impacts from coastal flooding and potential sea level rise.

Map 2-4



Source: Smith Planning and Design and MD 2011 Property View Database

Map 2-5



Source: Smith Planning and Design and Worcester County Department of Development Review & Permitting – Technical Services

Mitigation Record

Prior to 1995, the County relied on its *Comprehensive Development Plan* (Comprehensive Plan) and its implementation through the County Code for past hazard mitigation. In 1995, the County produced the *Worcester County Emergency Operations Plan* (EOP) as required by the Stafford Act. The EOP clarifies the roles of county departments and support agencies in the event of an emergency. It also calls for the establishment of an Emergency Operations Center (EOC). During the Plan Update planning cycle, the Emergency Operations Plan was updated; therefore, information from the latest plan has been utilized. The table below, obtained from the *Worcester County, Maryland 2017 Emergency Operations Plan,* summarizes the divisions and roles of those departments involved with emergency management.

Table 2-5: Departments and their Roles in the EOP

Public Safety Group	
Department of Emergency Services Director:	• Coordinate all phases of emergency management. • Identify and analyze the effects of hazards that may threaten the County and its citizens. • Keep the Worcester County Chain of Command completely informed during any emergency situation. • Establish and maintain an emergency communications system to operate in an emergency. • Establish and maintain a system to alert key officials, warn the public and provide information to the public in any emergency or disaster.
Emergency Communications Center:	• In most instances, receive the initial report of any emergency either from the National Warning System, a citizen, or agency. • Alert appropriate response personnel. • Notify emergency management and County officials as appropriate and required by department policies. • Maintain communications with responding fire and rescue units throughout the incident and notify the appropriate officials for any significant changes in the status of the incident.
Fire Service:	• Responsible for all fire suppression activities. • Provide incident scene command as appropriate. • Assist with search, rescue and evacuation activities as required. • Assist with traffic control as requested by law enforcement.
Special Hazards Response Team:	• Perform hazard detection and identification. • Conduct search and rescue operations in hazardous chemical environments. • Contain hazardous material spills using defensive and offensive means. • Perform technical decontamination when appropriate.
Emergency Medical Services:	• Provide emergency medical care for the critically ill and injured as required. • In conjunction with the Maryland Institute for Emergency Medical Services Systems (MIEMSS), coordinate the transport of critically ill or injured patients to local area hospitals and medical centers or to specialty referral centers operating with the Maryland EMS system. • Provide incident scene command as appropriate. • Assist with search, rescue and evacuation as necessary.
Worcester County Sheriff's Office:	• Provide law enforcement services, coordinating with State and municipal police agencies as required. • Provide traffic control and security in emergency areas as required. • Provide for control of restricted areas, protection of vital installations, and security for critical resources and/or facilities as applicable. • Arrange for law enforcement mutual aid from neighboring jurisdictions as necessary. • Assist with search, rescue and evacuation as necessary. • Provide damage assessment support as required.
Maryland State Police:	• Provide law enforcement services, coordinating with the Worcester County Sheriff's Office and the municipal police agencies as required. • Provide traffic control and security in emergency areas as applicable. • Provide air evacuation of casualties in support of EMS services.

	• Assist local jurisdictions in search, rescue and evacuation operations as required. • Provide for control of restricted areas, protection of vital installations and security for critical resources and/or facilities as applicable.
Essential Services	
Health Department:	• The Worcester County Health Director is responsible for health and medical services within the County. • The Health Officer and staff will supervise certain environmental activities to assure the health and safety of the population as described in the Memorandum of Understanding between the Commissioners and the Health Department. • The Health Officer in conjunction with the Office of the Chief Medical Examiner for the State of Maryland is responsible for supervising any mass fatality situation requiring morgue facilities, identification and internment of the deceased.
Social Services:	• Establish eligibility criteria for temporary housing and any other required assistance. • Establish procedures for providing assistance and temporary housing to victims of emergencies or a major disaster. • Provide orderly and effective social services assistance to the County, State, and/or Federal government in the event of a County declaration of an emergency, Governor's declaration of an emergency or a Presidential declaration of an emergency. . • Establish and maintain a formal understanding with the Board of Education to establish parameters for the use of schools as emergency shelters. • Provide shelter resources for the operation of emergency and long-term operations of mass-care shelters.
Board of Education:	• Provide schools and board operated facilities to be used as shelters. • Provide transportation assistance during emergencies with school buses and drivers for transportation to shelters. • Provide custodial and managerial support at the emergency shelters when shelter operations are in effect. • Provide food and cafeteria staff for meals at County shelters.
Department of Public Works Director:	• Provide for the removal and disposal of debris from roadways as necessary following a disaster. • Monitor status of transportation routes and advise DES of all major road damage and all road closings. • Provide fleet management personnel to service County owned equipment responding during and following a disaster. • Provide necessary resources at County Shelters. • Maintain water & wastewater services as necessary. • Maintain solid waste and debris management sites throughout the County as necessary.
Department of Development Review & Permitting:	• Provide trained damage assessment personnel to assess public property. • Provide trained damage assessment personnel to provide a "windshield survey" of damage throughout the County. • Provide DES with all pertinent information on damage assessment surveys. • Provide clerical/telephone support to DES in the Public Information Center located on the 3rd Floor of the Government Office Building. • Provide temporary building permitting where allowable and applicable to disaster victims. • Provide Geographical Information System (GIS) support to the EOC prior to, during and after disaster events.
Utilities:	• Electric utilities (Delmarva Power, Choptank Electric Cooperative and the Town of Berlin Power Plant) will, as necessary, provide emergency power in disaster areas, work to restore normal conditions as quickly as possible, and provide representation in the Emergency Operations Center as necessary. • The piped gas distributor (Sandpiper), as well as liquid petroleum (LP) gas distributors, will respond to any emergency involving their transmission facilities, assist in the efforts to deal with emergency situations involving their product or equipment, and provide representation in the Emergency Operations Center as necessary.
Public Information Officer:	• Serve as spokesperson to the media. • Exchange information with spokespersons from other organizations or jurisdictions. • Assist with public information announcements. • Coordinate announcements with State and Federal PIOs as appropriate

Department of Environmental Programs:	• Provide trained damage assessment personnel to assess public property. • Provide trained damage assessment personnel to provide a "windshield survey" of damage throughout the County. • Provide DES with all pertinent information on damage assessment surveys. • The Environmental Programs Director is the local Approving Authority for the Maryland Department of the Environment, and the Director and staff will provide emergency permitting for septic and well repairs and replacements where applicable to disaster victims. This will include potability testing for drinking water wells. • Emergency inspections and permitting for shoreline construction to repair disaster damaged structures. • Testing, reporting, and closure/re-opening announcements for public swimming areas and waterways impacted by disasters to include providing DES with all pertinent information on warning and closure determinations.

Source: Worcester County, 2017 Emergency Operations Plan

National Flood Insurance

The National Flood Insurance Program (NFIP) is "A federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods."

In regard to the National Flood Insurance Program (NFIP), a total of 31,477 flood insurance policies are filed within Worcester County and its four municipalities as of the report date, 30 September 2019. The County's participation in the Program is voluntary, however compliance is mandatory. Information regarding Worcester County's strategies for complying with the NIFP can be found in Appendix F.

Table 2-6: NFIP Insurance Policy Statistics

Community Name	Policies In-Force	Total Written Premium In-Force
Town of Berlin	90	$24,946,300
City of Pocomoke	46	$31,288
Town of Snow Hill	29	$30,251
Town of Ocean City	26,000	$7,588,911
Worcester County (Unincorporated)	5,312	$3,019,760

Details on the types of coverage available and the amount of policies will insure are provided on Table 2-6 and Table 2-7.

Source: Federal Emergency Management Agency (FEMA) NFIP Insurance Report; September 2019

Table 2-7: NFIP Available Coverage

Coverage Type	Policies
One to Four-family structure	$250,000
One to Four-family home contents	$100,000
Other residential structures	$500,000
Other residential contents	$100,000
Business structure	$500,000
Business contents	$500,000
Renter contents	$500,000

Source: National Flood Insurance Program (NFIP), 2019 FAQ; https://www.floodsmart.gov/faqs

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 outside the 100-year mapped floodplain.

As listed in Table 2-8, the Town of Ocean City comprises the majority of insurance losses with a total of 1,625 policies. This information is covered within the *2017 Ocean City Hazard Mitigation Plan.* As of 30 April 2019, the NFIP report stated that 873 losses were filed in Worcester County (Unincorporated), with total payments of $6,882,029.52.

Table 2-8: Worcester County NFIP Insurance Policies – Losses & Payments

Location	Number of losses	Total Payments
Town of Berlin	16	$190,535.65
Township of Berlin	1	-
Town of Ocean City	1,625	$12,299,355.40
City of Ocean City	1	$20,05548
City of Pocomoke City	10	$87,537.03
Town of Snow Hill	12	$59,578.80
Worcester County (Unincorporated)	873	$6,882,029.52

Source: Federal Emergency Management Agency (FEMA) NFIP Insurance Report; April 2019
Data Dictionary: Total Payments-The total amount of all building, contents, and ICC payments for all claims
Number of Losses- The number of losses (claims) reported with that community and/or county.
***Data Disclaimer:** This report is generated from the NFIP Pivot Analytical Reporting Tool (PART).*

CHAPTER 3: HAZARD IDENTIFICATION & RISK ASSESSMENT

Introduction

The scope of hazards relevant to Worcester County and its residents is fairly narrow. While the county has encountered hazards other than storms and flooding, the human and financial loss has been minimal in comparison. This document, as a guide to mitigating potential human and financial loss, will focus on the County's vulnerability to coastal storms and flooding. Later in the plan each of the lesser hazards will be discussed.

Risk Assessment

Both the *2011 and 2016 Maryland State All-Hazard Mitigation Plan* identified hazards categorizing and grouping hazards. The Maryland Emergency Management Agency (MEMA) is encouraging local plan revisions to approach classifying hazards in a similar fashion as completed in this revised risk assessment. The table below provides an outline of what types of events could fall within the designated Hazard Identification and Risk Assessment (HIRA) categories. The following hazards were identified and ranked by MEMA for Worcester County in the *2016 State of Maryland Hazard Mitigation Plan Update* and the *2020 Worcester County Hazard Mitigation & Resilience Plan Update.*

Table 3-1: HIRA

Identified Hazard	Types of Events	2016 MEMA HIRA	2020 Worcester County HIRA
Coastal	Coastal Flooding; Coastal Storms; Storm Surge; Hurricane/Tropical Storm; Nor'easter; Potential Sea Level Rise; Shoreline Erosion	**High**	**High**
Flood	Riverine Flood	**Medium-High**	**Medium-High**
Wildfire	Wildfire; Brush Fire; Conflagration	**Medium-High**	**Medium-High**
Wind	Thunder-storm winds; Non-thunder-storm wind	**Medium-High**	**Medium-High**
Drought	Drought; Extreme Heat	**Medium**	**Medium**
Thunderstorm	Thunderstorm; Lightning; Hail	**Medium-Low**	***Medium**
Tornado	Tornado	**Medium-Low**	***Medium**
Winter Storm	Winter Storm; Extreme Cold; Nor'easter (Snowfall)	**Medium-Low**	**Medium-Low**
HazMat	Toxic Chemicals	**Not Ranked**	***Medium-low**

Source: 2016 Maryland State Hazard Mitigation Plan Update & Worcester HMPC
Note: (*) Rankings changed from 2011 Worcester County HMP Hazard Rankings.

Based on the HIRA results table above, coastal hazards continue to be ranked as "High" risk. Following the review of the 2016 Maryland Emergency Management Agency (MEMA) HIRA, the Worcester County Hazard Mitigation Planning Committee (HMPC) made changes, as necessary based upon their local perspective. Due to recent events during the planning cycle, the HMPC decided that thunderstorm and tornado should be ranked as a "Medium" risk, differing from the MEMA HIRA which ranked both as a "Medium-Low" risk. Finally, the HMPC included HazMat as an identified hazard, which is not included in the 2016 MEMA HIRA.

The hazard risk presented by dams is low for Worcester County. Dams are 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., Big 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).

According to the USACE National Inventory of Dams, three (3) dams are located in Worcester County. Hazard classifications related to dams throughout Maryland are available through MDE's Dam Safety Division.

Table 3-2: USACE National Inventory of Dams – Worcester County, MD

Name	Owner Type	Purpose	River	Emergency Action Plan (EAP)
Big Millpond Dam	Local Government	Recreation	Little Mill Run	No
Pocomoke City Sewage Lagoon No. 1 (South Pond)	Local Government	-	Union Branch-OS	No
Pocomoke City Sewage Lagoon No. 2 (South Pond)	Local Government	-	Union Branch-OS	No

Source: USACE National Inventory of Dams - http://nid.usace.army.mil/cm_apex/f?p=838:7:0::NO

The three (3) dams located within Worcester County are State regulated dams and are not required to have Emergency Action Plans. Emergency Action Plans (EAP) are formal documents that identify potential emergency conditions at a dam and specify preplanned actions to be followed to minimize property damage and loss of life. According to the USACE National Inventory of Dams, the hazard potential for the three (3) dams is low and therefore rank as a low risk for Worcester County.

Probability & Future Risk

Probability and future risk are assessed based on a blend of quantitative factors. The most available data from the National Centers for Environmental Information (NCEI) and the *2016 State of Maryland Hazard Mitigation Plan Update* was utilized in Table 3-2 below.

Table 3-3: Probability & Future Risk

Hazards	Injuries & Deaths		Property & Crop Damage		Geographic Extent	Total Events/ Annualized		Future Probability
Coastal (Hurricane, Tropical Storm & Coastal Storm)	0	0	10.733M	1.020M	% County in risk area= 54%	1996-2019 13 0.54		Likely
Flood (Flood, Flash Flood, & Heavy Rain)	0	0	505K	0	% in 100-yr Flood Zone (A, AE, AO & VE) = 26.69%	1996-2019 51 2.13		Highly Likely
Thunderstorm (Lightning & Hail)	0	0	33K	0	2”>hail and lightning events with injuries/deaths =1	1958-2019 24 0.39		Likely
Winter Storm (Winter Storm, Blizzard, Heavy Snow, Winter Weather, Frost/Freeze, & Cold Wind Chill	0	0	20K	0	Average Snowfall Total =1	1996-2019 71 3.0		Highly Likely
Tornado (Tornado & Funnel Cloud)	0	0	365K	0	SVRGIS (Intensity & Frequency) =1	1958-2019 11 0.18		Unlikely
Wind (High Wind & Thunderstorm Wind)	0	0	3.963M	0	ASCE Wind Design Speed =120	1956-2019 67 1.05		Highly Likely
Wildfire (Includes Brush Fire)	0	0	2000-2017 Acres Burned 552.6		MD Forestry % in High & Medium-High Risk =3.904144725%	2000-2017 113 2000-2017 6.3		Highly Likely
Drought/	0	0	Low	Low	% Crop from 2012 Agriculture Census	Drought Events	Heat Events	Occasional

Excessive Heat					=32.8%	1995-2019 1 Annual .04	2011-2019 1 Annual 0.11	

Data Gathered for Worcester County
Sources: 2016 State of Maryland Hazard Mitigation Plan; National Centers for Environmental Information, as of July 2019; Maryland DNR Forest Service.
K=Thousands
M=Millions

Probability and Future Risk includes information on historic incidents, including impacts and costs, if known. The National Centers for Environmental Information, *2016 State of Maryland Hazard Mitigation Plan*, and the Maryland Department of Natural Resources (DNR) Forest Service was used to capture information from participating jurisdictions on past occurrences. Information from the HMPC was combined with other data sources, including those previously mentioned. The frequency of past events is used to gauge the likelihood of future occurrences. Based on historical data, the future probability is categorized as follows:

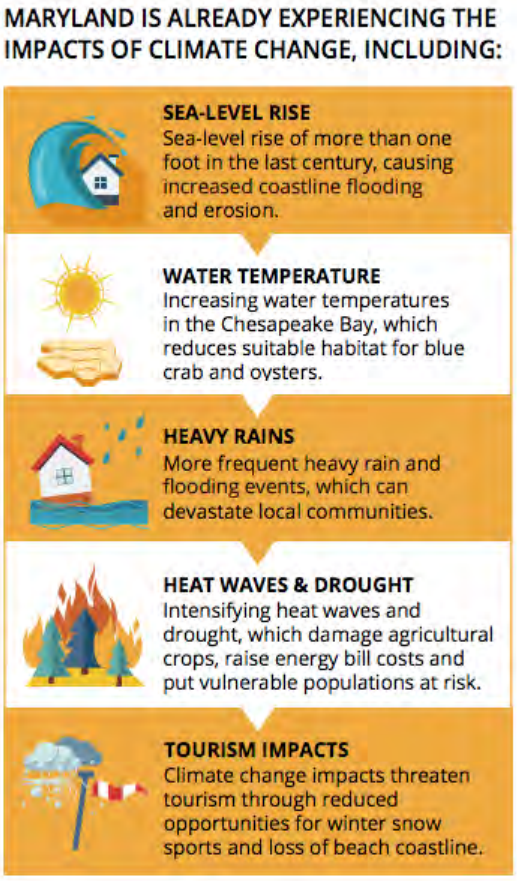
Probability and Future Risk Methodology

- **Highly Likely**—*Near 100% chance of occurrence next year or happens every year.*
- **Likely**—*10-100% chance of occurrence in next year or has a recurrence interval of 10 years or less.*
- **Occasional**—*1-10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.*
- **Unlikely**—*Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years. The probability, or chance of occurrence, was calculated where possible based on existing data.*

Future Probability was determined by dividing the number of events observed by the number of years and multiplying by 100. This gives the percent chance of the event happening in any given year. An example would be three droughts occurring over a 30-year period, which suggests a 10% chance of a drought occurring in any given year. Results are shown in the far-right column in the table above.

Climate Impacts

Figure 3-1



Source: Maryland Commission on Climate Change Fact Sheet 1 https://climatechange.maryland.gov/

While the *2020 Worcester County Hazard Mitigation & Resilience Plan* primarily addresses the current impacts of hazards as projected over the next 5 years (2020-2025), the current and anticipated role of climate change has been assessed for identified hazards including: flooding, wildfire, windstorms, tornadoes, hail, lightning, coastal erosion, winter storms, drought, and extreme heat.

This section provides information on hazards and their climate correlated occurrence throughout the planning area. For example:

- ***Sea-Level Rise*** is projected likely in Maryland between 2.2 and 4.1 feet with unrestrained growth in global emissions, and between 1.4 and 2.8 feet even when emissions were reduced to achieve the 2015 2°C IPCC mitigation scenario. This puts the people and infrastructure of Maryland's extensive coastline at increased risk of damage from hazards such as flooding, salt-water intrusion, storm surge, and erosion, according to the *2016 Maryland Commission on Climate Change (MCCC) Annual Report.*
- ***Extreme Heat*** in Maryland and the rest of the Northeastern U.S. is currently trending warmer and wetter, a trajectory which is expected to continue. According to the *2018 Maryland Commission on Climate Change*, heat waves are likely to increase in frequency, intensity and duration corresponding directly to increases in emissions; and Maryland is expected to have a notable increase in days with extreme heat (over 90 degrees Fahrenheit) by 2050, as compared to the late 1900's.
- ***Flooding*** in Annapolis, Maryland has experienced a devasting increase in nuisance flooding during the last 50 years. Flooding events have increased 925% - from an average of 3.8 days per year (1957-1963), to 39.3 days per year (2007-2013). It is number one in the U.S. Department of Commerce National Oceanic and Atmospheric Administration's top ten U.S. areas with an increase in nuisance flooding. As a result of increased rainfall and nuisance flooding, Maryland will now require each jurisdiction, including Worcester County, to submit a Nuisance Flooding Plan by October 2020.

- ***Extreme Cold*** can have severe or fatal impacts, and wind chill factors can increase the risk of frostbite or hypothermia.

- ***Winter Storms*** continue to be a hazard with high probability and low mitigation potential that affect the entire state including transportation systems, electrical distribution systems, infrastructure, public health and vulnerable communities. High energy use, reduced reliability of services, outages, and potential rise in household energy costs are major climate change risks to public health that are expected from extreme winter weather.

Chapter 9: Mitigation Strategies includes six adaptation recommendations for the Worcester County, along with related strategies formulated to support the implementation of these recommendations:

- Build greater resilience to extreme precipitation;
- Identify opportunities to strengthen the climate resilience and health of vulnerable populations;
- Increase focus on preserving natural and restored terrestrial and aquatic ecosystems and habitat to increase resilience of wildlife and native plants;
- Strengthen agricultural water management efforts to increase resilience to climate change impacts;
- Increase focus on managing climate impacts in towns and other population centers; and
- Strengthen our climate information infrastructure to support climate adaptation practices.

CHAPTER 4: FLOODING RELATED HAZARDS

Introduction

Chapter 4: Flooding Related Hazards include Tropical Storms and Hurricanes, Nor-Easters, Sea Level Rise and Shoreline Erosion, and other significant storm events. These hazards result in both coastal flooding-storm surge and riverine flooding.

FEMA has conducted several flood insurance studies for Worcester County over the years with the most recent and effective Flood Insurance Study (FIS) dated July 16, 2015. The FIS covers the geographic area of Worcester County, Maryland, including the City of Pocomoke City, and the Towns of Berlin, Ocean City, and Snow Hill. Flooding caused by the overflow of portions of Bottle Branch, Kitts Branch, Pocomoke River, and Whaleyville Branch, was studied by **riverine** methods. Also, all coastal islands, bays, and tidal inlets were studied by **coastal** methods.

Flooding in Worcester County is aggravated by wide, flat, floodplains, predominantly low ground elevations and tidal influences on the coastal inlets and lower reaches of major drainageways. Tidal effects in the Pocomoke River can extend to several miles above Snow Hill. The upper reaches of drainageways are characterized by relatively flat, longitudinal and transverse slopes. Freshwater swamps and their natural vegetation retard the flow of floodwaters and increase flood stages somewhat in surrounding areas upstream. However, these swamps are effective temporary storage basins for floodwaters that, if unimpeded, would threaten more-developed areas downstream. The bays, inlets, and designated portions of streams are recognized as essential drainageways and receiving basins. In the county's land use plan, these areas are identified as conservation areas and must be maintained free from obstructions. These designated areas are generally wet, ill-suited for development, and will not support septic systems. Flooding problems in Worcester County includes the effects of wave action for the following flooding sources: Chincoteague Bay, Newport Bay, Sinepuxent Bay, Isle of Wight Bay, Assawoman Bay, and the Atlantic Ocean.

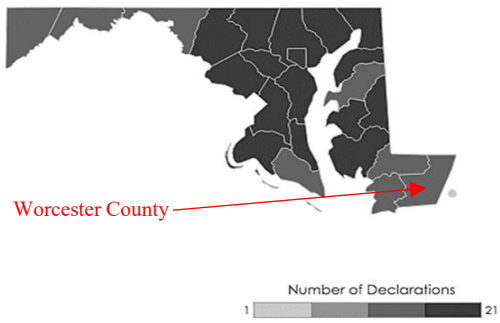
This chapter includes information on **hazard profiles, historical occurrences, and vulnerability**. Vulnerability has been assessed based on both coastal and riverine flooding flood inundation areas.

Coastal Flooding- Storm Surge	Riverine Flooding
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 **flood** waters penetrate which is controlled by the topography of the **coastal** land exposed to **flooding**. A **coastal flood**, as the name suggests, occurs in areas that lie on the coast of a sea, ocean, or other large body of open water. It is typically the result of extreme tidal conditions caused by severe weather. **Storm surge** is the rise in seawater level caused solely by a **storm,** over and above the normal astronomical tide. **Storm Surge** is produced when high winds from hurricanes and other storms push water onshore — is the leading cause of coastal flooding and often the greatest threat associated with a tropical storm-hurricane event.	**Riverine flooding** occurs when excessive rainfall over an extended period of time causes a river to exceed its capacity. It can also be caused by heavy snow melt and ice jams. The damage from a river flood can be widespread as the overflow affects smaller rivers downstream, often causing dams and dikes to break and swamp nearby areas. **There are two main types of riverine flooding:** 1. **Overbank flooding** occurs when water rises and overflows over the edges of a river or stream. This is the most common and can occur in any size channel — from small streams to huge rivers. 2. **Flash flooding** is characterized by an intense, high velocity torrent of water that occurs in an existing river channel with little to no notice. Flash floods are very dangerous and destructive not only because of the force of the water, but also the hurtling debris that is often swept up in the flow.

Storm related historical occurrence data primarily was obtained from the *2016 State of Maryland Hazard Mitigation Plan* and the National Centers for Environmental Information (NCEI) storm data, which is published by the National Oceanic and Atmospheric Administration (NOAA). The *2016 State of Maryland Hazard Mitigation Plan* provides information on population vulnerability and geographic extent and the storm event database contains information on storms and weather-related phenomena that have caused loss of life, injuries, significant property damage and crop damage.

Another important source for identifying hazards that affect Worcester County is the record of Federal Disaster Declarations. Thirty-four disaster declarations have occurred in Maryland since 1953. The flood hazard accounts for more declarations in Maryland than any other hazard. As shown on Figure 4-1, Worcester has been included in eleven of Maryland's Disaster Declarations. They include the following: (6) six Hurricane, (4) four snow, and (1) one **flood**.

Figure 4-1: Disaster Declarations for Maryland Jurisdictions



Source: https://www.fema.gov/data-visualization-disaster-declarations-states-and-counties

On July 25, 2019 during the Hazard Mitigation Planning Committee (HMPC) group discussion portion of the meeting, committee members were divided into groups. Participants were provided with hazard descriptions and blank hazard impact worksheets. Each group was provided time in which to discuss and record hazard impacts from their community perspective. Each group was then assigned a group representative to review results with the HMPC at-large. The following table provided community perspective impacts from coastal hazard events to Worcester County.

Table 4-1: Flood Related Hazard Impacts	
Health & Safety of the Public	Vulnerable and medically fragile populations, electricity dependent durable medical equipment and oxygen dialysis. Adequate evacuation notice routes to identified location shelters. Consider adding emergency routes and outreach initiatives. County issues advanced warnings to identify impact zones. Advise community to leave flooded areas and open shelters if necessary.
Health & Safety of the First Responders	First responders plan, train, practice and prepare. Staging prior to events and do not respond until it is safe. Replace personal protective equipment (PPE) and monitor fatigue of responders. First responders who reside in hazard risk area may not be available to respond to a coastal storm event. First responders take necessary precautions in regard to safety. Plans and adequate equipment needed. Flood waters are dangerous to those in affected areas, people may be swept off feet and /or vehicles may become buoyant.
Continuity of Operations (including Delivery of Services)	Interoperability of communications. Essential services and facilities must remain available. Immediate recovery and quick return to "normalcy". The County needs access to enough delivery vehicles, trained drivers and delivery staff. Each County department have Continuity of Operation Plans (COOP). (May need updates)
Property, Facilities, & Infrastructure	Restoration of essential facilities and schools are up and running. Document level of damage and elevation lines of sea level rise. Area to the east side of US Route 113 is vulnerable to coastal flooding/storm surge. In the early 1990's, several bridges/roads were destroyed. In 2017, Big Mill Dam was destroyed by debris from floating marsh.
Environment	Require environmental health inspections after return to "normalcy" within County. Possible contamination from fuel storage and disconnections. Well contamination from flood waters. Potential for mold growth and other contaminants. Along Pocomoke River, Snow Hill gas stations are located in flood prone areas. There are four others in close proximity to the river. Fuel contaminations from business and residential properties may become an issue.
Economic Conditions	Food and medical insecurity. Damage to business and loss of revenue from downtime. The larger the business is out-of-service, the less likely it will re-open. In Snow Hill, the approach to the bridge is flooded and traffic is detoured to Route 50-Route 113. Business closure is likely during flood event.
Public Confidence in Government	Moderate

Source: Hazard Mitigation Planning Committee, 2019

Tropical Storms and Hurricanes

Hazard Profile

Hurricane, tropical storm, and tropical depression are all examples of a tropical cyclone. The 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 39 mph.

A hurricane is a type of tropical cyclone, which is a very low-pressure, gyrating weather system that forms over tropical waters. Tropical cyclones that occur in the Atlantic Ocean are known as hurricanes. When such systems begin, they are called tropical depressions. Once winds reach a sustained force of 39 miles per hour, a tropical depression becomes a tropical storm. If the winds reach a sustained force of 74 miles per hour, the tropical storm becomes a hurricane. Their further classification depends on the speed of the winds and storm surge. Damage is not, however, a direct function of windspeed. Usually a combination of hazards within a storm causes the most extensive damage. Hurricane Katrina demonstrated this as it was only a category 3 hurricane, but the storm surge, the extensive rainfall, and the failed levees together resulted in unprecedented damage.

Table 4-2: Saffir-Simpson Hurricane Wind Scale

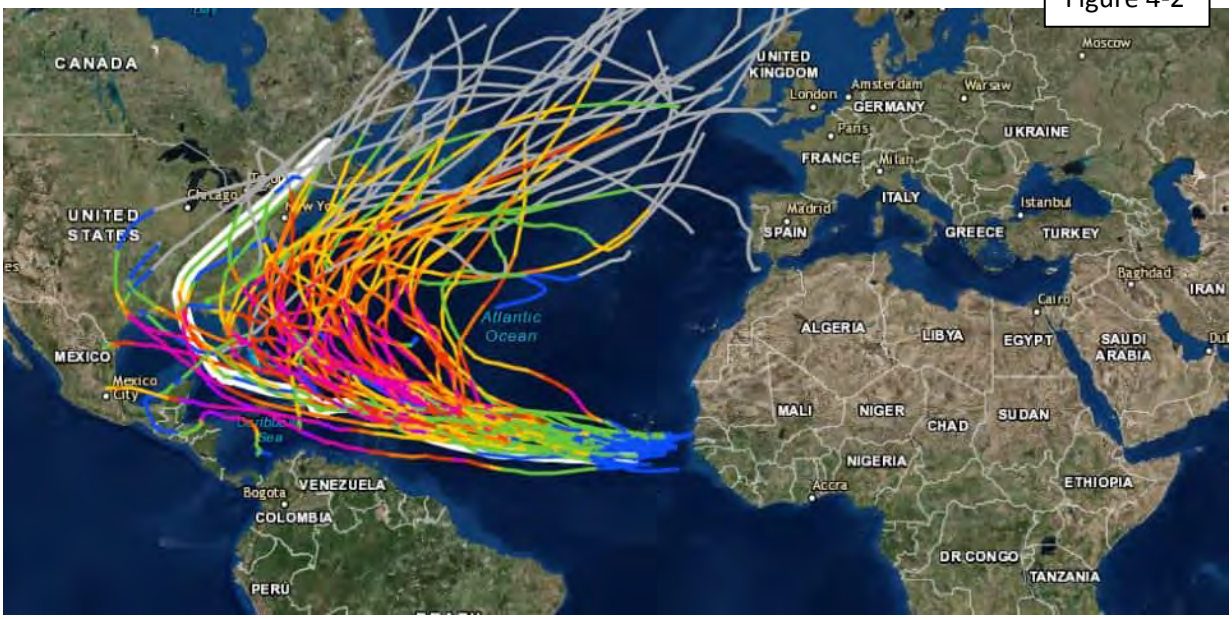
Category Wind Speed Storm Surge	Effects
Category 1-Weak 74-95 mph	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, and vinyl siding and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
Category 2-Moderate 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.
Category 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.
Category 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 possible months. Most of the area will be uninhabitable for weeks or months.
Category 5-Major >157 mph	**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: National Hurricane Center, 2012

Hurricanes are classified by the Saffir-Simpson scale which distinguishes hurricanes based on their intensity and damage level; Table 4-2. The categories from 1 to 5 indicate increasing intensity based on the degree of sustained winds, atmospheric pressure, storm surge and anticipated extent of damage.

A hurricane may include one or more of the following effects: storm surge, high winds and heavy rain. The cumulative impact of these can be life threatening and cause catastrophic damage. Several hurricanes or tropical storms travel up the Atlantic Coast each season threatening large areas of the eastern United States and millions of people. Shown in Figure 4.2 are Category 4 and 5 hurricane tracks from 1851-2016 in the East Atlantic Ocean basin.

Figure 4-2

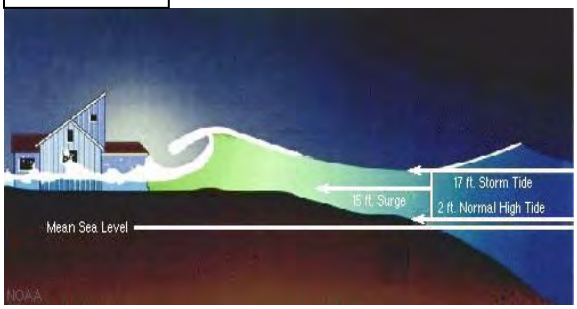


Source: NOAA Historical Hurricane Tracks: https://oceanservice.noaa.gov/news/historical-hurricanes/

The most destructive of the hurricane's effects is storm surge, an abnormal local rise in sea level. When a hurricane forms and as it moves landward, low barometric pressure and high, gyrating winds create a dome of ocean water that moves under the hurricane's eye. When over open ocean, the volume of this dome of water is absorbed by the great volume of water characteristic of substantial bottom depths.

Storm surge occurs when the hurricane approaches the coast and the depth decreases, the resulting dome of water floods ashore. Storm surge causes nine out of ten hurricane deaths. Storm surge results in a temporary sea level increase. Any wave action is in addition to the storm surge. Related flooding will be discussed in the next section, "Nor'easters and Flooding."

Figure 4-3



The stronger the hurricane and the closer it is perpendicular to its track, in relation to the coastline, the higher the storm surge and resulting destruction will be. The depth of the water along the coastline and the slope of the bottom are other determining factors of storm surge height. "…When surging waters come into contact with the gradually sloping shallow bottom, the speed of the surge decreases, and wave heights increase because of the kinetic energy that is forced upward by the bottom."

Because the local continental shelf slopes gradually, storm surge heights will generally be greater than in areas where the slope is more abrupt. Figure 4-3 shows storm surge inundation areas.

The heavy rain that accompanies hurricanes can also be destructive and has a greater area of impact than storm surge. Hurricanes can bring ten to fifteen inches or more of rainfall. This causes flooding and has many secondary impacts. Heavy rain can severely impede the flow of traffic and thus impair evacuation and emergency services. Rainfall, as a symptom of a hurricane can affect inland areas far from the coast.

High winds can also cause a great deal of damage and injuries. The high winds of hurricanes are a threat to the stability of structures including tall buildings, towers, and mobile homes. The destructive wind forces of hurricanes can be divided into several categories:

- Direct pressure and uplift;
- Internal pressurization; and
- Wind-borne debris.

Direct pressure and uplift result from sustained winds against a structure. The speed of the wind has a direct and exponential relationship with the amount of pressure exerted; Table 4-3.

Table 4-3: Velocity Pressure as a Function of Wind Speed

Wind Speed (mph)	75	95	110	130	155	180	200
Velocity Pressure (psf)	19	30.6	41	57.2	81.3	109.7	135

Source: ASCE, 1990

The level of structural damage is a function of its shape and construction. The most common form of damage to structures from wind is uplift that damages or completely separates the roof from the structure. This type of damage is much more likely with gable style roofs.

Internal pressurization or depressurization results from the entry of wind forces into the structure through openings. If the opening is on the leeward side of the structure, suction is created resulting in depressurization which can cause the roof or its structural components to cave inward. When the opening is on the windward side, the result is an internal pressurization of the structure that can blow windows, doors and walls outward.

Hurricane winds fling debris at high speeds. Debris can consist of roofing materials, glass from windows, doors, tree branches, lawn furniture, fencing materials, accessory structures, etc. This debris damages anything in its path and, when it hits a structure hard enough, can result in an opening that can cause internal pressurization or depressurization.

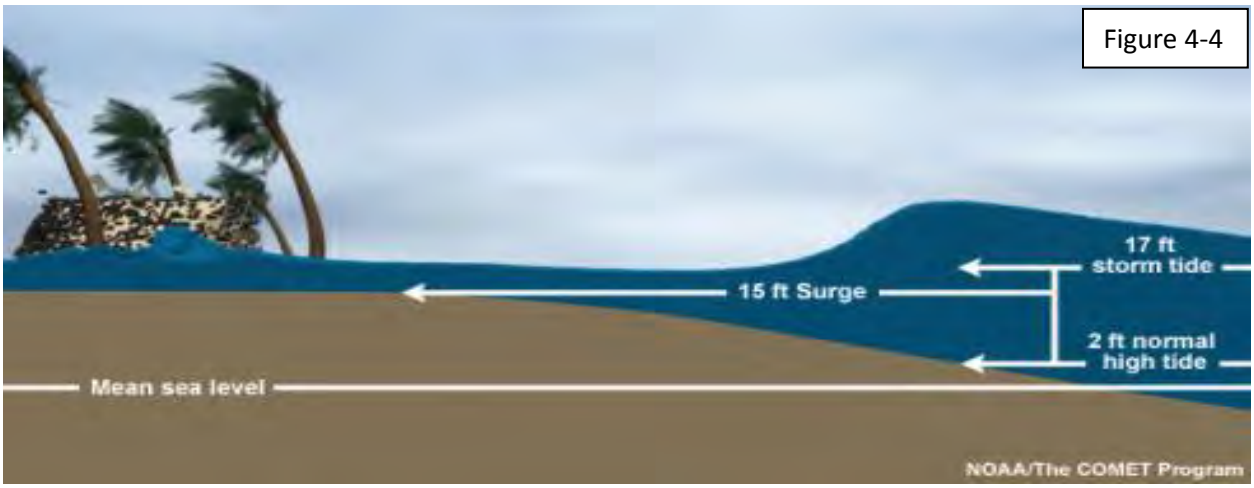
Typically wind speeds are thought to be slowed by land. However, wind speed is not a function of distance inland, rather it is a function of time spent over land. A building that is 5 miles inland is therefore not exempt from a wind hazard. A weaker storm that is moving 25 mph could wreak as much wind damage inland as a stronger storm that is moving slowly.

Storm Surge

Storm Surge is an abnormal rise of water generated by a storm, over and above the astronomical tide.

Storm Tide is the water level rise during a storm due to the combination of storm surge and the astronomical tide.

Figure 4-4

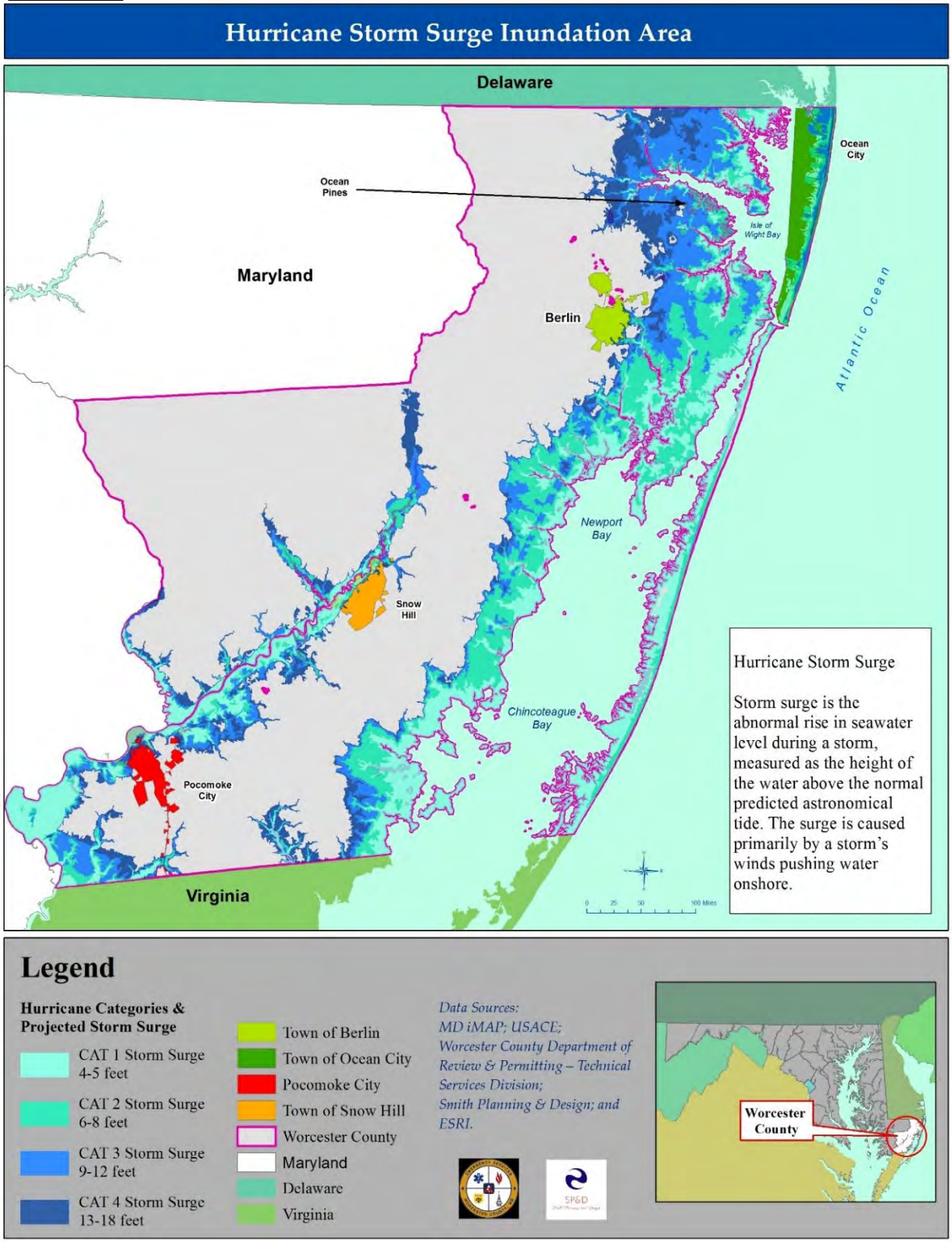


Source: nhc.noaa.gov/surge/surge_into.pdf

Storm Surge Zones (Inundation Areas)

The higher the Saffir-Simpson rating for the hurricane, the farther inland the storm surge zones. The storm surge zones data was generated using the **Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model.** SLOSH is a computerized model run by the National Weather Service to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes. The model creates its storm surge zones by analyzing the pressure, size, forward speed, track, and wind data from a hurricane. The method used for this data was a "worst case scenario" for the entire Slosh basin. Based on the SLOSH Model, the elevation of inundation ("worst case scenario") for Category One, Two, Three, and Four hurricanes were calculated for Worcester County.

Map 4-1


Hurricane Storm Surge Inundation Area
Delaware
Ocean City
Ocean Pines
Isle of Wight Bay
Maryland
Berlin
Atlantic Ocean
Newport Bay
Snow Hill
Chincoteague Bay
Pocomoke City
Virginia
Hurricane Storm Surge
Storm surge is the abnormal rise in seawater level during a storm, measured as the height of the water above the normal predicted astronomical tide. The surge is caused primarily by a storm's winds pushing water onshore.
0 25 50 100 Miles
Legend
Hurricane Categories & Projected Storm Surge
CAT 1 Storm Surge 4-5 feet
CAT 2 Storm Surge 6-8 feet
CAT 3 Storm Surge 9-12 feet
CAT 4 Storm Surge 13-18 feet
Town of Berlin
Town of Ocean City
Pocomoke City
Town of Snow Hill
Worcester County
Maryland
Delaware
Virginia
Data Sources:
MD iMAP; USACE;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and ESRI.
SP&D
Worcester County

Tropical Storm & Hurricane Historical Occurrences

Information obtained for Worcester County using both the *2016 State of Maryland Hazard Mitigation Plan* and the National Centers for Environmental Information (NCEI) – Storm Events Database between January 1950 and July 31, 2019 for Coastal Hazards include: Hurricane, Tropical Storm, and Coastal Storm. Data from NCEI has been included on the data table below.

Table 4-4: Hurricane, Tropical Storm & Coastal Storm Risk Assessment Data Table

Population Vulnerability	*Injuries & Deaths*		*Property & Crop Damage*		*Geographic Extent*	*Events 1996-2019*
0.86	0	0	10.733M	1.020M	% County in risk area= 54%	Total 13
						Annualized 0.54

Source: National Centers for Environmental Information, as of July 2019 & 2016 State of Maryland Hazard Mitigation Plan

Note: Hazards included within this table from NCEI Data: Hurricane, Tropical Storm & Coastal Storm

Federally declared hurricanes impacting Worcester County include Hurricane Sandy in 2012, Hurricane Irene in 2011 and Hurricane Isabel in 2003. In 1972, Tropical Storm Agnes impacted Worcester County and was federally declared.

According to the National Center for Environmental Information (NCEI), Hurricane Irene tracked northward over the outer banks of North Carolina and just off the Virginia and Maryland coasts. Heavy rains caused widespread flooding across most of the lower Maryland Eastern Shore starting Saturday, August 22nd through Sunday August 24th of 2004. Impacts to Worcester County from 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 5-10 inches. Snow Hill reported 8.10 inches of rain, while Bishopville reported 7.71 inches of rain.

Additionally, the passage of Hurricane Sandy in 2012 was relatively insubstantial for Worcester County despite the worst-case storm predictions, a storm dub "Frankenstorm" by meteorologist. Ocean City sustained damage due to flooding in low-lying downtown areas of the island. Impacts to Worcester County as a result of the storm included downed trees and debris, power outages and some flooding mainly attributed to high tide prior to the arrival of the rain event. In addition, flash flood, heavy rain and thunderstorm events cause flood conditions that impact the County as well.

The most recent storm related event occurred are as follows:

- October 2, 2015 – **Hurricane Joaquin** - heavy rain and wind pounded Ocean City and covered low-lying areas with as much as 5 feet of floodwater at high tide.
- September 3, 2016, **Tropical Storm Hermine** moved northeast along the Southeast Coast then continuing off the Mid-Atlantic Coast. This storm produced a few tropical storm force

wind gusts, minor coastal flooding, and locally heavy rainfall across portions of the Lower Maryland Eastern Shore. Rain bands associated with Tropical Storm Hermine produced generally 0.5 inch to 2.5 inches of rainfall across the Worcester County. Areas included: Public Landing (6 SE) reported 2.56 inches of rain; Ocean Pines (0.9 SSW) reported 2.31 inches of rain; Berlin (5.9 NNE) reported 1.92 inches of rain; Snow Hill (0.4 S) reported 1.89 inches of rain; Bishopville (3.1 E) reported 1.83 inches of rain; and Ocean Pines (1.2 SSW) reported 1.68 inches of rain.

- October 11, 2016 - **Hurricane Matthew** – steady rain exacerbated the condition of already waterlogged areas throughout Worcester County.
- September 11, 2018 – **Hurricane Florence** - Worcester County Emergency Services urged those residing in mobile homes and low-lying, flood-prone areas in Zone A to make preparations to evacuate ahead of Hurricane Florence. Though no mandatory evacuation order had been issued at the time, residents in low-lying areas and mobile homes are extremely vulnerable to anticipated hurricane conditions.

Flooding on Purnell Crossing Rd outside Berlin.
Source: The Dispatch

Hurricane & Tropical Storm Vulnerability Assessment

Building data provided by the Department of Development Review & Permitting – Technical Services Division was utilized to analyze the storm surge vulnerability. Residential, commercial and other structures, such as government, religion and industrial, were extrapolated from the building database. The following table provides the number of structures at-risk to hurricane storm surge.

Table 4-5: Hurricane Storm Surge At-Risk Structures per Community

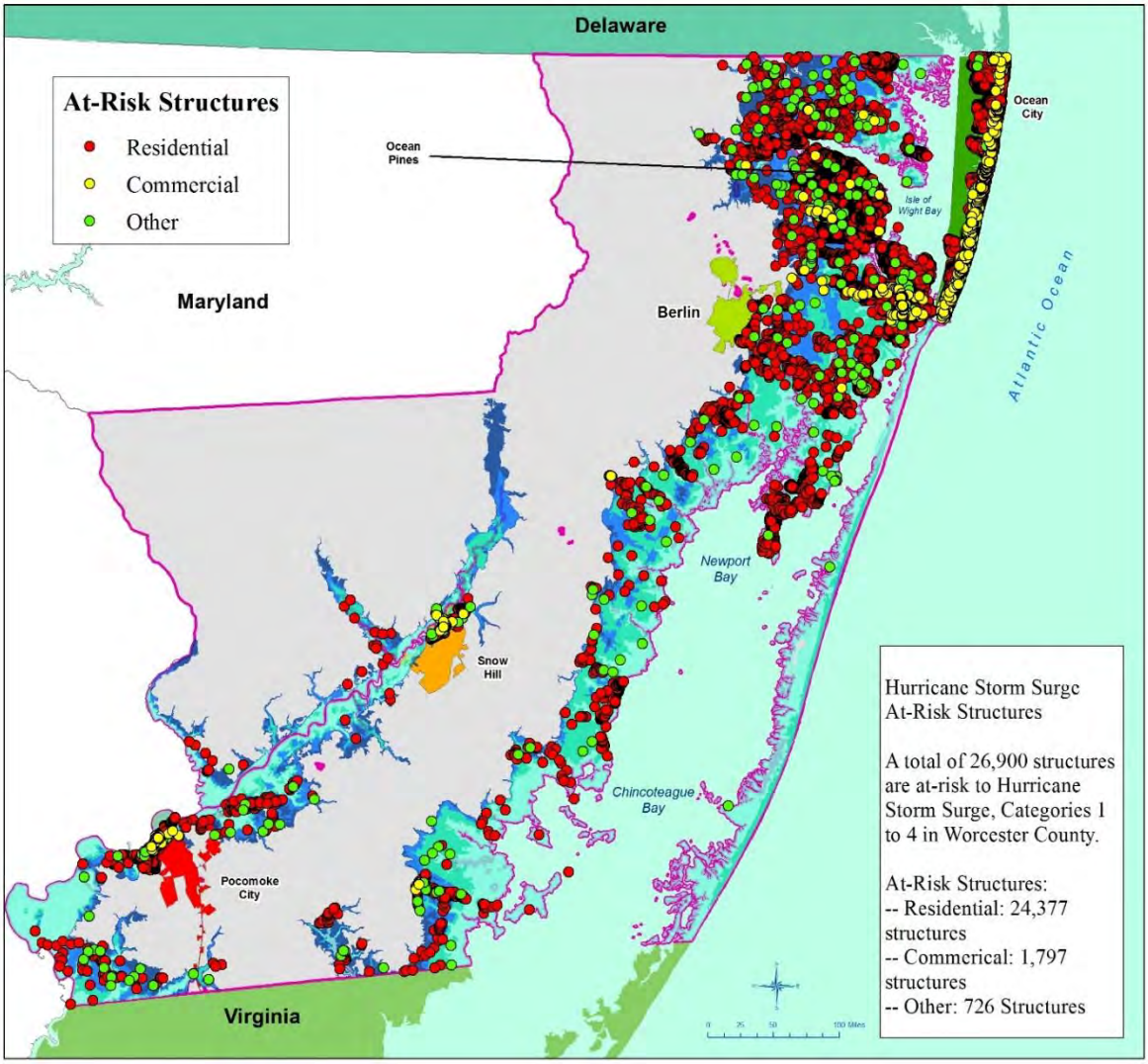
Storm Surge Categories	Category 1			Category 2			Category 3			Category 4		
	Residential	Commercial	Other	Residential	Commercial	Other	Residential	Commercial	Other	Residential	Commercial	Other
Berlin	0	0	0	0	0	1	25	0	9	119	0	14
Ocean City	1320	213	19	4164	512	47	6865	802	85	6983	806	85
Pocomoke City	4	4	0	46	10	6	190	31	17	318	59	26
Snow Hill	0	3	1	10	9	8	58	20	14	126	51	27
County - Unincorporated	3529	193	57	9010	508	263	15244	816	444	16831	881	574
TOTAL	4853	413	77	13230	1039	325	22382	1669	569	24377	1797	726

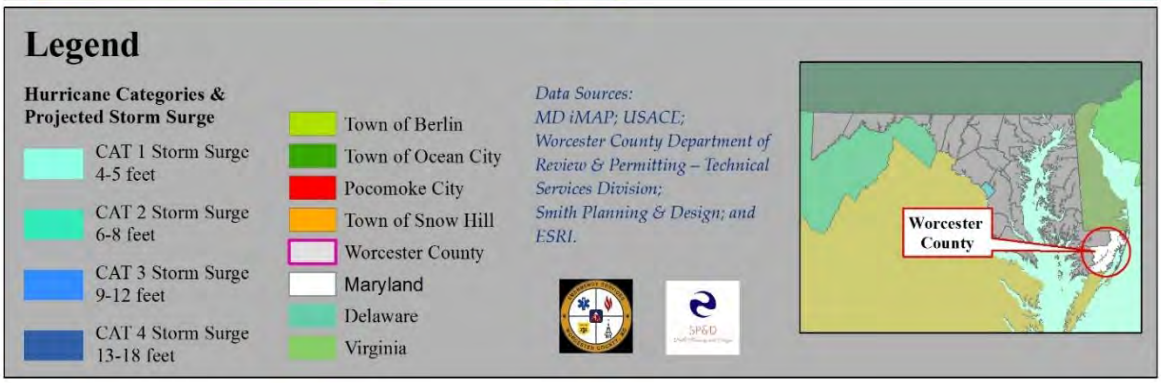
Source: Smith Planning & Design

Results from the analysis indicate most structures at-risk are within the Town of Ocean City and the unincorporated northeastern portions of the county, including Ocean Pines and Snug Harbor.

Map 4-2

Hurricane Storm Surge At-Risk Structures





Riverine & Coastal Flood

Hazard Profile

The word "rainstorm" implies a weather system marked by copious rainfall and often accompanied by strong winds, lightning and thunder. If rainfall continues long enough, streams and rivers will rise, overflow banks and spread across the floodplain. If intensive rainfall occurs within a short period, streams and rivers can rise rapidly and flash flooding develops.

Worcester County is susceptible to rainstorms in all seasons of the year, with the greatest incidence in spring and summer. Severe rainstorms and floods disrupt electrical service, block roads and streets with debris and wash out bridges. Some areas of the county have experienced repetitive losses due to flooding. Flood damage to businesses can result in loss of income, wages and tax revenues. Residential property damage impairs citizens' safe housing and can severely affect individual financial security. Other effects can be sewer and chemical spills, outbreaks of disease, widespread animal illness, broken gas and sewer lines, water supply pollution and fires. Agricultural lands are frequently affected, and crops destroyed.

The extent of flood/flash flood damage in Worcester County has been less severe than in other jurisdictions. This is due in large part to flat topography an ongoing mitigation program which discourages development in the flood plain through zoning and subdivision requirements.

Applicants for proposed construction activities within the ***Special Flood Hazard Area*** defined as an area identified by the United States Federal Emergency Management Agency as an area with a special flood or mudflow, and/or flood related erosion hazard, as shown on a flood hazard boundary map or flood insurance rate map must officially acknowledge the heightened risk of living in this hazard area. The County enforces flood plain management regulations which meet or exceed the requirements of federal and state regulations. The Comprehensive Plan redirects growth away from flood prone areas.

According to FEMA, a flood is considered: “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 unusual and rapid accumulation of runoff of surface waters from any sources.” In Maryland, flooding conditions can be caused or accelerated by:

- Thunderstorms;
- Hurricanes and tropical storms with heavy rain and damaging winds;
- Rainstorms/ frontal systems (Nor’easters);
- Snowpack melt; and
- Destruction of wetlands.

Flood Historical Occurrence

Information obtained for Worcester County using both the *2016 State of Maryland Hazard Mitigation Plan* and the National Centers for Environmental Information (NCEI) – Storm Events Database between January 1950 and July 31, 2019 for Flood Hazards include: Flood, Flash Flood, and Heavy Rain. Data from NCEI has been included on the data table below.

Table 4-6: Flood Hazard Risk Assessment Data Table

Population Vulnerability	*Injuries & Deaths*		*Property & Crop Damage*		*Geographic Extent*	*Events 1996-2019*
0.86	0	0	505K	0	% in 100-yr Flood Zone (A, AE, AO & VE) = 26.69%	Total 51
						Annualized 2.13

Source: National Centers for Environmental Information, as of July 2019 & 2016 State of Maryland Hazard Mitigation Plan

Note: Hazards included within this table from NCEI Data: Flood, Flash Flood, & Heavy Rain

The National Oceanic and Atmospheric Administration (NOAA) defines flood, flash flood, and heavy rain as follows:

- Flood - 'A large abundance of water formed onto normally dry land caused by an overflow of a river, stream, or drainage. Floods differ from flash floods because they are longer, usually lasting from one day to a week.'
- Flash Flood - 'A flood resulting from heavy rainfall in less than 6 hours.'
- Heavy Rain - 'Rainfall greater than or equal to 50 mm in a 24-hour period.'

The County often experiences events which keep water above flood stage for several days. Nor'easters, tropical storms and hurricane winds can force water into the Coastal Bays and hold it there causing flooding and damage to homes, businesses, and property. Flooding is not isolated to the County's coastal areas; the Pocomoke River overflows its banks after heavy rains.

According to the National Centers for Environmental Information (NCEI), on October 9, 2016, the most significant heavy rain event caused an extended period of significant flooding across portions of the county. Several roads were impassable or closed for a couple of days, and some homes and businesses were impacted due to post Tropical Cyclone Matthew. There was $500,000 reported in property damage.

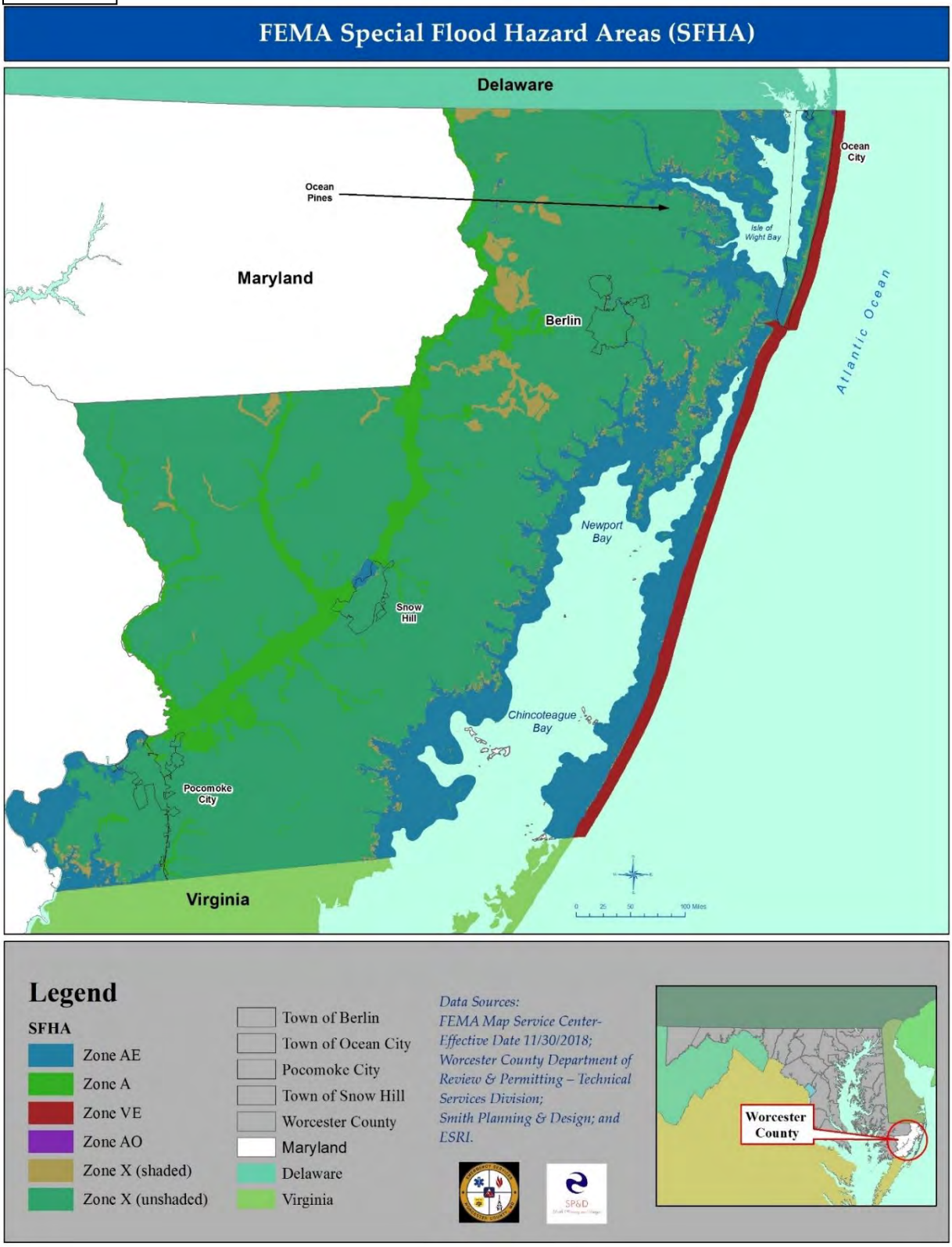
Flood Zones

Table 4-7 shows the floodplain designations within the County. Floodplain designations are an indicator of the flooding frequency within a given area.

Table 4-7: FEMA Flood Zones	
Flood Zone	**Description**
High Risk Areas	
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. This is also referred to as the 100-year floodplain.
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.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
High Risk – Coastal Areas	
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 to Low Risk Areas	
X (unshaded)	Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.
X500 (shaded)	Areas of 0.2-percent-annual-chance floodplain or the 500-year flood.

Source: FEMA

Map 4-3

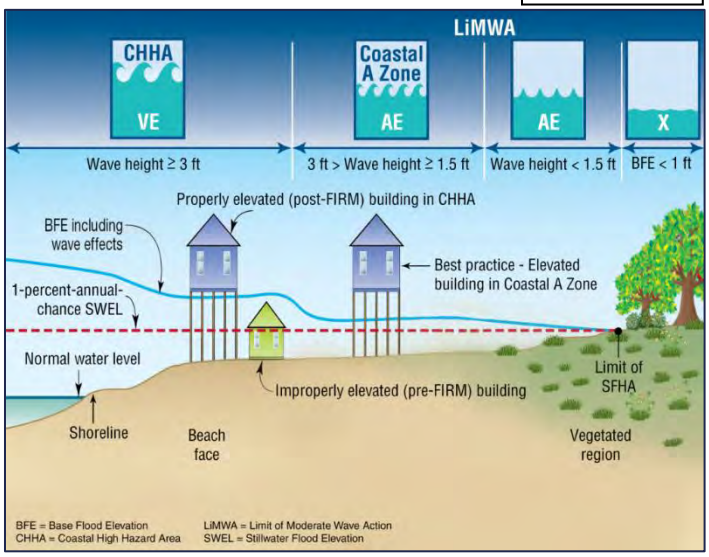

FEMA Special Flood Hazard Areas (SFHA)
Delaware
Ocean City
Ocean Pines
Isle of Wight Bay
Maryland
Berlin
Atlantic Ocean
Newport Bay
Snow Hill
Chincoteague Bay
Pocomoke City
Virginia
0 25 50 100 Miles
Legend
SFHA
Zone AE
Zone A
Zone VE
Zone AO
Zone X (shaded)
Zone X (unshaded)
Town of Berlin
Town of Ocean City
Pocomoke City
Town of Snow Hill
Worcester County
Maryland
Delaware
Virginia
Data Sources:
FEMA Map Service Center- Effective Date 11/30/2018;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and ESRI.
Worcester County

The Worcester County Floodplain Management Law requires structures in the V Zone to be built with the lowest structural floor element 2 feet above Base Flood Elevation (BFE); structures built in the A Zone must be at or above BFE. The BFE is the distance above "0" elevation 1929 NGVD. Accessory structures are prohibited in the V Zone. Any construction must also adhere to flood resistant building requirements including elevating building mechanical and electrical systems above BFE. The base flood is a flood that has a 1 percent probability of being equaled or exceeded in any given year (100-year flood).

Flood Hazard Zones Requirements

The following flood-resistant construction practices are strictly enforced by the Department of Development Review and Permitting in "A" flood hazard zones, regardless of the building's site elevation. For enclosures below the Base Flood Elevation, including all masonry foundations, the following minimum criterion must be met.

Figure 4-5



The graphic shows FEMA's identification of coastal flood hazard zones and how Base Flood Elevations (BFEs) are affected by wave heights. Areas in Zone VE (also known as the Coastal High Hazard Area) are likely to have flooding with waves that are three feet or greater. Areas in Zone AE will have waves less than three feet in height. Within Zone AE, the Limit of Moderate Wave Action (LiMWA) identifies an area where higher building standards are encouraged to promote safe development. Communities that adopt the LiMWA as a higher standard may earn flood insurance rate discounts.

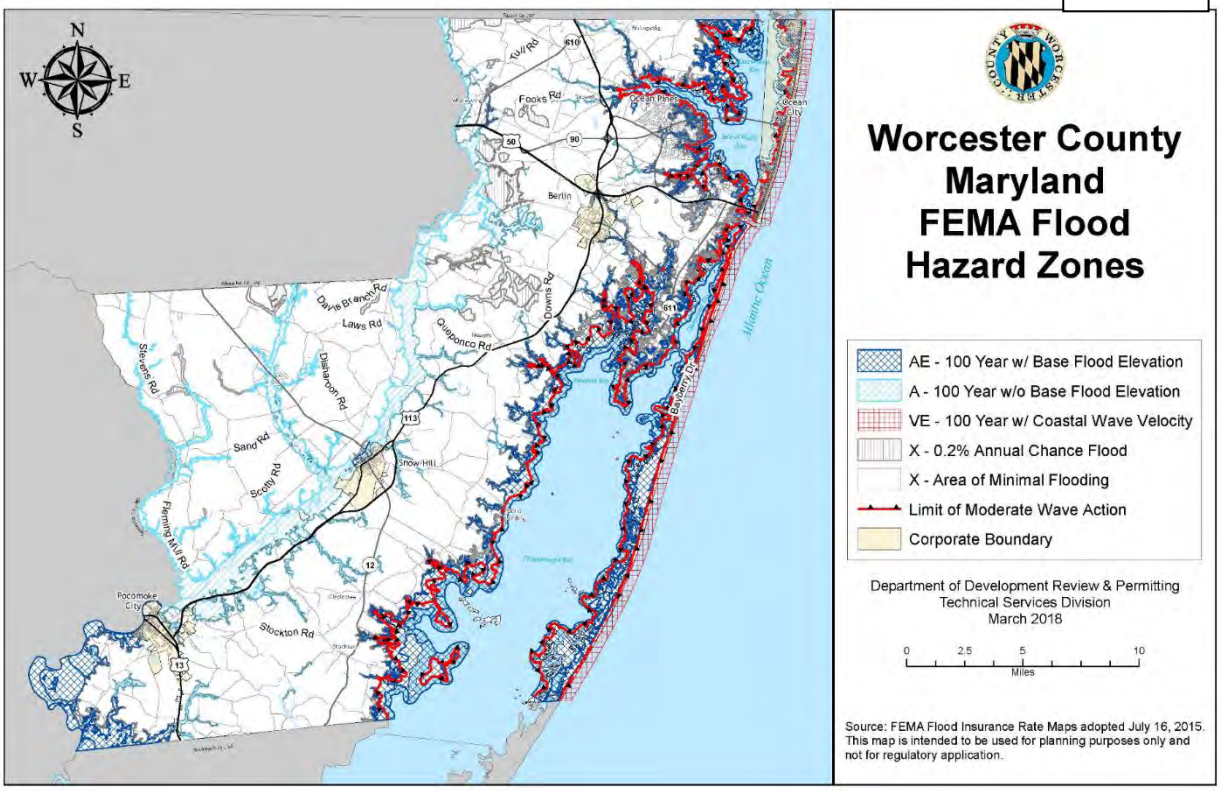
Source: FEMA Coastal Flood Hazard Mapping Studies, 2013

- A minimum of two (2) openings having a total net area of not less than one (1) square inch for every one (1) square foot of enclosed area, including attached garages, shall be provided.
- The bottom of all such openings shall not be higher than 12 inches above inside or outside grade. Openings shall permit automatic entry and discharge of flood waters.
- The grade in the under-floor space shall be at or above the outside finished grade.
- Liquid propane and other fuel tanks must be secured and adequately anchored to resist buoyancy and movement.
- Manufactured homes set up in flood zones require all piers to be reinforced by rebar and grout.
- Any other designs, including those for structures located in V Zones, shall be certified by a registered design professional licensed in the State of Maryland.

- No habitable space is allowed below base flood. Only garages, storage and limited entries.
- Non-conversion and/or venting affidavits may be required.
- No finish and non-flood resistant materials are permitted below base flood (i.e.: drywall).

The FEMA flood zones included on Map 4-4 are:

Map 4-4



Riverine and Coastal Flood Vulnerability Assessment

The Federal Emergency Management Agency (FEMA) developed Coastal Flood Risk Reports for all coastal counties within Maryland. In addition, the Maryland Emergency Management Agency (MEMA) obtained funding through FEMA in order to produce a Riverine Flood Risk Report (FRR). Both reports provide refined loss data for user defined facilities (at-risk structures) and essential facilities vulnerable to the 1-percent-annual-chance flood event. Flood risk assessment results reported in the Flood Risk Reports (FRR)s were developed using a FEMA flood loss estimation tool, Hazus (www.fema.gov/hazus). Hazus is a nationally applicable and standardized risk assessment tool that estimates potential losses from earthquakes, floods, and hurricanes.

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 Worcester County. The damage for essential facilities is determined on a site-specific basis (i.e., the depth of flooding at the location of the facility). Potential flood losses for the 1-percent-annual-chance flood event were calculated using Hazus-MH, version 3.1.

According to the Riverine and Coastal Flood Risk Reports, scenario-based flood losses were calculated using Hazus Version 3.1 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. The user defined facilities refined loss data provided data results for the following facility types: Residential Building & Contents; Commercial Building & Contents; Other Building & Contents.

According to the Riverine FRR, a total of 211 residential, commercial and other (industrial, religion, etc.) structures are at-risk to the riverine 1-percent-annual-chance flood event. Results for both riverine at-risk structures and riverine loss estimations are provided in Tables 4-8 and 4-9.

Table 4-8: Riverine At-Risk Structures per Community

	Residential	Commercial	Other	TOTAL
Berlin	6	3	0	9
Ocean City	-	-	-	-
Pocomoke City	13	1	0	14
Snow Hill	55	15	6	76
County - Unincorporated	86	9	17	112
TOTAL	160	28	23	211

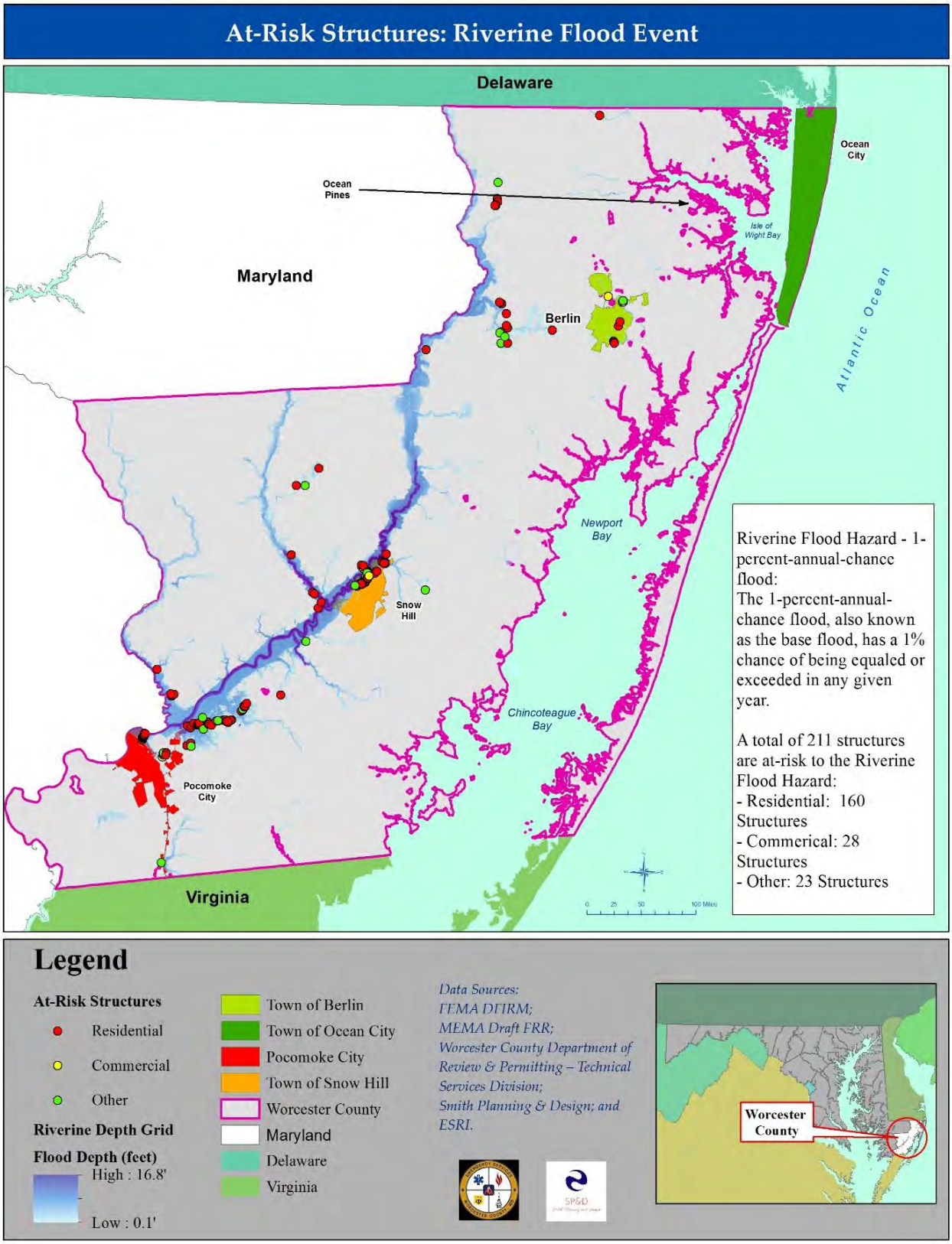
Source: State of Maryland Flood Risk Report – Worcester County, Maryland Draft 2019

Table 4-9: Riverine Loss Estimations per Community (Combined Building & Content Loss Estimations)

	Residential	Commercial	Other	TOTAL
Berlin	$4,066	$65,403	$0	$69,469
Ocean City	-	-	-	-
Pocomoke City	$241,104	$906,032	$0	$1,147,136
Snow Hill	$513,936	$1,784,182	$2,418,785	$4,716,903
County - Unincorporated	$1,014,273	$747,400	$560,456	$2,322,129
TOTAL	$1,773,379	$3,503,017	$2,979,241	$8,255,637

Source: State of Maryland Flood Risk Report – Worcester County, Maryland Draft 2019

Map 4-5


At-Risk Structures: Riverine Flood Event
Delaware
Ocean City
Ocean Pines
Isle of Wight Bay
Maryland
Berlin
Atlantic Ocean
Newport Bay
Snow Hill
Chincoteague Bay
Pocomoke City
Virginia
Riverine Flood Hazard - 1-percent-annual-chance flood:
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.
A total of 211 structures are at-risk to the Riverine Flood Hazard:
- Residential: 160 Structures
- Commerical: 28 Structures
- Other: 23 Structures
Legend
At-Risk Structures
Residential
Commercial
Other
Riverine Depth Grid
Flood Depth (feet)
High : 16.8'
Low : 0.1'
Town of Berlin
Town of Ocean City
Pocomoke City
Town of Snow Hill
Worcester County
Maryland
Delaware
Virginia
Data Sources:
FEMA DFIRM;
MEMA Draft FRR;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and ESRI.
Worcester County

According to the Coastal FRR, at total of 6,842 residential, commercial and other (industrial, religion, etc.) structures are at-risk to the coastal 1-percent-annual-chance flood event. Results for both coastal at-risk structures and coastal loss estimations are provided in Tables 4-10 and 4-11.

Table 4-10: Coastal At-Risk Structures per Community

	Residential	Commercial	Other	TOTAL
Berlin	-	-	-	-
Ocean City	3,130	138	30	3,298
Pocomoke City	36	6	6	48
Snow Hill	-	-	-	-
County - Unincorporated	3,444	41	11	3,496
TOTAL	6,610	185	47	6,842

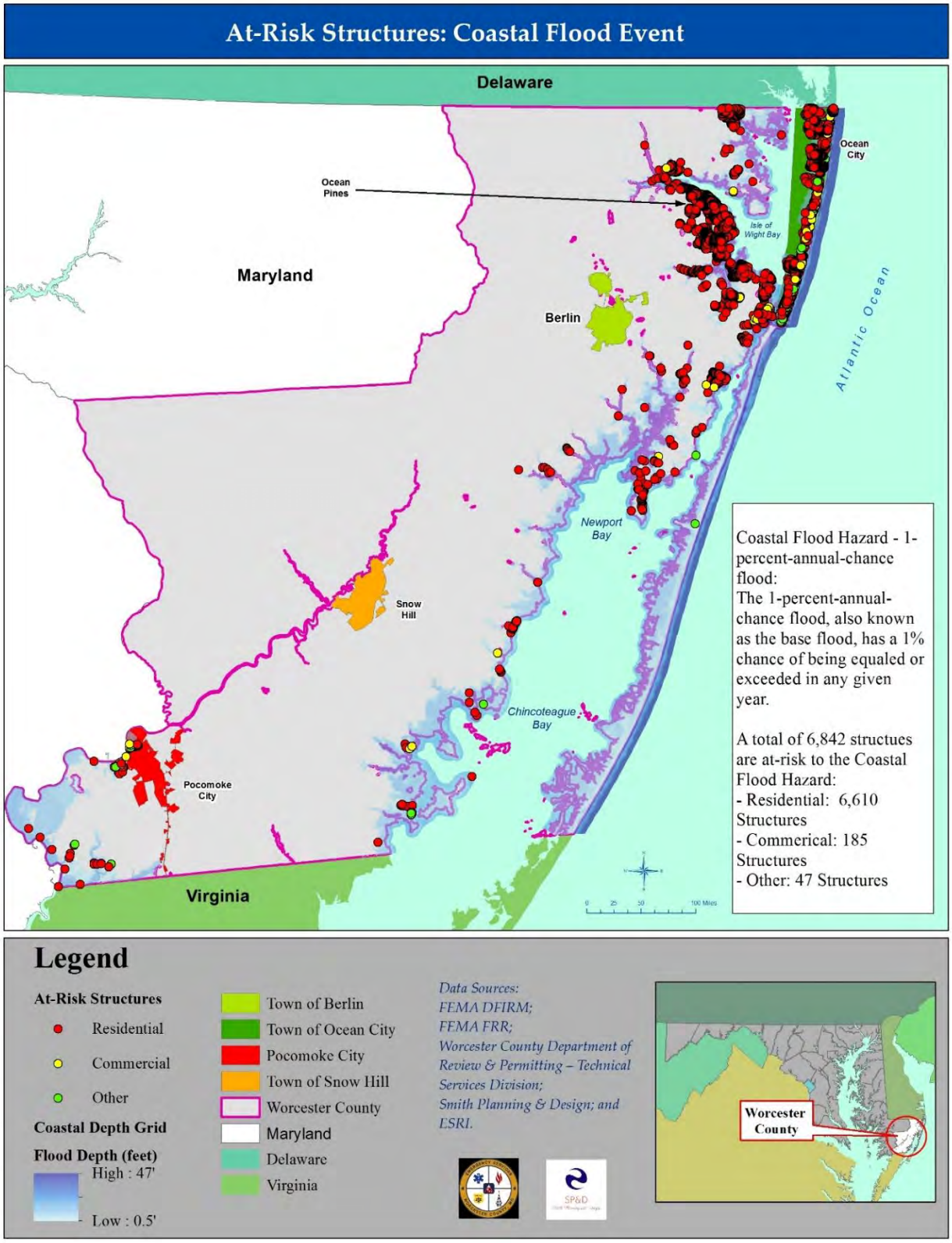
Source: Flood Risk Report – Worcester County, Maryland, Coastal Study 12/30/2015

Table 4-11: Coastal Loss Estimations per Community (Combined Building & Content Loss Estimations)

	Residential	Commercial	Other	TOTAL
Berlin	-	-	-	-
Ocean City	$1,451,052	$2,022,925	$848,086	$17,402,063
Pocomoke City	$228,106	$96,053	$729,530	$1,053,689
Snow Hill	-	-	-	-
County - Unincorporated	$13,183,635	$1,221,629	$1,568,399	$15,973,675
TOTAL	$14,862,793	$3,340,607	$3,146,015	$34,429,427

Source: Flood Risk Report – Worcester County, Maryland, Coastal Study 12/30/2015

Map 4-6


At-Risk Structures: Coastal Flood Event
Delaware
Maryland
Virginia
Ocean Pines
Ocean City
Isle of Wight Bay
Berlin
Atlantic Ocean
Newport Bay
Snow Hill
Chincoteague Bay
Pocomoke City
Coastal Flood Hazard - 1-percent-annual-chance flood:
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.
A total of 6,842 structues are at-risk to the Coastal Flood Hazard:
- Residential: 6,610 Structures
- Commerical: 185 Structures
- Other: 47 Structures
0 25 50 100 Miles
Legend
At-Risk Structures
Residential
Commercial
Other
Coastal Depth Grid
Flood Depth (feet)
High : 47'
Low : 0.5'
Town of Berlin
Town of Ocean City
Pocomoke City
Town of Snow Hill
Worcester County
Maryland
Delaware
Virginia
Data Sources:
FEMA DFIRM;
FEMA FRR;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and
ESRI.
SP&D
Worcester County

Essential Facilities At-Risk to Riverine and Coastal Flood Hazards

Essential facilities are facilities that the state determines must continue to operate before, during, and after an emergency and/or hazard event and/or are vital to health and safety. In May 2015, the State of Maryland published the *Local Hazard Mitigation Plan Guidance* to ensure continuity between local and State Hazard Mitigation Plan documents. According to the *2016 State of Maryland Hazard Mitigation Plan* there are various perspectives on types of facilities designated as critical, therefore, the HAZUS-MH User's Manual essential facility definition and facility types were adopted as the basis for the minimum essential facility types in Maryland. As part of the local guidance, the State determined at a minimum the following essential facilities must be included in both the State and local plan update process:

- Fire Stations;
- Hospital and Medical Clinics;
- Police Stations;
- Emergency Operations Centers; and
- Schools (K-12 & Colleges).

Results for potential flood loss from the coastal and riverine 1-percent-annual-chance flood concluded seven (7) Essential Facilities in Worcester County are at-risk.

Table 4-12: Worcester County Essential Facilities At-Risk to 1%-Annual-Chance Flood Event (Coastal & Riverine Areas)

Type	Total Essential Facilities Impacted by 1% Flood	Total 1% (100-yr) Dollar Losses (Building & Content)	Total Building Loss	Building Loss Percentage of Total	Total Content Loss	Content Loss Percentage of Total
Fire Station*	4	$0	$0	0%	$0	0%
Hospital	1	$126,739.80	$34,432.20	27%	$92,307.60	73%
Police Station	2	$6,213.00	$2,289.00	37%	$3,924.00	63%
TOTAL	7	**$132,952.80**	**$36,721.20**	**N/A**	**$96,231.60**	**N/A**

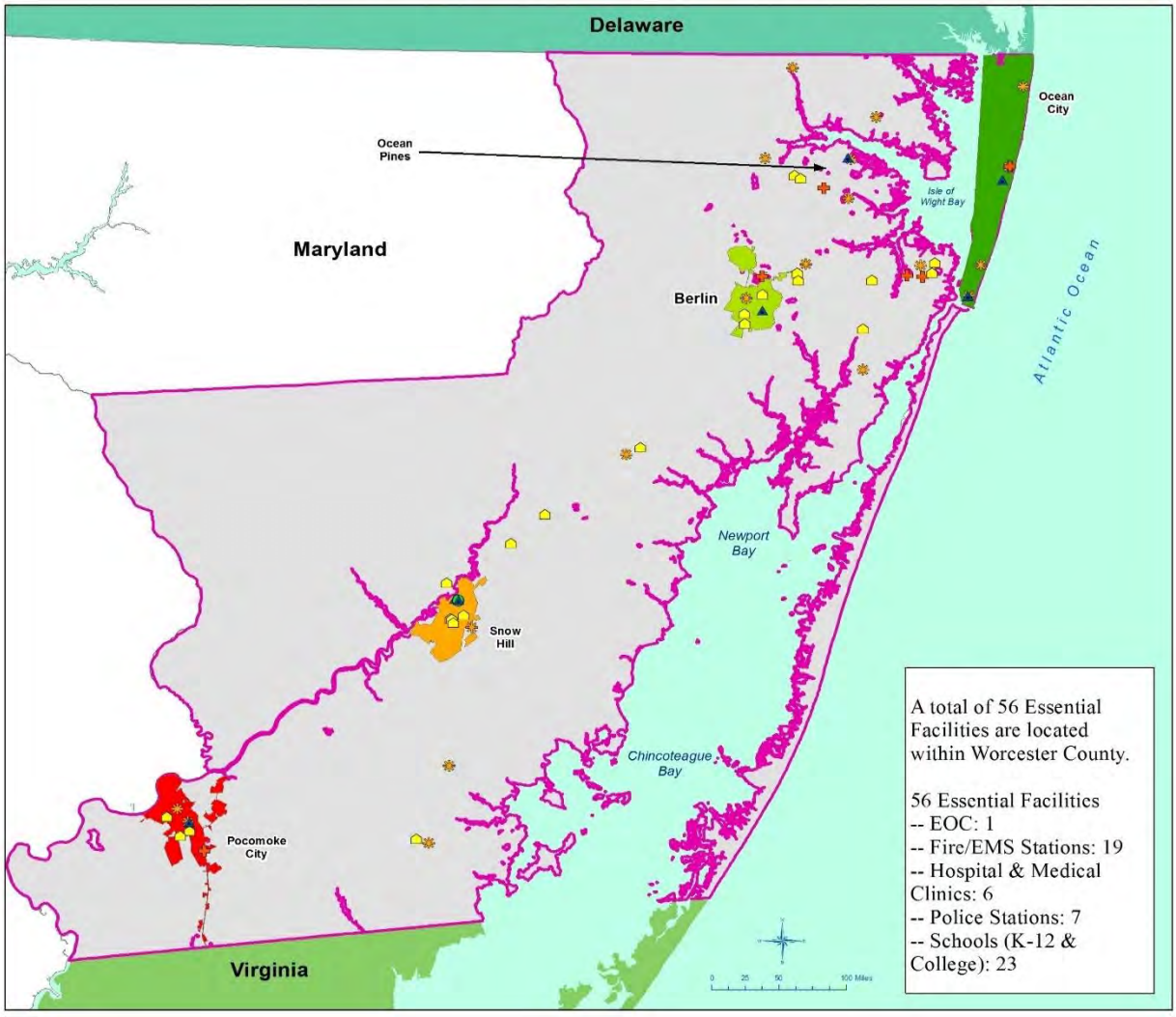
***NOTE:** Hazus does compute loss estimates for structures exposed to the minimum flood depths of 0.1 feet. However, structural and content loss are dependent upon foundation type and/or the First Flood Elevations (FFE). Therefore, structures exposed to the minimum flood depths of 0.1 feet may have content loss only or both structural or content loss or neither.*
Source: Draft MEMA Flood Risk Report-Worcester County Riverine
Hazus 3.1: Flood Modual – Worcester County Study Area/ Essential Facilities

Results from the 1-percent-annual-chance flood event analysis indicate seven (7) essential facilities are at-risk. These facilities include 4 fire stations, 1 medical facilities, and 2 police stations. In order to further assess the flood risk to these essential facilities, the depth of flooding was determined using each structures' lowest adjacent grade, depth of flooding from FEMA flood model, and the digital elevation model. Flood depths for each facility is provided below along with the identified facilities.

- Ocean City VFC No 3 – Flood Depth 0.5’
- Ocean City VFC Station 4 – Flood Depth 0.5’
- Ocean City VFC Headquarters – Flood Depth 0.5’
- Snow Hill Police Department – Flood Depth 0.9’
- Ocean City Fire Co Station 2 – Flood Depth 1.0’
- Your Doc’s In (Ocean City) – Flood Depth 1.3’
- Ocean City Beach Patrol – Flood Depth 1.6’

Map 4-7

Worcester County Essential Facilities



Legend

Essential Facilities
- EOC
- Fire
- Fire & EMS
- Medical
- Police
- School

- Town of Berlin
- Town of Ocean City
- Pocomoke City
- Town of Snow Hill
- Worcester County
- Maryland
- Delaware
- Virginia

Data Sources:
FEMA DFIRM;
MDE Community Assistance Program Manager;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and ESRI.

Water & Wastewater Facilities At-Risk to Riverine and Coastal Flood Hazards

Water and wastewater facilities were assessed for flood vulnerability as well. The following water and wastewater facilities identified as at-risk to flooding. Flood depths, in feet, are provided for each facility.

- Snow Hill WWTP – 3.2'
- Pocomoke – Maryland Avenue Pump Station (Waste) – 0.5'
- Unincorporated
    - Wastewater Facilities
        - Center Drive Wet Well – 2.3'
        - Center Drive Pump Station No. 1 – 2.7'
        - Golf Course Road Pump Station No. 4 – 0.5'
        - Golf Course Road Wet Well – 1.0'
        - Sunset Avenue Pump Station No. 7 – 0.5'
        - Madison Avenue Pump Station – 0.5'
    - Water Facilities
        - Ocean Gateway Well – 2.9'
        - Center Drive Well – 2.7'
        - Center Drive WTP – 1.9'
        - Madison Avenue Well – 1.8'

Riverine & Coastal Flood Debris Generation

The HAZUS flood model debris estimation methodology evaluates building-related debris by major component, yet recognizes a fundamental difference in the type of debris generated, most flood-related debris are contents and finishes. Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris. The debris module will determine the expected amounts of debris generated within each census block. Output from this module is the debris weight (in tons).

The model estimates that a total of 9,901 tons of debris will be generated from the 1-percent-annual-chance flood event. Of the total amount, Finishes comprises 81% of the total, Structure comprises 6% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 396 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Table 4-13: Debris Generation Summary for 1%-Annual-Chance Flood Event (Coastal & Riverine Areas)			
Debris Types	**Total (tons)**	**Percentage of Total**	**Total Truckloads (@25 tons/truck)**
Finishes	7,979	81%	319
Structure	601	6%	24
Foundation	1,320	13%	53
TOTAL	**9,901**	**100%**	**396**

Source: Draft MEMA Flood Risk Report-Worcester County Riverine
Hazus 3.1: Flood Module – Worcester County Study Area/ General Building Stock

Riverine &Coastal Projected Shelter Needs

The displaced population is based on the inundation area. Individuals and households will be displaced from their homes when the home has suffered little or no damage either because they were evacuated (i.e., a warning was issued) or there is no physical access to the property because of flooded roadways. Those displaced persons using shelters will most likely be individuals with lower incomes and those who do not have family and friends within the immediate area. Consequently, modification factors for flood are based primarily on income. Age plays a secondary role in that there are some individuals who will seek shelter even though they have the financial means of finding their own shelter. These will usually be younger, less established families and elderly families.

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 2,363 households will be displaced due to the flood. Displacement includes households evacuated from within, or very near, to the inundated area. Of these, 4,894 people (out of a total population of 51,454) will seek temporary shelter in public shelters.

Table 4-14: Projected Shelter Needs Summary for 1%-Annual-Chance Flood Event (Coastal & Riverine Areas)			
Projected Shelter Needs	**Total Number of Households Affected**	**Displaced Population**	**Population in need of Temporary Shelter**
Sheltering	2,363	7,088	4,894

Source: Draft MEMA Flood Risk Report-Worcester County Riverine
Hazus 3.1: Flood Modual – Worcester County Study Area/ General Building Stock

Nor'easters

Hazard Profile

"[A Nor'easter is] a strong low-pressure system that affects the Mid-Atlantic and New England States. It can form over land or over the coastal waters. These winter weather events are notorious for producing heavy snow, rain, and tremendous waves that crash onto Atlantic beaches, often causing beach erosion and structural damage. Wind gusts associated with these storms can exceed hurricane force in intensity. A nor'easter gets its name from the continuously strong northeasterly winds blowing in from the ocean ahead of the storm and over the coastal areas."

Nor'easters are notorious for moving slower than hurricanes, lingering over a region and therefore causing more intense damage. Most commonly occurring in the winter months, Nor'easters combine the detriment of hurricane force winds and flooding, with piercing cold and often heavy snow.

Nor'easter Historical Occurrences

Nor'easters typically form during the colder months, from around September to April, but they can occur at any time of year. They are more likely to develop during the winter because of the polar jet stream. The jet stream brings cold air from Canada toward the south, then east to the Atlantic Ocean. This provides the perfect combination of cold and warm air to form a nor'easter.

Federally declared storm event of 1962 impacted most of Maryland to varying degrees. Severe storms, high tides and flooding occurred on March 9, 1962. Surviving storms in 1962 Worcester County understands well the magnitude and voracity of a nor'easter. The 1962 storm bears the title "the storm of the century" as it caused extensive damage and loss of life along the Delmarva Coast. Nor'easters bring high winds, storm tides, heavy rains and significant surf and beach erosion. These storms often last 2-3 days. Strong northeast winds trap water in the back bays causing flooding and in extreme cases, inlet formation.

Heavy rain and snow lead to unsafe driving conditions, and strong winds knock down trees and power lines, causing outages. These conditions can disrupt a community and sometimes bring everything to a halt. Many people are injured during and after nor'easters because of car accidents, slips and falls, hypothermia, trees falling, roofs collapsing, and even snow shoveling. During a nor'easter, it is wise to plan properly, stay home and stay safe.

Sea Level Rise & Shoreline Erosion

Hazard Profile

According to the 2018 Sea Level Rise Projections for Maryland, the Likely range 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. After 2050, rates of sea-level rise depend increasingly on the future pathway of global emissions of greenhouse gases during the next sixty years; thus, separate projections are provided for three emissions pathways. 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, two to four times the relative sea-level rise experienced during the 20th century. Moreover, there is a one-in-twenty chance that it could be over 5.2 feet. If, on the other hand, global society were able to bring net greenhouse gas emissions to zero sufficient to meet the goals of the Paris Climate Agreement to limit the increase in global mean temperature to less than 2°Celsius over pre-industrial levels, the Likely range for 2100 is 1.2 to 3.0 feet, with a 5% chance that it would exceed 3.7 feet.

According to the Maryland Department of Natural Resources, a continuation of the current potential sea level rise trend (3 to 4 mm/year) or one foot over the next century is expected to occur in the Mid-Atlantic region due to global warming, depletion of groundwater, land subsidence, compaction and natural variations in climate. Potential sea level rise impacts vary with coastal characteristics, according to the Intergovernmental Panel on Climate Change (IPCC), Maryland could see as much as two to three feet of rise by 2099. Over the last 100 years, local tidal gauges have registered a one-foot increase (30.5 centimeters). Presently, Maryland is experiencing a greater impact from potential sea level rise due to the naturally occurring land subsidence. Land is currently subsiding at a rate of approximately 1.3 mm/year in the Chesapeake Bay region. If the trend continues with a rise of two or three feet in the next century, these impacts will be even greater.

Expected impacts of potential sea level rise include inundation of wetlands and lowlands, accelerated coastal erosion, exacerbated coastal flooding, threatened coastal structures, raised water tables, and increased salinity of rivers, bays, and aquifers. Potential sea level rise can greatly increase the severity of the 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 coast 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.

Inundation is the primary impact of potential sea level rise. The gradient of local topography determines the rate at which land will be submerged by water. The recession of shoreline can be exacerbated by erosion and flooding. Due to Worcester County's lower elevations and gradual slopes, large geographic areas could be inundated as the potential sea level rises. Intermediate levels of recession will occur along the sandy beaches fronting the bays since the sediments located there are more susceptible to erosion. Ocean Pines, a heavily developed area, is already vulnerable to flooding and erosion and will be impacted by current rates of potential sea level rise if no additional action is taken. Ocean Pines has approximately 15,000 year-round residents. The Snug Harbor neighborhood currently contains 17 repetitive loss properties and continued potential sea level rise may result in additional losses.

Figure 4-6

Accelerated potential sea level rise could also drown vegetation, which in return would reduce sedimentation entrapment and exacerbate substrate erosion. Erosion to the barrier islands also could affect the bays' wetlands if fragmentation of Assateague Island occurs and cause increased wave action against the coastline. The commonly used Brunn Rule states that for every 1 foot in potential sea level rise, the coastline will retreat 50 to 100 feet depending on the slope of the beach profile.

Fringe marsh established along the shoreline in lower energy areas provides significant habitat benefits to the aquatic ecosystem. Marsh vegetation protects water quality by slowing runoff, reducing erosion, and filtering nutrients that reduce oxygen and cause algal blooms. Natural shorelines also provide critical habitat for fish species at both juvenile and adult life stages. Bordering the shorelines of the Coastal Bays is 68 miles of fringe marsh and 6 miles of sandy beach.

Shoreline erosion is not a serious threat to human life; however, it is a slow and ongoing geological process that could lead to significant economic, property and infrastructure loss. According to the *2008 Sea Level Rise Response Strategy, Worcester County, Maryland*, the most recent study specific to Worcester County, approximately 56% of the county's shoreline is receding, with 4% eroding at over 4 feet per year. These eroding areas are candidates for non-structural or living shoreline stabilization approaches to mitigate erosion.

A large portion of Worcester County's bays were inventoried by the Virginia Institute of Marine Science. Of this inventoried area, approximately 26% of the shoreline was armored or contained some form of erosion control structures in place such as bulkheads, riprap, breakwaters, debris, unconventional, groin field, jetty, wharf, dilapidated bulkhead, or marina. The current placement and elevation of most erosion control structures will not stop future potential sea level rise inundation unless modifications and further armoring of neighboring shorelines is completed. Furthermore, according to the *2008 Sea Level Rise Response Strategy Worcester County*, *Maryland*, the bulkheads at Ocean Pines have most likely caused erosion to nearby beaches on either side of the beaches. The inlet armoring between Fenwick and Assateague Islands is an obvious example of how stabilizing one shore can cause erosion to nearby unarmored shores.

Barrier Island Migration

Barrier islands are dynamic landforms that can migrate landward through overwash processes as potential sea level rises if they are in their natural state. Fenwick Island and Assateague Island were split during a storm in 1933 and the inlet has been artificially maintained. This has caused severe erosion to northern Assateague Island and accelerated movement landward.

Source: 2008 Potential sea level rise Response Strategy, Worcester County

Although erosion and accretion are natural processes, both could potentially create significant problems for property owners, businesses, and the public, specifically in areas where planning and design activities have either increased natural erosion rates or compounded the impact of erosion processes. Considering waterfront property is costly, many waterfront property owners have a vested interest in the protection and fortification of the shoreline. Homeowners have often chosen to stabilize the low eroding or stable shorelines, which has led to an over investment in erosion control and has degraded vital shoreline habitat.

Determining the ecological impacts when selecting one shoreline stabilization option over another depends on the site conditions. If the property is one of a few natural stretches of shoreline in the region, it likely plays a significant role in providing habitat for horseshoe crabs, turtles and other species. Selecting a project that either enhances or maintains those habitat functions would be optimal. On the other hand, if the area is quite pristine where fringe marsh or SAV beds have established less than 30 meters from your property, a non-structural approach could be applied.

Additionally, the higher water tables could reduce the bearing capacity of some soils due to the friction loss between soil particles. This may affect the structural stability of road bases and could lead to more frequent resurfacing. Impacts such as this are more likely to occur in the vicinity of advancing sea level areas that contain hydric soils; sands, sandy loams, silt loams, mucks, and peats; which are hydrologically influenced by adjacent coastal water levels. According to the *2008 Sea Level Rise Strategy Worcester County*, *Maryland*, such conditions are

likely to already be common throughout much of Worcester County where more than 58% of the soils are very limited for road building. Roads in some areas of the County have been constructed on fill, which increases the roads' vulnerability to rising ground water.

Source: Worcester County Public Information Officer

Furthermore, sea level rise could increase storm surge; a major public safety issue. An increase in property and population at risk from storm surge increases the possible need for evacuation. According to the *2008 Sea Level Rise Response Strategy Worcester County*, *Maryland*, the most vulnerable roads in the County include those in the Pocomoke River floodplain, including portions of Pocomoke City and Snow Hill. Also roads that provide access to the western shores of Chincoteague Bay and Sinepuxent Bay, especially portions of South Point Road, Eagles Nest Road, and Airport Road as well as roads within the Assateague Point and The Landings subdivisions; many of the roads in the subdivisions along Sinepuxent Bay and Isle of Wight Bay in West Ocean City; many of the roads in Ocean Pines and other areas along the St. Martins River, Piney Island Drive, Dixie Drive, Salt Grass Point Road, and St. Martin's Neck Road; roads along Grey's Creek and within Edgewater Acres on the north shore of Assawoman Bay; and many of the bayside roads in Ocean City.

Sea level rise could also interfere with navigation under bridges by diminishing the above water clearance. This will not be a major issue for the movable-span bridges in Worcester County; however, these bridges will need to be opened more frequently as sea level. According to the *2008 Sea Level Rise Response Strategy Worcester County, Maryland,* these bridges include the following: the Harry W. Kelley draw bridge (US 50) over Sinepuxent Bay (clearance in closed position is 15 feet above mean high tide); the Snow Hill bridge (MD 19) on the Pocomoke River (closed position clearance is 5 feet); and the Pocomoke City draw bridge (MD 675) on the Pocomoke River (closed position clearance is 4 feet). Bridges over non-navigable, freshwater are typically designed with a "drift clearance" of approximately 2 feet. These streams affected by potential sea level rise are vulnerability to blockage and structural damage from the possible increase of floating debris.

In addition, direct inundation could pose a threat both to water supply lines as well as the wells and water supply treatment and storage facilities. According to the *2008 Sea Level Rise Response Strategy Worcester County*, *Maryland*, saltwater contamination of ground water aquifers due to rising sea level is most likely to occur in areas of Worcester County proximate to the Atlantic Ocean or the interior bays where water is drawn from the surficial, unconfined

Pleistocene aquifer; such areas include the Mystic Harbour, Ocean Pines, and River Run water supply service areas.

Sea Level Rise & Shoreline Erosion Historical Occurrences

Shoreline erosion results from both storm surge and sea level rise. Studies conducted by the U.S. Army Corps of Engineers estimate that 31% of the State's 4,360 miles of tidal shoreline currently experience some degree of erosion. According to the 200 Maryland's Shore Erosion Task Force Report, 110 miles of shoreline in Worcester County are eroding. Approximately 74 miles are eroding at less than 2 feet per year. About 26 miles of shoreline are eroding at 2 to 4 feet per year, and 10 miles of shoreline are eroding at more than 4 feet per year.

In 2010, the U.S. Army Corps of Engineers, Baltimore District (USACE), in partnership with Maryland Department of Natural Resources, completed Chesapeake Bay Shoreline Erosion in Maryland: A Management Guide. This study was authorized by a resolution of the U.S. Senate Committee on Environment and Public Works in 2001. The resolution directed USACE to review and update the 1990 Chesapeake Bay Shoreline Erosion Study, previously completed as a joint effort by the Baltimore and Norfolk Districts. The rates of shoreline erosion that were forwarded were based on the 1990 study; Table 4-15.

Table 4-15: 1990 Shoreline Erosion – Rate of Change

	Worcester County	Maryland
Erosion Category	Rate of Change (ft/yr)	Rate of Change (ft/yr)
Accretion	6,043	21,842
Slight	6,345	40,455
Low	1,038	7,052
Moderate	253	2,186
High	303	907
Null	92	672
Unknown	37	106
TOTAL	14,111	73,220

Source: 1990 U.S. Army Corps of Engineers Study

Table 4-16: Rate of Shoreline Erosion

Worcester County		Maryland	
Erosion Category	Average Erosion Rate (ft/yr)	Erosion Category	Average Erosion Rate (ft/yr)
Accretion	0	Accretion	+0.5
Protected	0	Protected	0
No Change	0	No Change	0
Slight	0	Slight	-1
Low	0	Low	-3
Moderate	0	Moderate	-6
High	0	High	-11
Unknown	0	Unknown	0 or -1
TOTAL		TOTAL	

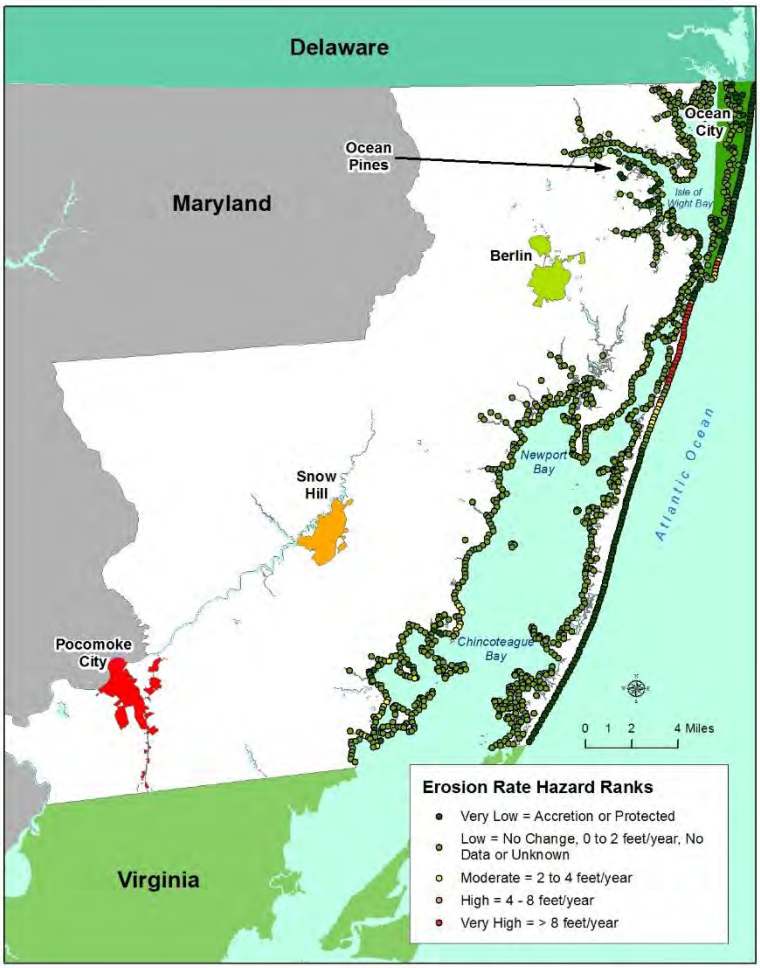
Source: 2010 U.S. Army Corps of Engineers Study

Information was requested from the U.S. Army Corps of Engineers, Baltimore District and updated shoreline erosion rates were provided by Andrew Roach, Planning Division in October 2018. Updated shoreline erosion rates are provided, Table 4-16. The erosion categories have been changed, and due to different mapping techniques, the measured shoreline has changed. The Virginia Institute of Marine Science (VIMS) produced the updated shorelines and erosion rates based on Maryland Geological Survey (MGS) data.

Please see the explanation below for the dates of the shorelines. Please also note that the dataset on which the table was produced does not include many large Bay island such as Smith Island, South Marsh Island, Poplar Island, and Bloodsworth Island. As detailed in Table 4-16, there was no reported change for Worcester County.

Using a series of recent shorelines (1988-1995), the Maryland Geological Survey (MGS) produced a recent shoreline coded with erosion rates. This shoreline was updated by the Center for Coastal Resources Management (CCRM), Virginia Institute of Marine Science to reflect the current status (2002-2006) of shoreline protection ("protected" category) and improve on the shoreline segments previously classified as "unknown" or "no data". The Maryland Shoreline Inventories use a different shoreline as a base, so the attribute information was transferred to the MGS shoreline using ArcGIS 9.2. For a detailed description of the original MGS shoreline and contact information, see http://www.mgs.md.gov and SLMetadata.doc.

Map 4-8



In 2016, the Maryland Department of Natural Resources with support from the Nature Conservancy (TNC), partnered with the Chesapeake and Coastal Services (CCS) to conduct a Statewide Coastal Resiliency Assessment. As a result, products developed from 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. Also, within this the database is the Erosion Rate Hazard Ranking. Ranks were assigned as follows, based on categories used by the Maryland Geological Survey (MGS): Very Low (1) = Accretion or Protected; Low (2) = No change, 0 to 2 feet/year, No Data or Unknown; Moderate (3) = 2 to 4 feet/year; High (4) = 4 - 8 feet/year; and Very high (5) = > 8 feet/year. As shown on Map 4-8, the majority of shorelines in Worcester County have a very low hazard ranking.

Sea Level Rise & Shoreline Erosion Vulnerability Assessment

The sea level rise (SLR) variable represents the vulnerability of the coast to long-term sea level change. Maryland, particularly vulnerable to sea level rise because of a combination of rising seas and sinking land, is projected to face from 0.7 meters to 1.7 meters in relative sea level rise by the year 2100, with a best-estimate projection of 1.1 meters (Boesch et al., 2013). After discussion with the steering committee, the project team decided to base the Sea Level Rise Hazard Ranks on the High projection of 1.7 meters. In order to estimate a range of values across the shoreline, the project team used a methodology developed by NatCap to localize the statewide projection to the county scale using historic sea level trends measured at tide gauges. For each county, the projection of 1.7 meters was multiplied by the ratio of local sea level change to average statewide sea level change (3.96 mm/yr). Local sea level change values were available from the Sea Level Affecting Marshes Model (SLAMM) parameter table (MD DNR, 2011). Because the resulting range of values was relatively small (1.32 m – 2.35 m), the Sea Level Rise Hazard Ranks were distributed among only 4 categories from Low (2) to Very High (5) and the Very Low (1) category was not used Sea Level Rise Hazard Ranks were assigned as follows, based on a quantile classification of the values along the entire Maryland coastline: Low Hazard (2) = 1.32 – 1.42 meters; Moderate (3) = 1.46 - 1.48 meters; High (4) = 1.49 - 1.67 meters; and Very High Hazard (5) = 2.05 - 2.35 meters.

Table 4-17: Sea Level Rise Hazard Rank by County

County	Historic SLR Trend (mm/yr)	Projected SLR 2100 (m)	SLR Hazard Rank
Anne Arundel	3.44	1.48	Moderate
Baltimore	3.08	1.32	Low
Calvert	3.41	1.46	Moderate
Caroline	3.48	1.49	High
Charles	4.78	2.05	Very High
Cecil	3.08	1.32	Low
Dorchester	3.9	1.67	High
Harford	3.08	1.32	Low
Kent	3.08	1.32	Low
Prince Georges	3.41	1.46	Moderate
Queen Anne's	3.44	1.48	Moderate
Somerset	4.97	2.13	Very High
St. Mary's	3.41	1.46	Moderate
Talbot	3.48	1.49	High
Wicomico	3.9	1.67	High
Worcester – Bayside	3.3	1.42	Low
Worcester - Seaside	5.48	2.35	Very High

Source: The Nature Conservancy, 2016 and Maryland Coastal Resiliency Assessment
Projected County SLR 2100 = 1.7* (Historic County SLR Trend/3.96)
1.7m=Statewide 2100 High SLR Projection
3.96 mm/yr = Statewide Average SLR Trend

Social Vulnerability & Flood Hazards

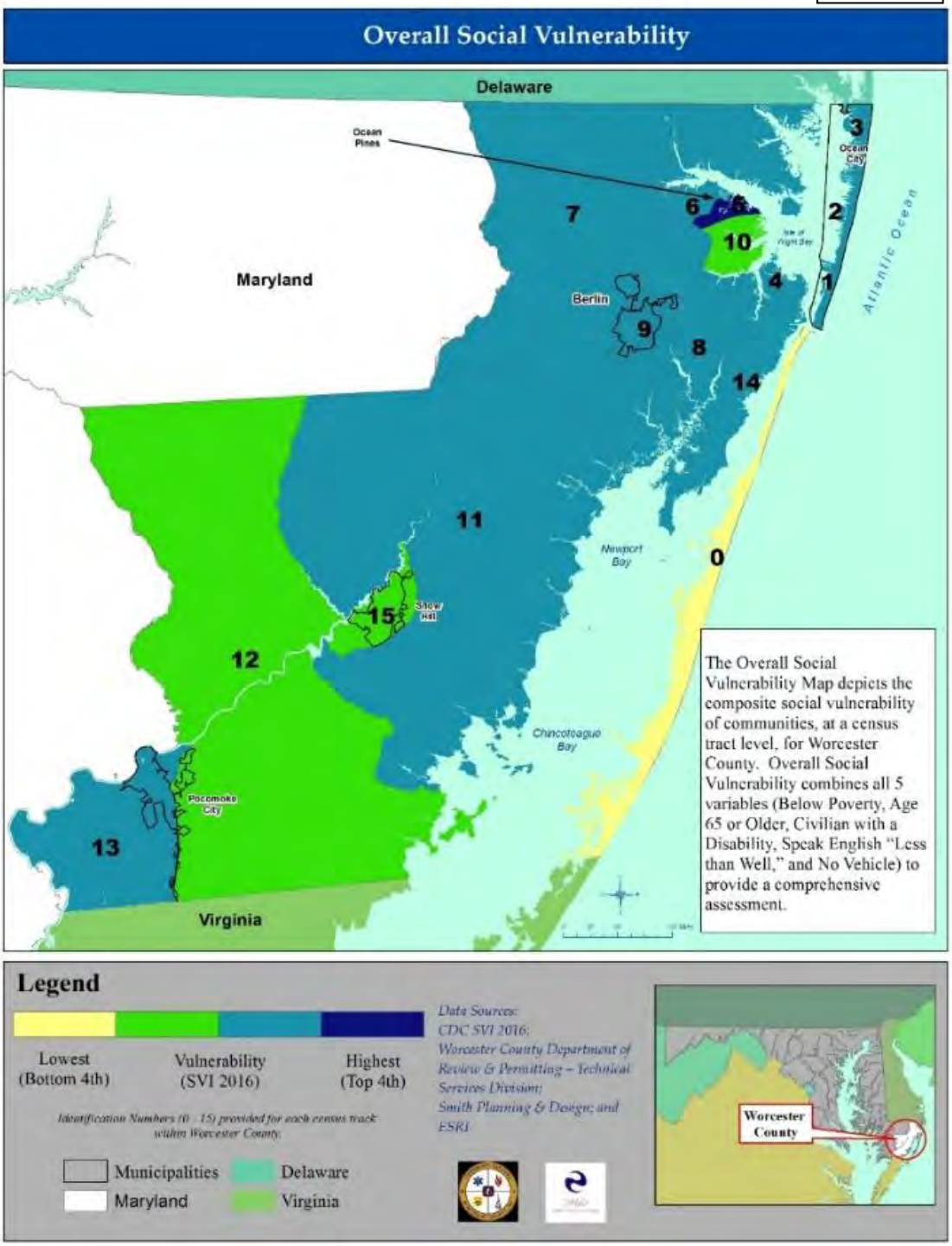
Social Vulnerability is defined in terms of the characteristics of a person or group that affect "their capacity to anticipate, cope with, resist, and recover from the impact" of a discrete and identifiable disaster in nature or society.

Every community must prepare for and respond to hazardous events. Information on the location and relative concentration of different types of social vulnerabilities in small geographic areas, such as census tracts can help emergency managers locate and plan for the specific needs of their communities.

A Social Vulnerability Assessment was performed at a census track level using five variables. The Overall Social Vulnerability Map below depicts the composite social vulnerability of communities within Worcester County. As shown on Map 4-8: Overall Social Vulnerability, the map combines all five variables: ***Below Poverty, Age 65 or Older, Civilian with a Disability, Speaks English "Less than Well", and No Vehicle*** to provide a comprehensive assessment of the (4) four flood related hazard within this chapter.

Additional and large format social vulnerability maps detailing the five variables listed above can be found in *Appendix I: Vulnerable Populations*.

Map 4-9

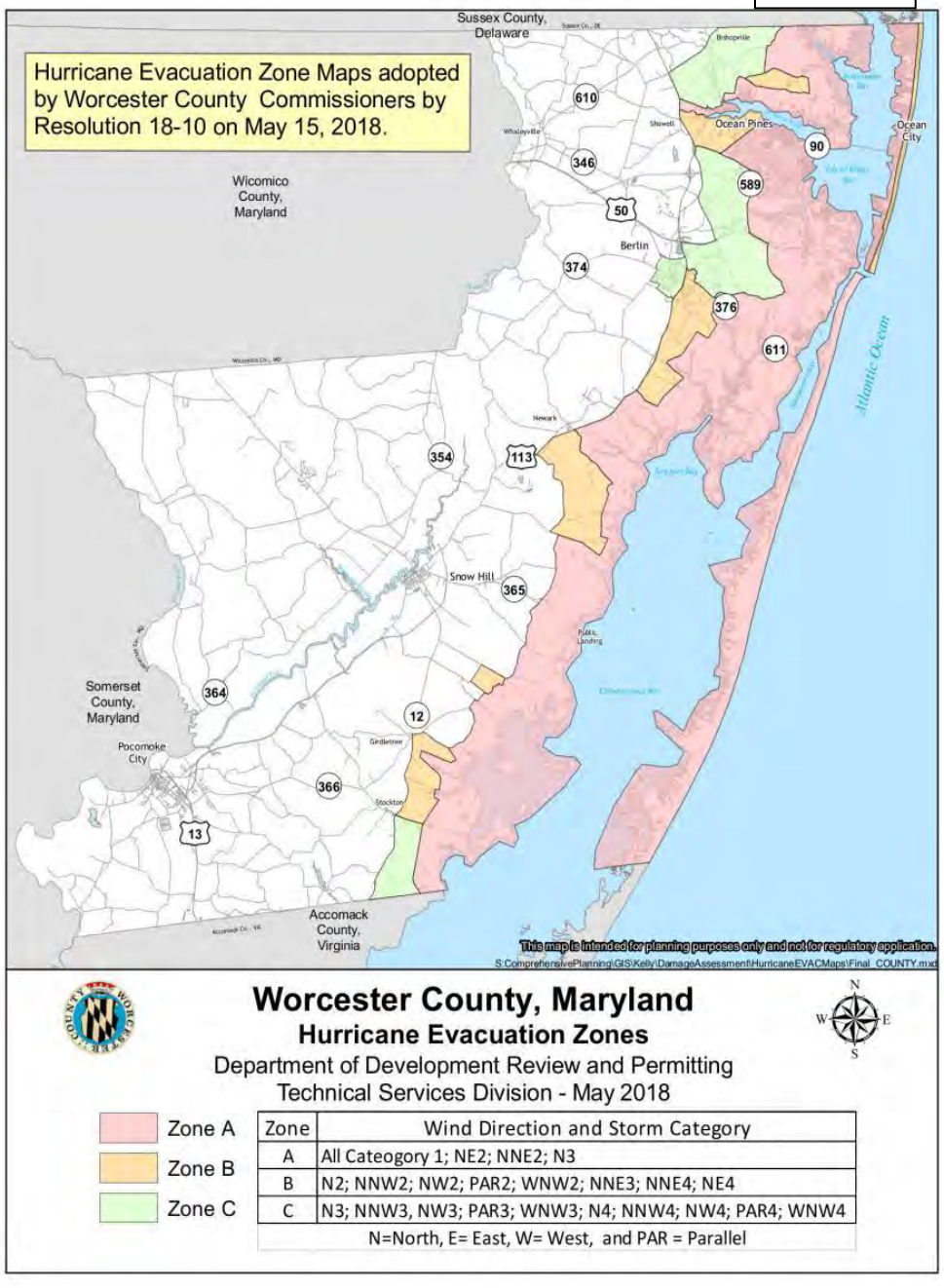


In all hazard events, vulnerability to people is based on the availability, reception, and understanding of early warning of hazard events. In addition, access to shelter and means and desire to adhere to evacuation order affects overall vulnerability to people. Finally, despite having access to technology that allows reception for of the warning, language differences oftentimes become a barrier to individuals understanding them. Children, elderly, and non-English speaking residents may face greater challenges overcoming the impacts of hazard events.

Reviewing the overall social vulnerability in relation with flood hazards, Ocean Pines has the highest vulnerability not only from a social vulnerability perspective but also to flood hazards. The northeastern portion of the county is at-risk to all flood hazards and is highly vulnerable to tropical storms and hurricanes and coastal flooding.

Therefore, this area of the county should be targeted for outreach on "Know Your Zone," Community Emergency Response Team (CERT) training and FEMA's new campaign, "You Are The Help, Until Help Arrives" information. Hurricane evacuation maps should be dispersed throughout the county to ensure the safety of the vulnerable populations within this area.

Figure 4-7

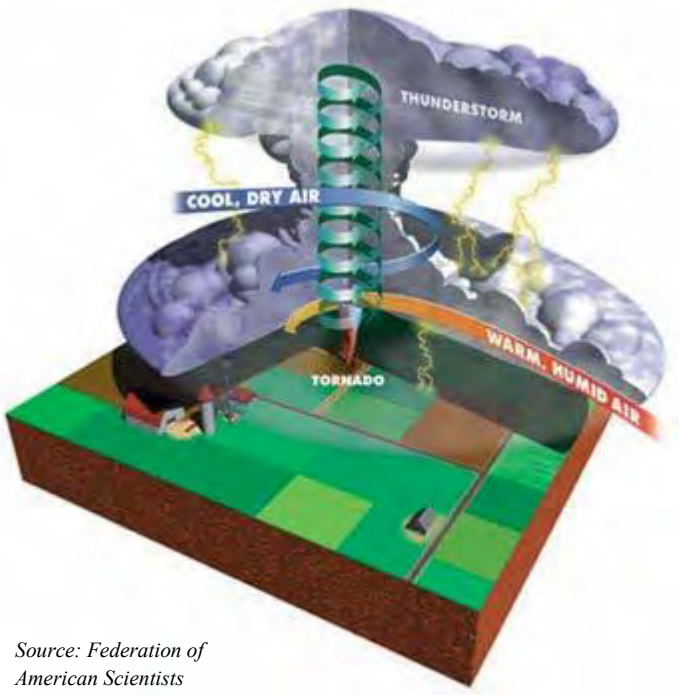


CHAPTER 5: NON-FLOOD RELATED HAZARDS

Tornado

Hazard 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 develop in 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. Another way that tornadoes can be created occurs when warm moist air flows upslope. Under the right temperature and moisture conditions, intense thunderstorms can produce tornadoes in higher terrain.



Source: Federation of American Scientists

Tornadoes can be ranked by intensity by using the Fujita Scale devised by Dr. Theodore Fujita at the University of Chicago in 1971. The Fujita Damage Scale (F-Scale) is used to determine the tornado strength based on observed damage. The Fujita Tornado Scale assigns a category to tornados based on their wind speed and relates this to the general type of damage that is expected. The damage scale increases in intensity from a weak F0 (40 to 70 mph wind) to a F5 (over 260 mph wind). The Fujita scale of tornado intensity indicates that tornadoes at the F0 classification cause light damage to chimneys, tree branches, and signboards. Tornadoes of F1 magnitude can cause moderate damage to road surfaces, automobiles, and mobile homes. The impact of tornadoes primarily depends upon their occurrence in developed areas-tornadoes in undeveloped areas can cause damage only to a few trees and even go unreported.

According to National Oceanic Atmospheric Administration (NOAA), the Enhanced Fujita (EF) Scale has replaced the original Fujita (F) Scale used to rate tornadoes by the NWS. The EF Scale improves upon the limitations of the original F- Scale, which has been used since 1971. The tornado rating categories of the EF Scale range from zero to five, with EF0 as having the lowest wind speed and EF5 as having the highest wind speed. A correlation between the two scales has

been developed and this makes it possible to express ratings in term of one scale to the other, thus preserving the historical database. The major improvements of the EF Scale are the more accurate wind speed ranges in each category and an increase in the amount of detail that goes into determining a tornado rating. These improvements will allow for more consistent and accurate tornado ratings by the National Weather Service (NWS).

Table 5-1: Enhanced Fujita (EF) Scale						
Fujita Scale			**Wind Speed**		**Typical Damage**	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	**EF Number**	**3 Second Gust (mph)**
0	40-72	45-78	0	65-85	**0**	**65-85**
1	73-112	79-117	1	86-109	**1**	**86-110**
2	113-157	118-161	2	110-137	**2**	**111-135**
3	158-207	162-209	3	138-167	**3**	**136-165**
4	208-260	210-261	4	168-199	**4**	**166-200**
5	261-318	262-317	5	200-234	**5**	**Over 200**

Source: http://www.spc.noaa.gov/faq/tornado/ef-scale.html

Tornado Hazard Impacts

On July 25, 2019 during the Hazard Mitigation Planning Committee (HMPC) group discussion portion of the meeting, committee members were divided into groups. Participants were provided with hazard descriptions and blank hazard impact worksheets. Each group was provided time in which to discuss and record hazard impacts from their community perspective. Each group was then assigned a group representative to review results with the HMPC at-large. The following table provided community perspective impacts from tornado events to Worcester County.

Table 5-2: Tornado Hazard Impact	
Health & Safety of the Public	Vulnerable and medically fragile populations, electricity dependent durable medical equipment and oxygen dialysis. Verbal announcement by media of possible path and to seek shelter if needed. Mobile home residents may be especially "at-risk".
Health & Safety of the First Responders	First responders to shelter in place. Replace personal protective equipment (PPE) and monitor fatigue of responders. First responders who reside in hazard risk area may not be available to respond to a tornado event. Heat, insect bites, and proper personal protective equipment (PPE) – structural vs. wildland.
Continuity of Operations (including Delivery of Services)	Interoperability of communications. Essential services and facilities must remain available. Immediate recovery and quick return to "normalcy". Damage and electric lines – long-term power outages may result.

Property, Facilities, & Infrastructure	Action and response plan needed. Restoration of essential facilities and schools are up and running. Damage to roofs, windows, and building facades may clog transportation routes. Dangerous areas due to debris.
Environment	Require environmental health inspections (air quality, water runoff, and erosion) after return to "normalcy" within County. Document as needed. Some debris may cause blockages to stream and culverts.
Economic Conditions	Impacts to areas or affected a community within the County. Food and medical insecurity. Damage to business and loss of revenue from downtime.
Public Confidence in Government	High

Source: Worcester County Hazard Mitigation Planning Committee, 2019

Tornado Historical Occurrences

Information obtained for Worcester County using both the *2016 State of Maryland Hazard Mitigation Plan* and the National Centers for Environmental Information (NCEI) – Storm Events Database between January 1950 and July 31, 2019 for Tornado Hazards include: Tornado and Funnel Cloud data from NCEI has been included on the data table below.

Table 5-3: Tornado Hazard Risk Assessment Data Table

Population Vulnerability	*Injuries & Deaths*		*Property & Crop Damage*		*Geographic Extent*	*Events 1958-2019*
0.86	0	0	365K	0	SVRGIS (Intensity & Frequency) = 1	Total 11
						Annualized 0.18

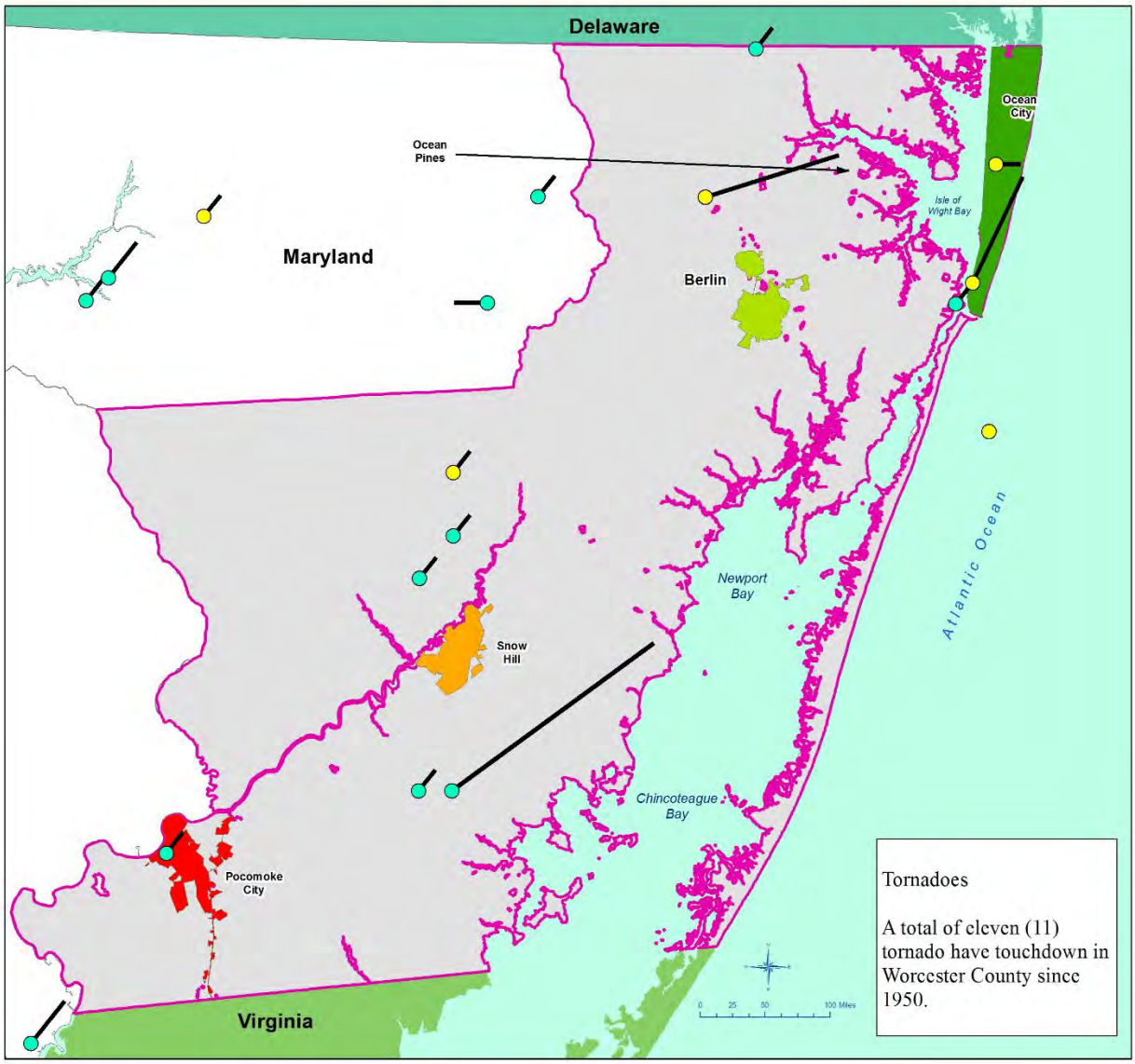
Source: National Centers for Environmental Information, as of July 2019 & 2016 State of Maryland Hazard Mitigation Plan

Note: Hazards included within this table from NCEI Data: Tornado & Funnel Cloud

Map 5-1 shows the approximate locations of tornado touch downs in the County. These tornadoes have been weak and have not exceeded an F1 rating. There have been ten recorded tornado and one funnel cloud events in the County. There has been a total of $365,000 in total property damage reported. The most recent tornado event recorded during this planning cycle occurred in West Ocean City on August 1, 2016. A waterspout developed in Assawoman Bay, came ashore near the Route 50 and Philadelphia Avenue Intersection, and resulted in structural damage to several businesses in the surrounding area. A large supply container for the town of Ocean City was overturned and moved down the adjacent beach, causing $75,000 in property damage.

Map 5-1

Tornado Initial Touch Downs and Paths



Legend

Tornado Initial Touchdowns

Intensity - Wind Speed

- EF 0 - 65 to 85 mph Winds
- EF 1 - 86 to 109 mph Winds
- Tornado Tracks

- Town of Berlin
- Town of Ocean City
- Pocomoke City
- Town of Snow Hill
- Worcester County
- Maryland
- Delaware
- Virginia

Data Sources:
NOAA NWS - SVRGIS;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and ESRI.

Hazardous Materials

Hazard Profile

The release of HazMats while in transit is of great concern to the U.S. 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 ships 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 and rail systems.

Hazardous Materials Hazard Impacts

On July 25, 2019 during the Hazard Mitigation Planning Committee (HMPC) group discussion portion of the meeting, committee members were divided into groups. Participants were provided with hazard descriptions and blank hazard impact worksheets. Each group was provided time in which to discuss and record hazard impacts from their community perspective. Each group was then assigned a group representative to review results with the HMPC at-large. The following table provided community perspective impacts from Hazardous Materials Hazards events to Worcester County.

Table 5-4: HazMat Hazard Impact	
Health & Safety of the Public	Availability of medical staff to respond to meet physical health issues related to a chemical spill. Lack of knowledge of incidents or what to do during an incident putting health and safety at-risk.
Health & Safety of the First Responders	Lack of information on true status of incidents – what happened or what are the material involved? Location of first responders to individuals living in rural areas. Replace personal protective equipment (PPE) and monitor fatigue of responders.
Continuity of Operations (including Delivery of Services)	Transportation blockage would limit access to social services programs to the community. Inability for staff to access homes to evaluate safety and vulnerability. Communication – is sparse if the system is comprised.
Property, Facilities, & Infrastructure	Physical security standard of facilities. Community being evacuated and not having access to their homes. Transportation impacts on access to food, water, medical care, communication, and work. HazMat transportation accidents lead to road closures and evacuation of affected area. HazMat incident at fixed-site facilities may impact adjacent facilities.
Environment	Contamination into ground and water is a serious environmental impact from HazMat incidents.
Economic Conditions	Impact to fixed site facilities with hazmats are typically at commercial and/or industrial facilities. Businesses in affected areas of a hazmat incident may be affected and experience down-time.
Public Confidence in Government	Reimbursement takes too long. Information gathering system is not in sync across the board.

Source: Worcester County Hazard Mitigation Planning Committee, 2019

Hazardous Materials Historical Occurrences

According to the Department of Transportation's Office of Hazardous Materials Safety (OHMS), within the Research and Special Programs Administration's (RSPA) website, in 1993 the definition of serious incident was created to better convey the consequences of hazardous materials transportation – i.e., what has resulted, in terms of harm and inconvenience – as unintended consequences of the necessity to transport hazardous materials.

Initially, a serious incident was defined as one resulting in one or more fatalities or major injuries, closure of a major artery or facility, a vehicle crash or derailment, or an evacuation. Over the years, this definition has evolved to better characterize the seriousness of incidents.

Since 1994, RSPA has defined serious incidents as "incidents that involve: a fatality or major injury due to a hazardous material; closure of a major transportation artery or facility or evacuation of six or more persons due to the presence of a hazardous material; or a vehicle crash or derailment resulting in the release of a hazardous material." Unlike the total number of hazardous materials incidents, the number of serious incidents has been more reliable as a descriptive statistic.

Information obtained for Worcester County using the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration's, Office of Hazardous Materials Safety listed a total of two HazMat Transportation Incidents affecting Worcester County between 2010-2019 using the criteria stated above.

Table 5-5: Hazmat Transportation Incidents

Date	Location	Mode of Transportation	Carrier	Commodity	Quantity Released
October 7, 2010	Berlin	Highway	Cropper Oil Co. Inc.	Gasoline includes gasoline mixed with ethyl alcohol, with not more than 10% alcohol	2 LGA
September 11, 2018	Girdletree	Highway	Universal Truckload, Inc.	Sodium Hydroxide Solution	3,790 LGA

Source: U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration's, Office of Hazardous Materials Safety, July 31, 2019.

According to the Worcester County Fire Marshal's Office, the Worcester County Special Hazards Response Team (SHRT) is responsible for the response and mitigation of all chemical, biological accidental or terrorism related incidents in Worcester County. This office in conjunction with the Worcester County Department of Emergency Services, employ seven full-time personnel and supplemented with over 30 volunteers from the 10 fire volunteer departments within Worcester County.

On Table 5-6, information obtained from the Worcester County Fire Marshal's Office lists hazmat incident responses by the Worcester County Special Hazards Response Team (SHRT) during 2002-2018 for Worcester County.

A more recent chemical spill to impact Worcester County took place in late June 2019. According to the Bayside Gazette, Berlin Falls Park was closed temporarily following a chemical spill at the facility on Old Ocean City Boulevard. The chemical was listed as sodium hydroxide 50 percent (caustic soda or lye). It was a base chemical with a pH level of 13, which is higher than a neutral pH level of 7. It was reported that the labor and equipment required to clean-up and dispose of the contaminated soil by Chesapeake Environment was $107,524.83.

Table 5-6: Hazmat Incidents 1994-2018

Year	Hazmat Incidents
2002	4
2003	9
2004	11
2005	11
2006	19
2007	15
2008	11
2009	9
2010	7
2011	11
2012	7
2013	8
2014	9
2015	19
2016	18
2017	12
2018	10

Source: Worcester County Fire Marshal's Office

Photo submitted by Thom Gulyas.
A "caustic chemical" spill with a pH level of 13 was discovered last Wednesday at Berlin Falls Park at the site off Old Ocean City Boulevard.

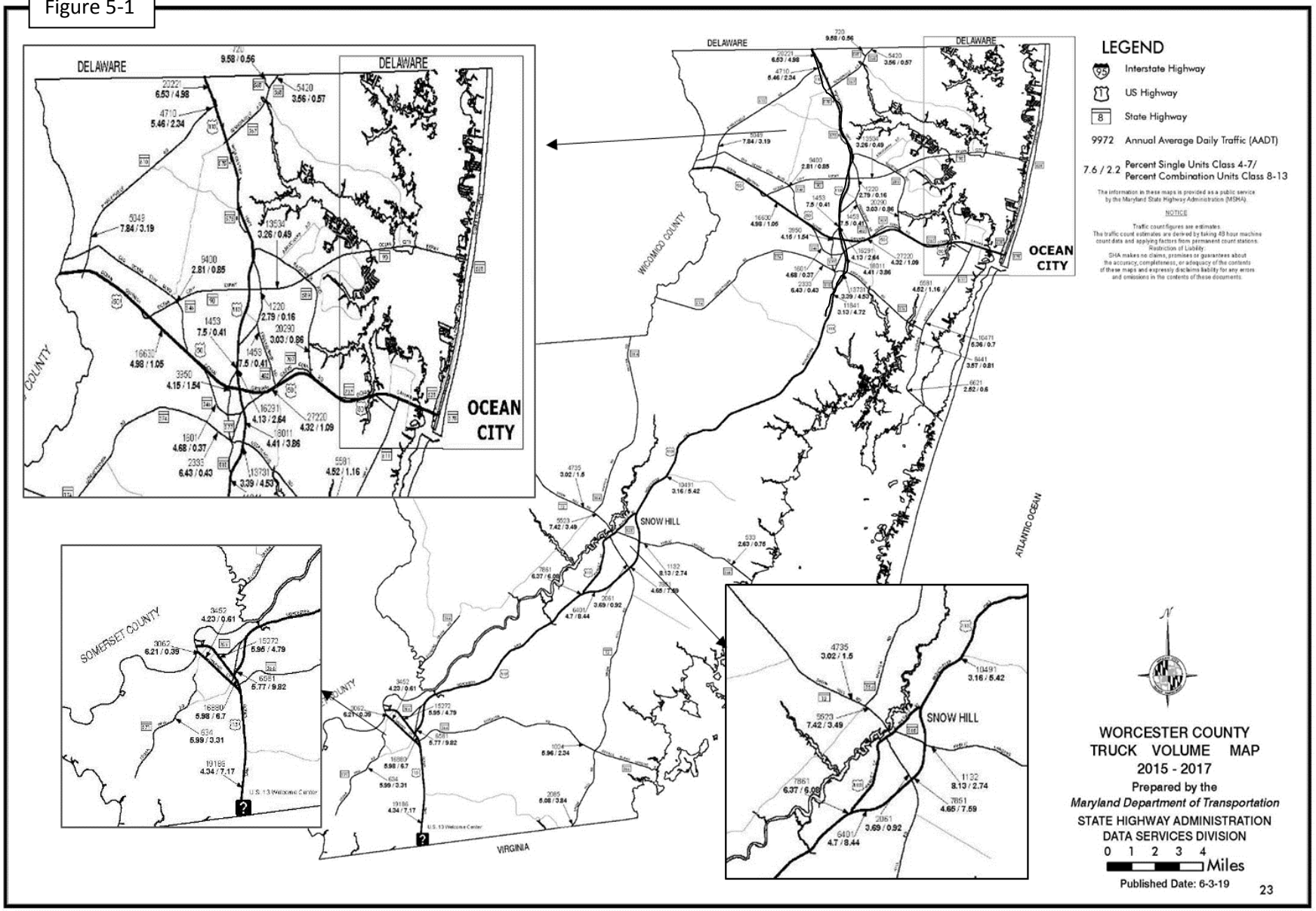
The photo (July 2019) shown to the left is a chemical spill at the facility on Old Ocean City Boulevard in Berlin Falls Park.

As illustrated on the Figure 5-1, the Maryland State Highway Administration tracks the amount of truck traffic traveling on the major road routes throughout the County. Routes 113 and 589, near the Delaware-Maryland line, approximately 14,042 and 17,141 trucks respectively are traveling in and out of the County on a daily basis. Truck traffic through Berlin via Route 50 has approximately 15,381 trucks traveling through from the west and 24,414 trucks from the east. Trucks traveling in and out of Snow Hill via Route 113 averages 8,762 trucks daily and Route 12 averages 4,735 trucks daily. Pocomoke City averages 15,020 trucks daily via Route 756 and within the City, approximately 16,800 trucks daily on Route 13. Truck traffic traveling in and

out Worcester County via Route 13 at the Virginia border averages 18,909 trucks daily. Critical facilities and residents located in close proximity to these State Routes are more susceptible to a transportation hazmat incident.

Finally, the interplay between propane and oil tanks and flood hazards is very dangerous, and costly. In 2003 hurricane Isabel dislodged and spilled hundreds of residential oil tanks in Maryland alone. Governments subsequently spent $2.25 million in remediation costs. The cost to individual homeowners was far greater. Elevating and anchoring propane and oil tanks properly mitigate this flood impact.

Figure 5-1



Source: Maryland Department of Transportation – SHA

Wildfires

Hazard Profile

A wildfire is an uncontrolled fire spreading through vegetative fuels, threatening and possibly consuming structures and other community assets. Wildfires often begin unnoticed and can spread quickly, creating dense smoke that can be seen for miles. A wildland fire is a fire in an area in which development is almost nonexistent, except for roads, power lines and similar facilities. An urban-wildland interface fire is a wildfire in an area where structures and other human development meet or intermingle with wildland or vegetative fuels. Fire may be rated as low, moderate, high, or very high based on the type of fuels that help sustain them (Table 5-7).

Wildfires can occur at any time of the year, but they mostly occur during long, dry hot spells. Any small fire in a wooded area, if not quickly detected and suppressed, can spread out of control. Human carelessness, negligence, and ignorance cause most wildfires. However, some are precipitated by lightning strikes and in rare instances, spontaneous combustion. Because wildfires consume the vegetative land cover, potential aftermath impacts include severe erosion and the silting of stream beds and reservoirs, resulting in damage to the watershed and increased flooding risks.

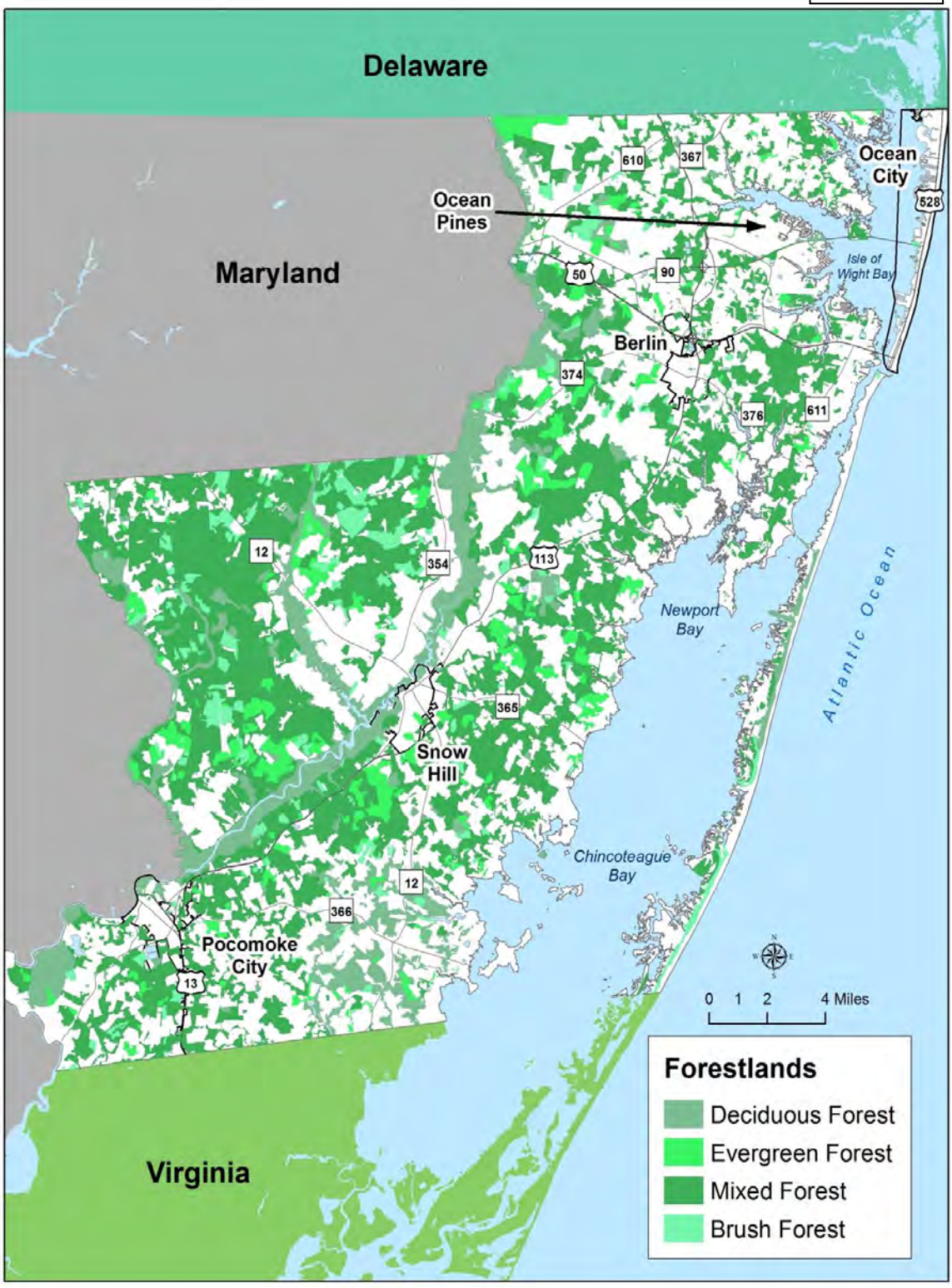
Table 5-7: Fire Danger Rating Descriptions

Rating	Description
Low	Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires in duff or punky wood. Fires in open cured grasslands may bum freely a few hours after rain, but woods fires spread slowly by creeping or smoldering, and burn in irregular fingers. There is little danger of spotting.
Moderate	Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot. Short-distance spotting may occur but is not persistent. Fires are not likely to become serious and control is relatively easy.
High	All fine dead fuels ignite readily, and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High intensity burning may develop on slopes or in concentrations of fine fuels. Fires may become serious and their control difficult unless they are attacked successfully while small.
Very High	Fires start easily from all causes and, immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high intensity characteristics such as long-distance spotting and fire whirlwinds when they burn into heavier fuels.
Extreme	Fires start quickly, spread furiously, and burn intensely. All fires are potentially serious. Development into high intensity burning will usually be faster and occur from smaller fires than in the very high fire danger class. Direct attack is rarely possible and may be dangerous except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens.

Source: USFS – Wildland Fire Assessment System

Occasionally brush fires threaten urban development where homes are built in close proximity to forest or brush covered land; Map 5-2. As more former agriculture land reverts to brush, this problem will become more prevalent.

Map 5-2



Source: Smith Planning and Design & MDP 2010 Land Cover

Wildfire Hazard Impacts

On July 25, 2019 during the Hazard Mitigation Planning Committee (HMPC) group discussion portion of the meeting, committee members were divided into groups. Participants were provided with hazard descriptions and blank hazard impact worksheets. Each group was provided time in which to discuss and record hazard impacts from their community perspective. Each group was then assigned a group representative to review results with the HMPC at-large. The following table provided community perspective impacts from Wildfire Hazard events to Worcester County.

Table 5-8: Wildfire Hazard Impact	
Health & Safety of the Public	Respiratory issues and the medically fragile population regarding oxygen needs. Urban/wildfire interface areas – those residents are particularly "at-risk".
Health & Safety of the First Responders	Heat, insect bites, and proper personal protective equipment (PPE) – structural vs. wildland.
Continuity of Operations (including Delivery of Services)	Restoration of services – Schools, etc.
Property, Facilities, & Infrastructure	Fire dependent – wildfire. Damages to area impacted may be significant in an urban/wildland interface area.
Environment	Environmental impacts – air quality, water runoff, and erosion.
Economic Conditions	Impacts only if it affected a community within the County.
Public Confidence in Government	Positive

Source: Worcester County Hazard Mitigation Planning Committee, 2019

Wildfire Historical Occurrences

According to the *2016 State of Maryland Hazard Mitigation Plan*, Worcester County has a 0.86 population vulnerability and a MD Forestry % in High & Medium-High Risk = 3.904144725% geographic extent.

Table 5-9: Wildfire Hazard Risk Assessment Data Table	
Population Vulnerability	*Geographic Extent*
0.86	MD Forestry % in High & Medium-High Risk = 3.904144725%
Source:2016 State of Maryland Hazard Mitigation Plan	

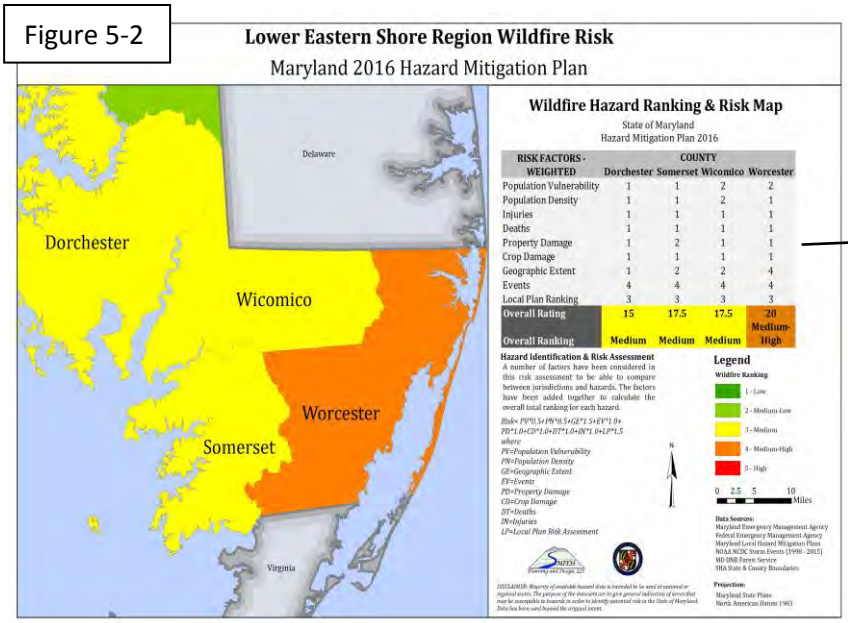
Table 5-10: Wildfire Events 2000-2017		
Year	**Number of Wildfires**	**Acres Burned**
2000	13	24.8
2001	28	16.3
2002	17	108.8
2003	0	0.0
2004	2	1.7
2005	7	53.6
2006	7	113.2
2007	11	51.2
2008	9	11.0
2009	2	3.0
2010	5	17.6
2011	5	125.8
2012	0	0.0
2013	3	12.0
2014	1	10.0
2015	3	3.6
2016	0	0.0
2017	0	0.0
Total	**113**	**552.6**
Average	**6.3**	**30.7**

Source: Maryland DNR Forest Service

In addition, the Maryland Department of Natural Resources, Forest Service reports 113 wildfire events and 552.6 acres burned between 2000-2017 in Worcester County, an average of 6.3 wildfire events and 30.7 acres burned.

The *2016 State of Maryland Hazard Mitigation Plan* also provided a Wildfire Risk Map; Figure 5-2, shown below. Worcester County is rated "Medium-High" for wildfire risk.

Figure 5-2



Wildfire Hazard Ranking & Risk Map

State of Maryland
Hazard Mitigation Plan 2016

RISK FACTORS - WEIGHTED	COUNTY Dorchester	Somerset	Wicomico	Worcester
Population Vulnerability	1	1	2	2
Population Density	1	1	2	1
Injuries	1	1	1	1
Deaths	1	1	1	1
Property Damage	1	2	1	1
Crop Damage	1	1	1	1
Geographic Extent	1	2	2	4
Events	4	4	4	4
Local Plan Ranking	3	3	3	3
Overall Rating	15	17.5	17.5	20
Overall Ranking	Medium	Medium	Medium	Medium-High

Source: 2016 State of Maryland Hazard Mitigation

Worcester County has abundant and beautiful forests that provide habitat for a plethora of species. The forest lands also provide storm water runoff filtration and serve as a resource for timber. Through the Worcester County Forest Conservation program as well as State and Nationwide programs such as Conservation Reserve Enhancement Program (CREP), much of this resource is able to be continually preserved.

In an area so rich in deciduous forest drought has rarely led to wildfires. Somerset County has seen marsh fires, while Worcester with fewer marsh acres has been spared. Around urban areas wildfires are also more common, and damage costs are higher. Wicomico County has experienced such fires.

Another common cause of the few fires that the county and the region have seen are from irresponsible human activity such as leaf burning and burning ditch banks. The county's burn regulations aim to mitigate this type of action. Worcester County has enforced a stringent burn policy as well which has kept fires occurrences to a minimum. Within Worcester County, several types of open fires require a permit. Worcester County only permits open burning according to rules set forth in County Code and State of Maryland regulations. According to the Worcester County Website, Worcester County regulations define an "open fire" as a fire where any material is burned in the open or in a receptacle other than a furnace, incinerator, or other equipment connected to a stack or chimney. While some open fires like leaf burns and campfires do not require official permits, they may not cause a public nuisance and leaf burns must be located at least 200 feet from the nearest inhabited structure.

In addition, Demolition of structures by fire may only be done under an official fire training exercise done by county volunteer fire companies with notifications given to Emergency Operations and the Fire Marshal. Disaster debris disposal for widespread destroyed structures by open burning are only approved when the Maryland Department of Environment issues a limited approval for such activities following an officially declared event.

Wind

Hazard Profile

Wind is the motion of air past a given point caused by a difference in pressure from one place to another. Produced by severe thunderstorms and tropical weather systems, high winds can cause significant damage. Flying debris, downed power lines, damaged communications utilities are just a few of the issues that can be caused by high winds.

According to the *2016 State of Maryland Hazard Mitigation Plan Update*, 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. When thunderstorm winds exceed 58 mph, the thunderstorm is considered severe and a warning is issued. "Downbursts" cause the high winds in a thunderstorm. Downburst winds result from the sudden descent of cool or cold air toward the ground. As the air hits the ground, it spreads outward, creating high winds. Unlike tornadoes, downburst winds move in a straight line, without rotation. The term "microburst" refers to a small downburst with damaging winds up to 168 mph and less than 2.5 miles in length. The term "macroburst" refers to a large downburst that can extend greater than 2.5 miles with winds up to 134 mph and can last 5 to 30 minutes.

Wind Hazard Impacts

On July 25, 2019 during the Hazard Mitigation Planning Committee (HMPC) group discussion portion of the meeting, committee members were divided into groups. Participants were provided with hazard descriptions and blank hazard impact worksheets. Each group was provided time in which to discuss and record hazard impacts from their community perspective. Each group was then assigned a group representative to review results with the HMPC at-large. The following table provided community perspective impacts from Wind Hazard events to Worcester County.

Table 5-11: Wind Hazard Impact	
(Thunderstorm winds and Non-thunderstorm wind)	
Health & Safety of the Public	Downed trees impact roads and structures. Tree damage may impact homes causing roof collapse, window breakage, and blockage.
Health & Safety of the First Responders	Unsafe obstacles during response. Downed powerlines and debris.
Continuity of Operations (including Delivery of Services)	Delays due to impacted routes and roadways.
Property, Facilities, & Infrastructure	Damaged water plants and public facilities. Impacted transportation routes

	may be closed.
Environment	Potential spills due to damaged facilities, particularly those with hazmats. Impacted fuel tanks that were not properly secured.
Economic Conditions	Added costs to clean and clear debris. Impact to structures causing business interruption and closures.
Public Confidence in Government	High

Source: Worcester County Hazard Mitigation Planning Committee, 2019

Wind Historical Occurrences

Information obtained for Worcester County using both the *2016 State of Maryland Hazard Mitigation Plan* and the National Centers for Environmental Information (NCEI) – Storm Events Database between January 1950 and July 31, 2019 for Wind Hazard include: High Wind & Thunderstorm Wind data from NCEI has been included on the data table below.

Table 5-12: Wind Hazard Risk Assessment Data Table

Population Vulnerability	*Injuries & Deaths*		*Property & Crop Damage*		*Geographic Extent*	*Events 1956-2019*
0.86	0	0	3.963M	0	ASCE Wind Design Speed = 120	Total 67
						Annualized 1.05

Source: National Centers for Environmental Information, as of July 2019 & 2016 State of Maryland Hazard Mitigation Plan

Note: Hazards included within this table from NCEI Data: High Wind & Thunderstorm Wind

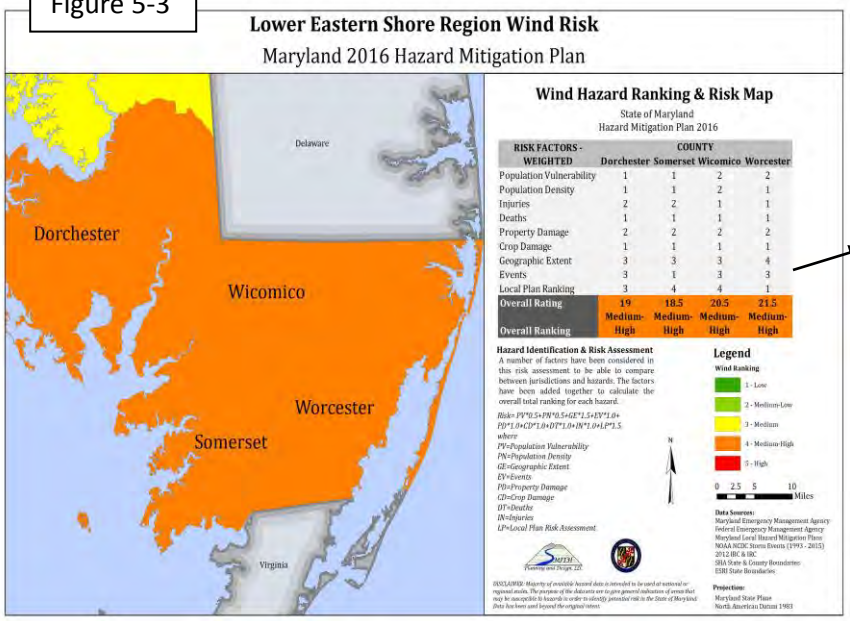
On August 7, 2017, thunderstorm wind damage occurred in West Ocean City resulting from straight line winds. Damage was evident along both sides of Route 50 and Route 611 (Stephen Decatur Highway) in West Ocean City. A few shingles were blown off an apartment complex near the Tanger Outlets, and a few trees were also downed. In addition to the wind damage in West Ocean City, two vehicles were damaged at the Ocean City airport as a result of a falling tree in the high wind. Total property damage was $200,000 and the wind magnitude was reported as 57 kts.

Additionally, on October 11-12th, 2018, very strong northwest winds on the back side of Tropical Storm Michael produced damaging wind gusts (50 kts.) across portions of the Lower Maryland Eastern Shore. Several trees were downed and there were minor structural damages of $10,000 along the Maryland beaches and $5,000 reported inland Worcester County.

The most recent thunderstorm event occurred on April 15, 2019 in Bishopville. Scattered severe thunderstorms in advance of a cold front produced damaging winds and one tornado across portions of the Lower Maryland Eastern Shore. Power poles were downed with power outages, with $2,000 in property damages reported.

The *2016 State of Maryland Hazard Mitigation Plan* provided a Wind Risk Map; Figure 5-3, shown below. Worcester County is rated "Medium-High" for wind risk.

Figure 5-3



Wind Hazard Ranking & Risk Map

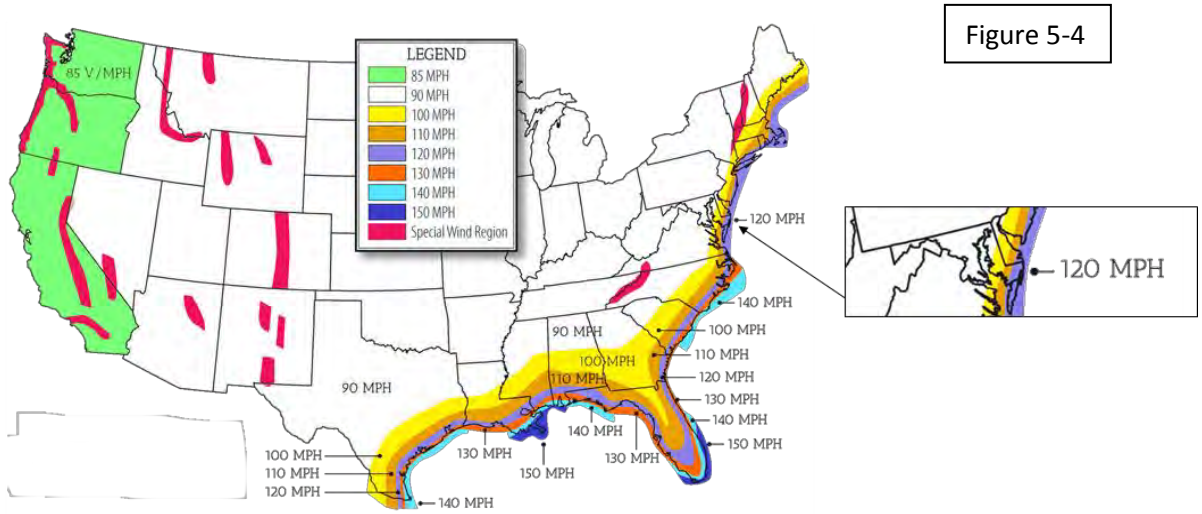
State of Maryland
Hazard Mitigation Plan 2016

RISK FACTORS - WEIGHTED	COUNTY Dorchester	Somerset	Wicomico	Worcester
Population Vulnerability	1	1	2	2
Population Density	1	1	2	1
Injuries	2	2	1	1
Deaths	1	1	1	1
Property Damage	2	2	2	2
Crop Damage	1	1	1	1
Geographic Extent	3	3	3	4
Events	3	1	3	3
Local Plan Ranking	3	4	4	1
Overall Rating	**19**	**18.5**	**20.5**	**21.5**
Overall Ranking	**Medium-High**	**Medium-High**	**Medium-High**	**Medium-High**

Source: 2016 Maryland State Hazard Mitigation Plan

According to the ASCE design wind speed zones, the wind design speed zones for Worcester County is 120 mph, shown below on Figure 5-4.

Figure 5-4



Source: ALP, http://alppoles.com/wind-speed.php Note: 2009 AASHTO LTS-5 specification 3-second gust basic wind speeds mph) with gust effect factor (G) of 1.14- and 25-year design life wind map (ASCE 7-05) is shown above. This wind map should be used to determine wind velocity for your specific location. If you are located between two different velocity isotach lines, the higher velocity should be used.

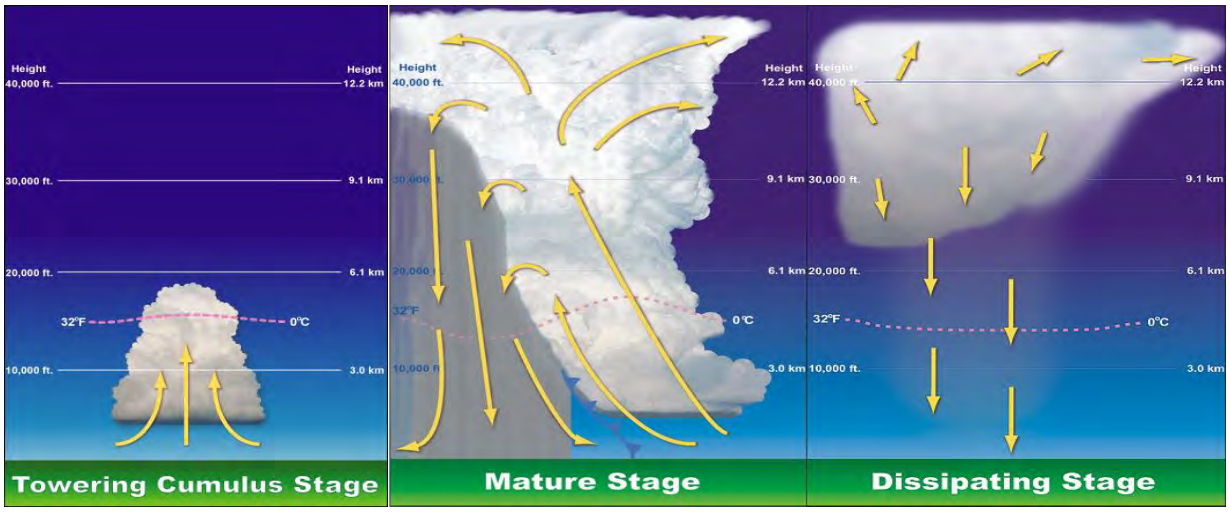
Thunderstorm

Hazard 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 rises, cools and condenses. This condensation proceeds until most of the moisture in the air mass has been precipitated. 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 to 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 or sudden descent 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 a lightning strike. Lightning has been known to strike up to 6-10 miles from the storm in an area of clear sky. It is estimated that more than 30,000,000 points on the ground in the continental 48 states are hit by lightning in a single year.

Figure 5-5: Thunderstorm Life Cycle



Thunderstorm Hazard Impacts

On July 25, 2019 during the Hazard Mitigation Planning Committee (HMPC) group discussion portion of the meeting, committee members were divided into groups. Participants were provided with hazard descriptions and blank hazard impact worksheets. Each group was provided time in which to discuss and record hazard impacts from their community perspective. Each group was then assigned a group representative to review results with the HMPC at-large.

The following table provided community perspective impacts from Thunderstorm Hazard events to Worcester County.

Table 5-13: Thunderstorm Hazard Impact (Thunderstorm, Hail, and Lightning)	
Health & Safety of the Public	Vulnerable and medically fragile populations, electricity dependent durable medical equipment and oxygen dialysis. Proper public announcements through the media and mass notification system.
Health & Safety of the First Responders	Follow standard operating procedures. Replace personal protective equipment (PPE) and monitor fatigue of responders. 1st responders who reside in hazard risk area may not be available to respond to a thunderstorm event.
Continuity of Operations (including Delivery of Services)	Interoperability of communications. Essential services and facilities must remain available. Immediate recovery and quick return to "normalcy". Evaluate the plans that were implemented.
Property, Facilities, & Infrastructure	Document impact and prioritize needs of the community. Restoration of essential facilities and schools are a priority.
Environment	Check for impacts recognized. Require environmental health inspections after return to "normalcy" within County. Inspect area for possible contamination and blockages due to downed trees and powerlines.
Economic Conditions	Food and medical insecurity. Mass power outage – closure of business potentially.
Public Confidence in Government	Moderate

Source: Worcester County Hazard Mitigation Planning Committee, 2019

Thunderstorm Historical Occurrences

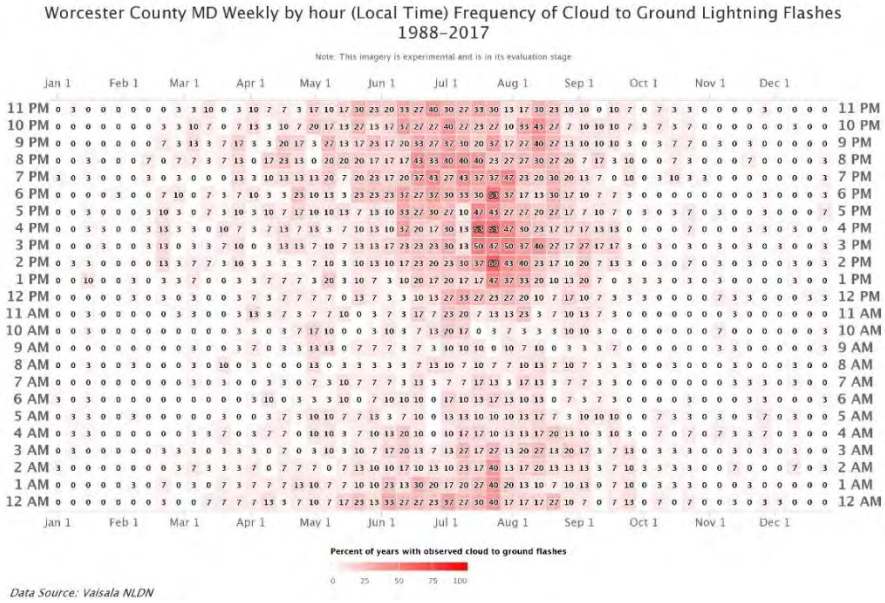
Information obtained for Worcester County using both the *2016 State of Maryland Hazard Mitigation Plan* and the National Centers for Environmental Information (NCEI) – Storm Events Database between January 1950 and July 31, 2019 for Thunderstorm Hazard include: Lightning & Hail data from NCEI has been included on the data table below.

Table 5-14: Thunderstorm Hazard Risk Assessment Data Table						
Population Vulnerability	*Injuries & Deaths*		*Property & Crop Damage*		*Geographic Extent*	*Events 1958-2019*
0.86	0	0	33K	0	2"> hail and lightning events with Injuries/Deaths = 1	Total 24 Annualized 0.39
Source: National Centers for Environmental Information, as of July 2019 & 2016 State of Maryland Hazard Mitigation Plan						

Note: Hazards included within this table from NCEI Data: Lightning, & Hail

Lightning Strikes

Figure 5-6



Lightning strikes are defined as sudden and violent discharges of electricity from within a thunderstorm due to a difference in electrical charges and represent a flow of electrical current from cloud-to-cloud or cloud-to-ground. Nationally, lightning strikes cause extensive damage to buildings and structures, kills or injures people and livestock, starts untold numbers of forest fires and wildfires, and disrupts electromagnetic transmissions. Lightning strikes are extremely dangerous during dry lightning storms because people remain outside due to the lack of precipitation; however, lightning is still present during the storm. Lightning strikes usually occur as a result of the thunderstorms that move through the area during the summer months.

As shown in Figure 5-6: Worcester County MD Weekly by Hour (Local Time) Frequency of Cloud to Ground Lightning Flashes 1988-2017 above, the peak months for lightning strikes are between May and September. In addition, the frequency of cloud to ground lightning flashes data shows that during those months the highest frequency of lightning strikes occur between the hours of 1pm-11pm, EST.

Figure 5-7: Eight Unit Two Story Building Fire Caused by Lightning

During the current planning cycle, on July 28, 2016 lightning strikes occurred in the following areas:

- Berlin, MD – Transformer stuck by lightning causing $10,000 in damages;
- Ocean Pines, MD – House struck by lightning causing 5,000 in damages; and
- Ocean City, MD – Camper struck by lightning in Frontier Town Campgrounds causing $5,000 in damages.

Most recently, on July 31, 2019, the Worcester County Fire Marshal's Office investigated a fire at an 8-unit two story building (Manklin Meadows Condominium) - 11421 Manklin Creek Road in Ocean Pines. Arriving

firefighters reported heavy fire from the roof area of the building. It took firefighters over two hours to control the fire and emergency units remained on the scene for over 4 hours. The cause of the fire was determined to be a lightning strike. No injuries were reported.

Figure 5-8: Thunderstorms Containing Hail Can Exhibit a Characteristic Green Coloration

Hail

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.

On August 1, 2016, scattered severe thunderstorms associated with a frontal boundary produced large hail (1”-1.5”) across portions of the Lower Maryland Eastern Shore. No reported damage or injuries.

Winter Storm

Hazard Profile

The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. This type of storm usually starts as a mid-latitude depression in the central U.S. and moves north and east between the Appalachians and the East Coast. Depending on the speed at which these storms travel and the air mass temperature, heavy amounts of snow, sleet, freezing rain or some combination will result. Typically, a winter storm will last for 24 – 48 hours and move out of the area into New England. Then, depending on the controlling air mass, temperatures will continue to be cold and the snow or ice will linger for days or sometimes weeks, or, conversely the temperature will warm quickly, and the snow or ice will melt in a short time. The National Oceanic Atmospheric Administration (NOAA) defines winter storms as 'conditions that are favorable for hazardous winter weather conditions including heavy snow, blizzard conditions or significant accumulations of freezing rain or sleet.'

Winter Storm Hazard Impacts

On July 25, 2019 during the Hazard Mitigation Planning Committee (HMPC) group discussion portion of the meeting, committee members were divided into groups. Participants were provided with hazard descriptions and blank hazard impact worksheets. Each group was provided time in which to discuss and record hazard impacts from their community perspective. Each group was then assigned a group representative to review results with the HMPC at-large. The following table provided community perspective impacts from Winter Storm Hazard events to Worcester County.

Table 5-15: Winter Storm Hazard Impact	
(Winter Storm; Extreme Cold; Nor'easter (Snowfall)	
Health & Safety of the Public	Media message of potential impacts and risks using mass notification system for public announcements. Extreme cold health risks and proper generator usage.
Health & Safety of the First Responders	Be prepared and properly protected due to snow removal activities, poor visibility, and potential risk from cold.
Continuity of Operations (including Delivery of Services)	Interoperability of radio systems to command and center. Snow and ice on communication tower equipment. Mass power outage due to heavy snow or ice buildup on power lines.
Property, Facilities, & Infrastructure	Heavy snow loads on roofs – collapse. Interruptions of services. Impassable roads and transportation accidents.
Environment	A different approach is needed in regard to treating roadways during a winter storm. Review county roads winter treatment and stockpile.

Economic Conditions	In Berlin, virtually no business makes money in the off season. Power outages and damage from ice and heavy snow may interrupt commercial activity.
Public Confidence in Government	Government is positively looked upon when weather isn't impacting the community. Confidence is ok when government resolves an electric outage quickly.

Source: Worcester County Hazard Mitigation Planning Committee, 2019

Winter Storm Historical Occurrences

Information obtained for Worcester County using both the *2016 State of Maryland Hazard Mitigation Plan* and the National Centers for Environmental Information (NCEI) – Storm Events Database between January 1950 and July 31, 2019 for Winter Storm Hazard include: Winter Storm, Blizzard, Heavy Snow, Winter Weather, Frost/Freeze, and Cold Wind Chill data from NCEI has been included on the data table below.

Table 5-16: Winter Storm Hazard Risk Assessment Data Table

Population Vulnerability	*Injuries & Deaths*		*Property & Crop Damage*		*Geographic Extent*	*Events 1996-2019*
0.86	0	0	20K	0	Average Snowfall Total = 1	Total 71 Annualized 3.0

Source: National Centers for Environmental Information, as of July 2019 & 2016 State of Maryland Hazard Mitigation Plan

Note: Hazards included within this table from NCEI Data: Winter Storm, Blizzard, Heavy Snow, Winter Weather, Frost/Freeze, & Cold Wind Chill.

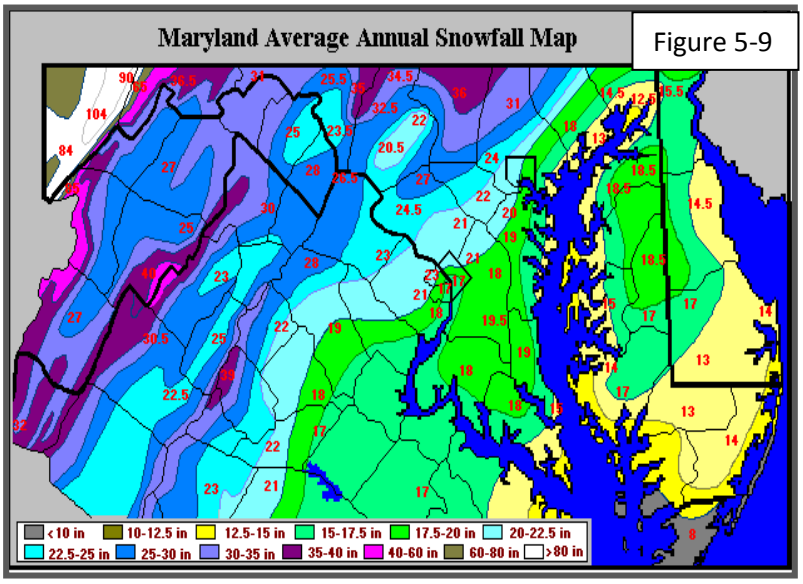


Figure 5-9

As illustrated in Figure 5-9, Worcester County's annual snowfall is approximately 14 inches. Significant snowfall amounts have the potential of damaging power lines, communication towers, interfering with transportation and damaging residential and commercial structures. In regard to critical facilities, the age and type of construction determines the vulnerability of the structure. Additionally, critical facilities should have an alternate power source in the chance power lines are downed due to winter storms. Critical facilities at a higher risk for structural damage or loss of power should be retrofitted to sustain the effects of winter storms.

On January 7, 2017, the Worcester County Emergency Services urged residents to prepare for cold weather. Snowfall totals were generally between 9 inches and 12 inches across the county, with Ocean Pines receiving 12 inches of snow. Very strong north winds affected the area, producing some blowing snow and reduced visibilities. More recently, on January 3, 2018, Snowfall totals ranged between 6 inches and 11 inches across the county. Very strong north to northwest winds of 30 to 50 mph affected the area, producing blizzard conditions. Snow Hill and Ocean City received 11 inches of snow, Ocean Pines received 8.7 inches of snow, Ironshire received 6 inches of snow. Travel and clean up were severely hampered by significant drifting of snow throughout the county.

Drought

Hazard Profile

According to National Oceanic Atmospheric Administration (NOAA), drought is a complex phenomenon which is difficult to monitor and define. The climatological community has defined four types of drought: 1) meteorological drought, 2) hydrological drought, 3) agricultural drought, and 4) socioeconomic drought. Meteorological drought happens when dry weather patterns dominate an area. Hydrological drought occurs when low water supply becomes evident, especially in streams, reservoirs, and groundwater levels, usually after many months of meteorological drought. Agricultural drought happens when crops become affected. And socioeconomic drought relates the supply and demand of various commodities to drought.

Drought Hazard Impacts

On July 25, 2019 during the Hazard Mitigation Planning Committee (HMPC) group discussion portion of the meeting, committee members were divided into groups. Participants were provided with hazard descriptions and blank hazard impact worksheets. Each group was provided time in which to discuss and record hazard impacts from their community perspective. Each group was then assigned a group representative to review results with the HMPC at-large. The following table provided community perspective impacts from Drought Hazard events to Worcester County.

Table 5-17: Drought Hazard Impact	
(Drought)	
Health & Safety of the Public	High risk for older & younger populations. Mandatory water restrictions may be implemented.
Health & Safety of the First Responders	Potential for fire outbreaks.
Continuity of Operations (including Delivery of Services)	Water shortages.
Property, Facilities, & Infrastructure	High heat may lead to power loss and damages.
Environment	Drought causes loss of habitat and long-term issues.
Economic Conditions	Crop failure and impacts to agriculture endeavors will be negatively impacted.
Public Confidence in Government	High

Source: Worcester County Hazard Mitigation Planning Committee, 2019

Drought Historical Occurrences

Information obtained for Worcester County using both the 2016 State of Maryland Hazard Mitigation Plan and the National Centers for Environmental Information (NCEI) – Storm Events Database between January 1950 and July 31, 2019 for Drought. Data from NCEI has been included on the data table below.

Table 5-18: Drought Hazard Risk Assessment Data Table

Population Vulnerability	*Injuries & Deaths*		*Property & Crop Damage*		*Geographic Extent*	*Events 1995-2019*
0.86	0	0	Low	Low	% Crop from 2012 Agriculture Census =32.8%	Total 1
						Annualized .01

Source: National Centers for Environmental Information, as of July 2019 & 2016 State of Maryland Hazard Mitigation Plan

Note: Hazards included within this table from NCEI Data: Excessive Heat

The data on Table 5-19 contains drought periods that impacted Worcester County starting in the1900's. The Northeast Regional Climate Center is partnered with National Centers for Environmental Information, Regional Climate Centers, and Cornell University. This table shows the Southern Eastern Shore Climate Division 1 drought periods which includes Worcester County. In addition, it provides data for periods of two or more months with severe or extreme drought. This data collected from the Northeast Regional Climate Center reflects a much more accurate description of previous and ongoing droughts that have affected Worcester County.

Table 5-19: Southern Eastern Shore Climate Division 1 Drought Periods

Drought Periods	Duration	Lowest PDSI
1900-10 to 1901-03	6 months	-3.75 in 1901-02
1921-09 to 1921-12	4 months	-3.97 in 1921-11
1930-04 to 1931-02	11 months	-6.74 in 1931-02
1941-11 to 1942-02	4 months	-3.48 in 1942-02
1965-11 to 1966-04	6 months	-4.03 in 1965-12
1966-07 to 1967-04	10 months	-4.03 in 1967-01
1985-03 to 1985-04	2 months	-4.16 in 1985-04
1986-06 to 1986-12	7 months	-4.24 in 1986-11
1987-11 to 1987-12	2 months	-3.08 in 1987-12
1991-05 to 1991-06	2 months	-3.19 in 1991-05
1994-12 to 1995-04	5 months	-3.84 in 1995-03
1995-08 to 1995-09	2 months	-3.74 in 1995-09
1998-11 to 1999-02	4 months	-3.76 in 1998-12
1999-06 to 1999-08	3 months	-3.52 in 1999-08
2001-12 to 2002-03	4 months	-4.41 in 2002-02
2002-05 to 2002-08	4 months	-4.29 in 2002-08
2007-09 to 2008-03	7 months	-4.03 in 2008-03
2010-07 to 2010-09	3 months	-3.71 in 2010-08
2010-11 to 2011-09	11 months	-4.95 in 2011-07
2011-12 to 2012-07	8 months	-3.94 in 2012-03

Source: 2017 Northeast Regional Climate Center
Note: Based on monthly Palmer Drought Severity Index as computed by the National Centers for Environmental Information. Period of record: January 1895-June 2019.

Worcester County has experienced two drought events between 1995 and 2010. However, an economic loss due to crop damage was not experienced during either event. Worcester County's agricultural lands predominately produce corn, soybean and winter wheat.

Furthermore, groundwater is another concern during a drought event. According to the *2006 Worcester County Comprehensive Plan*, the most current groundwater is the County's only source of drinking water. The plan states the county contains an abundance of sand and gravel aquifers that yield large quantities of groundwater. However, this water is also the primary source for irrigation and the major source of freshwater to the coastal bays. During a drought event, farmers will rely heavily on irrigation for crops. Therefore, water usage for irrigation will have to be monitored during a drought event.

Additionally, Maryland polices for water use restrictions became effective in August of 2002. The Maryland Department of the Environment uses four main indicators based on the amount and effect of precipitation on the hydrologic system to monitor potential drought conditions. They include precipitation levels, stream flows, ground water levels, and reservoir storage. These indicators are tracked during drought events to determine stages of drought for response by local authorities. In Worcester the drought coordinator is the Environmental Programs Director, responsible for handling applications for exemptions or variances to statewide water use restrictions imposed by the Maryland Department of the Environment. Regarding the historical perspective, since the imposition of these policies in 2002, Worcester County, as part of the Eastern Drought Region has only experienced a watch stage drought level, meriting a voluntary 5-10% in water usage.

Excessive Heat

Hazard Profile

According to the National Weather Service (NWS), 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.

The National Oceanic Atmospheric Administration (NOAA) defines excessive heat as 'excessive heat occurring from a combination of high temperatures (significantly above normal) and high humidity. At certain levels, the human body cannot maintain proper internal temperatures and may experience heat stroke. The "Heat Index" is a measure of the effect of the combined elements on the body.

Excessive Heat Hazard Impacts

On July 25, 2019 during the Hazard Mitigation Planning Committee (HMPC) group discussion portion of the meeting, committee members were divided into groups. Participants were provided with hazard descriptions and blank hazard impact worksheets. Each group was provided time in which to discuss and record hazard impacts from their community perspective. Each group was then assigned a group representative to review results with the HMPC at-large. The following table provided community perspective impacts from Excessive Heat Hazard events to Worcester County.

Table 5-20: Extreme Heat Hazard Impact	
(Extreme Heat)	
Health & Safety of the Public	High risk for older & younger populations. Mandatory water restrictions may be implemented.
Health & Safety of the First Responders	Potential for fire outbreaks.
Continuity of Operations (including Delivery of Services)	Water shortages.
Property, Facilities, & Infrastructure	High heat may lead to power loss and damages.
Environment	Drought causes loss of habitat and long-term issues.
Economic Conditions	Crop failure and impacts to agriculture endeavors will be negatively impacted.
Public Confidence in Government	High

Source: Worcester County Hazard Mitigation Planning Committee, 2019

Historical Occurrences

Information obtained for Worcester County using both the *2016 State of Maryland Hazard Mitigation Plan* and the National Centers for Environmental Information (NCEI) – Storm Events Database between January 1950 and July 31, 2019 for Excessive Heat. Data from NCEI has been included on the data table below.

Table 5-21: Excessive Heat Hazard Risk Assessment Data Table

Population Vulnerability	*Injuries & Deaths*		*Property & Crop Damage*		*Geographic Extent*	*Events 2011-2019*
0.86	0	0	Low	Low	% Crop from 2012 Agriculture Census =32.8%	Total 1 Annualized .11

Source: National Centers for Environmental Information, as of July 2019 & 2016 State of Maryland Hazard Mitigation Plan

Note: Hazards included within this table from NCEI Data: Excessive Heat

On July 20, 2017, heat indexes reached 110 degrees in Worcester County. The Worcester County Emergency Services urged residents to exercise caution and check on elderly and infirm neighbors. On July 20-22, the five branch County Libraries in Berlin, Ocean City, Ocean Pines, Pocomoke, and Snow Hill; Sunday, July 23, the Showell Volunteer Fire Department (SVFD) lobby; and the Worcester County Government Center first floor was opened to all county residents.

The heat index is an important aspect to consider during the summer months. As mentioned in Table 5-22, the heat index refers to how hot it really feels outside. The heat index is based on air temperature and relative humidity. For example, an air temperature of 92°F with a humidity of 100% creates a heat index of 132°F, which is extremely dangerous. Two groups that are most vulnerable to these excessive heat conditions are the elderly population and the younger population. The following table details the heat disorders that may occur to these two groups.

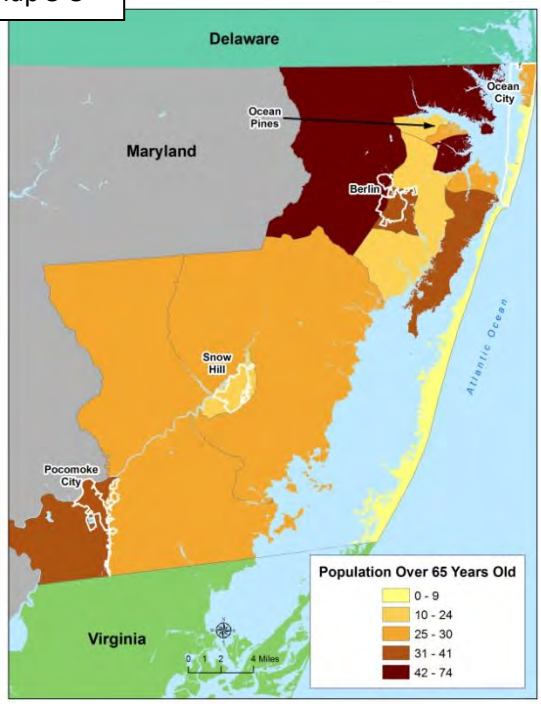
Table 5-22: Heat Disorders on High Risk Groups

Heat Disorders on High Risk Groups	
Heat Index/ Apparent Temperature (◦F)	**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.

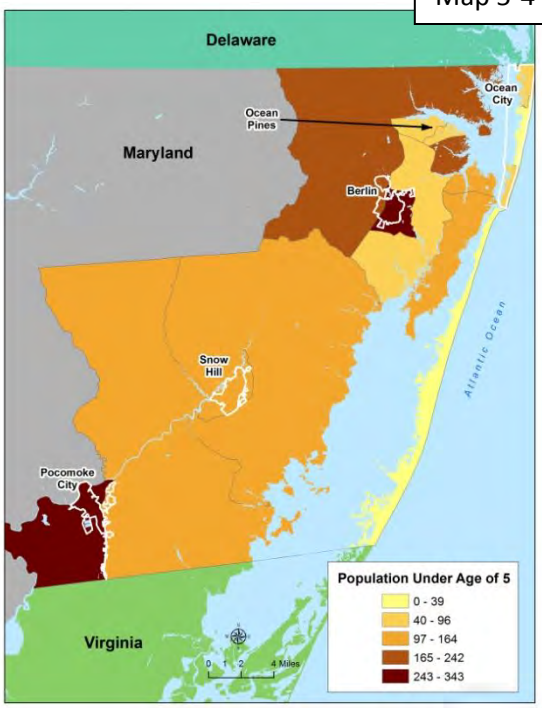
Source: NOAA

The following maps illustrate where the concentration of the two vulnerable groups are located. These groups include the population of 65 and older age group and children under the age of 5.

Map 5-3



Map 5-4



Source: Smith Planning and Design & 2010 US Census Data

Additionally, a prolonged period excessive heat can lead to drought. According to NOAA, drought is defined as 'a deficiency of moisture that results in adverse impacts on people, animals, or vegetation over a sizeable 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. NOAA together with its partners provides short- and long-term drought assessments.

Social Vulnerability & Non-Flood Related Hazards

Every community must prepare for and respond to hazardous events. Information on the location and relative concentration of different types of social vulnerabilities in small geographic areas, such as census tracts can help emergency managers locate and plan for the specific needs of their communities.

> ***Social Vulnerability*** is defined in terms of the characteristics of a person or group that affect "their capacity to anticipate, cope with, resist, and recover from the impact" of a discrete and identifiable disaster in nature or society.

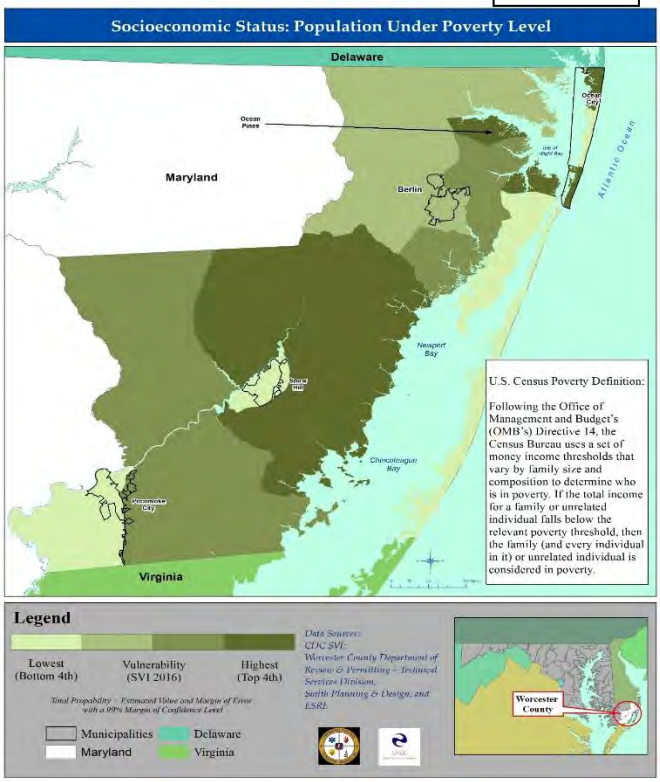
A Social Vulnerability Assessment was performed at a census track level using five variables. The Overall Social Vulnerability Map depicts the composite social vulnerability of communities within Worcester County. The Overall Social Vulnerability map combines all five variables: ***Below Poverty, Age 65 or Older, Civilian with a Disability, Speaks English "Less than Well", and No Vehicle*** to provide a comprehensive assessment of the (7) seven non-flood related hazards within this chapter. Additional and large format social vulnerability maps detailing the five variables listed above can be found in *Appendix I: Vulnerable Populations.*

In all hazard events, vulnerability to people is based on the availability, reception, and understanding of early warning of hazard events. In addition, access to shelter and means and desire to adhere to evacuation order affects overall vulnerability to people. Finally, despite having access to technology that allows reception for of the warning, language differences oftentimes become a barrier to individuals understanding them. Children, elderly, and non-English speaking residents may face greater challenges overcoming the impacts of hazard events.

Reviewing the overall social vulnerability in relation to the non-flood related hazards: **Tornado, Hazardous Materials, Wildfire, Wind, Thunderstorm, Winter Storm, and Drought,** it is difficult to determine the exact location of each event due to the lack of geographic extent. Therefore, all jurisdictions within Worcester County are expected to be impacted equally.

Socially vulnerable populations are considered most susceptible to the severe winter storm hazard. The high cost of fuel to heat residential homes can create a financial strain on populations with low or fixed incomes. According to the Socioeconomic Status: Population Under Poverty Level, shown on Map 5-5, the middle section of the county and small portions to the northeast, including Ocean Pines, contains the highest concentration of poverty stiction populations.

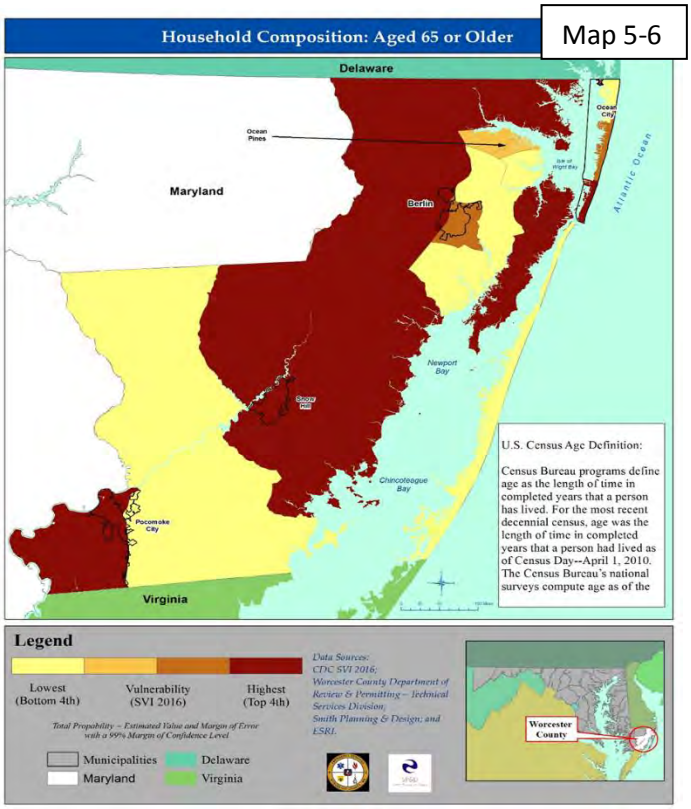
Map 5-5



In addition, low-income residents may not have access to housing, or their housing may be less able to withstand cold temperatures, such as, mobile homes and homes with poor insulation and heating supply. The aging population has an increased risk of injuries and death due to falls and from overexertion and/or hypothermia from attempts to clear snow. In addition, severe winter storm events can reduce the ability of these populations to access emergency services. Reviewing the Household Composition: Aged 65 or Older map below, the majority of the county is highly socially vulnerable due to age.

This socially vulnerable population is also at risk to extreme heat events. It is evident from past events that extreme heat is dangerous and can cause human related illnesses and death. As temperatures go up so do the number of people hospitalized for heat related illnesses. The elderly, just like small children, are more susceptible to temperature extremes.

Map 5-6



In regard to tornadoes, nearly 70 percent of the deaths from tornadoes happen to people located in residential structures. Of these, over 40 percent are located in mobile homes, which are easily overturned and destroyed due to the low wind resistance of the structure. According to the building database provided by the Department of Development Review & Permitting–Technical Services Division, there are 3,764 mobile homes located throughout Worcester County. Even anchored mobile homes can be seriously damaged when winds gust reach over 80 mph.

Since 97% of wildfires are caused by people, wildfire ignitions are also more

common in these Wildland-Urban Interface (WUI) zones. Considering all factors, wildfires can be a significant threat in Maryland. Homes and other structures intermixed with wildland fuels are at risk, and WUI residents need to take actions to protect themselves and their property.

Furthermore, vulnerable population groups should be targeted for disaster preparedness outreach initiatives. Disaster preparedness outreach initiatives include:

- First Aid Kits, Emergency Food Supplies, Evacuation Plans, and Fire Extinguishers;
- Home Protection from Wind Damage (Shutters or Supplies);
- Homeowners Insurance Protection;
- Warning Systems – not receiving or believing the warnings which can result in death or injury;
- Evacuation Orders – no vehicle or transportation, public transportation options, or no place to go; and
- Where you reside – mobile home park versus traditional home.

Finally, Worcester County should continue to improve the vulnerable population identification, planning initiatives, and develop hazard preparedness and mitigation public outreach materials. These materials should include infectious disease outbreak information, health impacts, citizen alert system, and how citizens can be notified of hazard events and forecasts. Outreach initiative mitigation action items have been included in *Chapter 9: Mitigation Strategies*.

CHAPTER 6: CAPABILITY ASSESSMENT

Overview

Through its Emergency Services Department, Worcester County has developed a network of trained agency and volunteer personnel through the Maryland Emergency Management Assistance Compact (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 Emergency Management Agency. County agencies include the Public Works-Roads Division, Sanitary Commission, Board of Education and the Sheriff's Office.

Worcester County's Department of Emergency Services has recently expanded and enhanced their facilities. The County has installed a new 800 MHz radio system to link police, fire, and EMS responders. Pre-planning has been conducted to enable the evacuation of the County's identified special populations (hospital patients, nursing home residents, prison inmates, etc.). Improved access to timely meteorological data has been implemented. Mutual aid agreements with adjacent jurisdictions have been signed. The County also participates in the Delmarva Emergency Task Force with most of the other jurisdictions on the Delmarva Peninsula. This task force endeavors to coordinate all emergency management functions between these jurisdictions.

Types of Capabilities

Various types of capabilities for reducing long term vulnerability have been identified throughout this chapter. This chapter is organized to reflex capabilities as they relate to the hazards identified in Chapter 3: Hazard Identification & Risk Assessment. Capabilities of Worcester County and the municipalities of Berlin, Pocomoke, and Snow Hill are included.

All-Hazards Planning

During this planning cycle, the Department of Emergency Services and their partners updated the *2010 Worcester County Emergency Operation Plans*. The plan update was officially adopted in February of 2017.

Plan Integration

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.

During the preparation of the 2020 Worcester County Hazard Mitigation & Resilience Plan, a Safe Growth Audit was conducted; Appendix H. Performing a Safe Growth Audit is a way to assess how well the existing planning tools address hazard risks and community resiliency. Safe Growth Audit questions provide a systematic way to review local planning tools and identify the presence of, or need for, hazard-related actions.

Local documents reviewed during the Safe Growth Audit include:

- 2006 Worcester County Comprehensive Plan;
- 2010 Town of Berlin Comprehensive Plan;
- 2014 Town of Pocomoke Comprehensive Plan;
- 2010 Town of Snow Hill Comprehensive Plan;
- Worcester County Zoning Ordinance;
- Worcester County Subdivision of Land;
- 2011 Worcester County Hazard Mitigation Plan;
- 2016 Lower Eastern Shore Maryland Coordinated Public – Transit Human Services Transportation Plan; and
- Worcester County Five-Year Capital Improvement Plan - FY 2018 To FY 2022.

There are four (4) municipalities within Worcester County. All municipalities exercise planning and zoning authority.

Note: Ocean City has completed a Safe Growth Audit during the development of the *2016 Town of Ocean City Hazard Mitigation Plan*.

Recommendations for implementation are included within Chapter 9: Mitigation Strategies and Appendix H: Safe Growth Audit.

Building Codes

Building Codes were adopted by Worcester County in 1993 and 1988, respectively. Worcester County implemented these codes to improve the quality of construction, regulate building permit issuance and decrease the damage to buildings from storms. Some of the topics covered by these codes are:

- Standards for building construction.
- Wind resistance designs and the placement of glass.
- Foundation design.
- The construction, sizing and attachment of structural members and the reinforcement and bracing of floors, walls, roofs, etc.
- Structural design to resist winds and fastener schedules to improve stability.
- Roof and ceiling installation to create foundation to rafter continuous ties to resist wind uplift.

The International Building Code (IBC) and the International Residential Code (IRC) are designed to ensure safety to life and property from all hazard incidents with building design and construction at the least possible cost consistent with national recognized standards. More recently, Worcester County has adopted both the 2015 IBC and IRC and other codes consistent with the Maryland Building Performance Standards and the Maryland Accessibility Code. In addition, Worcester County adopted the 2015 International Energy Code and the 2017 National Electric Code.

County and Municipal Departments

The County and its municipalities possess capabilities through various departments and staff resources.

Table: 6-1: Government Department & Staff Resources

Communities	Land Use/ Development Planning	Public Works & Engineering	Emergency Services	Floodplain Manager	GIS	Fiscal Staff	Planning Commission
Worcester County	X	X	X	X	X	X	X
Town of Berlin	X	X	Police Dept.; Fire Co.; EMS			X	Historic District; Board of Zoning Appeals
Pocomoke City	X	X	Police Dept.; Fire Dept.; EMS		X	X	Commission & Board of Appeals
Town of Snow Hill	X	X	Police Dept.; Fire Co.; EMS.			X	X

Source: County & Municipal Local Information

Notifications and Alarms

Emergency Alert Signals

Worcester County emergency alert signals will sound from area fire sirens throughout the County, a steady tone that will sound for approximately one minute, on the first Saturday of each month. In the event of an actual emergency, the sirens would be used as additional means to warn the surrounding communities of imminent danger and the need to tune to either radio, television or the internet for information.

Code Red

The Worcester County Connect CodeRED system allows residents and businesses to subscribe to important notifications regarding Worcester County. This system covers the unincorporated areas of the county as well as Pocomoke City and Snow Hill.

The Worcester County's Emergency Service website page contains a citizen sign-up link: https://public.coderedweb.com/cne/en-US/BFBCCB5CAFD5.

In addition, the Town of Berlin utilizes their own CodeRED notification system.

Storm Ready

The National Weather Service (NWS) in Wakefield VA renewed the StormReady recognition for Worcester County through September 22, 2022. To be officially StormReady, Worcester County must:

- Establish a 24-hour warning point and emergency operations center;
- Have more than one way to receive severe weather warnings and forecasts and to alert the public;
- Create a system that monitors weather conditions locally;
- Promote the importance of public readiness through community seminars; and
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

The Worcester County's Emergency Service website page contains a link to the NWS Storm Ready Program at: https://www.weather.gov/stormready/.

Flooding Related Hazards – Coastal and Riverine

Hurricanes and major storms have provided opportunities for local emergency services to test response plans. Real events continue to be the proving grounds for developing systems and procedures. Although there has not been major damage from such events for several years, additional preparation has come through participation in County and statewide drills and exercises.

The County Code's building, natural resources, zoning and subdivision articles also provide mechanisms to protect properties against storm damage. Several of the hazard-related topics covered under the Code include:

- Floodplain development regulations; § BR 2-305.
- High hazard area regulations; Subtitle NR3: I: Atlantic Coastal Bays Critical Area.
- Floodplains forest retention; § NR 1-409.

- Limiting new development in coastal areas; Subtitle NR3: I: Atlantic Coastal Bays Critical Area.
- Delineation of the 100-year floodplain for major subdivisions and site plans at the review stage; § BR 2-304.
- A 100-foot buffer for mean high water line of tidal waters, edge of tributary streams and tidal wetlands; § NR 3-104.

The County Code is thus the statutory source for the County's hazard avoidance and mitigation policies and practices. Collectively, the policies established in the comprehensive plan and the county code set a foundation for the reduction of the risks associated with the more common hazards that the county might face.

Flood Hazard Zone Requirements

The following flood-resistant construction practices are strictly enforced by the Department of Development Review and Permitting for "A" flood hazard zones, regardless of the building's site elevation. For enclosures below the Base Flood Elevation, including all masonry foundations, the following minimum criterion must be met.

- A minimum of two (2) openings having a total net area of not less than one (1) square inch for every one (1) square foot of enclosed area, including attached garages, shall be provided.
- The bottom of all such openings shall not be higher than 12 inches above inside or outside grade. Openings shall permit automatic entry and discharge of flood waters.
- The grade in the under-floor space shall be at or above the outside finished grade.
- Liquid propane and other fuel tanks must be secured and adequately anchored to resist buoyancy and movement.
- Manufactured homes set up in flood zones require all piers to be reinforced by rebar and grout.
- Any other designs, including those for structures located in V-zones, shall be certified by a registered design professional licensed in the State of Maryland.
- No habitual space is allowed below base flood. Only garages, storage and limited entries.
- Non-conversion and/or venting affidavits may be required.
- No finish and non-flood resistant materials are permitted below base flood (ie: drywall).

Stormwater Management

The Stormwater Management Ordinance was revised and approved by the Maryland Department of Environment in January 2010. The Ordinance became effective for the County in May 2010. The goal of the Stormwater Management Ordinance is to manage stormwater by utilizing an Environmental Site Design in the initial planning phase. Any activity that will disturb 5,000 square feet or more area, and/or require the filling of 100 cubic yards or more of material requires property owner to obtain Stormwater Management Plan approval and a permit. Various environmental constraints such as steep slopes, soils, forest, wetlands and floodplains must be

delineated prior to submitting stormwater management design plans. Once the constraints for the site have been established, a site layout can be prepared using the new Storm Water Management (SWM) requirements.

Wind Resistance Design

The IBC and IRC are designed to ensure safety to life and property from all hazards incident to building design and construction at the least possible cost consistent with national recognized standards. Being located along the Atlantic coastline, Worcester County is subject to many coastal storms, including hurricanes. This is evidenced by the County's inclusion in the 125 MPH Wind Speed Zone, exposure "C" as set forth by the Department of Housing and Community Development (DHCD) Codes Administration and referenced in ASCE 7-10 Minimum Design Loads for Buildings and Other Structures.

FEMA Flood Risk Products-Worcester County

The Flood Risk Database, Flood Risk Map, and Flood Risk Report are “non-regulatory” products. They are available and intended for community use but are neither mandatory nor tied to the regulatory development and insurance requirements of the National Flood Insurance Program (NFIP). They may be used as regulatory products by communities if authorized by state and local enabling authorities. These products were completed by FEMA for Worcester County in 2015 and are available online through FEMA’s Map Service Center. Information from these reports have been integrated into the *2020 Hazard Mitigation & Resilience Plan Update*.

Sea Level Rise & Shoreline Erosion

The Rural Legacy program targets both the Coastal Bays and the Dividing Creek areas for permanent protection through purchasing voluntary conservation easements. To date, over 16 miles of shoreline and 10,700 acres of land are permanently protected from development. Nearly 8,000 acres have been permanently protected by the Maryland Agricultural Land Preservation Foundation (MALPF) Program. Additional programs designed to protect coastal lands include: Conservation Reserve Enhancement Program (CREP) Permanent Easement Program: 400 acres; LSLT donated easements: 2,074; and Department of Natural Resources held easements: 7,157. A total of 29.45% of county lands are protected with easements or with state ownership; this is 25% of the Coastal Bays watershed.

The Maryland Agricultural Land Preservation program, in existence since 1977, is one of the most successful farm preservation programs in the country. It strives to preserve sufficient agricultural land to maintain a viable base of food and fiber production. The Program consists of two basic steps: the establishment of agricultural preservation districts, and the purchase of perpetual agricultural conservation easements. To date, approximately 3,300 acres have been permanently protected under this program in Worcester County.

The Atlantic Coastal Bays Critical Areas regulation is charged with the responsibility of preserving, protecting, and improving water quality and natural habitats of the Atlantic Coastal Bays and their tributaries, accomplished through protection, minimization, and mitigation. The Chesapeake Bay Critical Area was implemented to preserve the water quality of the bay as well as the wildlife habitat located along the shoreline. These programs minimize development 1,000 feet landward of tidal waters. To date, a total of 41,059 acres is regulated in Atlantic Coastal Bays Critical Area and 10,030 acres in Chesapeake Bay Critical Area (land within 1,000 feet of tidal waters).

Tornadoes

As stated in the Flooding Related Hazard section, Worcester County enforces the International Building and Residential Codes, which help to mitigate damage to buildings from storm events by establishing building construction standards. Additionally, the International Building Code is enforced in the county and ensures proper building design and construction from exposure to extreme wind speeds.

Toxic Chemicals and Natural Hazards

Worcester County has an established Special Hazards Response Team (SHRT) and regulations for the team (Subtitle VI: Special Hazards Response Team). The purpose of the Team's regulations is to establish responsibility of the County to prepare, respond and mitigate any and all chemical, biological, radiological, nuclear and explosive incidents.

In addition, Worcester County has an established Local Emergency Planning Committee (LEPC) that meets quarterly. Meetings are open to the public and include media representation. The LEPC plans for those areas relating to the safe storage, transportation, and utilization of hazardous materials, as they apply to public safety.

In addition, the LEPC serves as the Citizens Corp. Council for Worcester County. Community Emergency Response Team (CERT) training is often held in conjunction with Ocean City. In fact, three classes were held in 2018 and three (3) CERT classes were held in 2019, as follows:

- Spring 2018 - CERT Class at Worcester County Technical High School;
- Spring 2018 - CERT Class;
- Fall 2018 - CERT Class at Worcester County Technical High School Intro;
- Spring 2019 - CERT Train-the-Trainer held with Ocean City, MD;
- Spring 2019 - CERT Class at Worcester County Technical High School; and
- Spring 2019 - CERT Class with Ocean City, MD.

Finally, trained CERT volunteers help with the Department Emergency Services public outreach initiatives. Specifically, the "Know-Your-Zone" campaign and the distribution of laminated Emergency Check-List Cards.

Wildfires

The Department of Natural Resources (DNR) Forest Service and the Federal government are the lead agencies for wildfire suppression and works with local fire departments and police in training related fire suppression. The Department of Emergency Services assists DNR with coordination and communications during an event.

Additionally, Code § PS 1-504 states households who burn leaves or refuse are not permitted to burn at locations that are less than two hundred feet from any neighboring habitable dwelling or place where people work or congregate.

Worcester County offers a free smoke detector program. Battery-operated smoke detectors are given away in Worcester County free of charge. Residents can receive one smoke detector per household. Smoke detectors may be requested by contacting the Worcester County Fire Marshal's Office.

Worcester Hazard Mitigation Projects Funded by FEMA

Worcester County along with several of its municipalities have engaged in hazard mitigation projects using FEMA Hazard Mitigation Assistance Program Funding.

Table 6-2: Projects Funded by FEMA

Award DR-4038	Award DR-4091	Award DR-4170	Award DR-4261
Town of Berlin-Electrical Substation **Total Project Cost: $165,397.00**	Berlin Road Elevation **Total Project Cost: $81,779.00**	Ocean City Variable Message Sign Boards **Total Project Cost: $32,000.00**	Ocean City Check Water Valve **Total Project Cost: $118,323.00**
Berlin Well House Generator **Total Project Cost: $47,990.00**		Worcester County Habitat for Humanity Elevation **Total Project Cost: $99,805.00**	

Source: FEMA

Critical Facilities Generator Installation & Capabilities

In order to continue operations and increase resiliency generators have been installed at critical facilities throughout Worcester County.

Table: 6-3: Generator Capabilities – Critical Facilities

Location	Facility	Fuel Type	Size in KW
One West Market Street – Snow Hill	Government	Fuel Oil	450
Central Site Lane – Newark	Fire Training Center	Fuel Oil	100
Snow Hill	Water Tower	Propane	20
2630 Klej Grange	New Building	Propane	35
2630 Klei Grange	Government Building	Propane	75

6841 Central Site Lane	State Building	Propane	60
6841 Central Site Lane	New County Building	Propane	75
6572 Snow Hill Road	Water Tower Building 2	Propane	20
1884 Pocomoke Beltway – Pocomoke	Water Tower	Propane	25
Source: Worcester County Department of Emergency Services			

In addition, Worcester County utilizes four area schools and Animal Control as shelter locations. All locations have a generator and are included on the table below.

Table: 6-4: Worcester County Shelter Locations			
Name	**Address**	**Capacity**	**Type**
Pocomoke High School	1817 Old Virginia Road Pocomoke City, Maryland 21851	1400	Generator/Pet Friendly
Snow Hill High School	305 South Church Street Snow Hill, Maryland 21863	1436	Generator
Stephen Decatur Middle School	9815 Seahawk Road Berlin, Maryland 21811	1600	Generator/Pet Friendly
Stephen Decatur High School	9913 Seahawk Road Berlin, Maryland 21811	2600	Generator
Worcester County Animal Control	6207 Timmons Road Snow Hill, Maryland 21863	N/A	Pet Shelter
Source: Worcester County Department of Emergency Services			

Mitigation Actions & Capabilities by Worcester County Health Department

The Health Department in Worcester County have undertaken various mitigation measures over the past several years (2015-2019) and are included in Table 6-4, below.

Table: 6-5: Mitigation Actions & Capabilities by Worcester County Health Department
Plans
• Multiple plan updates with operational details conducted and authorized through Health and Medical Emergency Preparedness Committee activities.
• Isolation and Quarantine Plan completely re-vamped in 2016. Annual updates followed.
• Medically Fragile Sheltering Plan Exercised and updated annually.
• Ongoing collaborative efforts regarding Family Assistance Center (FAC), Family Reception Center (FRC), and Community Reception Center (CRC) through plan development and real time conduct.
Training and Exercise
• Advanced Emerging Infectious Disease (EID) planning with multiple Exercises and real time situations; includes Epidemiologic certification with annual updates. MDH Electronic Surveillance System for the Early Notification of Community-based Epidemics ESSENCE. Governor's Core Goal (Bio surveillance #5) Mitigate, reduce morbidity & mortality w/disease outbreaks & public health impact situations - early surveillance w/non-traditional data sources including sentinel (over-the-counter registry) and primarily syndromic surveillance that features enhanced connections with multiple healthcare & partner entities that monitor & document community (patient) health data through various electronic platforms. Coordinated with Maryland Department of Health, Worcester Board of Education, Atlantic General Hospital.

Training and Exercise cont.
• Plan, conduct, and evaluate two (2) Full Scale HSEEP Exercises for EID, and Radiologic dispersal device detonation, response within 2016 – 2018 timeframe. EID Exercise encompassed Direct Isolation & Quarantine Operations, decision-makers, plan(s), communications, law(s), public information, Order(s), public & patient education, community partner engagement, mass care issues, decontamination concerns, situational awareness, information sharing, needs assessment = site, resource, authorities / restrictions. Radiologic dispersal device detonation Exercise encompassed notification, assembly, site activation, incident management protocols, POD operations for medical countermeasure dispensing, and demobilization.
• Conduct and deliver multiple community-wide Avian Influenza infection control training sessions within the context of coordinating the activities of the Delmarva Avian Influenza Task Force (DAITF).
Clinics and Outreach
• Conduct regular multi-site immunization clinics, as needed.
• Development, and conduct, of naloxone program for community outreach with “safe stations”.
• Conduct Annual Public Health Conference with 120 + community partners, address timely community-initiatives; 2009 – 2019.
Source: Worcester County Health Department

CHAPTER 7: JURISDICTIONAL PERSPECTIVE

Introduction

In an effort to gather, incorporate, and present community specific information in this plan update, the Jurisdictional Perspective Chapter has been added. The need to include additional community specific information was identified at the 2020 Hazard Mitigation Plan Kick-Off meeting on May 22, 2019.

The physical characteristics of a community, including both the natural and build environment, will greatly affect its vulnerability to hazards. Therefore, a community perspective of ***The Town of Berlin, The City of Pocomoke, The Town of Snow Hill, and Ocean Pines*** has been completed. Community perspective information includes:

- physical location,
- demographics,
- economy,
- development trends,
- hazard data,
- National Flood Insurance Program Report,
- flood hazard vulnerability, and,
- non-flood related hazards vulnerability.

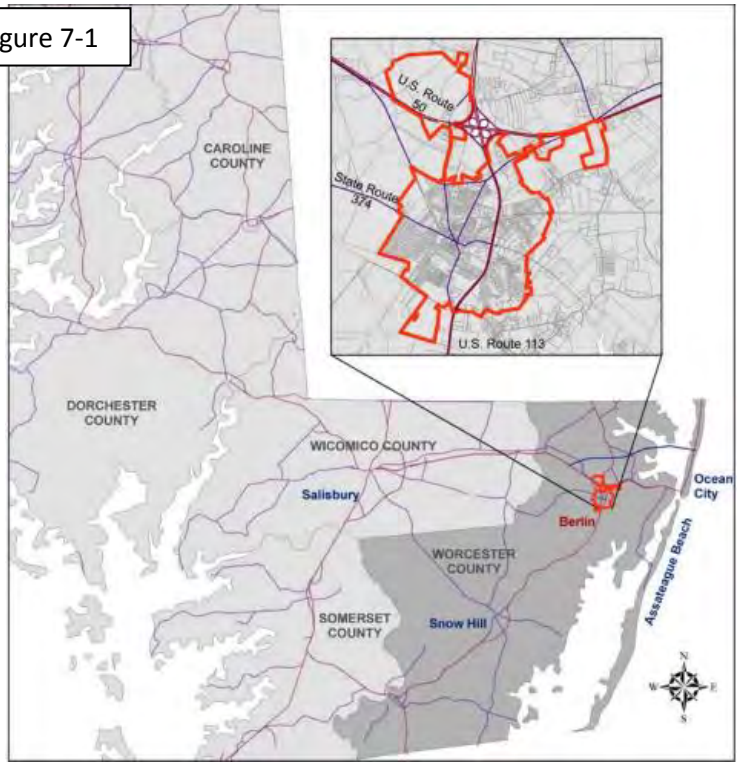
Geography, demographics, and land use practices offers insight into a community's overall vulnerability. Furthermore, analysis of the jurisdictional economic situation and development patterns in relation to geographically defined hazard areas aids in determining areas of the community that are highly vulnerable.

Also included in this chapter, following the individual community perspectives information, is the 2014 Community Mitigation Action Status Report and the new Community Mitigation Actions Table.

Town of Berlin

Physical Location

Figure 7-1



Berlin, located in northern Worcester County, is located only seven miles away from popular destinations such as Ocean City and Assateague Island. It also lies approximately 20 miles away from Salisbury, the largest city on Maryland's Eastern Shore. The Town can be accessed through a variety of roads including State Routes 374 and 376, and U.S. Routes 50 and 113.

Demographics

According to U.S. Census, Population Estimates for 2018, the population of the Town of Berlin has increased from 4,485 in 2010 to 4,818 in 2018, an increase of 333 or 6.9%. Table 7-1 shows year-round populations for the Town of Berlin compared to the overall Worcester County population total.

Table 7-1: Year-Round Populations of the Town of Berlin

Place	2010	2018 Estimates	Change	Percent Change
Berlin	4,485	4,818	333	6.9%
County Total	51,454	51,823	369	0.7%

Source: U.S. Census Bureau, Population Division – Annual Estimates of Resident Population: April 1, 2010 to July 1, 2018

Economy

According to the 2016 United States Census Bureau - American Community Survey (ACS), a good indicator of the strength of the job market is the income per capita and the median household income. The Town of Berlin's employment information is shown on the table below.

Table 7-2: Berlin Employment Information

Index	Berlin, MD	Maryland	National
Income Per Capita	$26,801	$37,756	$29,829
Median Household Income	$51,875	$76,067	$55,322
Median Income Owner Occupied	$61,177	$95,994	$70,586
Median Income Renter Occupied	$35,288	$47,333	$35,192
Median Earnings Male	$37,396	$46,495	$36,919
Median Earnings Female	$22,589	$35,61	$26,250
Unemployment Rate	2.7%	4.5%	4.7%
Poverty Level	10.8%	9.9%	15.1%

Source: 2016 United States Census Bureau American Community Survey

The income per capita in Berlin is $26,801, which is 29% lower than the Maryland average and 10% lower than the national average. The median household income is in Berlin is $51,875, which is 32% lower than the Maryland average and 6% lower than the national average. Finally, the unemployment rate in Berlin is 3%, which is 43% lower than the national average and the poverty rate is 11%, which is 28% lower than the national average.

Table 7-3: Berlin Employment by Industry

Industry Types	Total Percentage of Workforce
Construction Industry	3.5%
Manufacturing Sector	5.1%
Financial & Insurance Services	8.1%
Wholesale & Retail Services	25.5%
Public Administration	8.4%
Transportation, Warehousing & Utilities	11.8%
Education, Health & Social Services	42.5%
Other	51.1%

Source: 2016 United States Census Bureau American Community Survey

In addition, Table 7-3 shows Berlin's employment by industry with total workforce percentage for each industry type. Education, Health & Social Services is 42.5% of the workforce followed by Wholesale & Retail Services, with 25.5% of the workforce.

Development Trends

According to the *Maryland Department of Planning Worcester County Property View Database*, there has been a total of 79 new structures for the Town of Berlin from 2013 through July 2017.

Table 7-4: New Development for the Town of Berlin from 2013 - 2017

Town of Berlin	Commercial	Commercial Condominium	Residential	Residential Condominium	TOTAL
2013	0	0	5	0	5
2014	0	0	6	0	6
2015	1	1	3	0	5
2016	47	0	12	0	59
2017	1	0	3	0	4
TOTAL	49	1	29	0	79

Source: MD 2015 Property View Database

Hazard Event Data

According to the National Centers for Environmental Information (NCEI), included in Table 7-5 below are notable hazard events recorded **specific** to the Town of Berlin. Hazards impacting the Town of Berlin include:

- ***Flood Hazard*** *– Flood, Flash Flood, And Heavy Rain;*
- ***Thunderstorm Hazard*** *– Hail and Lightning;*
- ***Tornado Hazard*** *– Funnel Cloud; and*
- ***Wind Hazard*** *– Thunderstorm Wind.*

Table 7-5: Town of Berlin Notable Hazard Event Data				
Hazard Type	**Date**	**Event Narrative**	**Property Dam.**	**Probability of Future Event**
Flash Flood	29-Jul-00	Heavy rain caused flooding on many main and secondary roads around Berlin and Girdletree. Saint Louis Avenue in Ocean City was closed from Talbot Street to 11th Street.	0	Occasional
Flash Flood	17-May-04	Road closed at Timmons Town Road due to flooding.	0	
Flash Flood/Heavy Rain	26-Aug-12	Emergency management official measured 13 inches of rain from his cocorahs gage.	0	Occasional
Flash Flood/Heavy Rain	8-Aug-17	Rainfall total of 3.40 inches was measured at Berlin.	0	
Flood	25-Aug-12	Road closures were reported at Routes 113 and 50 due to high water. There were 15 to 20 rescues from vehicles.	0	Occasional
Funnel Cloud	31-Jul-09	Funnel cloud was reported over the Delmarva Power and Light Station moving towards north Ocean City.	3K	Unlikely
Hail	22-May-01	Hail size was reported up to 1.75”.	0	Occasional
Hail	19-Jul-11	Quarter size hail was reported.	0	
Heavy Rain	10-Dec-08	Rainfall amounts between two and seven inches occurred across the county. Rainfall amount of 6.35 inches was measured at Berlin.	0	Likely
Lightning	28-Jul-16	A transformer was struck by lightning.	10K	Occasional
Thunderstorm Wind	3-Jul-96	Several trees downed.	3K	Highly Likely
Thunderstorm Wind	28-Apr-02	Trees down on Purnell Crossing Road.	2K	
Thunderstorm Wind	28-Jun-06	Trees blown down on Libertytown Road.	2K	
Thunderstorm Wind	31-Jul-09	Tree was downed.	1K	
Thunderstorm Wind	5-Aug-10	Large tree limbs were downed.	1K	
Thunderstorm Wind	19-Jul-11	Tree was downed onto a residence.	2K	
Thunderstorm Wind	23-Jun-15	Trees were downed on roads.	2K	

Source: National Centers for Environmental Information (NCEI), July 2019

Note: There were no deaths, injuries, or crop damage reported for any events listed on this table.

Coastal Storms, Winter Storms, and Droughts are recorded as county-wide events in the NCEI database. Refer to Chapter 4 and Chapter 5 of the Plan for data.

Note: Probability was determined based on annualized events shown in the table above.

•Highly Likely—Near 100% chance of occurrence next year or happens every year.

• Likely—10-100% chance of occurrence in next year or has a recurrence interval of 10 years or less.

• Occasional—1-10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.

• Unlikely—Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

National Flood Insurance

As of 30 September 2019, the National Flood Insurance Program (NFIP) report shows 90 policies in-force for the Town of Berlin. The amount paid for the reported written premium in-force totaled $24,946,300.

Table 7-6: Town of Berlin NFIP Insurance Policy Statistics

Community Name	Policies In-Force	Total Written Premium In-Force
Town of Berlin	90	$24,946,300
Worcester County (Unincorporated)	5,312	$3,019,760

Source: Federal Emergency Management Agency (FEMA) NFIP Insurance Report; September 2019

As of 30 April 2019, the NFIP report stated that 16 losses were filed in the Town of Berlin, with total payments of $19,535.65.

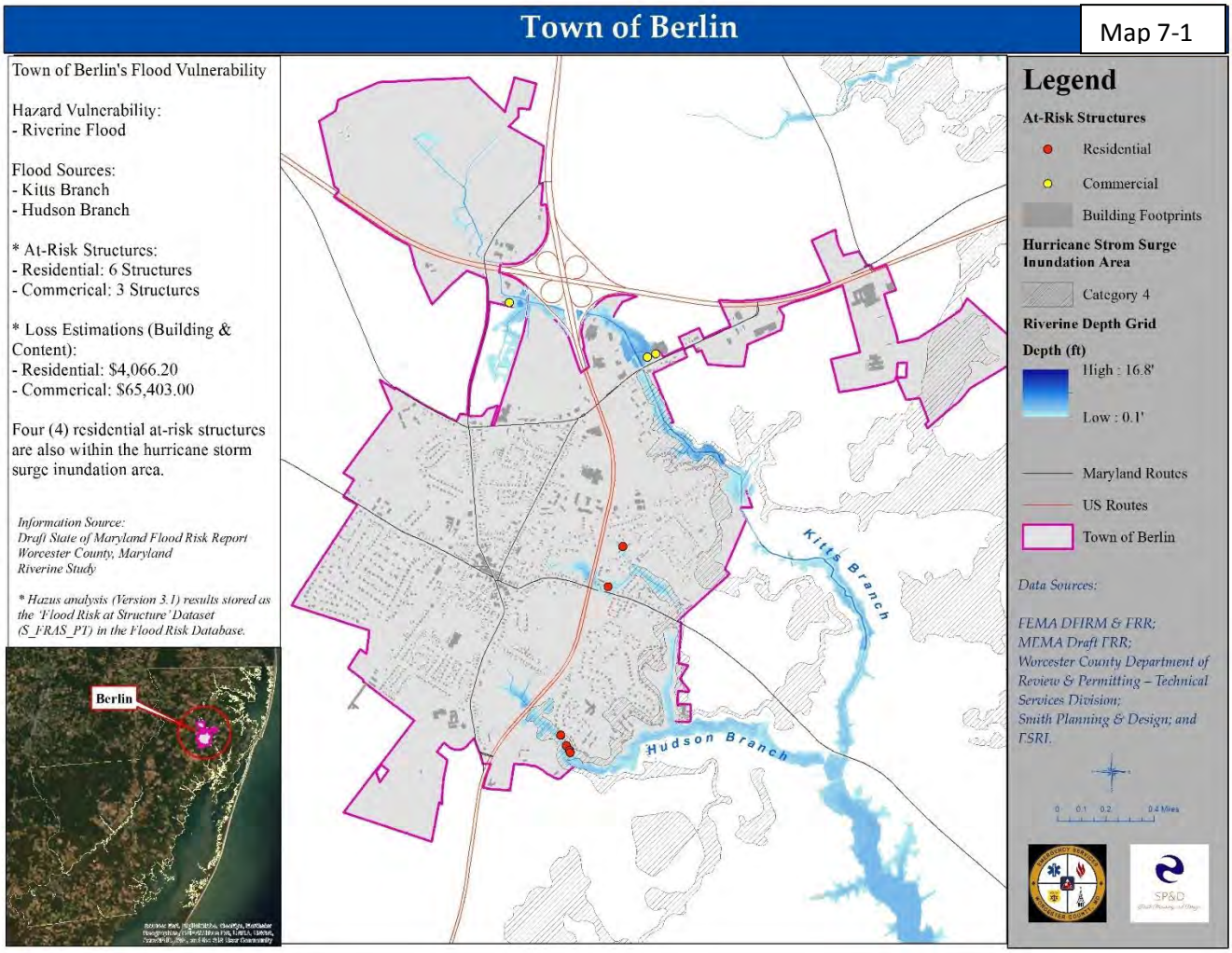
Table 7-7: Worcester County NFIP Insurance Policies – Losses & Payments

Community Name	Total losses	Total Payments
Town of Berlin	16	$190,535.65
Township of Berlin	1	-
Worcester County (Unincorporated)	873	$6,882,029.52

Source: Federal Emergency Management Agency (FEMA) NFIP Insurance Report; April 2019
Data Dictionary: Total Payments-The total amount of all building, contents, and ICC payments for all claims. Number of Losses - The number of losses (claims) reported with that community and/or county.
***Data Disclaimer:** This report is generated from the NFIP Pivot Analytical Reporting Tool (PART).*

Flood Hazard Vulnerability

Structures at-risk to riverine flood have been depicted and detailed on the map below. Sources of flooding to the Town of Berlin include both the Kitts Branch and Hudson Branch. In addition, the Town of Berlin is susceptible to hurricane storm surge.



Non-Flood Related Hazards Vulnerability

Major transportation routes in and around the Town of Berlin include US Route 50 and 113. As such, the Town of Berlin is vulnerable to HazMat transportation related incidents and fixed-site incidents. The entirety of Worcester County, including the Town of Berlin, is vulnerable to wind related incidents including hurricane, Nor'easter, thunderstorm and tornados. In addition, winter storm and drought hazards affect the entirety of the County.

In terms of social vulnerability, the Town of Berlin contains a significant portion of its population under the age of five (5), shown on Map 5-5, *Chapter 5: Non-Flood Related Hazards*. Therefore, extreme heat should be considered in planning and outreach initiatives for this particular vulnerable population.

City of Pocomoke

Physical Location

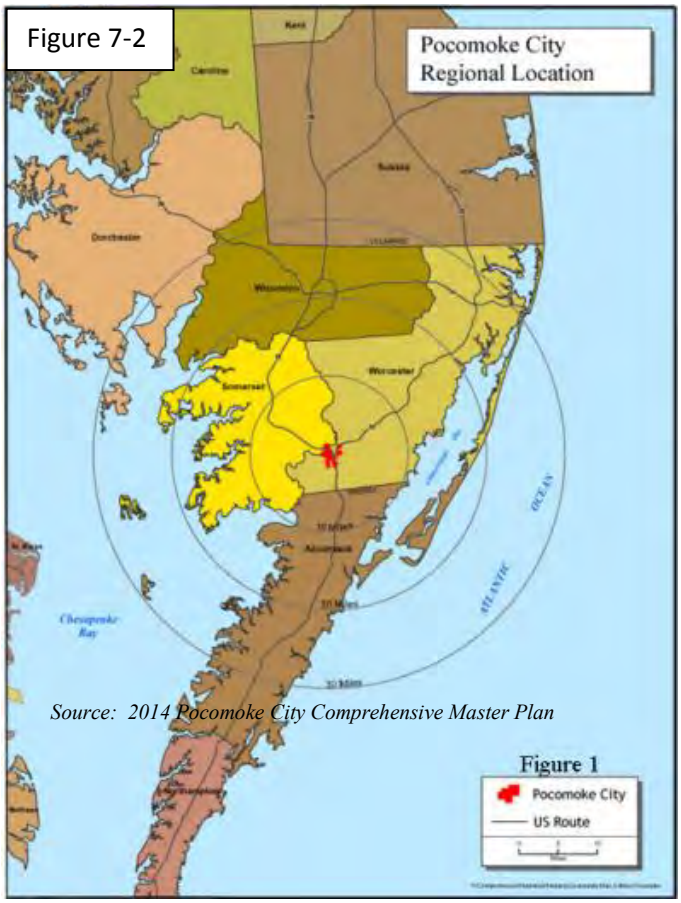
Pocomoke City is located the southern portion of the Lower Eastern Shore of Maryland and nearly midway on the Delmarva Peninsula. From a planning perspective, its geographical context may be defined several ways, including:

• Chesapeake Bay Watershed: Part of the drainage area for the Chesapeake Bay thus impacts by state and national policies address water quality in the Bay and its tributaries.

• The Delmarva Peninsula: Fluctuations in the region's (and Nation's) economy affect quality of life in Pocomoke City.

• Worcester County: Unique location among Maryland's Eastern Shore counties, in large part due to the attractiveness of access to the Atlantic Ocean, with some spin-off benefits for the city. Pocomoke City is within 40 miles or less of Ocean City, Maryland, Assateague Island (Maryland and Virginia).

Figure 7-2



Source: 2014 Pocomoke City Comprehensive Master Plan

Demographics

According to U.S. Census, Population Estimates for 2018, the population of the City of Pocomoke has decreased from 4,184 in 2010 to 4,042 in 2018, a decrease of 142 or -3.5%. Table 7-8 shows year-round populations for the City of Pocomoke compared to the overall Worcester County population total.

Table 7-8: Year-Round Populations of the City of Pocomoke

Place	2010	2018 Estimates	Change	Percent Change
Pocomoke	4,184	4,042	-142	-3.5%
County Total	51,454	51,823	369	0.7%

Source: U.S. Census Bureau, Population Division – Annual Estimates of Resident Population: April 1, 2010 to July 1, 2018

Economy

According to the 2016 United States Census Bureau - American Community Survey (ACS), a good indicator of the strength of the job market is the income per capita and the median household income. The City of Pocomoke's employment information is shown on the table below.

Table 7-9: Pocomoke Employment Information			
Index	**Pocomoke, MD**	**Maryland**	**National**
Income Per Capita	$17,405	$37,756	$29,829
Median Household Income	$29,943	$76,067	$55,322
Median Income Owner Occupied	$49,688	$95,994	$70,586
Median Income Renter Occupied	$18,300	$47,333	$35,192
Median Earnings Male	$21,641	$46,495	$36,919
Median Earnings Female	$19,625	$35,61	$26,250
Unemployment Rate	10.5%	4.5%	4.7%
Poverty Level	31.7%	9.9%	15.1%

Source: 2016 United States Census Bureau American Community Survey

The income per capita in Pocomoke is $17,405, which is 54% lower than the Maryland average and 42% lower than the national average. The median household income is in Pocomoke is $29,943 which is 61% lower than the Maryland average and 46% lower than the national average. Finally, the unemployment rate in Pocomoke is 10%, which is 125% higher than the national average and the poverty rate is 32%, which is 28% higher than the national average.

Table 7-10: Pocomoke Employment by Industry	
Industry Types	**Total Percentage of Workforce**
Construction Industry	18.7%
Manufacturing Sector	9.5%
Financial & Insurance Services	4.1%
Wholesale & Retail Services	31%
Public Administration	24%
Transportation, Warehousing & Utilities	4.6%
Education, Health & Social Services	51.6%
Other	55.5%

Source: 2016 United States Census Bureau American Community Survey

In addition, Table 7-10 shows Pocomoke's employment by industry with total workforce percentage for each industry type. Education, Health & Social Services is 51.6% of the workforce followed by Wholesale & Retail Services, with 31% of the workforce.

Development Trends

According to the *Maryland Department of Planning Worcester County Property View Database*, there has been a total of 20 new structures for the City of Pocomoke from 2013 through July 2017.

Table 7-11: New Development for the City of Pocomoke from 2013 - 2017

City of Pocomoke	Commercial	Commercial Condominium	Residential	Residential Condominium	TOTAL
2013	0	0	1	0	1
2014	0	0	6	0	6
2015	1	1	3	0	5
2016	1	0	3	0	4
2017	0	0	0	4	4
TOTAL	2	1	13	4	20

Source: MD 2015 Property View Database

Hazard Event Data

According to the National Centers for Environmental Information (NCEI), included in Table 7-12 below are notable hazard events recorded **specific** to the City of Pocomoke. Hazards impacting the City of Pocomoke include:

- ***Flood Hazard*** *– Flood and Flash Flood;*
- ***Thunderstorm Hazard*** *– Hail and Lightning; and*
- ***Wind Hazard*** *– Thunderstorm Wind.*

Table 7-12: City of Pocomoke Notable Hazard Event Data

Hazard Type	Date	Event Narrative	Property Dam.	Probability of Future Event
Flash Flood	5-Jul-06	Most intersections along Market Street under water.	0	Occasional
Flood	19-Sep-16	Several roads in and around Pocomoke City were closed due to high water.	0	Occasional
Flood	9-Oct-16	Heavy rain caused an extended period of significant flooding across portions of the county. Several roads were impassable or closed for a couple of days, and some homes and businesses were impacted.	500K	
Hail	21-Apr-00	0.75-inch diameter hail reported via ham radio at Pocomoke.	0	Occasional
Hail	31-May-08	Nickel size hail was reported in Pocomoke City.	0	
Lightning	22-Jul-17	Lightning strike caused a house fire.	10K	Occasional
Thunderstorm Wind	26-Jun-98	Several trees down in Pocomoke River State Forest.	2K	Highly Likely
Thunderstorm Wind	14-Jul-04	Trees down.	2K	
Thunderstorm Wind	28-Jul-06	Several trees down.	2K	
Thunderstorm Wind	8-Jun-07	Trees were downed across Dividing Creek Road.	2K	
Thunderstorm Wind	19-Jul-07	Large tree limbs were blown down.	1K	
Thunderstorm Wind	24-Jun-10	Tree was downed onto power lines.	1K	

Source: National Centers for Environmental Information (NCEI), July 2019

Note: There were no deaths, injuries, or crop damage reported for any events listed on this table.

Coastal Storms, Winter Storms, Tornado and Droughts are recorded as county-wide events in the NCEI database. Refer to Chapter 4 and Chapter 5 of the Plan for data.

Note: Probability was determined based on annualized events shown in the table above.

•Highly Likely—Near 100% chance of occurrence next year or happens every year.

• Likely—10-100% chance of occurrence in next year or has a recurrence interval of 10 years or less.

• Occasional—1-10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.

• Unlikely—Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

National Flood Insurance

As of 30 September 2019, the National Flood Insurance Program (NFIP) shows 46 policies in-force for the City of Pocomoke. The amount paid for the reported written premium in-force totaled $31,288.

Table 7-13: City of Pocomoke NFIP Insurance Policy Statistics

Community Name	Policies In-Force	Total Written Premium In-Force
City of Pocomoke	46	$31,288
Worcester County (Unincorporated)	5,312	$3,019,760

Source: Federal Emergency Management Agency (FEMA) NFIP Insurance Report; September 2019

As of 30 April 2019, the NFIP report stated that 10 losses were filed in the City of Pocomoke, with total payments of $87,537.03.

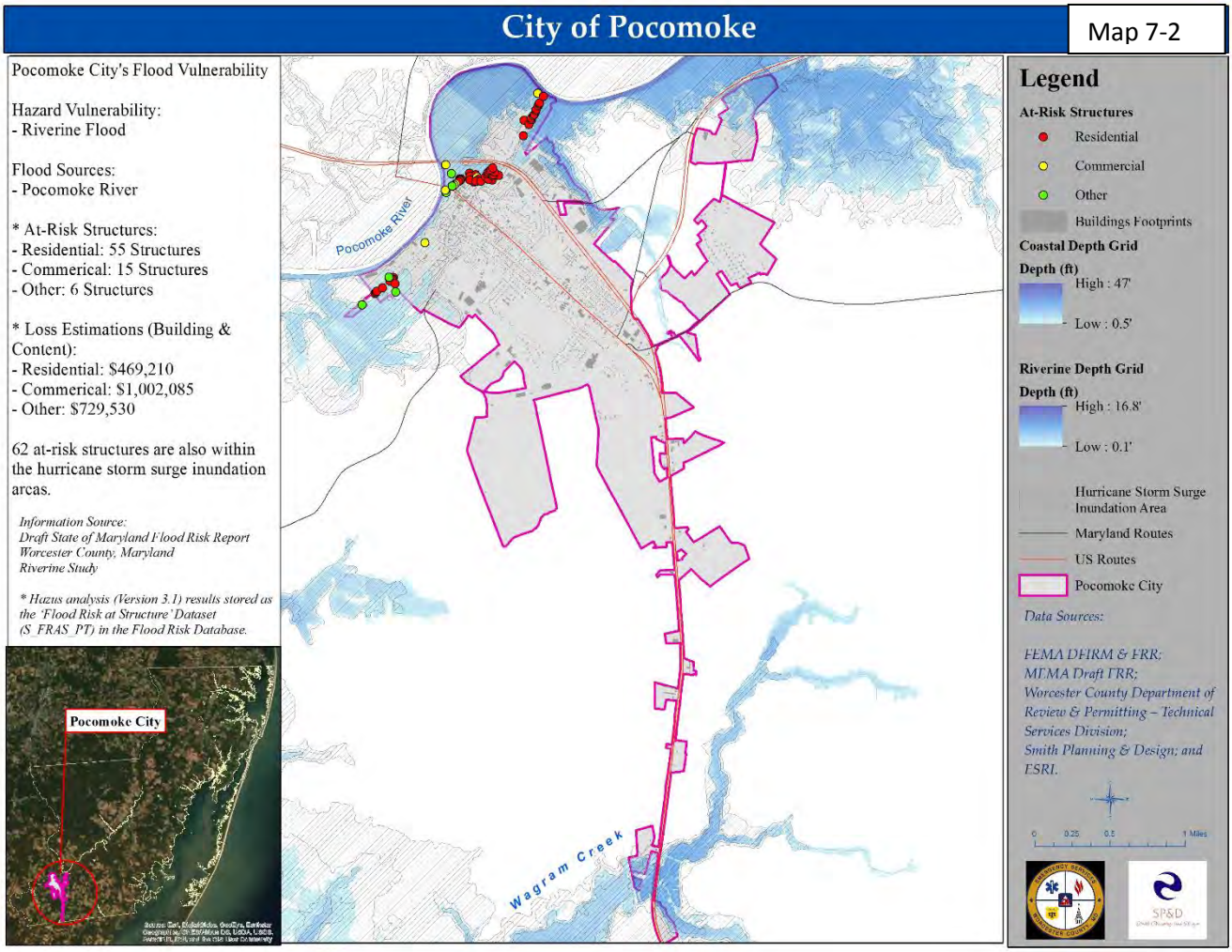
Table 7-14: Worcester County NFIP Insurance Policies – Losses & Payments

Community Name	Total losses	Total Payments
City of Pocomoke	10	$87,537.03
Worcester County (Unincorporated)	873	$6,882,029.52

Source: Federal Emergency Management Agency (FEMA) NFIP Insurance Report; April 2019
Data Dictionary: Total Payments-The total amount of all building, contents, and ICC payments for all claims. Number of Losses - The number of losses (claims) reported with that community and/or county. ***Data Disclaimer:*** *This report is generated from the NFIP Pivot Analytical Reporting Tool (PART).*

Flood Hazard Vulnerability

Structures at-risk to riverine flood have been depicted and detailed on the map below. Source of flooding to the City of Pocomoke City is the Pocomoke River. In addition, the City of Pocomoke is susceptible to hurricane storm surge. Furthermore, according to the 2016 Maryland State Highway Administration (MDSHA) and US Army Corps of Engineers (USACE) 2050 and 2100 Projected Sea Level Rise data, the City of Pocomoke is vulnerable to both sea level rise scenarios.



Non-Flood Related Hazards Vulnerability

Major transportation route US Route 13 travels along the eastern portion of the City of Pocomoke. As such, the City of Pocomoke is vulnerable to HazMat transportation related incidents. The entirety of Worcester County, including the City of Pocomoke, is vulnerable to wind related incidents including hurricane, Nor'easter, thunderstorm and tornados. The southern portion of the County is vulnerable brush fires due to forested areas that interface with development. Finally, winter storm and drought hazards affect the entirety of the County.

The social vulnerability assessment performed during this plan development process indicates vulnerability based on 5 variables. The City of Pocomoke contains two of the five social vulnerability variables assessed at a high level, as follows:

- Population – Age 65 or older; and
- Civilian with a disability.

The social vulnerability assessment has been included as *Appendix I: Vulnerable Populations*.

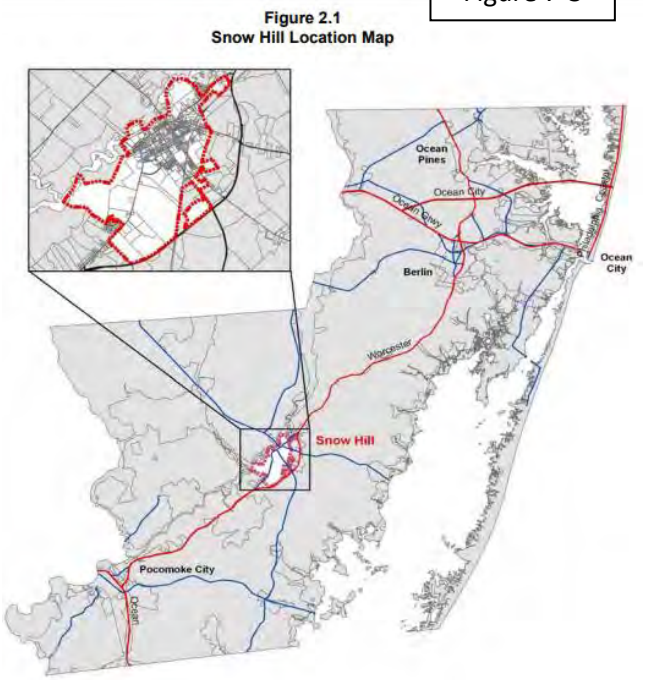
Town of Snow Hill

Figure 7-3

Physical Location

The Town of Snow Hill is located near the center of Worcester County on the east side of the Pocomoke River and 18 miles southeast of Salisbury, 15 miles south of Berlin, and 12 miles north of Pocomoke City. It is situated on uplands ranging from 5 to 40 feet above low tide in the Pocomoke River. Most of the Town is at an elevation of 10 to 20 feet above sea level and rests on slightly rolling, fertile farmlands with extensive forested areas, including some unusual cypress swamps along the Pocomoke River.

Snow Hill is the County seat for Worcester County with most of the County offices headquartered in the Town's central business area.



Source: 2010 Town of Snow Hill Comprehensive

Demographics

According to U.S. Census, Population Estimates for 2018, the population of the Town of Snow Hill has decreased slightly from 2,103 in 2010 to 2,038 in 2018, a decrease of 65 or -3.2%. Table 7-15 shows year-round populations for the Town of Snow Hill compared to the overall Worcester County population total.

Table 7-15: Year-Round Populations of the Town of Snow Hill

Place	2010	2018 Estimates	Change	Percent Change
Snow Hill	2,103	2,038	-65	-3.2%
County Total	51,454	51,823	369	0.7%

Source: U.S. Census Bureau, Population Division – Annual Estimates of Resident Population: April 1, 2010 to July 1, 2018

Economy

According to the 2016 United States Census Bureau - American Community Survey (ACS), a good indicator of the strength of the job market is the income per capita and the median household income. The Town of Snow Hill's employment information is shown on the table below.

Table 7-16: Snow Hill Employment Information			
Index	**Snow Hill, MD**	**Maryland**	**National**
Income Per Capita	$20,751	$37,756	$29,829
Median Household Income	$37,012	$76,067	$55,322
Median Income Owner Occupied	$51,548	$95,994	$70,586
Median Income Renter Occupied	$23,333	$47,333	$35,192
Median Earnings Male	$16,103	$46,495	$36,919
Median Earnings Female	$26,042	$35,61	$26,250
Unemployment Rate	7.9%	4.5%	4.7%
Poverty Level	22.4%	9.9%	15.1%

Source: 2016 United States Census Bureau American Community Survey

The income per capita in Snow Hill is $20,751, which is 45% lower than the Maryland average and 30% lower than the national average. The median household income is in Snow Hill is $37,012 which is 51% lower than the Maryland average and 33% lower than the national average. Finally, the unemployment rate in Snow Hill is 8%, which is 69% higher than the national average and the poverty rate is 22%, which is 48% higher than the national average.

Table 7-17: Snow Hill Employment by Industry	
Industry Types	**Total Percentage of Workforce**
Construction Industry	6.4%
Manufacturing Sector	10.3%
Financial & Insurance Services	4%
Wholesale & Retail Services	39.4%
Public Administration	20.3%
Transportation, Warehousing & Utilities	6.2%
Education, Health & Social Services	48.4%
Other	58%

Source: 2016 United States Census Bureau American Community Survey

In addition, Table 7-17 shows Snow Hill's employment by industry with total workforce percentage for each industry type. Education, Health & Social Services is 48.4% of the workforce followed by Wholesale & Retail Services, with 39.4% of the workforce.

Development Trends

According to the *Maryland Department of Planning Worcester County Property View Database*, there has been a total of three new residential structures for the Town of Snow Hill from 2013 through July 2017.

Table 7-18: New Development for the Town of Snow Hill from 2013 - 2017					
Town of Snow Hill	**Commercial**	**Commercial Condominium**	**Residential**	**Residential Condominium**	**TOTAL**
2013	0	0	0	0	0
2014	0	0	0	0	0
2015	0	0	1	0	1
2016	0	0	2	0	2
2017	0	0	0	0	0
TOTAL	0	0	3	0	3

Source: MD 2015 Property View Database

Hazard Event Data

According to the National Centers for Environmental Information (NCEI), included in Table 7-19 below are notable hazard events recorded **specific** to the Town of Snow Hill.

Hazards impacting the Town of Snow Hill include:

- ***Flood Hazard*** *– Flood, Flash Flood and Heavy Rain;*
- ***Thunderstorm Hazard*** *– Hail;*
- ***Tornado*** *– Tornado; and*
- ***Wind Hazard*** *– Thunderstorm Wind.*

Table 7-19: Town of Snow Hill Notable Hazard Event Data				
Hazard Type	**Date**	**Event Narrative**	**Property Dam.**	**Probability of Future Event**
Flash Flood	29-Sep-16	Water was reported rushing across Whiton Road near Porters Crossing Road.	0	Occasional
Flood	3-Aug-96	Highway 12 was closed due to water 2.5 feet deep covering the road.	0	Occasional
Flood	27-Aug-11	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 five to ten inches. Snow Hill reported 8.10 inches of rain. Bishopville reported 7.71 inches of rain.	0	
Flood	19-May-18	Flooding occurred along the Pocomoke River and Nassawango Creek in southwest Worcester county. The Route 12 bridge near Snow Hill was closed due to flooding, along with several roads.	0	
Hail	1-Apr-93	N/A	0	Likely
Hail	29-Mar-97	N/A	0	
Hail	21-Apr-00	0.88-inch diameter hail reported at Snow Hill.	0	
Hail/Thunderstorm Wind	25-May-98	Estimated wind gust of 74 knots (85 mph) was reported by an employee of Delmarva Power.	0	Highly Likely
Hail/Thunderstorm Wind	2-Jun-98	Microburst ripped the roof off of a maintenance building, with the roof debris scattered about 200 yards into a neighboring field. Damage also occurred at a nearby car dealership, where a tent was blown down and approximately 18 cars were damaged. The tent poles caused most of the damage to the cars, including numerous dents and broken windows. About 3 miles west of this site, several large pine trees were snapped off approximately 15 feet above the ground.	250K	
Heavy Rain	29-Mar-10	Rainfall amounts of one to three inches occurred across the county. Assateague Island National Seashore reported 2.36 inches of rain. Snow Hill reported 2.29 inches of rain.	0	Highly Likely
Heavy Rain	19-Sep-16	Rainfall totals generally ranged from 1 inch to 5 inches across the county. Snow Hill reported 3.51 inches of rain. Bishopville (3 E) reported 2.61 inches of rain. Ocean City Municipal Airport (OXB) reported 1.81 inches of rain. Public Landing (6 SE) reported 1.73 inches of rain. Ocean Pines (1 E) reported 1.47 inches of rain.	0	
Heavy Rain	28-Sep-16	Rainfall totals generally ranged from 3 to 12 inches across the county. Public Landing (6 SE) reported 11.94 inches of rain. Snow Hill reported 8.76 inches of rain. Bishopville (3 E) reported 6.20 inches of rain. Berlin reported 6.01 inches of rain. Ocean City Municipal Airport (OXB) reported 4.68 inches of rain. Ocean Pines (1 E) reported 3.76 inches of rain.	0	
Heavy Rain	29-Jul-17	Rainfall total of 2.77 inches was measured at Snow Hill.	0	

Heavy Rain	29-Aug-17	Rainfall total of 2.78 inches was measured at Public Landing (6 SE).	0	
Thunderstorm Wind	26-Jun-98	Several trees down.	2K	Highly Likely
Thunderstorm Wind	4-Jul-08	Trees were downed across road near the intersection of Sand Road and Millville Road.	2k	
Thunderstorm Wind	31-Jul-09	Trees were downed.	1K	
Thunderstorm Wind	24-Jun-10	Tree was downed onto power lines.	1K	
Thunderstorm Wind	25-Jul-10	Tree was downed on Old Furnace Road.	1K	
Thunderstorm Wind	18-Sep-12	Trees were downed on Saint Luke's Road.	2K	
Thunderstorm Wind	13-Jun-13	Several trees and snapped power poles were downed along Whiton Road (Highway 354).	1K	
Thunderstorm Wind	23-Jun-15	Trees were downed and blocking roads near Snow Hill.	2K	
Thunderstorm Wind	21-Jun-16	Power lines were downed.	2K	
Thunderstorm Wind	17-Aug-16	Power lines were downed along Route 12 near the intersection with Worcester Highway.	2K	
Tornado	11-Nov-95	Brief tornado touchdown in generally open farm area approximately four miles north of Snow Hill. Tornado path was bisected by Route 354 (about one-quarter mile north of Porters Crossing Road) on a WSW to ENE track. Numerous trees uprooted or snapped/twisted off. No structural damage, although farmhouse within 50 feet of tornado path was left completely untouched.	5K	Unlikely

Source: National Centers for Environmental Information (NCEI), July 2019
Note: There were no deaths, injuries, or crop damage reported for any events listed on this table.
Coastal Storms, Winter Storms, and Droughts are recorded as county-wide events in the NCEI database. Refer to Chapter 4 and Chapter 5 of the Plan for data.
Note: Probability was determined based on annualized events shown in the table above.
•Highly Likely—Near 100% chance of occurrence next year or happens every year.
• Likely—10-100% chance of occurrence in next year or has a recurrence interval of 10 years or less.
• Occasional—1-10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.
• Unlikely—Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

National Flood Insurance

As of 30 September 2019, the National Flood Insurance Program (NFIP), reported shows that 29 policies in-force for the Town of Snow Hill. The amount paid for the reported written premium in-force totaled $30,251.

Table 7-20: Town of Snow Hill NFIP Insurance Policy Statistics

Community Name	Policies In-Force	Total Written Premium In-Force
Town of Snow Hill	29	$30,251
Worcester County (Unincorporated)	5,312	$3,019,760

Source: Federal Emergency Management Agency (FEMA) NFIP Insurance Report; September 2019

As of 30 April 2019, the NFIP report stated that 12 losses were filed in the Town of Snow Hill, with total payments of $59,578.80.

Table 7-21: Worcester County NFIP Insurance Policies – Losses & Payments

Community Name	Total losses	Total Payments
Town of Snow Hill	12	$59,578.80
Worcester County (Unincorporated)	873	$6,882,029.52

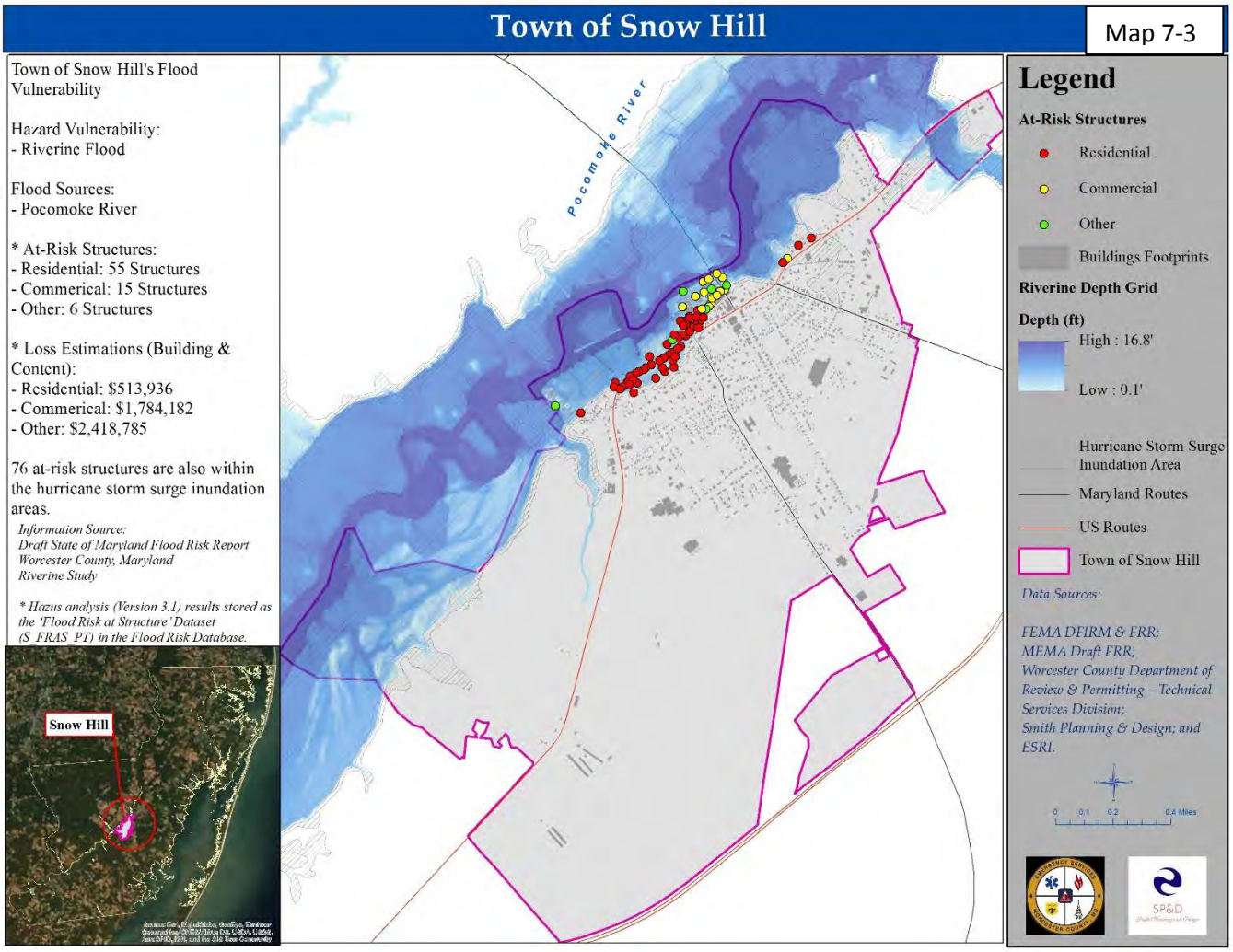
Source: Federal Emergency Management Agency (FEMA) NFIP Insurance Report; April 2019
Data Dictionary: Total Payments-The total amount of all building, contents, and ICC payments for all claims. Number of Losses - The number of losses (claims) reported with that community and/or county. ***Data Disclaimer:*** *This report is generated from the NFIP Pivot Analytical Reporting Tool (PART).*

Flood Hazard Vulnerability

Structures at-risk to riverine flood have been depicted and detailed on the map below. A small portion in the western of the Town of Snow Hill is located in the Special Flood Hazard Area (SFHA). Source of flooding to the Town of Snow Hill is the Pocomoke River. In addition, the Town of Snow Hill is susceptible to hurricane storm surge. The fire district survey completed by the Snow Hill Volunteer Fire Company indicated that two (2) roadways are repetitive flood areas. These roadways include:

- Route 12 west of the Pocomoke River for approximately 300yards; and
- Nassawango Road at the cross over bridge.

Furthermore, according to the 2016 Maryland State Highway Administration (MDSHA) and US Army Corps of Engineers (USACE) 2050 and 2100 Projected Sea Level Rise data, the western portion, along the Pocomoke River, of the Town of Snow Hill is vulnerable to both sea level rise scenarios.



Non-Flood Related Hazards Vulnerability

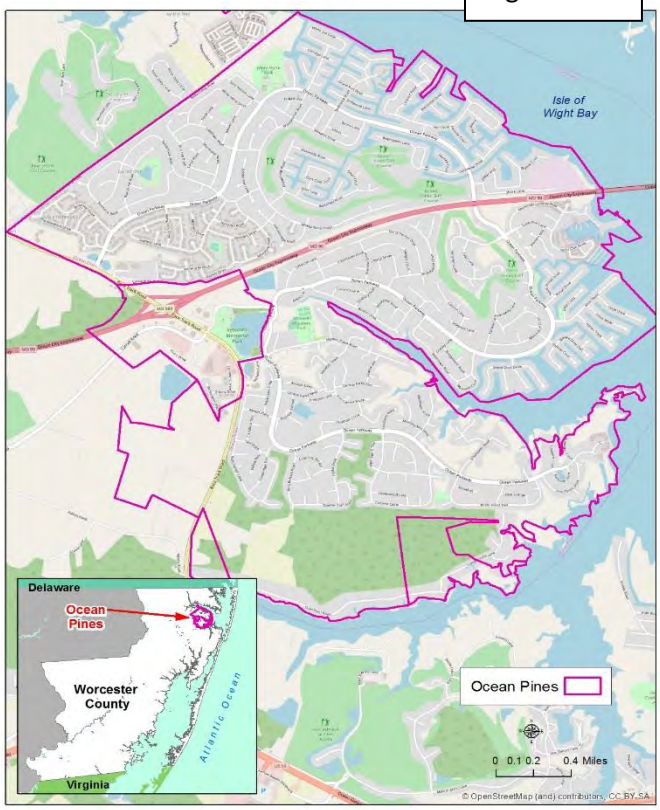
State Route 12 and US Business Route 113 both travel through the Town of Snow Hill. As such, the Town of Snow Hill is vulnerable to HazMat transportation related incidents. The entirety of Worcester County, including the City of Pocomoke, is vulnerable to wind related incidents including hurricane, Nor'easter, thunderstorm and tornados. Snow Hill is susceptible brush fires due to urban development within close proximity to forested or brush cover land. Finally, winter storm and drought hazards affect the entirety of the County.

The social vulnerability assessment performed during this plan development process indicates that the Town of Snow Hill has a high concentration of person aged 65 or older. This population is vulnerable to natural hazards, namely extreme cold and heat related incidents. The social vulnerability assessment has been included as *Appendix I: Vulnerable Populations*.

Ocean Pines

Physical Location

Figure 7-4



Ocean Pines is a premier residential community nestled on Maryland's Eastern Shore in Northern Worcester County. It has over 9 miles of waterfront property on 3,000 acres of wooded areas, with amenities throughout the community including a beachfront property located in Ocean City on the Atlantic Ocean. Today, there are approximately 8,452 platted lots in the community that house 12,000 full-time residents and 8,000 part-time residents and associated guests. The Ocean Pines community also features restaurants, shops and extensive recreation facilities including a racquet complex, golf course, five swimming pools, two marinas and more.

Demographics

According to U.S. Census, Population Estimates for 2018, the population of Ocean Pines from 2010 to in 2017, Table 7-22 shows year-round populations for the Ocean Pines compared to the overall Worcester County population total.

Table 7-22: Year-Round Populations of Ocean Pines

Place	2010	2017 Estimates	Change	Percent Change
Ocean Pines	11,710	12,085	375	3.2%
County Total	51,454	51,823	369	0.7%

Source: U.S. Census Bureau, Population Division – Annual Estimates of Resident Population: April 1, 2010 to July 1, 2018 and Source: 2013-2017 American Community Survey 5-Year Estimates

Economy

According to the 2016 United States Census Bureau - American Community Survey (ACS), a good indicator of the strength of the job market is the income per capita and the median household income. Ocean Pine's employment information is shown on the table below.

Table 7-23: Ocean Pines Employment Information

Index	Ocean Pines, MD	Maryland	National
Income Per Capita	$39,867	$37,756	$29,829
Median Household Income	$67,485	$76,067	$55,322

Median Income Owner Occupied	$73,208	$95,994	$70,586
Median Income Renter Occupied	$49,306	$47,333	$35,192
Median Earnings Male	$40,718	$46,495	$36,919
Median Earnings Female	$27,247	$35,61	$26,250
Unemployment Rate	2.8%	4.5%	4.7%
Poverty Level	6.8%	9.9%	15.1%

Source: 2016 United States Census Bureau American Community Survey

The income per capita in Ocean Pines is $39,867, which is 6% higher than the Maryland average and 34% higher than the national average. The median household income is in Ocean Pines is $67,485 which is 11% lower than the Maryland average and 22% higher than the national average. Finally, the unemployment rate in Ocean Pines is 3%, which is 39% lower than the national average and the poverty rate is 7%, which is 55% lower than the national average.

Table 7-24: Ocean Pines Employment by Industry

Industry Types	Total Percentage of Workforce
Construction Industry	19.2%
Manufacturing Sector	7.1%
Financial & Insurance Services	8.3%
Wholesale & Retail Services	34.1%
Public Administration	11.7%
Transportation, Warehousing & Utilities	6%
Education, Health & Social Services	44.7%
Other	62.2%

Source: 2016 United States Census Bureau American Community Survey

In addition, Table 7-24 shows Ocean Pine's employment by industry with total workforce percentage for each industry type. Education, Health & Social Services is 44.7% of the workforce followed by Wholesale & Retail Services, with 34.1% of the workforce.

Development Trends

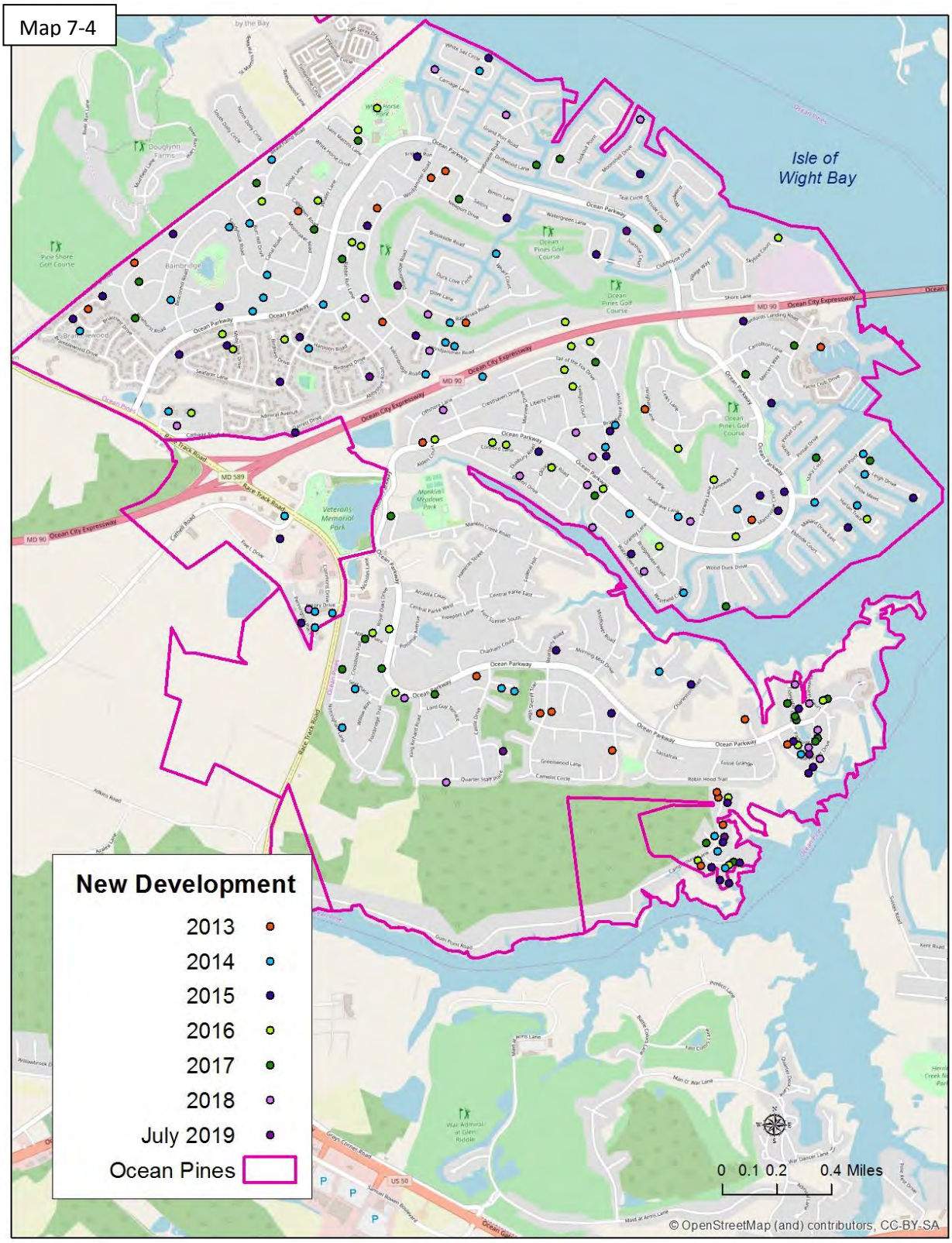
According to the *Worcester County Department of Development Review & Permitting – Technical Services*, there has been 202 structures developed in Ocean Pines from 2013 through July 2017.

Table 7-25: New Development for Ocean Pines from 2013 - 2017

Ocean Pines	Commercial	Commercial Condominium	Residential	Residential Condominium	TOTAL
2013	1	0	21	0	22
2014	2	0	39	0	41
2015	1	0	42	0	43
2016	2	0	34	0	36
2017	2	0	28	0	30
2018	1	0	22	0	23
2019	1	0	6	0	7
TOTAL	10	0	192	0	202

Source: Worcester County Department of Development Review & Permitting – Technical Services

Map 7-4



Source: Smith Planning and Design and MD 2011 Property View Database

Hazard Event Data

According to the National Centers for Environmental Information (NCEI), included in Table 7-26 below are notable hazard events recorded **specific** to Ocean Pines. Hazards impacting Ocean Pines include:

- ***Flood Hazard*** *–Flash Flood and Heavy Rain;*
- ***Thunderstorm Hazard*** *– Hail and Lightning;*
- ***Tornado Hazard*** *– Tornado; and*
- ***Wind Hazard*** *– Thunderstorm Wind.*

Table 7-26: Ocean Pines Notable Hazard Event Data				
Hazard Type	**Date**	**Event Narrative**	**Property Dam.**	**Probability of Future Event**
Flash Flood	1-Aug-04	Street flooding in Ocean Pines. Several other roads flooded throughout the county.	0	Occasional
Flash Flood	2-Aug-09	Flash flooding was reported in Ocean City. Street (65TH) was closed due to a foot and a half of water on the road at St. Louis Avenue. Roads were flooded from 8th Street south to Route 50. The intersection of Bayshore Drive and Gull Way was flooded with 2 feet of water on the road.	0	
Hail	16-Jul-97	N/A	0	Occasional
Hail	29-May-09	Nickel size hail was covering the ground.	0	
Heavy Rain	29-Jul-16	Rainfall total of 2.84 inches was reported from July 28.	0	Highly Likely
Heavy Rain	15-Jul-17	Rainfall total of 1.48 inches was measured at Ocean Pines.	0	
Heavy Rain	29-Jul-17	Rainfall total of 3.22 inches was measured at Ocean Pines.	0	
Heavy Rain	8-Aug-17	Rainfall total of 3.45 inches was measured at Ocean Pines.	0	
Heavy Rain	13-Aug-17	Rainfall total of 5.21 inches was measured at Ocean Pines.	0	
Heavy Rain	17-May-18	Three-day rainfall total was 5.77 inches at Ocean Pines.	0	
Lightning	28-Jul-16	A house was struck by lightning.	5K	Likely
Thunderstorm Wind	29-Jun-12	Large tree was downed on a home in Ocean Pines. Several additional trees were downed.	40K	Highly Likely
Thunderstorm Wind	22-Jul-17	Tree was downed onto a vehicle with people trapped.	3K	
Tornado	15-Sep-11	Brief weak tornado (EF0) originally touched down just west of Ocean City in Assawoman Bay and weakened as it moved toward Ocean City. The tornado produced minor damage to several buildings with windows broken, siding ripped off, and minor roof damage. Damage generally occurred above the first floor. In addition, a number of vehicles had windows broken by flying debris. Winds with the tornado were estimated in the 60 to 70 mph range.	0	Unlikely

Source: National Centers for Environmental Information (NCEI), July 2019
Note: There were no deaths, injuries, or crop damage reported for any events listed on this table.
Coastal Storms, Winter Storms, and Droughts are recorded as county-wide events in the NCEI database. Refer to Chapter 4 and Chapter 5 of the Plan for data.
Note: Probability was determined based on annualized events shown in the table above.
•Highly Likely—Near 100% chance of occurrence next year or happens every year.
• Likely—10-100% chance of occurrence in next year or has a recurrence interval of 10 years or less.
• Occasional—1-10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.
• Unlikely—Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

National Flood Insurance

As of 30 September 2019, the National Flood Insurance Program (NFIP) report shows 5,312 policies in-force for the unincorporated portion of Worcester County, which includes Ocean Pines. The amount paid for the reported written premium in-force totaled $3,019,760.

Table 7-27: Worcester County (Unincorporated) NFIP Insurance Policy Statistics

Community Name	Policies In-Force	Total Written Premium In-Force
Worcester County (Unincorporated)	5,312	$3,019,760

Source: Federal Emergency Management Agency (FEMA) NFIP Insurance Report; September 2019

As of 30 April 2019, the NFIP report stated that 873 losses were filed in the unincorporated portion of Worcester County, which includes Ocean Pines, with total payments of $6,882,029.52.

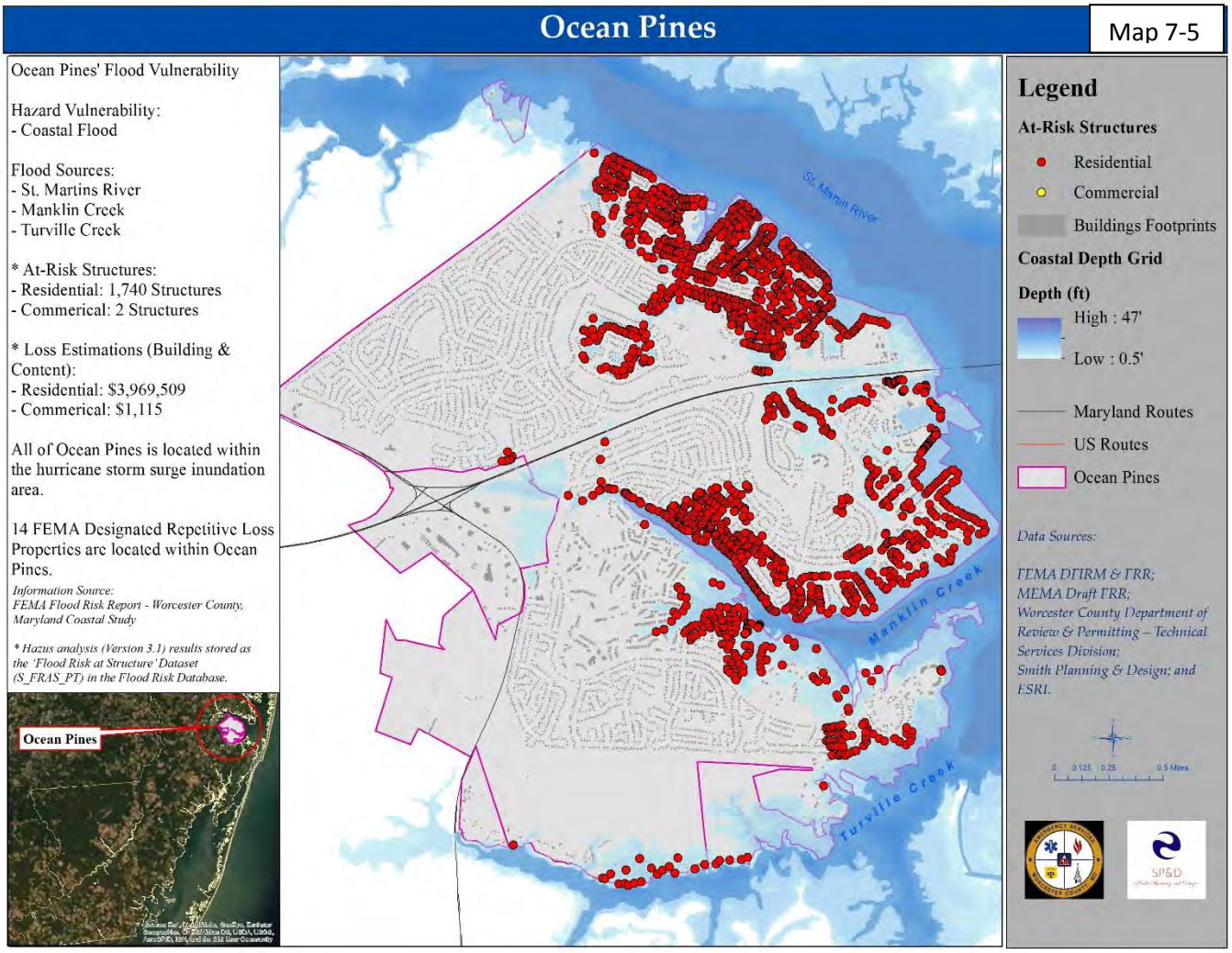
Table 7-28: Worcester County NFIP Insurance Policies – Losses & Payments

Community Name	Total losses	Total Payments
Worcester County (Unincorporated)	873	$6,882,029.52

Source: Federal Emergency Management Agency (FEMA) NFIP Insurance Report; April 2019
Data Dictionary: Total Payments-The total amount of all building, contents, and ICC payments for all claims. Number of Losses - The number of losses (claims) reported with that community and/or county.
***Data Disclaimer:** This report is generated from the NFIP Pivot Analytical Reporting Tool (PART).*

Flood Hazard Vulnerability

Structures at-risk to coastal flood have been depicted and detailed on the map below. Sources of flooding to the community of Ocean Pines include St. Martins River, Manklin Creek, and Turville Creek. In addition, the community of Ocean Pines is highly susceptible to hurricane storm surge. Furthermore, according to the 2016 Maryland State Highway Administration (MDSHA) and US Army Corps of Engineers (USACE) 2050 and 2100 Projected Sea Level Rise data, the community of Ocean Pines is vulnerable to both sea level rise scenarios.



Non-Flood Related Hazards Vulnerability

HazMat transportation related incidents along Maryland Route 90 could impact the community of Ocean Pines. In addition, the entirety of Worcester County, including the community of Ocean Pines, is vulnerable to wind related incidents including hurricane, Nor'easter, thunderstorm and tornados.

The social vulnerability assessment performed during this plan development process indicates vulnerability based on 5 variables. Overall social vulnerability for the community of Ocean Pines is high. This area of the County should be targeted for hazard mitigation planning, projects and outreach initiatives. The social vulnerability assessment has been included as *Appendix I: Vulnerable Populations*.

2014 Community Mitigation Strategies Assessment and Results

The Town of Berlin, Town of Snow Hill, Pocomoke City, and the community of Ocean Pines reviewed mitigation goals and actions identified in the 2014 Plan to provide a status for each action. Previous mitigation goals and actions were discussed and reviewed at two planning committee meetings held on May 22nd and July 25th of 2019. In addition to the in-person meetings, status updates and opportunities for further review and input were provided to all planning partners using the hazard mitigation planning email group listing.

A local jurisdiction must review and revise its plan to reflect progress in local mitigation efforts.

44 CFR 201.6(d)(3)

Results of the assessment of the action items for the Town of Berlin, Town of Snow Hill, Pocomoke City, and the community of Ocean Pines are shown on the chart below and the Community Mitigation Action Items status table.

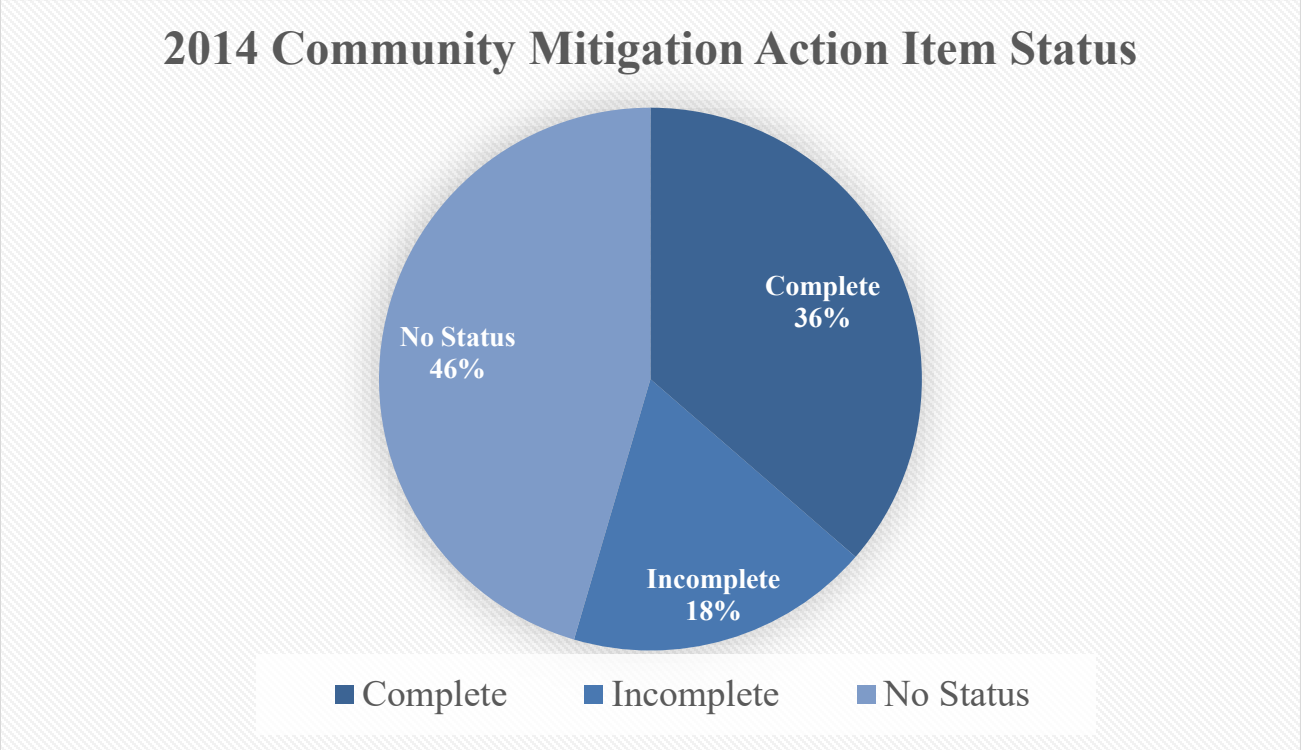


Table 7-29: 2014 Community Mitigation Action Status Table							
Previous Action	Responsible Department	Status					Remarks
		Complete	Incomplete	Ongoing	In-Process	Pending	
FLOOD HAZARD-COMMUNITY/MUNICIPAL **CRS indicate actions that are eligible for credit under the Community Rating System (CRS).**							
OCEAN PINES							
CRS-Target the Ocean Pines Fire Station for critical facility flood mitigation project.	Ocean Pines			X			
POCOMOKE							
CRS-According to the 2006 Land Use Plan, Growth Areas are projected along Cedar Hall Road. This area borders Category 4 in the SLOSH model. Ensure building codes, regulations and proper site designs are enforced for the new proposed development in this area.	Pocomoke			X			
Review existing network of Datum Markers and re-survey, replace, and add new Datum Markers in areas identified as high risk for flooding.	Pocomoke			X			
SHORELINE EROSION & SEA-LEVEL RISE- COMMUNITY/MUNICIPAL							
OCEAN PINES							
Continue to install erosion control structures, bulkheads, in the Ocean Pines area. Inspect current control structures for integrity.	Ocean Pines			X			
Request State participation in evaluating long-term options for Ocean Pines, given its current vulnerability to flooding, high ground water levels, saltwater intrusion, and anticipated loss of land due to erosion and sea-level rise that will exacerbate these limiting conditions.	Ocean Pines	X	X				Engineer Study of Stormwater/Drainage completed. Projects to improve repetitive flood area and ongoing ditch maintenance- Incomplete
Regarding buried infrastructure, conduct a vulnerability assessment by compiling a detailed list of specific buried infrastructure segments that are in or close proximity to areas likely to be inundated by potential sea level rise.	Ocean Pines		X				Remove from action listing.
Host workshop on coastal risk. Seek the assistance of National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center.	Ocean Pines;		X				Development along the shorelines of Isle of Wight Bay, Newport Bay & Chincoteague Bay
OCEAN PINES & POCOMOKE							
Work with Maryland Department of the Environment to identify areas of shoreline that are most vulnerable to erosion and utilize Best Management Practices (BMP) to protect these areas.	Ocean Pines; Pocomoke		X				Ocean Pines-Incomplete

Previous Action	Responsible Department	Status					Remarks
		Complete	Incomplete	Ongoing	In-Process	Pending	
FLOOD HAZARD-COMMUNITY/MUNICIPAL **CRS indicate actions that are eligible for credit under the Community Rating System (CRS).**							
DROUGHT-COMMUNITY/MUNICIPAL							
OCEAN PINES							
Distribute information on cooling stations, specifically in Ocean Pines, Berlin and Pocomoke City during the high temperature months of July and August and/or an excessive heat event. These areas have a high concentration of children under the age of 5 and populations 65 years and older.	Ocean Pines	X					Library Community Center (New)
POCOMOKE							
Distribute information on cooling stations, specifically in Ocean Pines, Berlin and Pocomoke City during the high temperature months of July and August and/or an excessive heat event. These areas have a high concentration of children under the age of 5 and populations 65 years and older.	Pocomoke			X			Information on cooling stations is in coordination with the County and distributed on a countywide basis.
WILDFIRE- COMMUNITY/MUNICIPAL							
SNOW HILL							
Areas identified as potential problems areas that have large amounts of wildland/urban interface are northwest of Snow Hill, along Route 12. According to the Maryland's Strategic Forest Lands Assessment, this area is very high to extreme for wildland-urban interface fire threat potential. This area is at a higher wildfire risk than the rest of the County. Target these areas for FIREWISE program.	Snow Hill		X				Local fire district to review and determine needs.
HAZMAT- COMMUNITY/MUNICIPAL							
SNOW HILL & POCOMOKE							
Distribute information concerning HazMat Transportation to highly developed areas that are located within the transportation route, specifically to the structures located along Route 113 due to high concentration of Industrial land use.	Snow Hill; Pocomoke			X			Information provided by the HazMat team and in coordination with countywide LEPC.

New Community Mitigation Actions

Community mitigation action items were developed during the *2020 Worcester County Hazard Mitigation & Resilience Plan Update*. Community actions items that were marked incomplete in the 2014 Plan Status Update or remain applicable for the update have been carried over and included in the strategy table below. Action items that are countywide specific have been included within the new plan chapter, *Chapter 9: Mitigation Strategies*. Those items denoted CRS indicate actions that are eligible for credit under the Community Rating System (CRS).

Table 7-30: New Municipal Mitigation Actions

Strategy	Community	Timeframe
FLOOD		
New-Consider mitigation measure for the Julia A. Purnell Museum, which is located in the FEMA Special Flood Hazard Area-AE Zone. The depth of flood at the lowest adjacent grade on the structure is projected to be 4 feet.	Snow Hill	Long-term
New-Consider mitigation measures that elevate and/or relocate one (1) Essential Facility, Snow Hill Police Department, which is at-risk to the riverine 1-percent-annual-chance flood and hurricane storm surge inundation area. These mitigation measures should be reasonable and prove cost-effective.	Snow Hill	Long-term
CRS-Target the Ocean Pines Fire Station for critical facility flood mitigation project. New FEMA 2015 FIRM Mapping indicates Ocean Pines Fire Department is outside the Special Flood Hazard Area, however, to remain resilient future conditions should be considered.	Ocean Pines	Ongoing
Work with Worcester County Public Works to continue to replace drainage pipes and contracting for ditch maintenance in specific areas of Ocean Pines to provide relief from flooding.	Ocean Pines	Ongoing
Completion of Tier 2 Stormwater Hudson Branch Project 1 – Pine, Franklin, Grice and Nelson Streets	Berlin	Short-term
Complete Tier 2 Stormwater Hudson Branch Project 2 – Bottle Branch Road – Channel Stabilization and Restoration	Berlin	Long-term
Complete Tier 2 Stormwater Bottle Branch Project 3 – Bottle Branch at Henry's Green and Henry's Mill	Berlin	Long-term
Complete Tier 2 Stormwater Bottle Branch Project 4 – Bottle Branch at West Street and Abbey Lane	Berlin	Long-term
SHORELINE EROSION & SEA-LEVEL RISE		
Continue to install erosion control structures, bulkheads, in the Ocean Pines area. Inspect current control structures for integrity and environmental impacts.	Ocean Pines	Ongoing
Request State participation in evaluating long-term options for Ocean Pines, given its current vulnerability to flooding, high ground water levels, saltwater intrusion, and anticipated loss of land due to erosion and sea-level rise that will exacerbate these limiting conditions.	Ocean Pines	Long-term
SHORELINE EROSION & SEA-LEVEL RISE Cont.		
Host workshop on coastal risk. Seek the assistance of National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center. Note: Development along the shorelines of Isle of Wight Bay, Newport Bay & Chincoteague Bay	Ocean Pines;	Short-term

Utilize Best Management Practices (BMP) to protect these areas and high vulnerability to shoreline erosion.	Ocean Pines	Long-term
Strategy	**Community**	**Timeframe**
PUBLIC OUTREACH		
New-Target the nine (9) properties located within the Riverine FEMA Special Flood Hazard Area for flood mitigation outreach activities.	Berlin	Short-term
New-Target the 76 properties located within the Riverine FEMA Special Flood Hazard Area for flood mitigation outreach activities.	Snow Hill	Short-term
New-Target the 14 properties located within the Riverine FEMA Special Flood Hazard Area and 48 properties within the Coastal FEMA Special Flood Hazard Area for flood mitigation outreach activities. All properties at risk to the riverine and coastal 1-percent-annual-chance flood are also at risk to hurricane storm surge inundation area.	Pocomoke	Short-term
DROUGHT & EXTREME HEAT		
Distribute information on cooling stations, specifically in Ocean Pines, Berlin and Pocomoke City during the high temperature months of July and August and/or an excessive heat event. These areas have a high concentration of children under the age of 5 and populations 65 years and older. New- Distribute information on cooling stations, specifically in new Library & Community Center.	Ocean Pines Berlin Pocomoke City	Short-term
PLANNING		
New-2020 Worcester County Hazard Mitigation & Resilience Plan should be integrated into the Ocean City Hazard Mitigation Plan including the following findings. Results for potential flood loss from the coastal 1-percent-annual-chance flood concluded five (5) Essential Facilities in Ocean City are at-risk. These facilities are also located within the hurricane storm surge inundation area. •Ocean City VFC No 3 – Flood Depth 0.5' – Hurricane Category 2 •Ocean City VFC Station 4 – Flood Depth 0.5' – Hurricane Category 2 •Ocean City VFC Headquarters – Flood Depth 0.5' – Hurricane Category 1 •Ocean City Fire Co Station 2 – Flood Depth 1.0' – Hurricane Category 1 •Ocean City Beach Patrol – Flood Depth 1.6' – Hurricane Category 1	Ocean City	Long-term
New-streamline Government services by coordinating with the County to become an authorized user on the Everbridge System.	All	Short-term
New-Install Emergency Exits off Route 90 (Ocean Parkway) at Ocean Pines for ingress/egress of emergency vehicles.	Ocean Pines	Long-term
New-Offer Community Emergency Response Team (CERT) training to educate volunteers about disaster preparedness for the hazards that may impact Ocean Pines and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations.	Ocean Pines	Short-term

**Timeframe: Short-term (1-2 Years), Long-term (2 or more years)*

CHAPTER 8: MITIGATION STATUS REPORT

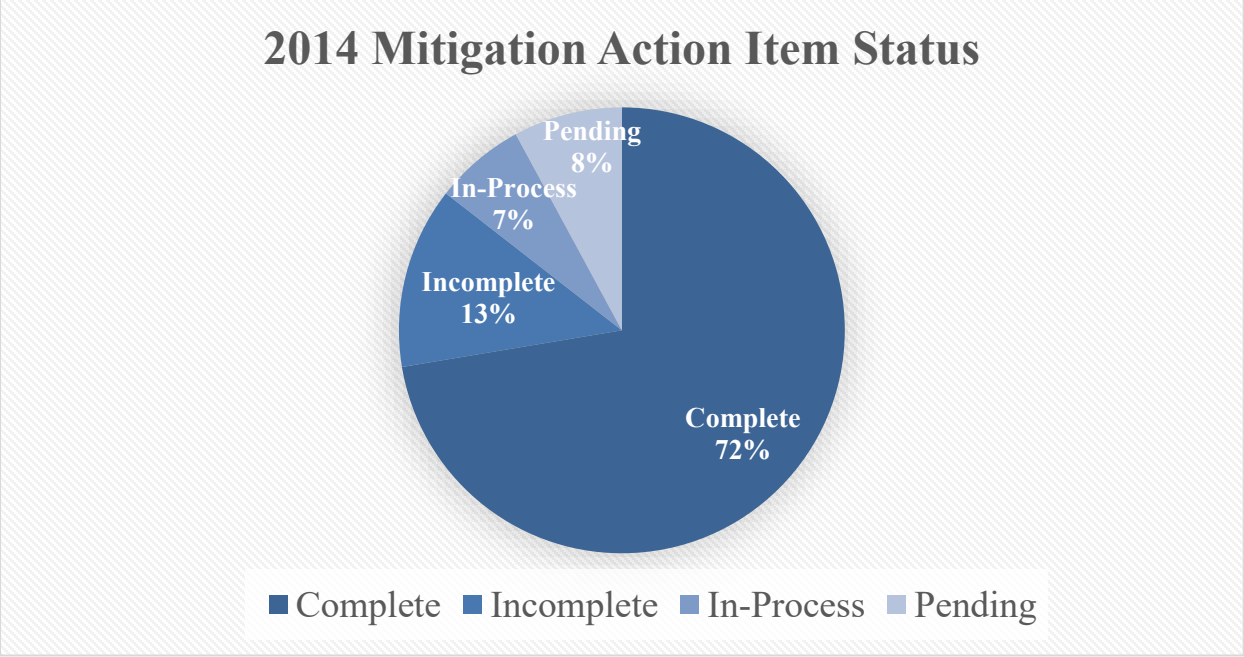
Introduction

> A local jurisdiction must review and revise its plan to reflect progress in local mitigation efforts.
>
> 44 CFR 201.6(d)(3)

An important step in updating the Plan is the assessment of previous goals and actions items. Worcester County along with the Town of Berlin, Town of Snow Hill, Pocomoke City, and the community of Ocean Pines reviewed mitigation goals and actions identified in the 2014 Plan to provide a status for each action. Previous mitigation goals and actions were discussed and reviewed at two planning committee meetings held on May 22nd and July 25th of 2019. In addition to the in-person meetings, status updates and opportunities for further review and input were provided to all planning partners using the hazard mitigation planning email group listing.

2014 Mitigation Strategies Assessment and Results

Results of the 2014 goals and action items assessment for county-wide initiatives indicate that Worcester County is committed to hazard mitigation and planning. The goals from the 2014 Plan were reviewed and (2) two new goals and (15) fifteen new objectives were identified and added as part of the update. The majority of the action items identified in the 2014 Plan have been completed and/or are ongoing as shown on the chart below.



Mitigation Action Status Table

The 2014 Mitigation Action Item Status table has been included below and provides a listing of county-wide initiatives. The status of action items identified in the previous plan for the Town of Berlin, Town of Snow Hill, Pocomoke City, and the community of Ocean Pines is included in the new Plan *Chapter 7: Jurisdictional Perspective*.

Previous Actions	Responsible Organization	Status					Remarks
		Complete	Incomplete	Ongoing	In-Process	Pending	
FLOOD HAZARD-COUNTY-WIDE **CRS indicate actions that are eligible for credit under the Community Rating System (CRS).**							
CRS-Evaluate the effectiveness of the current floodplain protection regulations. Review the State's new Model Guidelines.	DRP	X					New Floodplain Study completed July 16, 2015 resulting in updates to the floodplain management ordinance.
CRS-Identify water and wastewater facilities where additional flood damage avoidance measures may be appropriate. Conduct site specific visits and assess alternatives where indicated.	DRP, WCES				X		
CRS-Consider participating in the Community Rating System program, to receive flood insurance premium credits. To participate, the flood program must address public information, mapping, regulation; flood damage reduction; and flood preparedness, much of which has been accomplished by this plan.	DRP, WCES		X				
CRS- Utilizing the National Flood Mitigation Data Collection Tool (FEMA 497), a database should be developed containing information on each "at-risk" property. The data collected should include structure type, condition, foundation type, number of stories, square footage, depth of flooding, flash flooding occurrence, flood velocity, and structure location within the floodway. This database could be utilized in prioritizing the structures most at-risk and in need of mitigation. According to the 2011 Maryland Property View Database, approximately 33% of the housing was built prior to 1979.	DRP		X				
Mitigate repetitive roadway flooding in areas identified in Chapter 3: Vulnerability Assessment.	DPW					X	
SHORELINE EROSION & SEA-LEVEL RISE-COUNTY-WIDE							
Engage county and municipal decision makers in identifying hazards and climate change issues and make connections to existing planning and policy efforts.	DEP, WCES			X			

DROUGHT-COUNTY-WIDE							
Provide information to farmers regarding the assistance that could be provided to livestock producers in approved counties when the growth and yield of hay and pasture have been substantially reduced because of a widespread natural disaster. The grant program utilized for this type of assistance is the Animals: Emergency Haying and Grazing Program.	WCES					X	Delegate to Cooperative Extension Office
Distribute information on cooling stations, specifically in Ocean Pines, Berlin and Pocomoke City during the high temperature months of July and August and/or an excessive heat event. These areas have a high concentration of children under the age of 5 and populations 65 years and older.	WCES	X					Schools Health Dept. County Parks
TORNADO & WIND-COUNTY-WIDE							
Assess existing multilevel structures such as hospitals, commercial and residential condominiums and apartment complexes for their wind load capacities.	DRP, WCES, DPW			X			DRP WCES-Windshield Assessment
Consider working with utility companies to identify problem areas and the possibility of changing to underground lines in those areas.	WCES					X	
WINTER STORM- COUNTY-WIDE							
Purchase new generators for critical facilities that currently do not have a generator or that are lacking capacity or are outdated.	WCES	X				X	DPW-Complete New Project

Note: Acronym list for the Departments/Agencies listed under Responsible Agency:

- *DPW – Department of Public Works*
- *WCES – Worcester County Emergency Services*
- *DRP – Development Review and Permitting*
- *DEP – Department of Environmental Programs*

CHAPTER 9: MITIGATION STRATEGIES

Introduction

Goals and objectives serve as the basis for implementing action items and projects that mitigate the hazards detailed in Chapters 3-9 of the Plan Update. During the July 25th meeting of the Worcester County Hazard Mitigation Planning Committee (HMPC), nine existing goals and associated objectives were reviewed. New objectives were added to existing goals and two new goals and associated objectives were added as part of the update process. New goals and objectives are shown in red text below.

In addition, new Climate Adaptation & Resilience Strategies were developed.

Goals and Objectives

Goals as identified in this plan are broad-based and long-term in nature. 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.

> *These goals, objectives, and mitigation action items apply to municipal participants as well as the unincorporated part of the county.*

GOAL 1 **Maintain and enhance Worcester County's Department of Emergency Service's capacity to continuously make Worcester County less vulnerable to hazards, specifically those rated as high and medium high.**

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 and applications.
Objective 1.5 Continue to improve Community Rating System score in order to reduce the cost of flood insurance within Worcester County.

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 such as volunteer and neighborhood groups.

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 Work to increase the number of businesses that have developed a business risk reduction plan.
Objective 4.5 Encourage the public to educate themselves about local flooding, hazards, and zoning issues.
Objective 4.6 Ensure County residents and visitors are aware of evacuation procedures.
Objective 4.7 Require proper real estate disclosure including elevation certificates to enable buyers to make informed purchase decisions.

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 flooding.
Objective 5.2 Enact and enforce regulatory measures to ensure that new development will not increase hazard threats from flooding and the threat of wildfire.
Objective 5.3 Work to reduce the number of houses in the floodplain that are subject to repetitive losses from flooding.
Objective 5.4 Work to increase the number of critical facilities that have carried out mitigation measures to ensure their functionality in a 100-year or the 1% annual chance flood event, winter storm or high wind event.
Objective 5.5 Review and update Building Codes as necessary to ensure that all buildings, including manufactured housing and mobile homes, are constructed and installed in a manner to minimize wind damage.
Objective 5.6 Ensure existing high-risk residential structures where possible 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 facilities.

Objective 6.3 Maximize the use of outside funding sources.

Objective 6.4 Encourage property-owner self-protection measures.

GOAL 7 Promote sustainable development to improve the quality of life.

Objective 7.1 Promote 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 group housing (especially elderly and high density) in areas of high hazard risk.

Objective 7.4 Create a Post Disaster Redevelopment Plan (PDRP) to guide rebuilding after a major disaster.

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 measures 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.

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 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.

GOAL 10 Organize effectively and address resilience priorities.

Objective 10.1 Address infrastructure dependencies and cascading effects in system failures.

Objective 10.2 Determine customized short-term and long-term resilience initiatives.

Objective 10.3 Regularly review and integrate the best available projections for sea level rise, flooding, precipitation, and other hazards into county and municipal planning.

GOAL 11 Integrate plan and policies across disciplines and agencies within the County through the consideration of potential hazards and future development.

Objective 11.1 Integrate hazard mitigation and resilience into areas such as land use, transportation, climate change, natural and cultural resource protection, water resources, and economic development.

Objective 11.2 Solicit participation and offer opportunities for various departments to work together on a regular basis

Objective 11.3 Cleary define roles of, and improve intergovernmental coordination between planners, emergency managers, engineers, and other staff, and municipal and regional partners in improving disaster resilience.

Objective 11.4 Train and exercise emergency plans and protocols.

Climate Adaptation & Resilience Strategies

In addition to the new goals and objectives added during this planning process, new climate adaptation & resilience strategies were recommended.

Below are six adaptation recommendations for Worcester County, along with hazard mitigation related strategies formulated to support the implementation of these recommendations:

- Build greater resilience to extreme precipitation;
- Identify opportunities to strengthen the climate resilience and health of vulnerable populations;
- Increase focus on preserving natural and restored terrestrial and aquatic ecosystems and habitat to increase resilience of wildlife and native plants;
- Strengthen agricultural water management efforts to increase resilience to climate change impacts;
- Increase focus on managing climate impacts in towns and other population centers; and
- Strengthen our climate information infrastructure to support climate adaptation practices.

Repetitive & Nuisance Flooding

As part of the plan development process, repetitive flood locations were identified and provided by the Department of Public Works - County Roads Division and listed on Table 9-1. The roads identified historically flood during a Nor'easter, hurricane, or heavy rain event. A Fire District Survey Form was provided to the Worcester County Fire Districts to comment on roads impacting their communities. Four Volunteer Fire Departments (Newark VFD, Snow Hill VFD, Stockton VFD, and Bishopville VFD) identified flood prone roads with their district. Issues identified include: Sea Level Rise (SLR), Stormwater Management (SWM), Drainage, Low Road Elevation, Tidal, Undersized Culvert and Wetlands.

Table 9-1: Potential Roads That Flood During a Nor'easter, Hurricane, or Heavy Rain Event	
Road	**Issue**
Back Creek Road*	Tidal
Basketswitch Road	Drainage Away Blocked/Low Road Elevation
Bayview Road	Drainage Away Blocked
Beaverdam Creek Road	Drainage Away Blocked
Bethands Road	Drainage
Betheden Church Road	Drainage Blocked
Bishopville Road*	Drainage
Brighton Road	Tidal
Byrd Road	Drainage
Cathell Road	Drainage
Cedar Hall Wharf Road	Tidal
Cedartown Road	Drainage
Colona Road	Drainage
Creek Road	Drainage/Tidal
Dukes Road	Drainage
Eagle's Nest Road	Tidal/Sea Level Rise
Exeter Road	Tidal
George Island Road*	
Golf Course Road	Storm Water Management not sufficient/Tidal
Greenbackville Road	Drainage
Gum Point Road	Tidal
Harmon Landing Road	Tidal
Harrison Road	Drainage Blocked
Hidden Harbor Road	Tidal
Holly Grove Road	Drainage Blocked/Nontidal Wetlands
Hotel Road	Drainage Blocked
Island View Road	Drainage/Tidal
Jarvis Road	Drainage
Johnson Neck Road	Drainage
Keyser Point Road	Drainage/Tidal
Klej Grange Road	Drainage-Bridge
Langmaid Road	Drainage
Laws Road	Drainage
Logtown Road	Drainage
Madison Avenue	Drainage/Tidal
Marshall Creek Road	Tidal
McCabe's Corner Road	Drainage
Meadow Drive	Tidal
Mt. Olive Church Road	Drainage
Muskrattown Road	No Drainage Ditches
Nassawango Road*	Tidal
New Quay Road	Tidal
Norwich Road	Tidal
Onley Road	Drainage

Road	Issue
Orchard Road	Drainage
Parker Bay Road	Tidal
Patey Woods Road	Drainage
Pennewell Road	Pond Overflow
Porter's Crossing Road*	Low Bridge
Purnell Crossing Road	Drainage/Tidal/Wetland
Rabbit Knaw Road*	
Red House Road	Drainage/Tidal
Rt. South of Girdletree*	
Rum Gate Road	Tidal
Sand Road	Drainage/Tidal
Scott's Landing Road	Tidal
Seahawk Road	Drainage
Selsey Road	Tidal
Sheephouse Road	Drainage
Sheffield Road	Tidal
Sheppard's Crossing	Drainage-Ditch
Shockley Road	Drainage
Sinepuxent Road	Tidal-Ditch
Snug Harbor Road	Tidal
South Point Road	Drainage/Tidal/Sea Level Rise
Spencer Road	Drainage
Stagg Road	Drainage
St. Martin Neck Road*	Sea Leve Rise
Taylor Landing Road	Tidal
Taylor Road	Drainage
Truittt's Landing Road	Drainage/Tidal
West Line Road*	Drainage-Ditch
Whiton Crossing Road*	Drainage on Both Sides of Bridge

Source: Department of Public Works – County Roads Division, Newark VFD, Stockton VFD, Snow Hill VFD, and Bishopville VFD.
** Locations identified by Volunteer Fire Departments.*

A total of 73 were identified as being potentially flooded during an event. Sixty-three by the Department of Public Works – County Roads Division and ten by Newark Volunteer Fire Department, Snow Hill Volunteer Fire Department, Stockton Volunteer Fire Department, and Bishopville Volunteer Fire Department. Three roads were identified due to potential sea level rise, 31 roads for tidal flooding, one road caused by a stormwater management issue, and 45 roads affected due to drainage issues. Several of the issues regarding drainage involved blockages or the lack of drainage ditches or bridge interferences. Flooding occurring on Pennellwell Road is caused by an undersized pond. Of the total roads identified, 13 are affected by more than one issue, for example, Purnell Crossing Road contains drainage, wetland and tidal flooding issues. Additionally, Eagle's Nest Road and South Point Road are currently affected by tidal flooding and have the potential to be inundated due to sea level rise.

As a result of identifying repetitive roadway flood locations, Mitigation Action #5 was developed as part of this planning process. Future recommendation for this action items is to gather additional information that will assist with future prioritization of road improvement projects.

Mitigation Actions

Upon completing the review of the goals and objectives, the HMPC reviewed and provided status updates for the 2014 mitigation strategies, *Chapter 8: Mitigation Status Report.* The Hazard Mitigation Planning Committee members then prioritized all mitigation actions that were not completed during the previous Plan cycle and new mitigation actions identified during the 2020 Plan Update process. Mitigation Actions address the goals and objectives developed by the HMPC. These actions form the core of the *Worcester County 2020 Hazard Mitigation & Resilience Plan Update*.

Mitigation Action Rankings

The following table lists the **Mitigation Action Items** set forth by the Hazard Mitigation Planning Committee (HMPC), the table denotes which **Goals and Objectives** are met by each action item, provides the **Time Frame** for completion and the **Priority Ranking** established by the HMCP. The prioritization method was based on cost benefit for the County, implementation benefit and the likelihood of the project being completed within the next five years. Cost benefit factors included funding the County would have to contribute and grant funding.

Table 9-2 provides the listing for the new Mitigation Actions. Overall, eight action items were rated as “High” and nine action items were rated as “Medium”, while twenty-two action items were rated as “Low”. The eight action items rated as “High” are shown in bold text.

Potential Mitigation Projects

Concluding this chapter are potential Mitigation Projects that address the highest ranked Mitigation Actions. Three projects involve staff time; therefore, these projects can be accomplished at a minimal expense to the County. These projects include: Plan Integration, Outreach materials for “At-Risk” Populations, Develop Evacuation Plan, Develop Post-Disaster Plan, Back-up Capabilities for 9-1-1 and EOC Centers, and develop a Nuisance Flooding Plan.

Mitigation action items that are considered county-wide were developed during the *2020 Worcester County Hazard Mitigation & Resilience Plan Update*. County-wide actions items that were marked incomplete in the 2014 Plan Status Update or remain applicable for the update have been carried over and included in the new strategy table below. Action Items that are a "High" Priority are highlighted below. Action items that are specific to jurisdiction and/or communities within the county, have been included within the new plan chapter, *Chapter 7: Jurisdictional Perspective.* Those items denoted CRS indicate actions that are eligible for credit under the Community Rating System (CRS).

TABLE 9-2: NEW MITIGATION ACTION ITEMS

	STRATEGY	HAZARD	COMMUNITY	GOALS	OBJECTIVES	DEPARTMENT	TIMEFRAME	PRIORITY
FLOOD								

#1	CRS Water and wastewater facilities identified as at-risk to flooding. Additional flood damage avoidance measures may be appropriate. Conduct site specific visits and assess alternatives where indicated.
	• Snow Hill WWTP – 3.2' (Waste)
	• Ocean City
	• Pocomoke – Maryland Avenue Pump Station – 0.5' (Waste)
	• Unincorporated
	  • Center Drive Wet Well – 2.3' (Waste)
	  • Center Drive Pump Station No. 1 – 2.7' (Waste)
	  • Golf Course Road Pump Station No. 4 – 0.5' (Waste)
	  • Golf Course Road Wet Well – 1.0' (Waste)
	  • Sunset Avenue Pump Station No. 7 – 0.5' (Waste)
	  • Ocean Gateway Well – 2.9' (Water)
	  • Center Drive Well – 2.7' (Water)
	  • Center Drive WTP – 1.9' (Water)
	  • Madison Avenue Pump Station – 0.5' (Waste)
	  • Madison Avenue Well – 1.8' (Water)
			Countywide	1
				2
				5
				6
					2.3
					5.1; 5.3
					6.1; 6.2; 6.4
						DPW, WCES	Short-term	Medium

STRATEGY		HAZARD	COMMUNITY	GOALS	OBJECTIVES	DEPARTMENT	TIMEFRAME	PRIORITY
FLOOD Cont.								
#2	CRS-Consider participating in the Community Rating System program, to receive flood insurance premium credits. To participate, the flood program must address public information, mapping, regulation; flood damage reduction; and flood preparedness, much of which has been accomplished by this plan.		Countywide	1 2 4 6	1.1 2.1 4.1; 4.3 6.5	WCES	Short-term	Low
#3	Update the Army Corp. of Engineers Flood Risk Survey & Assessment.		Countywide	3 4 6	3.1; 3.3 4.1 6.3	DPW	Long-term	Low
#4	Check shelter capacity in relation to the Flood Zone Evacuation Maps.		Countywide	1 4	1.1; 1.2; 1.3 4.1; 4.5		Short-term	Medium
#5	CRS- Review prioritized 2019 repetitive roadway flooding areas identified in Chapter 9. Include these areas in capital improvement plan.		Countywide	1 2 9 11	1.1 2.4 9.1; 9.3 11.1	DPW	Long-term	Low
#6	Discuss potential mitigation measures with Your Doc's In medical clinic, Essential Facility, which is at-risk to the coastal 1-percent-annual-chance flood and hurricane storm surge inundation area.		Countywide	5 6 10	5.1; 5.4 6.1; 6.2; 6.3 10.1	WCES	Short-term	Low
#7	Develop a county-wide Nuisance Flooding Plan. By October 2020, a local jurisdiction that experiences nuisance flooding must develop a plan to address nuisance flooding - which must be updated at least once every five years. *Maryland HB 1350/ SB 1006 - Sea Level Rise Inundation and Coastal Flooding - Construction, Adaptation, and Mitigation*		Countywide	1 4 5	1.1 4.1; 4.5 5.1; 5.3	DRP, DPW, WCES, DEP	Short-term	**High**
SHORELINE EROSION & SEA-LEVEL RISE								
#8	Continue to engage county and municipal decision makers in identifying hazards and climate change issues and make connections to existing planning and policy efforts.		Countywide	1 2	1.1; 1.3; 1.4 2.1; 2.2	DEP, WCES	Ongoing	**High**

STRATEGY		HAZARD	COMMUNITY	GOALS	OBJECTIVES	DEPARTMENT	TIMEFRAME	PRIORITY
SHORELINE EROSION & SEA-LEVEL RISE Cont.								
#9	Update flood models to account for Climate Change.		Countywide	2 4 11	2.4 4.1 11.1; 11.2	DEP, DPW	Short-term	Low
PUBLIC OUTREACH								
#10	CRS-Develop hazard preparedness and mitigation public outreach materials targeting At-Risk Populations. New- This information should include infectious disease information and health impacts.	Infectious Disease	Countywide	3 4	3.1 4.2; 4.3; 4.4	WCES	Ongoing	**High**
#11	CRS-Continue to strengthen public awareness or hazard mitigation through county comprehensive plan and community/town plans. Use recommendations within the Safe Growth Audit – Appendix H.	All Hazards	Countywide	4	4.2; 4.3; 4.4	WCES, DRP	Ongoing	Low
#12	CRS-Work with the County Visitors/Tourism Bureau, MD DNR to alert tourists to potential hazard areas and what to do in the event that a man-made or natural hazard event occurs. This would include brochures to be left at hotels, visitor centers, and attractions to inform visitors about evacuation routes, and sheltering info.	All Hazards	Countywide	4 8	4.2 8.1; 8.3	WCES, DNR, VISITORS BUREAU	Ongoing	Medium
#13	Encourage Public Drainage Associations and public at-large to improve/maintain ditches on private land. Provides tips sheets and quick facts via social media and at public events.	Flood	Countywide	4 5 6	4.1; 4.3 5.1 6.4	WCES	Ongoing	Medium
#14	Work with the Worcester Regional Chamber of Commerce and Worcester County Economic Development to encourage local business owners to devlopment a business continuity of operations plan. FEMA's **Ready Business toolkits** available at : https://www.ready.gov/business is an available resource.	All Hazards	Countywide	4	4.2; 4.4	WCES	Ongoing	Low

	STRATEGY	HAZARD	COMMUNITY	GOALS	OBJECTIVES	DEPARTMENT	STRATEGY	HAZARD
PUBLIC OUTREACH Cont.								
#15	Target the 112 properties located within the Riverine FEMA Special Flood Hazard Area, 3,496 properties within the Coastal FEMA Special Flood Hazard Area and the 60 FEMA Designated Repetitive Loss Properties for flood mitigation outreach activities.	Flood	Countywide	4 5 6	4.1; 4.2; 4.3 5.3; 5.5 6.4	DEP	Ongoing	Low
#16	Work with the Worcester County Health Department to develop vulnerable population outreach and engagement specific to current health impacts and outbreaks to Worcester County.	All	Countywide	1 2 3 4 11	1.1 2.1 3.1 4.1 11.2	HD	Ongoing	**High**
#17	Public Information Campaign Pre & Post Disaster – black mold danger, impacts, and remediation.	Flood	Countywide	1 2 3 4 11	1.1 2.1 3.1 4.1 11.2	HD	Ongoing	Low
#18	Disseminate generator safety tips such as those provided by the American Red Cross at: https://www.redcross.org/get-help/how-to-prepare-for-emergencies/types-of-emergencies/power-outage/safe-generator-use.html	Flood and Winter Storm	Countywide	4 6	4.1 6.4	WCES	Ongoing	Low
PLANNING								
#19	Guide safe growth and road improvements or other measures intended to facilitate continuity of passage, evacuation, and other community needs in the event of a disaster.		Countywide	9	9.2; 9.3	DRP	Short-term	Medium
#20	Implement actions listed in the Hazard Mitigation Plan through other County plans or programs.		Countywide	1 2 3	1.1; 1.2 2.1 3.1; 3.2; 3.3	ALL	Ongoing	Low
#21	Integrate existing evacuation route mapping into a new Worcester County Evacuation Plan.		Countywide	1 2 3 4	1.2; 1.3; 1.4 2.4 3.1; 3.2 4.6	WCES, DPW, DRP	Short-term	**High**

STRATEGY		HAZARD	COMMUNITY	GOALS	OBJECTIVES	DEPARTMENT	TIMEFRAME	PRIORITY
PLANNING Cont.								
#22	Develop Post-Disaster Redevelopment Plan to guide decision making process after a major disaster.		Countywide	7 10 11	7.4 10.1, 10.3 11.1	ALL	Long-term	**High**
#23	Increase back-up capabilities for 9-1-1 Centers and EOC's with operations.		Countywide	5 6 10	5.4; 5.5 6.1; 6.2; 6.3 10.1	WCES	Short-term	**High**
#24	Consider the health impacts to the community early in the Mitigation Planning Process.		Countywide	1 4 6	1.4 4.1; 4.2 6.1	WCES, HD	Short-term	Medium
#25	Include protection of critical assets in Capital Planning and Funding		Countywide	1 6 10	1.1 6.1 10.2	WCES	Short-term	Low
#26	Incorporate debris generation Hazus (riverine and coastal flood) results into a Debris Management Plan and/or Emergency Support Function (ESF).		Countywide	1 4	1.3; 1.4 4.1	WCES	Short-term	Low
#27	Incorporate projected shelter needs Hazus (riverine and coastal flood) results into Emergency Support Function – Mass Care, Housing & Human Services.		Countywide	1 4	1.3; 1.4 4.1	WCES	Short-term	Medium
#28	Explore ways to reduce the cost of flood insurance in Worcester County.		Countywide	1	1.5	DEP	Short-term	Low
#29	Continue and enhance the vulnerable population identification and planning initiatives. In Chapter 3 of the plan, the following were identified as vulnerable populations: • Children under the age of 5 • Population 65 years and older • Non-English-Speaking Population • Special Needs Population Low Income Population		Countywide	3 4 7	3.1; 3.2; 3.3 4.1; 4.2; 4.3 7.3	HD, WCES	Ongoing	**High**
#30	Complete a Threat and Hazard Identification and Risk Assessment (THIRA) and include emerging infectious diseases.		Countywide	3 4 6	3.1; 3.2; 3.3 4.1 6.1	WCES	Short-term	Medium

	STRATEGY	HAZARD	COMMUNITY	GOALS	OBJECTIVES	DEPARTMENT	TIMEFRAME	PRIORITY
DROUGHT								
#31	Provide information to farmers regarding the assistance that could be provided to livestock producers in approved counties when the growth and yield of hay and pasture have been substantially reduced because of a widespread natural disaster. The grant program utilized for this type of assistance is the Animals: Emergency Haying and Grazing Program.		Countywide	4 6	4.1; 4.2; 4.3 4.4 6.3; 6.4; 6.5	WCES	Ongoing	Low
WILDFIRE								
#32	Work with DNR and local Fire Departments to develop and/or update community Wildfire Protection Plans, promoting safe Urban/Wildland Interface.		Countywide	8	8.1; 8.2; 8.3	WCES	Short-term	Low
TORNADO & WIND								
#33	Assess existing multilevel structures such as hospitals, commercial and residential condominiums and apartment complexes for their wind load capacities.		Countywide	4 5 6	4.1; 4.4 5.1; 5.3 6.5	WCES, DRP	Long-term	Low
#34	Consider working with utility companies to identify problem areas and the possibility of changing to underground lines in those areas.		Countywide	2 3 4 5	2.1 3.1 4.1 5.1	WCES	Long-term	Low
WINTER STORM								
#35	Purchase new generators for critical facilities that currently do not have a generator or that are lacking capacity or are outdated.		Countywide	5 6	5.1; 5.3 6.2; 6.3; 6.4; 6.5	WCES	Long-term	Medium
HAZMAT								
#36	Inundation due to potential sea level rise and increased flooding could result in pollution of county coastal waterbodies if septic tanks and hazardous materials storage is allowed to remain in inundation and flood-risk areas. Requiring removal of these potential pollutants in areas as flood probability increases due to potential sea level rise will allow existing development to remain, in most circumstances, without putting the		Countywide	1 2 4 6	1.3 2.2; 2.3 4.1; 4.3 6.4; 6.5	WCES, DEP, DRP	Long-term	Low

	health and safety of the community at risk or imperiling environmental quality. Therefore, an overlay zoning district could designate where hazardous materials must be removed. A progression of this district based on potential sea level rise rates in conjunction with a grace period could be used to give property owners advance notice of the requirement.							
STRATEGY			**COMMUNITY**	**GOALS**	**OBJECTIVES**	**DEPARTMENT**	**TIMEFRAME**	**PRIORITY**
HAZMAT Cont.								
#37	Conduct a Hazardous Materials Survey to identify all hazardous materials that are either stored or traveling through the county.		Countywide	4	4.1; 4.2	WCES	Short-term	Low
#38	Set-up Regional HazMat planning meeting(s) to discuss regional capabilities, mutual aid response, and new strategies for training and resource procurement.		Regional	1 2.4 6 11	1.2 2.4 6.2; 6.3 11.2	LEPC, WCES	Short-term	Low
#39	Consider expanding the Worcester County Emergency Operations Plan-Annex H-Hazardous Materials. Potentially include warning notifications, personal protection of citizens, standard operating procedures, absorbent disposal, patient transport & hospital care, and decontamination.		Countywide	1 3 4	1.2, 1.4 3.1, 3.2 4.1, 4.4	LEPC, WCES	Long-term	Low

**Timeframe: Short-term (1-2 Years), Long-term (2 or more years)*

Note: Acronym list for the Departments/Agencies listed under Responsible Agency:

- *DPW – Department of Public Works*
- *WCES – Worcester County Emergency Services*
- *DRP – Development Review and Permitting*
- *DEP – Department of Environmental Programs*
- *HD – Health Department*
- *LEPC – Local Emergency Planning Committee*
- *DNR – Department of Natural Resources*

Hazard Mitigation High Priority Projects

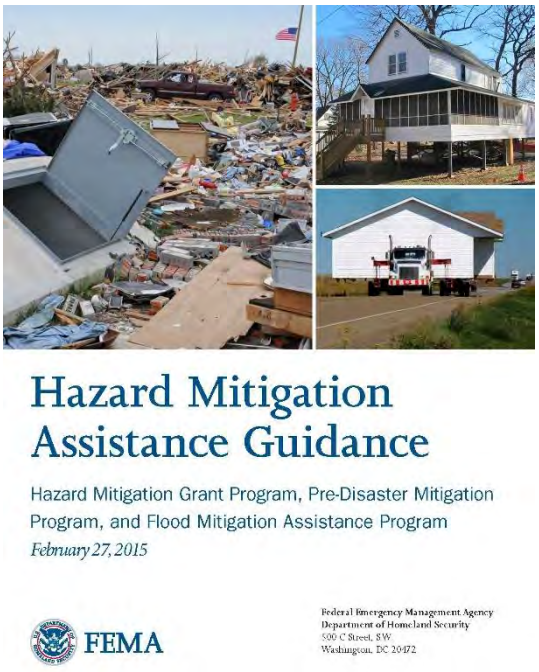
Thirty-nine mitigation projects were identified during the plan development process. These projects are robust and are reflective of stakeholder's engagement throughout the planning process. In order to prioritize the projects, a survey was developed and distributed to the Hazard Mitigation Planning Committee. The survey contained the same five questions for each project and was limited to yes/no answers, along with a comment section for use by respondents. The five questions included:

1. *Do you consider this project cost effective?*
2. *Would there be community acceptance/support for this project?*
3. *Is this project technically feasible?*
4. *Is this project consistent with environment goals?*
5. *Should this project be a high priority for the county/municipality?*

Survey results yielded six **"High"** priority projects. Project sheets detailing the project, associated goals, responsible entity(s), estimated cost, and potential grant funding sources are included within this chapter.

Action: *Continue to engage county and municipal decision makers in identifying hazards and climate change issues while making connections to existing planning and policy efforts.*

Discussion: Over the last several decades, natural disasters in the United States have become more numerous and costly. Climate change threatens to further exacerbate this trend by increasing both the severity and duration of many natural hazards, ultimately leading to even greater costs in both human life and monetary resources. In 2015, FEMA recently passed updated guidance that requires states to consider climate change during their hazard mitigation planning. This requirement is not legally binding for local communities. However, some states, including Maryland, are strongly encouraging their municipalities to think about climate change during the hazard mitigation planning process.



Except from FEAM Guidance:

As they work to update their existing plans, there is a clear need to understand how to effectively consider climate change in hazard mitigation planning. This will ensure that municipalities are creating State and FEMA approvable plans—plans that help them prepare for current and future hazards.

Project: During the update of the *2006 Worcester County Comprehensive Plan*, include in the scope of work recommendations for plan integration with the *2020 Worcester County Hazard Mitigation & Resilience Plan.* Suggest elements of the comprehensive plan for hazard mitigation plan integration include:

- **Land Use;**
- **Sensitive Areas and Natural Resources;**
- **Community Facilities and Transpiration;**
- **Water Resource Element; and**
- **Municipal Growth Element(s).**

In addition, county projects listed on the Capital Improvement Plan should be evaluated for hazard related issues and opportunities for mitigation projects. Projects that include a mitigation and/or resiliency component should receive priority.

Responsible Organizations: Department of Environmental Programs, Department of Emergency Services, and Department of Public Works

Estimated Costs: County Staff-time

Possible Funding Sources: n/a

Timeline for Implementation: 1-2 Years

Action: *CRS- Continue to enhance the vulnerable population identification and planning initiatives and work with the Worcester County Health Department to develop hazard preparedness and mitigation public outreach materials including infectious disease outbreak information and health impacts targeting "At-Risk Populations".*

Discussion: 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. In order to accomplish this task, the process must begin with defining and locating the at-risk populations. The term "At Risk Populations" describes individuals or groups whose needs are not fully addressed by traditional service providers or those who cannot comfortably or safely use the standard resources offered during preparedness, response, and recovery efforts. In *Appendix I: Vulnerable Populations* of the plan, the following were identified as vulnerable populations:

- Below Poverty
- Age 65 or Older
- Civilian with a Disability
- Speak English "Less than Well"
- No Vehicle

In addition, social vulnerability in relation to hazards are included in *Chapter 4: Flooding Related Hazards* and *Chapter 5: Non-Flood Related Hazards*. Using this information, distribute outreach materials thru 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.

Project: Enhance "At-Risk Populations" identification and planning initiatives and distribute outreach materials regarding disaster preparedness, infectious disease, and health impacts to the community. Also provide information on where to locate helpful FEMA information for mitigation and preparedness and Worcester County Health Department information on infectious diseases and impacts.

These outreach materials would include information on the county's alert system and how citizens can be notified of flood conditions and forecasts, as well as information on the new links provided on the county's Emergency Services website. The county's Emergency Services website provides citizens of the county with links to helpful FEMA related documents, as well as the county's Health Department website.

Responsible Organizations: Department of Emergency Services and Worcester County Health Department

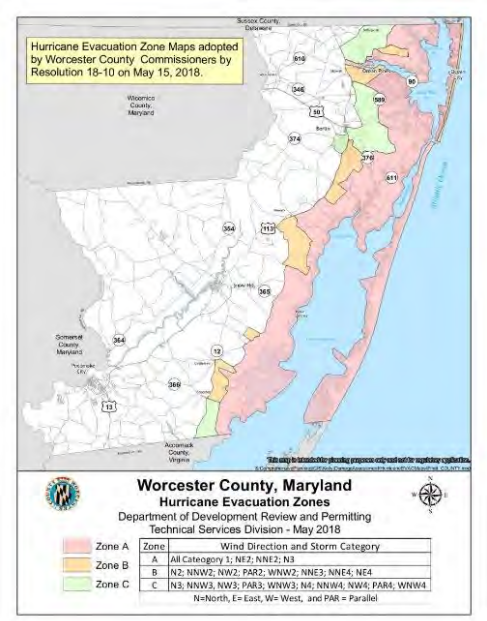
Estimated Costs: Staff time and Mailing Costs:

Possible Funding Sources:

Timeline for Implementation: Ongoing

Action: *Integrate existing evacuation route mapping into a new Worcester County Evacuation Plan.*

Discussion: Know Your Zone in Worcester County is part of a recently introduced Maryland color-coded interactive mapping program used to determine which storm evacuation zone you live in based upon your street address.

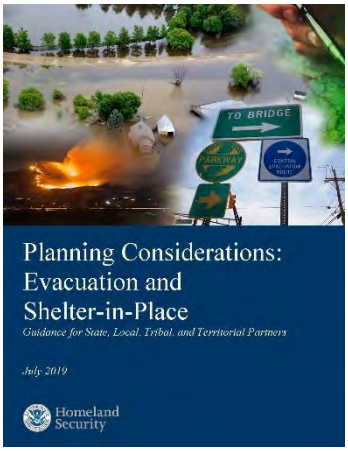


Worcester County is mapped into three evacuation zones, from greatest to least risk of threat from wind speed, storm intensity, and storm surge, which causes flooding.

- Zone A, in pink identifies addresses most at risk.
- Zone B is orange addresses moderate risk.
- Zone C is green and includes addresses least at risk.
- Addresses further inland that are not color coded are not expected to evacuate.

Worcester County residents can go to: http://www.knowyourzonemd.com/ to find their evacuation zone.

Project: Create a new Worcester County Evacuation Plan using existing evacuation route mapping and the *2019 FEMA Guidance Planning Considerations: Evacuation and Shelter-in Place.* Using this planning guidance, twelve planning principals are identified to support successful evacuation and shelter-in-place plans development.



They are as follows:

- **Defined Authorities;**
- **Shelter-In-Place – First/Default Option;**
- **Common Understanding;**
- **Unified Coordination Process;**
- **Zone-based Operational Strategies;**
- **All-Hazard Planning;**
- **Whole Community Approach;**
- **Flexibility and Scalability;**
- **Critical Transportation Needs (CTN);**
- **Service and Assistance Animals and Household Pets;**
- **Evacuee Tracking/Accountability; and**
- **Mass Care.**

Responsible Organizations: Department of Emergency Services, Department of Public Works, and the Department of Development Review and Planning.

Estimated Costs: $25-30K

Possible Funding Sources: State Homeland Security Grant Program (SHSGP), Emergency Preparedness Grant Program (EMPG)

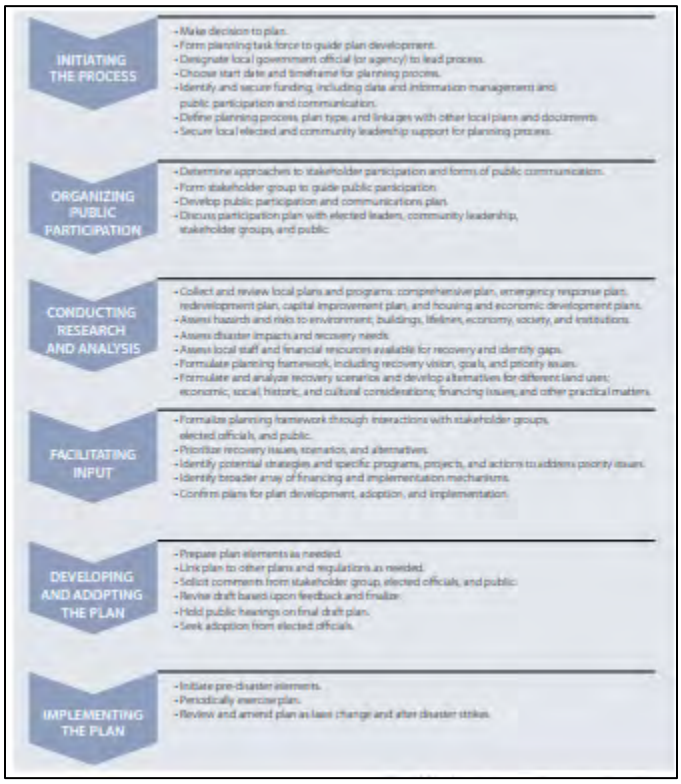
Timeline for Implementation: Short-term

Action: *Develop Post-Disaster Plan to guide decision making process after a major disaster.*

Discussion: Post-disaster recovery planning is defined as developing a set of strategies to assist a community in rebuilding after a disaster occurs.

Along with the Federal Emergency Management Agency (FEMA*), the new American Planning Association 2015 Planning for Post-Disaster Recovery: Next Generation* is designed to help communities improve their resiliency and provides how-to guidance for communities to start their mitigation planning and disaster-recovery planning processes. This report provides resources to assist Worcester County with their disaster recovery planning, including a model recovery ordinance to enhance their disaster recovery planning before a disaster strikes.

Project: Develop a Post-Disaster Plan for Worcester County using FEMA guidance to assist in disaster recovery planning before a disaster occurs in the county. Using the plan guidance, a recovery planning process follows the typical structure of most community planning initiatives. The six steps below provides a simple chronological outline of the steps to be taken in initiating and completing a disaster recovery planning effort:



1. **Initiating the Process;**
2. **Organizing Public Participation;**
3. **Conducting Research and Analysis;**
4. **Facilitating Input;**
5. **Developing and Adopting the Plan; and**
6. **Implementing the Plan.**

Responsible Organizations: All Worcester County Departments

Estimated Costs: $25-30K

Possible Funding Sources: State Homeland Security Grant Program (SHSGP), Emergency Preparedness Grant Program (EMPG)

Timeline for Implementation: Long-term

Action: *Increase back-up capabilities for 9-1-1 Center and Emergency Operation Centers with operations.*

Discussion: An emergency operations center (EOC) is a central command and control facility responsible for carrying out the principles of emergency preparedness and emergency management, or disaster management functions at a strategic level during an emergency, and ensuring the continuity of operation of a company, political subdivision or other organization.

An EOC is responsible for strategic direction and operational decisions and does not normally directly control field assets, instead leaving tactical decisions to lower commands. The common functions of EOCs is to collect, gather and analyze data; make decisions that protect life and property, maintain continuity of the organization, within the scope of applicable laws; and disseminate those decisions to all concerned agencies and individuals.

A continuity of operations ensures that critical functions continue, and that personnel and resources are relocated to an alternate facility in case of emergencies. This is particularly important for Emergency Operations Center and 9-1-1 Communications.

Project: Designating an alternate facility that could immediately be stood-up as an alternate EOC provides continuity of operations. In addition, while the county has mutual aid agreements and virtual 9-1-1 communications back-up systems in-place, a physical location for an alternate 9-1-1 communications center is needed.

Responsible Organizations: Department of Emergency Services

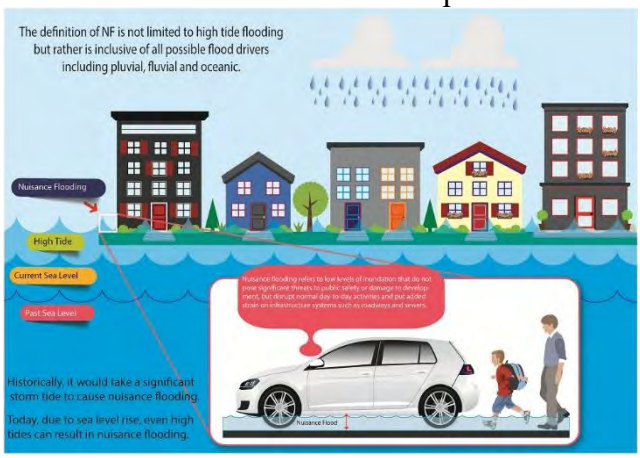
Estimated Costs: TBD

Possible Funding Sources: Emergency Services Board

Timeline for Implementation: Long-term

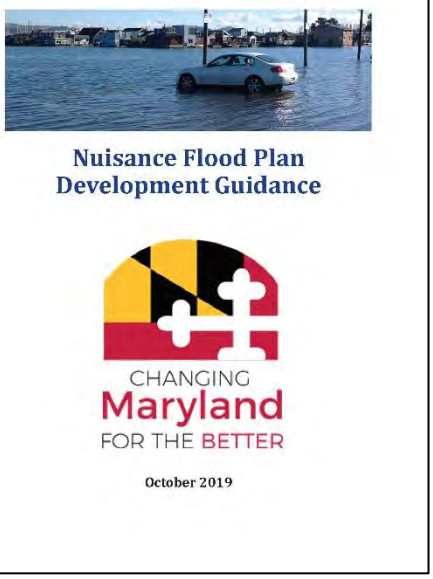
Action: *Develop a county-wide Nuisance Flooding Plan for Worcester County.*

Discussion: Nuisance flooding (NF) refers to low levels of inundation that do not pose significant threats to public safety or cause major property damage, but can disrupt routine day-to-day activities, put added strain on infrastructure systems such as roadways and sewers, and cause minor property damage. In addition, climate change and potential sea level rise may increase flooding in the area both in quantity of water and number of events.



Maryland House Bill 1350/ SB 1006 - Sea Level Rise Inundation and Coastal Flooding - Construction, Adaptation, and Mitigation was signed by Governor Hogan on May 15, 2018. This bill states that a local jurisdiction that experiences nuisance flooding must develop a plan to address nuisance flooding by October 2020. This plan must be updated at least once every five years.

Project: Develop a county-wide *Nuisance Flooding Plan* for Worcester County required by the State of Maryland.



Review the (5) nuisance flooding plan development process within the *2019 Nuisance Flood Plan Development Guidance.*

1. ***Determine which Department will complete the Nuisance Flood Plan and/or set up and lead a Nuisance Flood Plan Workgroup.***
2. ***Assess risk & impacts.***
3. ***Review existing plans/programs & evaluate how your jurisdiction will meet the requirement.***
4. ***Develop the plan.***
5. ***Submit, communicate and implement the plan.***

In addition, integrate repetitive roadway flood locations identified and provided by the Department of Public Works - County Roads Division and community Volunteer Fire Departments in *Chapter 9: Mitigation Strategies* and listed on Table 9-2.

Responsible Organizations Department of Development Review and Planning

Estimated Costs: Staff-time

Possible Funding Sources: DNR Community Resilience Program

Timeline for Implementation: Short-term

CHAPTER 10: PLAN MAINTENANCE & IMPLEMENTATION

Recovery and Reconstruction Planning

The Worcester County Department of Emergency Services has published an Emergency Operations Plan (EOP) in accordance with state and federal guidelines. An emergency operations center is in place as well. However, the immediate disaster response is only the first step toward rehabilitating an area. “Disaster recovery is ordered, knowable, and predictable.”

There is a four-phase recovery and reconstruction process that should be considered. The first two steps are most relevant in an Emergency Operations framework, while the last two highlight the opportunity for preplanning and **hazard mitigation**.

1. The emergency period covered the initial hours or days following disaster when the community was forced to cope with its losses in property, lives, injuries and normal activities were disrupted.
2. The restoration period covered the time following the emergency period until major urban services and transportation returned, evacuees returned, and rubble was removed.
3. During the replacement reconstruction period, the city rebuilt capital stock to pre-disaster levels and social and economic activities returned to their previous levels. Signs of its completion included the return to pre-disaster population levels and the replacement of homes, jobs, and urban activities.
4. Finally, in the commemorative, betterment, and developmental reconstruction period, major reconstruction activities took place, and future growth and development began to take hold.

As the plan is continually maintained recovery and reconstruction will be thoroughly considered. The county understands that without guidelines haphazard redevelopment is inevitable. The comprehensive plan will still apply along with the hazard mitigation and both documents will serve as a guiding vision for the future of the county.

Implementation and Leadership

The Worcester County Commissioners have oversight responsibility for all facets of the hazard mitigation plan recommendations, including, but not limited to, implementation timeline, initiation of public meetings about hazard mitigation plans and activities, project budgets, and support of hazard mitigation objectives.

The Worcester County Department of Emergency Services has held primary responsibility for coordinating the writing of the hazard mitigation plan and the implementation of the plan objectives. The Department of Development Review and Permitting will serve as the project management authority for most hazard mitigation activities.

Plan Monitoring and Evaluation

The plan is intended to be adapted to changing conditions, new information and the knowledge gained by testing its recommended strategies. Mitigation activities will be monitored to determine whether they achieve the objectives of this plan. The plan itself will be evaluated every five years to ensure that it is kept up to date with the changing vulnerabilities and capabilities of the County.

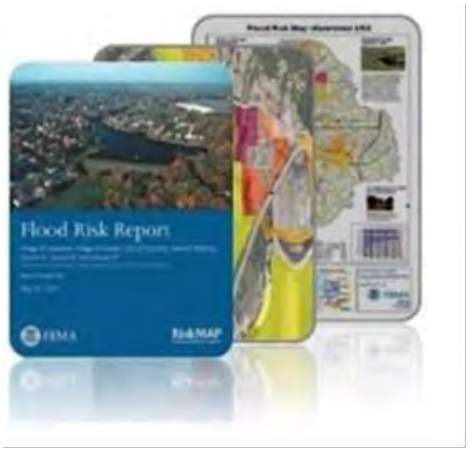
The Local Emergency Planning Committee and Hazard Mitigation Planning Committee will continue to meet on an annual basis during the five-year cycle to monitor and evaluate mitigation projects and to keep the plan current. The community will be involved in these updates with public hearings and the opportunity to comment on the plan or any of its components.

Copies of the annual status report will be made available to Planning Committee members, local governments, participating agencies and partners and citizens via the Worcester County website: http://www.co.worcester.md.us/EmergencyServices/emerservindex.aspx.

Appendix A
HAZUS & HIRA Methodology

HAZUS METHODOLOGY

To update the Worcester County Hazard Mitigation & Resilience Plan, the FEMA Flood Risk Report Worcester County, Maryland Coastal Study 12/30/2015 and Draft State of Maryland Flood Risk Report Worcester County, Maryland 2019 were reviewed for integration into the HMP Update, as follows.



Flood Risk Map (FRM) - The FRM depicts flood risk data for a flood risk project area and is typically used to illustrate an overall picture of flood risk for the area. The content and format of individual FRMs may vary among project areas to best represent the local conditions. Typical maps might show the potential flood losses associated with the one-percent annual chance flood event for each census block, areas planned for new or revised maps, key watershed features that affect local flood risk and information about potential or successful past projects to reduce flood risk.

Flood Risk Report (FRR) - The FRR provides community and watershed specific flood risk information extracted from the Flood Risk Database (FRD), explains the concept of flood risk and identifies useful tools and reference materials. The FRR, used in combination with Flood Risk Map (FRM), is a good tool for communities to use for raising local flood risk awareness.

Flood Risk Database (FRD) - The FRD stores all flood risk data for a flood risk project, including the information shown in the Flood Risk Report (FRR) and on the Flood Risk Map (FRM). The FRD provides a wealth of data that may be used to analyze, communicate and visualize flood risk on an ad-hoc basis for a variety of uses. Communities are encouraged to use this database to support mitigation efforts and raise awareness. Data in the FRD represents a snapshot-in-time. Data is not updated regularly once the final FRD is posted to the Map Service Center. Elements in the FRD can include:

- Changes Since Last FIRM shows where the Special Flood Hazard Area (SFHA) has changed since the last effective Flood Insurance Rate Map (FIRM).
- Areas of Mitigation Interest (AoMI) communicates where conditions have contributed to the severity of flooding losses, allowing for better prioritization of flood mitigation efforts and use of funds.
- Flood Depth and Analysis Grids communicate the depth and velocity of floodwaters as well as the probability of an area being flooded over time.
- Flood Risk Assessment Data provides an assessment of potential financial consequences and other impacts associated with structures located in a SFHA. This data also enables communities to make informed decisions regarding future land development and community infrastructure.

In addition to these standard flood risk datasets, the Flood Risk Database may contain custom flood risk datasets created for the specific project area or even risk datasets related to other hazards. Geographic Information System (GIS) software and specialized skills are required to view the FRD and the associated elements.

According to the Flood Risk Reports, the following GIS data was utilized:

- New/revised engineering analyses (i.e. hydrologic and hydraulic modeling), floodplain boundaries, and flood depths based on a countywide regulatory FIRM update, provided by FEMA Region III and Maryland Department of the Environment.
- MD Property View – parcel-specific information containing assessed values, land use/occupancy categories, number of stories, etc., acquired through the Maryland Department of Planning – http://planning.maryland.gov/OurProducts/.
- Building footprints, representing real-world locations for addressable structures, provided by Worcester County Department of Development Review and Permitting – Technical Services.
- Essential facilities as defined and identified within the State of Maryland Hazard Mitigation Plan.
- 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. Hazus uses GIS technology to estimate physical, economic, and social impacts of disasters. Section 2 - Subsection ii Flood Risk Assessments, page 10 of this report, contains additional details about Hazus. Users can also find more information and download link at https://www.fema.gov/hazus.

The following data layer provided within the FRD was used to further analyze potential losses.

- **S_FRAS_Pt** – *Flood Risk Assessment Results at the Structure Level*
  This point feature class contains building location and inventory data for site-specific risk assessments. State and local data was leveraged for this feature class, including building footprints, structure values, and land use classifications. The data was evaluated against the riverine 1-percent-annual-chance floodplain boundaries and for buildings that are within the regulatory 1-percent-annual-chance floodplain, estimated loss calculations were performed in this 'Refined' study.

Flood Risk Databases can be obtained through the FEMA Map Service Center – Search All Products: https://msc.fema.gov/portal/advanceSearch#searchresultsanchor.

Product ID	File Format	MSC Posting Date	Size	Download
FRD_24047C_Coastal_Geodatabase	GeoDatabase	12/30/2015	76MB	DL
FRD_24047C_Coastal_GeoTIFFs	GeoTIFFs	12/30/2015	38MB	DL
FRD_24047C_Coastal_Shapefiles	ShapeFiles	12/30/2015	19MB	DL

Appendix B

2014 Mitigation Actions Status

The 2014 Mitigation Action Item Status table has been included below and provides a listing of county-wide initiatives.

Previous Actions	Responsible Organization	Status					Remarks
		Complete	Incomplete	Ongoing	In-Process	Pending	
FLOOD HAZARD-COUNTY-WIDE **CRS indicate actions that are eligible for credit under the Community Rating System (CRS).**							
CRS-Evaluate the effectiveness of the current floodplain protection regulations. Review the State's new Model Guidelines.	DRP	X					New Floodplain Study completed July 16, 2015 resulting in updates to the floodplain management ordinance.
CRS-Identify water and wastewater facilities where additional flood damage avoidance measures may be appropriate. Conduct site specific visits and assess alternatives where indicated.	DRP, WCES				X		
CRS-Consider participating in the Community Rating System program, to receive flood insurance premium credits. To participate, the flood program must address public information, mapping, regulation; flood damage reduction; and flood preparedness, much of which has been accomplished by this plan.	DRP, WCES		X				
CRS- Utilizing the National Flood Mitigation Data Collection Tool (FEMA 497), a database should be developed containing information on each "at-risk" property. The data collected should include structure type, condition, foundation type, number of stories, square footage, depth of flooding, flash flooding occurrence, flood velocity, and structure location within the floodway. This database could be utilized in prioritizing the structures most at-risk and in need of mitigation. According to the 2011 Maryland Property View Database, approximately 33% of the housing was built prior to 1979.	DRP		X				
Mitigate repetitive roadway flooding in areas identified in Chapter 3: Vulnerability Assessment.	DPW					X	
SHORELINE EROSION & SEA-LEVEL RISE-COUNTY-WIDE							
Engage county and municipal decision makers in identifying hazards and climate change issues and make connections to existing planning and policy efforts.	DEP, WCES			X			
DROUGHT-COUNTY-WIDE							
Provide information to farmers regarding the assistance that could be provided to livestock producers in approved counties when the growth and yield of hay and pasture have been	WCES					X	Delegate to Cooperative Extension Office

substantially reduced because of a widespread natural disaster. The grant program utilized for this type of assistance is the *Animals: Emergency Haying and Grazing Program*.							
Distribute information on cooling stations, specifically in Ocean Pines, Berlin and Pocomoke City during the high temperature months of July and August and/or an excessive heat event. These areas have a high concentration of children under the age of 5 and populations 65 years and older.	WCES	X					Schools Health Dept. County Parks
TORNADO & WIND-COUNTY-WIDE							
Assess existing multilevel structures such as hospitals, commercial and residential condominiums and apartment complexes for their wind load capacities.	DRP, WCES, DPW			X			DRP WCES-Windshield Assessment
Consider working with utility companies to identify problem areas and the possibility of changing to underground lines in those areas.	WCES					X	
WINTER STORM- COUNTY-WIDE							
Purchase new generators for critical facilities that currently do not have a generator or that are lacking capacity or are outdated.	WCES	X				X	DPW-Complete New Project

The status of action items identified in the previous plan for the Town of Berlin, Town of Snow Hill, Pocomoke City, and the community of Ocean Pines is included on the table below.

Previous Action	Responsible Department	Status					Remarks
		Complete	Incomplete	Ongoing	In-Process	Pending	
FLOOD HAZARD-COMMUNITY/MUNICIPAL **CRS indicate actions that are eligible for credit under the Community Rating System (CRS).**							
OCEAN PINES							
CRS-Target the Ocean Pines Fire Station for critical facility flood mitigation project.	Ocean Pines			X			
POCOMOKE							
CRS-According to the 2006 Land Use Plan, growth areas are projected along Cedar Hall Road. This area borders Category 4 in the SLOSH model. Ensure building codes, regulations and proper site designs are enforced for the newly proposed development in this area.	Pocomoke						
Review existing network of Datum Markers and re-survey, replace, and add new Datum Markers in areas identified as high risk for flooding.	Pocomoke						

SHORELINE EROSION & SEA-LEVEL RISE- COMMUNITY/MUNICIPAL							
OCEAN PINES							
Continue to install erosion control structures, bulkheads, in the Ocean Pines area. Inspect the current control structures for integrity.	Ocean Pines			X			
Request State participation in evaluating long-term options for Ocean Pines, given its current vulnerability to flooding, high ground water levels, saltwater intrusion, and anticipated loss of land due to erosion and sea-level rise that will exacerbate these limiting conditions.	Ocean Pines	X	X				Engineer Study of Stormwater/Drainage completed. Projects to improve repetitive flood area and ongoing ditch maintenance-Incomplete
Regarding buried infrastructure, conduct a vulnerability assessment by compiling a detailed list of specific buried infrastructure segments that are in or close proximity to areas likely to be inundated by potential sea level rise.	Ocean Pines						
Host a workshop on coastal risk. Seek the assistance of National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center.	Ocean Pines;		X				Development along the shorelines of Isle of Wight Bay, Newport Bay & Chincoteague Bay
OCEAN PINES & POCOMOKE							
Work with Maryland Department of the Environment to identify areas of shoreline that are most vulnerable to erosion and utilize Best Management Practices (BMP) to protect these areas.	Ocean Pines; Pocomoke		X				Ocean Pines-Incomplete
DROUGHT-COMMUNITY/MUNICIPAL							
OCEAN PINES							
Distribute information on cooling stations, specifically in Ocean Pines, Berlin and Pocomoke City during the high temperature months of July and August and/or an excessive heat event. These areas have a high concentration of children under the age of 5 and populations 65 years and older.	Ocean Pines	X					Library Community Center (New)
POCOMOKE							
Distribute information on cooling stations, specifically in Ocean Pines, Berlin and Pocomoke City during the high temperature months of July and August and/or an excessive heat event. These areas have a high concentration of children under the age of 5 and populations 65 years and older.	Pocomoke						
WILDFIRE- COMMUNITY/MUNICIPAL							
SNOW HILL							
Areas identified as potential problems areas that have large amounts of wildland/urban interface are northwest of Snow Hill, along Route 12. According to the Maryland's Strategic Forest Lands Assessment, this area is very high to extreme for wildland-urban interface fire threat potential. This area is at a higher wildfire risk than the rest of the County. Target these areas for the FIREWISE program.	Snow Hill						

HAZMAT- COMMUNITY/MUNICIPAL							
SNOW HILL & POCOMOKE							
Distribute information concerning HazMat Transportation to highly developed areas that are located within the transportation route, specifically to the structures located along Route 113 due to high concentration of Industrial land use.	Snow Hill; Pocomoke						

Appendix C

Federal & State Funding Sources

Federal & State Grant Funding Sources

The following is a list of Federal and State Grants that may assist in implementing local All Hazard Mitigation Plans. This information is subject to change at any time; contact the federal or state agency for current grant status. (Last Updated: November 2019)

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
Federal Emergency Management Agency, Hazard Mitigation Grant Program (HMGP)	Maryland Emergency Management Agency 5401Rue Saint Lo Drive Reisterstown, MD 21136	All Hazards Mitigation Planning. Acquisition, relocation, elevation and flood-proofing of flood-prone insured properties, flood mitigation planning, wind retrofit, stormwater improvements, education and awareness.	Federal - 75% Non-Federal - 25%	Local government must be in compliance with the National Flood Insurance Program to be eligible. Projects must be cost effective, environmentally sound and solve a problem. Repetitive loss properties are a high priority.	After a Presidential Disaster Declaration
Federal Emergency Management Agency, Pre-Disaster Mitigation Grant Program (PDM)	Maryland Emergency Management Agency 5401Rue Saint Lo Drive Reisterstown, MD 21136	Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations.	Federal - 75% Non-Federal - 25%	PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.	Annual Spring/Summer
Federal Emergency Management Agency, Flood Mitigation Assistance Program (FMA)	Maryland Emergency Management Agency 5401Rue Saint Lo Drive Reisterstown, MD 21136	Assist States and communities to implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured under the National Flood Insurance Program.	RL: Federal - 90% Non-Federal - 10% SRL: Federal - 100% Non-Federal - 0%	Available once a Flood Mitigation Plan has been developed and approved by FEMA.	Annual Spring/Summer

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
National Flood Insurance Program (NFIP)	Maryland Emergency Management Agency 5401Rue Saint Lo Drive Reisterstown, MD 21136	Provides financial protection by enabling persons to purchase insurance against floods, mudslide or flood related erosion.	Varies	Includes Federally backed insurance against flooding, available to individuals and businesses that participate in the NFIP.	Anytime
Increased Cost of Compliance	Maryland Emergency Management Agency 5401Rue Saint Lo Drive Reisterstown, MD 21136	ICC coverage provides payment to help cover the cost of mitigation activities that will reduce the risk of future flood damage to a building. If a Flood Insurance Policy Holder suffers a flood loss and is declared to be substantially or repetitively damaged, ICC will pay up to 30,000 to bring the building into compliance with State or community floodplain management laws or ordinances. Usually this means elevating or relocating the building so that it is above the base flood elevation (BFE).	Varies	Once the local jurisdiction determines the building is substantially or repetitively damaged, the policy holder can contact insurance agent to file an ICC claim.	Anytime

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
U.S. Economic Development Administration, Economic Adjustment Program	U.S. Department of Commerce Economic Development Administration Curtis Center, 601 Walnut Street, Ste. 140 South Philadelphia, PA 19106-3323 215-597-4603	Improvements and reconstruction of public facilities after a disaster or industry closing. Research studies designed to facilitate economic development.	Federal - 50%-70% Local- 30%-50%	Documenting economic distress, job impact and proposing a project that is consistent with a Comprehensive Economic Development Strategy are important funding selection criteria.	Anytime
U.S. Economic Development Administration, Public Works and Development Facilities	U.S. Department of Commerce Economic Development Administration Curtis Center, 601 Walnut Street, Ste 140 South Philadelphia, PA 19106-3323 215-597-4603	Water and sewer, Industrial access roads, rail spurs, port improvements technological and related infrastructure	Federal - 50%-70% Local- 30%-50%	Documenting economic distress, job impact and projects that is consistency with a Comprehensive Economic Development Strategy are important funding selection criteria.	Quarterly Basis
Small Business Administration (SBA) Pre-disaster Mitigation Loan Program	James Rivera, Office of Disaster Assistance, Small Business Administration, 409 3rd Street, SW, STE 6050 Washington, DC 20416;202-205-6734	Activities done for the purpose of protecting real and personal property against disaster related damage.	No information	The mitigation measures must protect property or contents from damage that may be caused by future disasters and must conform to the priorities and goals of the state or local government's mitigation plan.	

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
Community Development Block Grants / States Program	U.S Department of Housing and Urban Development, Office of Block Grant Assistance, 451 7th Street SW., Washington, DC 20410-7000;202-708-1112	Used for long-term recovery needs, such as: rehabilitation residential and commercial building; homeownership assistance, including down-payment assistance and interest rate subsidies; building new replacement housing; code enforcement; acquiring, construction, or reconstructing public facilities.	No information	Citizen participation procedures must be followed. At least 70 percent of funds must be used for activities that principally benefit persons of low and moderate income. Formula grants to States for non-entitlement communities.	After a Presidential Disaster Declaration
Fire Suppression Assistance Program	Infrastructure Division, Response and Recovery Directorate, FEMA, 500 C Street SW., Washington DC 20024; 202-646-2500.	Provides real-time assistance for the suppression of any fire on public (non-Federal) or privately-owned forest or grassland that threatens to become a major disaster.	Federal - 70% Local - 30%	The State must first meet annual floor cost (f percent of average fiscal year fire costs) on a single declared fire. After the State's out-of-pocket expenses exceed twice the average fiscal year costs, funds are made available for 100 percent of all costs for each declared fire.	Funds from President's Disaster Relief Fund for use in a designated emergency or major disaster area.
Historic Preservation: Repair and Restoration of Disaster-Damaged Historic Properties	Infrastructure Division, Response and Recovery Directorate, FEMA, 500 C Street SW., Washington DC 20024; 202-646-4621.	To evaluate the effects of repairs to, restoration of, or mitigation hazards to disaster-damaged historic structures working in concert with the requirements of the Stafford Act.	Federal - 75% Local - 25%	Eligible to State and local governments, and any political subdivision of a State. Also, eligible are private non-profit organizations that operate educational, utility, emergency, or medical facilities.	After a Presidential Disaster Declaration

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
Transportation: Emergency Relief Program	Federal Transit Authority, FHWA, DOT, 1200 New Jersey Avenue Washington, DC 20590; 202-366-4043	Provides aid for the repair of Federal-aid roads and roads on Federal lands.	Federal - 100%	Application is submitted by the State department of transportation for damages to Federal-aid highway routes, and by the applicable Federal agency for damages to roads on Federal lands.	After serious damage to Federal-aid roads or roads on Federal lands caused by a natural disaster or by catastrophic failure.
Animals: Emergency Haying and Grazing	Emergency and Non-insured Assistance Programs, FSA, USDA, 1400 Independence Ave, SW, Washington, DC 20013; 202-720-4053	To help livestock producers in approved counties when the growth and yield of hay and pasture have been substantially reduced because of a widespread natural disaster.	No information	Assistance is provided by the Secretary of Agriculture to harvest hay or graze cropland or other commercial use of forage devoted to the Conservation Reserve Program (CRP0 in response to a drought or other similar emergency.	Anytime
Emergency Watershed Protection Program	Natural Resources Conservation Service 1400 Independence Avenue, SW Washington, DC 20250	Implementing emergency recovery measures for runoff retardation and erosion prevention to relieve imminent hazards to life and property created by a natural disaster that causes a sudden impairment of a watershed.	Federal - 75% Local - 25%	It cannot fund operation and maintenance work or repair private or public transportation facilities or utilities. The work cannot adversely affect downstream water rights and funds cannot be used to install measures not essential to the reduction of hazards.	TBD

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
Watershed Protection and Flood Prevention Program	Natural Resources Conservation Service 1400 Independence Avenue, SW Washington, DC 20250	To provide technical and financial assistance in carrying out works of improvement to protect, develop, and utilize the land and water resources in watersheds.	Varies due to project type.	Watershed area must not exceed 250,000 acres. Capacity of a single structure is limited to 25,000 acre-feet of total capacity and 12,500 acre-feet of floodwater detention capacity.	TBD
Watershed Surveys and Planning	Natural Resources Conservation Service 1400 Independence Avenue, SW Washington, DC 20250	To provide planning assistance to Federal, State, and local agencies for the development of coordinated water and related programs in watersheds and river basins. Emphasis is on flood damage reduction, erosion control, water conservation, preservation of wetlands and water quality improvements.	No information	These watershed plans form the basis for installing needed works of improvement and include estimated benefits and costs, cost-sharing, operation and maintenance arrangements, and other information necessary to justify the need for Federal assistance in carrying out the plan.	Anytime

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
Emergency Advance Measures for Flood Prevention (Public Law 84-99 (Section 5 of the Flood Control Act of 1941))	USACE, Baltimore District Emergency Management 2 Hopkins Plaza, Baltimore, MD 21202 410-962-2013	Assistance may be provided in order to prevent or reduce damages when there is an imminent threat of unusual flooding. Technical Assistance may be provided when there is a significant potential that an imminent threat of unusual flooding will develop.	No information	Advance Measures projects are temporary projects that provide measures necessary to prevent or reduce impacts of floods that (1) pose a significant threat to life and/or improved property, and (2) are beyond the technical capability of Tribe/State/local interests to perform in a timely manner. Advance Measures projects must be engineering- feasible and capable of being constructed in time to meet the anticipated threat	Governor of State must request assistance
Continuing Authorities Program (CAP) Section 14 - Emergency Streambank and Shoreline Protection	USACE, Baltimore District Emergency Management 2 Hopkins Plaza, Baltimore, MD 21202 410-962-2013	Authorizes the construction of emergency streambank protection measures to prevent damage to highways, bridge approaches, municipal water supply systems, sewage disposal plants, and other essential public works facilities endangered by floods or storms due to bank erosion.	Feasibility: 100%/0% Fed/Local for initial $100,000; 50%/50% remaining cost; Implementation: 65%/35% Fed/Local; Federal Project Limit: $5M	Churches, hospitals, schools, and other non-profit service facilities may also be protected under this program. This authority does not apply to privately-owned property or structures.	Anytime

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
Continuing Authorities Program (CAP) Section 205 - Flood Damage Reduction	USACE, Baltimore District Emergency Management 2 Hopkins Plaza, Baltimore, MD 21202 410-962-2013	Authorizes the construction of small flood control projects that have not already been specifically authorized by Congress	Feasibility: 100%/0% Fed/Local for initial $100,000; 50%/50% remaining cost; Implementation: 65%/35% Fed/Local; Federal Project Limit: $10M	There are two general categories of projects: structural and nonstructural. Structural projects may include levees, floodwalls, diversion channels, pumping plants, and bridge modifications. Nonstructural projects may include flood proofing, the relocation of structures, and flood warning systems.	Anytime
Continuing Authorities Program (CAP) Section 103- Hurricane and Storm Damage Reduction (Beach Erosion)	USACE, Baltimore District Emergency Management 2 Hopkins Plaza, Baltimore, MD 21202 410-962-2013	Development and construction small beach erosion control projects. A potential project must provide benefits other than for the purposes of recreation, such as beach stabilization to reduce flooding or to provide protection to public facilities	Feasibility: 100%/0% Fed/Local for initial $100,000; 50%/50% remaining cost; Implementation: 65%/35% Fed/Local; Federal Project Limit: $10M	Protection of privately owned shorelines which offer no benefits to the public are not eligible for Federal cost sharing	Anytime
USACE Rehabilitation and Inspection Program (RIP) & Inspection of Completed Works (ICW) Program)	USACE, Baltimore District Emergency Management 2 Hopkins Plaza, Baltimore, MD 21202 410-962-2013	Provides for inspection of flood control projects, rehabilitation of damaged flood control projects, and the rehabilitation of federally authorized and constructed hurricane or shore protection projects	100% Federal for projects built by USACE and properly maintained; 80%/20% Fed/Sponsor for projects rehabbed by USACE	Projects initially constructed by the Corps, including hurricane and shore protection projects, and turned over to the local sponsor for maintenance are inspected under authority of the Inspection of Completed Works (ICW) program	After flood or storm event

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
USACE General Investigation (GI)	USACE, Baltimore District Emergency Management 2 Hopkins Plaza, Baltimore, MD 21202 410-962-2013	Congress can authorize USACE to study, design and construct major flood risk management projects	Feasibility: 50%/50%Fed/Local; Implementation 65%/35%	Generally large scale projects that cost more than $10 million	Anytime
USACE Flood Plain Management Services Program (FPMS)	USACE, Baltimore District Emergency Management 2 Hopkins Plaza, Baltimore, MD 21202 410-962-2013	The program allows USACE to compile and disseminate information on floods and flood damages, including identification of areas subject to inundation by floods, and general criteria for guidance in the use of floodplain areas.	Upon request, program services are provided to the State, regional, and local governments, Native American Tribes, and other non-federal public agencies without charge. Per Section 202 of WRDA 1999, USACE may accept funds voluntarily contributed by sponsor with the purpose of expanding the scope of services.	USACE can provide engineering advice to local interests in planning to reduce flood hazard.	Anytime
Hazardous Materials: State Access to the Oil Spill Liability Trust Fund	Director, USCG National Pollution Funds Center, U.S. Coast Guard Stop 7605 2703 Martin Luther King Jr. Avenue, SE Washington, DC 20593-7605 202-795-6000	To encourage greater State participation in response to actual or threatened discharges of oil.	No information	Eligible to States and U.S. Trust Territories and possessions.	Anytime

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
Emergency Management Assistance (EMA)	Maryland Emergency Management Agency 5401Rue Saint Lo Drive Reisterstown, MD 21401	Funds may be used for salaries, travel expenses, and other administrative cost essential to the day-to-day operations of State and Local emergency management agencies. Program also includes management processes that ensure coordinated planning, accountability for progress, and trained qualified staffing.	Federal - 50%	EMA funded activities may include specific mitigation management efforts not otherwise eligible for Federal funding. Management Assistance program funds may not be used for construction, repairs, equipment, materials or physical operations required for damage mitigation projects for public or private buildings, roads, bridges, or other facilities.	Anytime
Assistant to Firefighters Grant	Source: U.S. Fire Administration CFDA Number: 97.044	Vehicles, safety equipment, protective equipment, etc.	Federal Grant Funds match depended upon population served by Fire Departments and nonaffiliated EMS organizations	Provides assistance to local fire department to protect citizens and firefighters against the effects of fire and fire-related incidents.	Annually in September projects are due.
Maryland Program Open Space	Department of Natural Resources 580 Taylor Ave. Annapolis, MD 21401 410-260-8445	Local provides financial and technical assistance to local subdivisions for the planning, acquisition, and/or development of recreation land or open space areas.	A local governing body may use up to $25,000 annually from its 100% (Acquisition) money to fund planning projects that update the Local Land Preservation and Recreation Plans.	Acquires outdoor recreation and open space areas for public use. Administers funds made available to local communities for open and recreational space by the Outdoor Recreation Land Loan of 1969 and from the Land and Water Conservation Fund of the National Park Service, U.S. Department of the Interior.	July 1st

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
Maryland Recreational Trails Program	Maryland Scenic Byways /Recreational Trails Program* Office of Planning & Preliminary Engineering State Highway Administration 707 N Calvert Street Baltimore, MD 21201 (p) 410.545.8637 (f) 410.209-5012 tmaxwell@sha.state.md.us	Maintenance and restoration of existing recreational trail; Development and rehabilitation of trailside facilities and trail linkages; Purchase and lease of trail construction equipment; Construction of new trails; Acquisition of easements or property for recreational trails or recreational trail corridors; and Implementation of interpretive/educational programs to promote intrinsic qualities, safety, and environmental protection, as those objectives relate to the use of recreational trails.	Administered by the State Highway Administration (SHA), this program matches federal funds with local funds or in-kind contributions to implement trail projects. Projects can be sponsored by a county or municipal government, a private non-profit agency, a community group or an individual (non-governmental agencies must secure an appropriate government agency as a co-sponsor). Federal funds administered by the State Highway Administration are available for up to 80% of the project cost, matched by at least 20% funding from the project sponsor. Matching funds must be committed and documented in the local jurisdiction's budget.	Projects must meet state and federal environmental regulatory requirements (NEPA, MEPA, Section 106, Section 4(f)). SHA will provide assistance to the project sponsor to acquire these approvals.	July 1st

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
CoastSmart Communities Grant (CCG) Program	Maryland Department of Natural Resources Chesapeake and Coastal Service (p) 410.260.8718 (f) 410.260.8739 sasha.land@maryland.gov	Municipalities and counties in the coastal zone are eligible to apply for and receive funds: Anne Arundel, Baltimore, Calvert, Caroline, Cecil, Charles, Dorchester, Harford, Kent, Prince George's, Queen Anne's, St. Mary's, Somerset, Talbot, Wicomico, and Worcester counties and Baltimore City. Funding for a one-year project that contributes to understanding, planning for, or implementing planning and outreach measures to address coastal hazard issues.	Up to $75,000 annually	Track A can fund flood vulnerability and risk assessments, updates to planning documents (e.g. hazard mitigation plans, zoning ordinances, building codes, floodplain ordinances, comprehensive plans), education and outreach campaigns and materials, applications to FEMA's Community Rating System in concert with other task outcomes, support for adopting an updated plan and integrating the plan into day-to-day existing planning processes that reduce overall flood risk due to tidal events or stormwater and rain events.	TBD

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
Green Infrastructure Resiliency Grant Program	Maryland Department of Natural Resources Chesapeake and Coastal Service (p) 410.260.8799 (f) 410.260.8739 (e) megan.granato@maryland.gov	Municipalities and counties within the Maryland portion of the Chesapeake Bay watershed are eligible to apply for and receive funds. Please note that projects proposed in Cecil, Garrett and Worcester counties must be located within the portions of those counties that are within the watershed in order to be eligible. Funding for one year for Phase 1 and Phase 2 projects and up to 2 years for Phase 3 projects that will assess stormwater management needs associated with localized flooding and design or construct targeted green infrastructure practices to address those needs.	Up to $100,000 per project	Track B can fund watershed assessments that focus on determining local flood risks and how green infrastructure can be used to address those risks, site or watershed-level green infrastructure implementation plans, and green infrastructure project designs. This track can also fund construction of green infrastructure projects. In order to apply for construction funding, all applicable permit preapplication meetings must be complete.	TBD

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
Maryland Community Parks and Playgrounds Program	Department of Natural Resources 580 Taylor Ave. Annapolis, MD 21401 410-260-8445	1) development of new parks 2) rehabilitation of existing parks 3) expansion or improvement of existing parks 4) purchase and installation of playground equipment 5) development of environmentally oriented parks and recreation projects 6) development of new trails or extension of existing trails 7) creation of access points to water recreation resources 8) acquisition of land to create new parks.	The source of funds for this program is primarily State General Obligation Bonds, which may be authorized on an annual basis. The Community Parks and Playgrounds Program provides funding to incorporated municipalities and Baltimore City. Grants may be for up to 100% of the project cost and are selected on a competitive basis. Each applicant will be limited to one (1) Grant Proposal List submission package, which may contain several prioritized projects, per award cycle.	The Department of Natural Resources works to provide opportunities for Marylanders, especially our children, to experience nature. The Department has developed a website that provides information about Nature Play Spaces. Nature Play Spaces are one of the many types of public recreation projects eligible for consideration for Community Parks and Playgrounds grant funding. While land acquisition costs may be considered for project funding, the highest priority will be placed on capital costs associated with park development and improvement.	TBD

GRANT PROGRAM NAME	ADDRESS AND TELEPHONE CONTACT INFORMATION	ELIGIBLE ACTIVITIES	FEDERAL, STATE AND LOCAL COST SHARE REQUIREMENTS	OTHER PROGRAM CHARACTERISTICS	GRANT APPLICATION DUE DATE
Rural Legacy Program	Rural Legacy Program Department of Natural Resources, Tawes State Office Building, E-4 580 Taylor Avenue Annapolis, MD 21401	Rural Legacy Areas are primarily evaluated based on: 1. the significance and extent of agricultural, forestry, natural and cultural resources proposed for protection; 2. the threat to resources from development pressure and landscape changes; 3. the significance of historic and cultural resources proposed for protection; and 4. the economic value of the resource-based industries or services proposed for protection through land conservation, such as agriculture, forestry, tourism and recreation.	Rural Legacy Program staff will prepare a standard Grant Agreement based upon an approved Rural Legacy Area and Plan. The Grant Agreement will indicate the total amount of Rural Legacy Program funds that the Board will submit to the Board of Public Works for final approval. It will also specify the duration of the Grant Period within which this funding shall be available and all work to be completed by the Sponsor.	Maryland's Rural Legacy Program provides funding to preserve large, contiguous tracts of land and to enhance natural resource, agricultural, forestry and environmental protection while supporting a sustainable land base for natural resource-based industries. The program creates public-private partnerships and allows those who know the landscape best – land trusts and local governments – to determine the best way to protect the landscapes that are critical to our economy, environment and quality of life.	TBD

Appendix D

HMPC Meeting Minutes

Worcester County Hazard Mitigation Planning Committee (HMPC)

Minutes

Meeting:	**HMPC Kick-off Meeting**		
Date of Meeting:	May 22, 2019	**Time:**	10:00 am – 12:00 pm
Meeting Facilitator:	Virginia Smith – Smith Planning & Design	**Location:**	Worcester County Library – Berlin 13 Harrison Ave. Berlin, MD 21811

Meeting Topics Discussed

Agenda Topics

- ✓ **What is Hazard Mitigation?**
- ✓ **Expectation of HMPC**
- ✓ **Project Schedule**
- ✓ **2016 MEMA Hazard Identification**
- ✓ **Group Discussion**
  - o **Public Outreach Strategies**
  - o **Regional Collaboration**
  - o **Community Rating System**
- ✓ **Next Steps**

Attendees

Name	Organization	Name	Organization
Billy Birch	Department of Emergency Services	Kelly Henry	Department of Development Review & Permitting
Tina Vickers	Department of Emergency Services	Mark Dunlevy	Department of Development Review & Permitting
David Engelhart	Town of Berlin Planning Department	Tess Wimbrow	Department of Development Review & Permitting
Mary Bohlen	Town of Berlin	Bob Rhodes	Ocean City Emergency Services
Debra Stevens	Health Department	Amanda Lewis	Ocean City Emergency Services
Kristy Kagan	Health Department	Bill Neville	Ocean City Planning
Robyn Tytomi-Dalton	Health Department	Virginia Smith	Smith Planning & Design (SP&D)
John Tustin	Department of Public Works	Michele King	Smith Planning & Design (SP&D)
Ed Werkheiser	Maryland Emergency Management Agency (MEMA)		

What is Hazard Mitigation?

The hazard mitigation planning process was discussed with the committee. Hazard mitigation planning is a Federal requirement under the *Disaster Mitigation Act of 2000*. Hazard mitigation is sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Worcester County's Hazard Mitigation Plan is the roadmap to evaluating hazards, identifying resources and capabilities, selecting appropriate actions, and implementing mitigation measures to eliminate or reduce future damage from those hazards. Additional information is provided on the attached handout: *What is Hazard Mitigation?*

Expectation of the HMPC

The following expectations of the HMPC members were reviewed and discussed.

- Meeting Participation
- Review of Meeting Materials
- Mitigation Action (Status Update & New)
- Review of Plan Components

With the understanding that participates are not always able to attend the meetings, meeting minutes, handouts and other information will be sent to all HMPC members. Of the 48 invitees (HMPC members), 15 were in attendance at the kick-off meeting.

Project Schedule

The Hazard Mitigation Plan Update project began in March 2019 and projected to conclude December 2019. Three HMPC meetings will be scheduled during this timeframe; however, additional meetings may be included during the plan development process. The committee agreed to utilize Doodle Poll to establish meeting dates. Once the meeting date is determined, calendar invites will be distributed.

2016 MEMA Hazard Identification

The 2016 Maryland Emergency Management Agency (MEMA) Hazard Identification and Risk Assessment (HIRA) results for Worcester County were reviewed (handout attached). Coastal hazards were ranked as high risk for the County. Committee members comments included:

- Thunderstorm (Thunderstorm, Lightning, Hail)
    - Medium-Low to Medium
- Tornado
    - Medium-Low to Medium
- HazMat (Toxic Chemicals)
    - Low to Medium-Low

Rankings for these hazards were modified due to the increase in events/incidents per year since the last hazard mitigation planning cycle.

Group Discussion

For the group discussion portion of the meeting, committee members were divided into 5 groups in order to complete a group discussion questionnaire. Discussion topics included: Public Outreach Strategies, Regional Events & Planning, Community Rating System, identification of additional stakeholders, and new mitigation activities.

Public and regional involvement in the plan development process is necessary. The committee provided information on public outreach opportunities and regional collaboration. Examples and opportunities for public and regional inclusion were discussed. Members provided additional suggestions on the group questionnaire.

The Community Rating System (CRS) was reviewed with the HMPC; handout attached. The purpose for the County and its municipalities to participate in the CRS program was explained. Jurisdictions participating in the CRS program receive discounted flood insurance premium rates for engaging in various mitigation activities. Committee members were asked to provide feedback on whether Worcester County and/or its municipalities would be interested in becoming a CRS Community. Currently, Ocean City is a CRS Community with a CRS Rating of 6. This means Ocean City residents within the Special Flood Hazard Area (SFHA) receive a 20% discount on their insurance policies and residents not within the Special Flood Hazard Area (SFHA) receive a 10% discount on their insurance policies.

Following discussion, committee members reviewed data request and 2014 mitigation actions. For the 2014 mitigation action items, members were asked to provide a status update. Data request packets and 2014 mitigation action items status update sheets will be provided via email to specific agencies/departments for completion as a next step item.

Next Steps

Next Steps

- Obtain, Review & Incorporate New Data
- Add 2014 Mitigation Strategies Status Information
- Add New Capabilities
- Identify New Mitigation Action & Projects – Ongoing
- Send Doodle Poll for July Meeting Date
- Public Outreach
- Regional Collaboration

What is Hazard Mitigation?

DEFINING TERMS

Hazard *– a source of danger*

Risk *– possibility of loss or injury*

Vulnerability *– open to attack or damage*

Hazard mitigation is any action taken to permanently reduce or eliminate long-term risk to people and their property from the effects of hazards. Participating in hazard mitigation planning will afford Worcester County the opportunity to recognize its vulnerabilities before a disaster occurs. This recognition and consideration provides the community with the foresight to plan ahead and take actions to reduce its hazard vulnerabilities.

Although a disaster is something that no community ever wants to experience it can be an opportunity to re-think where we live, play, and work, and rebuild safer, stronger, and more sustainable communities. Effective hazard mitigation planning is a critical first step in making the community more disaster resistant. Through this hazard mitigation planning process, Worcester County will identify their hazards, access their vulnerabilities to the identified hazards, and build consensus for approaches to mitigating them.

Steps involved in Hazard Mitigation Planning are:

- Organize Resources
  - Establish local planning team
  - Acquire technique expertise for planning process
- Assess Risk
  - Identify the characteristics and potential consequences of natural hazards in order to understand how much Worcester County and its municipalities can be affected by specific hazards and what the impacts would be for important community assets
- Mitigation Strategies
- Implementation
- Plan Review
- Public Involvement
- Agency Review
- Adoption

HAZARD IDENTIFICATION

2016 MEMA HIRA Results for Worcester County		
Identified Hazard	**Types of Events**	**Worcester County**
Coastal	Coastal Flooding; Coastal Storms; Storm Surge; Hurricane/Tropical Storm; Nor'easter; Potential Sea Level Rise; Shoreline Erosion	**High**
Flood	Riverine Flood	**Medium-High**
Wind	Thunder-storm winds; Non-thunder-storm wind	**Medium-High**
Wildfire	Wildfire; Brush Fire; Conflagration	**Medium-High**
Drought	Drought; Extreme Heat	**Medium**
Tornado	Tornado	**Medium-Low**
Thunderstorm	Thunder-storm; Lightning; Hail	**Medium-Low**
Winter Storm	Winter Storm; Extreme Cold; Nor'easter (Snowfall)	**Medium-Low**
HazMat	Toxic Chemicals	**Low**

FEMA

Fact Sheet

Federal Insurance and Mitigation Administration

Community Rating System

June 2017

The National Flood Insurance Program (NFIP) Community Rating System (CRS) was implemented in 1990 as a voluntary program for recognizing and encouraging community floodplain management activities exceeding the minimum NFIP standards. Any community in full compliance with the minimum NFIP floodplain management requirements may apply to join the CRS.

1,444 Communities Participate in the CRS

Nearly 3.6 million policyholders in 1,444 communities participate in the CRS by implementing local mitigation, floodplain management, and outreach activities that exceed the minimum NFIP requirements.

Under the CRS, flood insurance premium rates are discounted to reward community actions that meet the three goals of the CRS, which are: (1) reduce flood damage to insurable property; (2) strengthen and support the insurance aspects of the NFIP; and (3) encourage a comprehensive approach to floodplain management.

Although CRS communities represent only 5 percent of the over 22,000 communities participating in the NFIP, more than 69 percent of all flood insurance policies are written in CRS communities.

CRS Classes

The CRS uses a Class rating system that is similar to fire insurance rating to determine flood insurance premium reductions for residents. CRS Classes* are rated from 9 to 1. Today, most communities enter the program at a CRS Class 9 or Class 8 rating, which entitles residents in Special Flood Hazard Areas (SFHAs) to a 5 percent discount on their flood insurance premiums for a Class 9 or a 10 percent discount for Class 8. As a community engages in additional mitigation activities, its residents become eligible for increased NFIP policy premium discounts. Each CRS Class improvement produces a 5 percent greater discount on flood insurance premiums for properties in the SFHA.

* *CRS Class changes occur on May 1 and October 1 of each year. The data contained in this fact sheet were current through May 2017.*

Best of the Best

Seven communities occupy the highest levels of the CRS. Each built a floodplain management program tailored to its own particular hazards, character, and goals. Under these programs, each community carries out numerous and varied activities, many of which are credited by the CRS. The average discount in policyholder premiums varies according to a community's CRS Class and the average amount of insurance coverage in place.

- **Roseville, California** was the first to reach the highest CRS rating (Class 1). Floods in 1995 spurred Roseville to strengthen its floodplain management program. Today the City earns points for almost all CRS-creditable activities. The average premium discount for policies in the Special Flood Hazard Area (SFHA) is $963.
- Comprehensive planning has been a key to **Tulsa, Oklahoma** in reducing flood damage from the dozens of creeks within its jurisdiction. The City (Class 2) has cleared more than 900 buildings from its floodplains. The average SFHA premium discount is $709.
- **King County, Washington** (Class 2) has preserved more than 100,000 acres of floodplain open space and receives additional CRS credit for maintaining it in a natural state. The average premium discount in the SFHA is $722.
- **Pierce County, Washington** (Class 2) maintains over 80 miles of river levees. The County mails informational brochures to all floodplain residents each year. The average premium discount in the SFHA is $846.
- **Fort Collins, Colorado** (Class 2) uses diverse approaches to keep its large student population informed. Identifying and protecting critical facilities and continually improving its GIS system help the city maintain its exemplary program. The average premium discount in the SFHA is $703.
- **Sacramento County, California**, has steadily improved its rating since joining the CRS in 1992. Now a Class 2, the County's more significant activities are diligent public outreach on protecting waterways, purchasing flood insurance, and preparing for floods. The average premium discount in the SFHA is $395.
- **Thurston County, Washington,** has a history of planning for hazard mitigation, watershed protection, and open space. Combining that with strict development standards and stormwater management has helped the County achieve Class 2. The average premium discount in the SFHA is $577.

CRS Credit

A community accrues points to improve its CRS Class rating and receive increasingly higher discounts. Points are awarded for engaging in any of 19 creditable activities, organized under four categories:

- Public information
- Mapping and regulations
- Flood damage reduction
- Warning and response.

Formulas and adjustment factors are used to calculate credit points for each activity.

The communities listed below are among those that have qualified for the greatest premium discounts:

Class 1: Roseville, California

Class 2: Sacramento County, California
Fort Collins, Colorado
Tulsa, Oklahoma
King County, Washington
Pierce County, Washington
Thurston County, Washington

Class 3: Louisville–Jefferson County, Kentucky
Ocala, Florida

Class 4: Charlotte, North Carolina
Palm Coast, Florida
Charleston County, South Carolina
Maricopa County, Arizona

Benefits of the CRS

Lower cost flood insurance rates are only one of the rewards a community receives from participating in the CRS. Other benefits include:

- Citizens and property owners in CRS communities have increased opportunities to learn about risk, evaluate their individual vulnerabilities, and take action to protect themselves, as well as their homes and businesses.
- CRS floodplain management activities provide enhanced public safety, reduced damage to property and public infrastructure, and avoidance of economic disruption and loss.
- Communities can evaluate the effectiveness of their flood programs against a nationally recognized benchmark.
- Technical assistance in designing and implementing some activities is available to community officials at no charge.
- CRS communities have incentives to maintain and improve their flood programs over time.

How to Apply

To apply for CRS participation, a community must initially inform the Federal Emergency Management Agency (FEMA) Regional Office of its interest in applying to the CRS and will eventually submit a CRS application, along with documentation that shows it is implementing the activities for which credit is requested. The application is submitted to the Insurance Services Office, Inc. (ISO)/CRS Specialist. ISO works on behalf of FEMA and insurance companies to review CRS applications, verify communities' credit points, and perform program improvement tasks.

A community's activities and performance are reviewed during a verification visit. FEMA establishes the credit to be granted and notifies the community, the State, insurance companies, and other appropriate parties.

Each year, the community must verify that it is continuing to perform the activities that are being credited by the CRS by submitting an annual recertification. In addition, a community can continue to improve its Class rating by undertaking new mitigation and floodplain management activities that earn even more points.

CRS Training

CRS Specialists are available to assist community officials in applying to the program and in designing, implementing, and documenting the activities that earn even greater premium discounts. A week-long CRS course for local officials is offered free at FEMA's Emergency Management Institute (EMI) on the National Emergency Training Center campus in Emmitsburg, Maryland, and can be field deployed in interested states. A series of webinars is offered throughout the year.

For More Information

A list of resources is available at the CRS website: www.fema.gov/national-flood-insurance-program-community-rating-system. For more information about the CRS or to obtain the CRS application, contact the Insurance Services Office by phone at (317) 848-2898 or by e-mail at nfipcrs@iso.com.

Worcester County Hazard Mitigation Planning Committee (HMPC)

Minutes

Meeting:	**HMPC Midpoint Meeting**		
Date of Meeting:	July 25, 2019	**Time:**	1:00 pm – 3:00 pm
Meeting Facilitator:	Virginia Smith – Smith Planning & Design	**Location:**	Worcester County Government Center - Room 1102; One W. Market St., Snow Hill, MD 21863

Meeting Topics Discussed

Agenda Topics

- ✓ **What is Hazard Mitigation?**
- ✓ **Mitigation Plan Title**
- ✓ **Hazard Event Photos**
- ✓ **Public Outreach Initiative**
- ✓ **Group Discussion**
  - o **Items for Review & Comment**
  - o **Items for Completion**
- ✓ **Next Steps**

Attendees

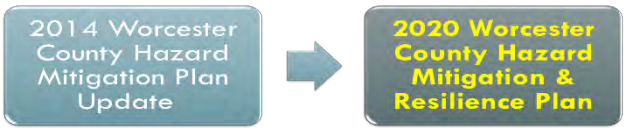
Name	Organization	Name	Organization
Tina Vickers	Department of Emergency Services	Bob Mitchell	Environmental Programs
Kelly Henry	Department of Development Review & Permitting	Mark Dunlevy	Department of Development Review & Permitting
Ed Tudor	Department of Development Review & Permitting	Tess Wimbrow	Department of Development Review & Permitting
Bill Bradshaw	Department of Development Review & Permitting	John Tustin	Department of Public Works
Shannon Chapman	Department of Social Services	Ken Whited	DPW – Maintenance Division
Robyn Tytomi-Dalton	Health Department	Frank Adkins	DPW – Roads Division
Kristy Kagan	Health Department	Doug Parks	Ocean Pines Board Member
Laura Allen	Town of Berlin	Ed Werkheiser	MEMA
Mary Bohlen	Town of Berlin	Virginia Smith	Smith Planning & Design (SP&D)
Martin Sullivan	Town of Snow Hill	Michele King	Smith Planning & Design (SP&D)
Carolyn Clemens	Ocean Pines Resident	Brian Reynolds	Ocean Pines Resident
Richard Clemens	Ocean Pines Resident	Don O'Grince	St. Paul's by the Sea Episcopal Church

What is Hazard Mitigation?

For new Hazard Mitigation Planning Committee (HMPC) members, a brief overview of the hazard mitigation planning process was discussed. Hazard mitigation planning is a Federal requirement under the *Disaster Mitigation Act of 2000*. Hazard mitigation is sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Worcester County's Hazard Mitigation Plan is the roadmap to evaluating hazards, identifying resources and capabilities, selecting appropriate actions, and implementing mitigation measures to eliminate or reduce future damage from those hazards.

Mitigation Plan Title

During the kick-off meeting held May 22, 2019, HMPC members discussed the hazard mitigation plan title. Members emphasized that the plan is multi-jurisdictional and should include resilience. Therefore, the 2014 Plan title will be updated to *2020 Worcester County Hazard Mitigation & Resilience Plan*.



Hazard Event Photos

Committee members were asked to provide any hazard event photos for inclusion in the plan. Members were asked to provide photos via email to either Tina Vickers (tvickers@co.worcester.md.us) or Michele King (mking@smithp-d.com).

Public Outreach Initiative

SP&D discussed several public outreach initiatives that have occurred since the kick-off meeting. A *HMPC and Public Stakeholders Meeting Summary* (**attached**) table was provided to the group for review. The table provided information on all meetings and outreach efforts completed to date. Committee members were asked to provide additional information on any meetings or outreach events they have attended, for inclusion into the summary table. Please provide information to Tina Vickers, tvickers@co.worcester.md.us.

Also, a public opinion survey has been developed and is available on Worcester County Department of Emergency Services webpage: http://www.co.worcester.md.us/departments/emergency.

> ***Public Survey:*** *The Worcester County Hazard Mitigation Plan is a project that aims to ensure the County is prepared for all kinds of hazards. The Department of Emergency Services is placing special emphasis on understanding citizens' concerns regarding hazards. Community members input to the process is incredibly valuable. This survey is being used to collect your insight and perspective. https://www.surveymonkey.com/r/P28Y7T9.*

Committee members were asked to share the Public Opinion Survey link with colleagues, friends and family.

Finally, a Citizen Alert & Notification flyer was developed and distributed to increase the number of residents utilizing the CodeRED Notification System. This system provides citizens with warnings, such as severe weather, via voice calls, text messages or emails. Committee members are encouraged to distribute this information during meeting(s) or outreach events, the flyer has been **attached** for your convenience. SP&D is requesting members to provide information on the event at which the flyer was distributed.

Group Discussion

For the group discussion portion of the meeting, committee members were divided into 4 groups. Discussion topics were broken down into 2 tasks: Items for Review & Comment and Items for Completion. Groups were provided with folders containing the following for each task:

- Task 1: Items for Review & Comment
    - Hazard Identification & Risk Assessment
    - Probability & Future Risk
    - Group Discussion Questionnaire Results
    - Goals & Objectives
- Task 2: Items for Completion
    - Safe Growth Audit
    - Mitigation Actions – Status Table
    - Hazard Impact Sheets

Task 1: Items for Review & Comment
As part of Task 1, members were asked to review and provide comment and/or modifications. Modifications made during the meeting have been integrated and the revised *Group Discussion Questionnaire Results* handout, **attached**.

Goals and objectives associated with mitigation action items were provided for review and comment. Comments received at the Midpoint meeting have been integrated into the **attached** updated *Goals & Objectives*.

Task 2: Items for Completion
Committee members were asked to provide information on the sheets provided in Task 2. A draft of the *Safe Growth Audit* was provided for review and members were asked to provide recommendations as a result of the review.

The Mitigation Actions Status table was a compilation of the 2014 mitigation actions. Members were asked to provide a status update for the action items that pertained to their agency or community. All feedback provided on the *Mitigation Actions Status Report* has been included on the table and is **attached** for review.

Finally, as part of Task 2, committee members were asked to provide information on Hazard Impacts. A hazard impact sheet was completed for each identified hazard: Coastal, Flood, Wildfire, Wind, Drought, Thunderstorm, Tornado and Winter Storm. SP&D attended the Local Emergency Planning Committee (LEPC) meeting earlier in the day and requested the HazMat Hazard Impact sheet be completed by the LEPC committee members. Information gathered during the meeting was incorporated into each hazard impact sheet and are **attached** for review.

The meeting concluded with each group providing new mitigation action ideas developed during the group discussion.

Next Steps

Next Steps

- Survey Results
- CRS Presentation
- Safe Growth Audit Recommendations
- Hazus Results
- Identify New Mitigation Action – Ongoing
- Send Doodle Poll for September Meeting Date
- Public Outreach
- Regional Collaboration
- Prioritization of New Mitigation Actions

Worcester County Hazard Mitigation Planning Committee (HMPC)

Minutes

Meeting:	**HMPC Strategies Meeting**		
Date of Meeting:	September 16, 2019	**Time:**	10:00 am – 12:00 pm
Meeting Facilitator:	Virginia Smith – Smith Planning & Design	**Location:**	Worcester County Government Center - Room 1102; One W. Market St., Snow Hill, MD 21863

Meeting Topics Discussed

Agenda Topics

- ✓ **Public Opinion Survey Results**
- ✓ **Hazus Results**
- ✓ **2014 Mitigation Action Status Report**
- ✓ **New Mitigation Action Items**
- ✓ **Next Steps**

Attendees

Name	Organization	Name	Organization
Tina Vickers	Department of Emergency Services	Ed Tudor	Department of Development Review & Permitting
Billy Birch	Department of Emergency Services	Mark Dunlevy	Department of Development Review & Permitting
Joshua Nordstrom	Worcester County Commissioner	Tess Wimbrow	Department of Development Review & Permitting
Walt West	National Park Services Assateague Island	Mark Titanski	Worcester County Sheriff's Office
Robyn Tytomi-Dalton	Health Department	Frank Adkins	DPW – Roads Division
Kristy Kagan	Health Department	Ed Werkheiser	MEMA
Dave Engelhart	Town of Berlin	Jihane Ambroise	MEMA
Mike Thornton	Pocomoke City EMS	Kristen Forti	MEMA
Doug Parks	Ocean Pines Board Member	Virginia Smith & Michele King	Smith Planning & Design (SP&D)

Public Opinion Survey Results

Public Opinion Survey results were reviewed. Survey participant demographics:

- 52% Unincorporated area of the county
- 20% Town of Snow Hill
- 16% Town of Berlin
- 8% City of Pocomoke
- 4% Ocean city

- Age
  - 60% – 45-60 age range
  - 28% – 65 & Older
  - 12% – 25-44 age range

Participants were asked to select hazard events that affect their area of the County or Community. The top three hazards selected were:

1. High Wind & Thunderstorm
2. Coastal Flooding & Storms
3. Winter Storms

The participants were provided a list of hazards other than hazards already included in the 2020 Hazard Mitigation Plan for future planning considerations. Participants selected those hazards of most concerned. The order of priority, highest to lowest, for "other hazards" were:

1. Opioid crisis
2. Cyber attack
3. Active shooter
4. Terrorism

Finally, participants were asked to select segments of the population that they consider were most vulnerable to hazards.

- Age Group
- Disabled or Mobility Impaired/Medically Dependent
- Homeless

The public opinion survey is available on Worcester County Department of Emergency Services webpage: http://www.co.worcester.md.us/departments/emergency.

> ***Public Survey:*** *The Worcester County Hazard Mitigation Plan is a project that aims to ensure the County is prepared for all kinds of hazards. The Department of Emergency Services is placing special emphasis on understanding citizens' concerns regarding hazards. Community members input to the process is incredibly valuable. This survey is being used to collect your insight and perspective. https://www.surveymonkey.com/r/P28Y7T9.*

Committee members were asked to **continue** to share the Public Opinion Survey link with colleagues, friends and family.

Hazus Results

Michele King provided an overview of the results from the flood vulnerability assessment. Ms. King provided an overview of Hazus, a FEMA geographic information system-based natural hazard analysis tool. This tool was utilized to determine the number of structures at-risk to both **riverine** and **coastal** flood events and projected loss estimates.

Hazus analysis results will be included in Chapter 3 Vulnerability Assessment of the 2020 Plan. In addition, these results inform new mitigation action items discussed later in the meeting. A brief overview discussed during the meeting are provided below.

Results indicate a total of 211 structures are at-risk to the **riverine** flood event, totaling a projected combined building and content loss estimate of $8,255,637.

Projected **coastal** flood event results indicate a total of 6,842 structures are at-risk with a projected combined building and content loss estimation of $34,429,427.

Water and wastewater facilities were assessed for flood vulnerability as well. The following water and wastewater facilities identified as at-risk to flooding. Flood depths, in feet, are provided for each facility.

- Snow Hill WWTP – 3.2' (Waste)
- Pocomoke – Maryland Avenue Pump Station – 0.5' (Waste)
- Unincorporated
    - Wastewater Facilities
        - Center Drive Wet Well – 2.3'
        - Center Drive Pump Station No. 1 – 2.7'
        - Golf Course Road Pump Station No. 4 – 0.5'
        - Golf Course Road Wet Well – 1.0'
        - Sunset Avenue Pump Station No. 7 – 0.5'
        - Madison Avenue Pump Station – 0.5'
    - Water Facilities
        - Ocean Gateway Well – 2.9'
        - Center Drive Well – 2.7'
        - Center Drive WTP – 1.9'
        - Madison Avenue Well – 1.8'

Hazus estimated the amount of debris that will be generated by the riverine and coastal flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.).

Debris Types	Total (tons)	Percentage of Total	Total Truckloads (@25 tons/truck)
Finishes	7,979	81%	319
Structure	601	6%	24
Foundation	1,320	13%	53
TOTAL	**9,901**	**100%**	**396**

Projected Shelter Needs	Total Number of Households Affected	Displaced Population	Population in need of Temporary Shelter
Sheltering	2,363	7,088	4,894

Hazus also estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters.

FEMA Designated Repetitive Loss Properties were discussed with members. A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978.

- 60 Repetitive Loss properties (RLP)
    - Unincorporated: 58 RLP
        - Snug Harbor: 21 RLP
        - Ocean Pines: 14 RLP
    - Ocean City: 2 RLP

Finally, Essential Facilities were assessed for flood vulnerability. Essential facilities are defined in Hazus as facilities which provide services to the community and should be functional after a flood, including:

- Emergency Operation Center
- Fire and EMS stations
- Medical Facilities
- Police Stations
- Schools

Essential facilities, sometimes called “critical facilities,” are those whose impairment during a flood could cause significant problems to individuals or communities. Essential facilities were analyzed for vulnerability to riverine, coastal and storm surge flood events. Results from the analysis indicate seven (7) essential facilities are at-risk to 1-percent-annual-chance flood **and** Storm Surge:

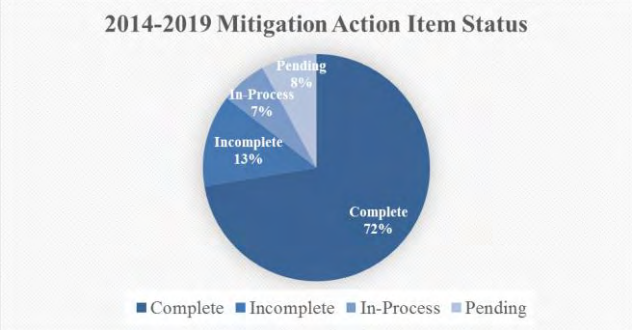
- Ocean City VFC No 3 – Flood Depth 0.5’ – Category 2
- Ocean City VFC Station 4 – Flood Depth 0.5’ – Category 2
- Ocean City VFC Headquarters – Flood Depth 0.5’ – Category 1
- Snow Hill Police Department – Flood Depth 0.9’ – Category 3
- Ocean City Fire Co Station 2 – Flood Depth 1.0’ – Category 1
- Your Doc’s In (Ocean City) – Flood Depth 1.3’ – Category 1
- Ocean City Beach Patrol – Flood Depth 1.6’ – Category 1

2014 Mitigation Action Status Report

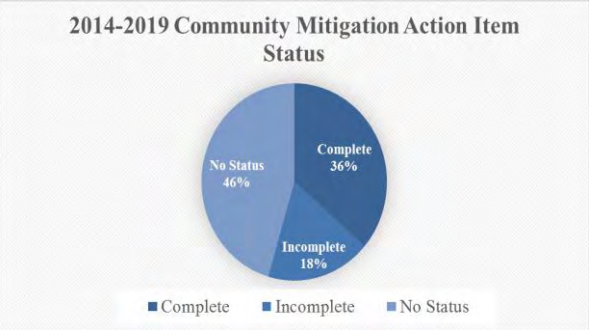
Virginia Smith reviewed the 2014 Mitigation Action Status Report with committee members. Mrs. Smith explained that 72% of the 2014 mitigation action items were completed or are ongoing. Only 13% of the 2014 mitigation action items were incomplete. Those items were carried over into the new Mitigation Action Items listing, as applicable.

The community status report indicated 36% of the 2014 mitigation actions were completed, however 46% of the mitigation actions are still in need of a status report. SP&D will reach out to each community for a status on those mitigation action items developed by their community.

Countywide Status Report



Community Status Report



New Mitigation Action Items

New mitigation action items developed over the course of this plan development process were distributed to the committee. A total of 41 countywide and 21 community mitigation action items were developed for the 2020 Plan Update.

Members were divided into 2 groups, countywide and community, to review all 62-mitigation action items. As a result, the committee removed 3 mitigation action items from the countywide listing.

The mitigation action items were numbered and posted for members to select 5 action items that were of high priority from their perspective. Results were discussed by the meeting attendees. However, in order for all HMPC members to participate in the prioritization process, a mitigation action prioritization online tool will be distributed. Prioritized mitigation action items will be integrated into the 2020 Plan. Those action items ranked as a “High Priority” will be further developed into projects.

Next Steps

Next Steps

- Distribute Prioritization Survey of New Mitigation Actions
- Mitigation Projects & Implementation
- Draft Plan Review

Appendix E

Public Meeting Announcements, Minutes & Survey Results

This appendix includes documentation of public meetings held throughout the plan development process. The first public meeting was held by Worcester County Commissions held on April 2, 2019. Press releases for each meeting of the Hazard Mitigation Planning Committee were issued in advance of each meeting by Kim Moses, Public Information Officer and Tina Vickers, WCES Planner. In each of the press releases issued the public were invited to attend. Members of the public attended the Hazard Mitigation Mid-Point meeting held July 25, 2019 at the County Office Building and are listed under the *Attendees* section of the meeting minutes. At this meeting, members of the public participated as one of four break-out groups. Members provided ideas for mitigation actions and projects. Please refer to Meeting Minutes from the July 25, 2019 meeting. Smith Planning & Design also presented at the Local Emergency Planning Committee (LEPC) meeting on the morning of July 25, 2019. The meeting agenda has been included. All LEPC meetings are advertised and open to the public.

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Minutes of the County Commissioners of Worcester County, Maryland

April 2, 2019

Diana Purnell, President
Joseph M. Mitrecic, Vice President
Anthony W. Bertino, Jr.
Madison J. Bunting, Jr.
James C. Church
Theodore J. Elder
Joshua N. Nordstrom

Following a motion by Commissioner Bunting, seconded by Commissioner Bertino, with Commissioners Church and Mitrecic temporarily absent, the Commissioners unanimously voted to meet in closed session at 9:00 a.m. in the Commissioners' Conference Room to discuss legal and personnel matters permitted under the provisions of Section 3-305(b)(1), (7), and (8) of the General Provisions (GP) Article of the Annotated Code of Maryland and to perform administrative functions, permitted under the provisions of Section GP 3-104. Also present at the closed session were Chief Administrative Officer Harold L. Higgins, Assistant Chief Administrative Officer Kelly Shannahan, County Attorney Maureen Howarth, Public Information Officer Kim Moses, Human Resources Director Stacey Norton; Public Works Director John Tustin, and Public Works Deputy Director John Ross. Topics discussed and actions taken included: hiring Michael Bowen as a Maintenance Worker III within the Maintenance Division of Public Works; promoting George Schoepf from temporary Sergeant to permanent Sergeant and hiring Kaelan Patterson as a Correctional Officer Trainee within the County Jail; reviewing vacancies in the Roads Division of Public Works and a vacancy within Emergency Services; acknowledging the hiring of Marie Northam as a Youth Services Specialist at the Ocean City Branch Library; receiving legal advice from counsel; consulting with staff about pending litigation; and performing administrative functions, including: receiving FY19 monthly financial update and preventing sexual harassment training update; discussing retiree insurance delinquent accounts; and discussing penalty settlement at the Mystic Harbour Wastewater Treatment Plant.

Following a motion by Commissioner Mitrecic, seconded by Commissioner Bertino, the Commissioners unanimously voted to adjourn their closed session at 9:52 a.m.

After the closed session, the Commissioners reconvened in open session. Commissioner Purnell called the meeting to order, and following a morning prayer by Arlene Page and pledge of allegiance, announced the topics discussed during the morning closed session.

The Commissioners reviewed and approved the open and closed session minutes of their March 19, 2018 meeting as presented.

The Commissioners received objections and other public comments on the proposed disposal of surplus County vehicles and equipment no longer used by the County, by auctioning

these items on GovDeals.com. There being no objections, upon a motion by Commissioner Mitrecic, the Commissioners unanimously agreed that the list of personal property, including vehicles, furniture, and equipment will be sold online at www.govdeals.com as County surplus property.

The Commissioners presented a proclamation to Department of Social Services (DSS) Director Roberta Baldwin and several members of her staff recognizing April as National Child Abuse Prevention Month in Worcester County and encouraged residents to remain aware and involved, so that abuse and neglect can be detected early or prevented from occurring entirely.

The Commissioners presented a proclamation to Housing Program Administrator Jo Ellen Bynum recognizing April as Fair Housing Month in Worcester County to celebrate the passage of the Fair Housing Act of 1968, which eliminates housing discrimination and promotes economic opportunity and diverse communities through public understanding, recognizing that inclusive communities are vibrant communities, which provide residents of all backgrounds with access to quality schools and increased opportunities for self-sufficiency.

The Commissioners met with Human Resources Director Stacey Norton and Volunteer Services Manager Kelly Brinkley to proclaim the week of April 7-13, 2019 as National Volunteer Week and to present commendations to recognize 58 volunteers for their long-term service on the many Worcester County boards and commissions, which enhances the services provided to County citizens, towns, and the County. Those recognized included Adult Public Guardianship Board members Dr. William Greer (11 years) and Richard Collins (23 years); Commission on Aging Board members Cynthia Malament (11 years) and Lloyd Parks (10 years); Agricultural Preservation Advisory Board members Kathy Drew (12 years) and Ed Phillips (13 years); Agricutural Reconciliation Board members Dean Ennis (12 years) and Brooks Clayville (18 years); Building Code Appeals Board members Elbert Davis (15 years), Kevin Holland (22 years), James Spicknall (14 years), and Jim Wilson (16 years); Drug and Alcohol Abuse Council members Jim Freeman, Jr. (14 years) and Colleen Wareing (12 years); Economic Development Advisory Board members John Glorioso (10 years), Ralph Shockley (10 years), and Robert Fisher (31 years); Board of Electrical Examiners members Carl Smith (20 years), J.T. Novak (11 years), Kenneth Lambertson (22 years), Michael Patchett (10 years), and Duane Duncan (13 years); Ethics Commission member Bruce Spangler (16 years); Housing Review Board members John Glorioso (12 years), Donna Dillon (10 years), and Sharon Teagle (18 years); Local Management Board - Initiative to Preserve Families Board members Ira F. "Buck" Shockley (15 years), Eloise Henry Gordy (11 years), and Mark Frostrom (19 years); Library Board members Ron Cascio (10 years) and Vivian Nicholson Pruitt (10 years); Local Development Council for Ocean Downs Casino members Rod Murray (10 years); Ocean City Mayor Rick Meehan (10 years), Berlin Mayor Gee Williams (10 years), Jim Rosenberg (10 years), Ocean Pines Police Chief David Massey (10 years), and Cam Bunting (10 years); Planning Commission members Betty Smith (11 years), Brooks Clayville (16 years), and Marlene Ott (10 years); Property Tax Assessment Appeal Board member Robert D. Rose (12 years); Recreation Advisory Board member Alvin "Hondo" Handy (12 years); Social Services Advisory Board member Nancy Howard (10 years); Solid Waste Advisory Committee members James Rosenberg (12 years) and

Wendell Purnell (who was recognized posthumously for 20 years of service); Tourism Advisory Committee member Barbara Tull (15 years); Water and Sewer Advisory Council members for the Mystic Harbour Service Area Joseph Weitzell (13 years), Bob Huntt (12 years), and Richard Jendrek (13 years); Water and Sewer Advisory Council members for the Ocean Pines Service Area Frederick Stiehl (12 years) and James Spicknall (11 years); Water and Sewer Advisory Council members for the West Ocean City Service Area Deborah Maphis (23 years) and Gail Fowler (15 years); Board of Zoning Appeals member Joseph W. Green, Jr. (13 years); and Commission for Women members Charlotte Cathell (eight years), Eloise Henry Gordy (nine years), Nancy Fortney (six years), and Teola Brittingham (nine years).

In response to a question by Commissioner Elder, Assistant Chief Administrative Officer Kelly Shannahan advised that the service of these individuals reflects a total of 774 volunteer years.

The Commissioners conducted a public hearing on a request to amend the Comprehensive Water and Sewerage Plan and expand service areas submitted by Attorney Mark Cropper, on behalf of River Run Development Associates, LLC (River Run) and Nichols-Neff Properties, LLC to reclassify the sewer and water planning areas from S-6/W-6 (no planned service) to S-1/W-1 (present to two years) for two adjacent parcels known as the former Pine Shore North Golf Course, in conjunction with expanding the River Run sewer planning area and the Ocean Pines water planning area to serve a proposed residential development on the subject properties. Environmental Programs Director Bob Mitchell reviewed the request, noting that the subject property is located on Beauchamp Road, east of Racetrack Road, north of the current boundary of the Ocean Pines Sanitary Service Area (SSA), and directly southwest of the current boundary of the River Run SSA, and more specifically is identified on Tax Map 15 as Parcels 127 and 259. He stated that the applicant is proposing that the sanitary services for the expanded SSA be provided by the purchase of 90 equivalent dwelling units (EDUs) of potable water capacity from the Ocean Pines SSA and 90 EDUs of wastewater treatment capacity purchased from available excess capacity from the River Run SSA. Mr. Mitchell concluded that the Planning Commission found the proposed amendment to be consistent with the County's Comprehensive Development Plan and the zoning category for the subject properties and granted the application a favorable recommendation. In response to a question by Commissioner Bertino, Mr. Mitchell stated that there would be no adverse impact from the expansion on Ocean Pines ratepayers.

Commissioner Purnell opened the floor to receive public comment.

Mr. Cropper stated that the staff and Planning Commission reports are correct and accurate, asked that they be included as evidence, and adopted them as his testimony. He then asked the Commissioners to amend the Water and Sewerage Plan and to expand the Ocean Pines SSA and the River Run SSA to add the former Pine Shore North Golf Course property based on these findings.

There being no further public comment, Commissioner Purnell closed the public hearing.

Upon a motion by Commissioner Bunting, the Commissioners unanimously adopted the Findings of Fact and Resolution No. 19-8 amending the Comprehensive Water and Sewerage Plan to reclassify and expand the water planning area of the Ocean Pines SSA and the sewer planning area of the River Run SSA to provide public water and sewer service to the former Pine

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Shore North Golf Course property; and Resolution No. 19-9 expanding the Ocean Pines SSA and the River Run SSA to add the former Pine Shore North Golf Course property.

The Commissioners conducted a public hearing to consider a request from Hugh Cropper, IV, Esquire, on behalf of Moore's Boatyard, LLC to award 4.71 acres of the County's Atlantic Coastal Bays Critical Area Growth Allocation to a property on North Piney Point Road in Bishopville. Mr. Mitchell reviewed the history of the site and the application to reclassify 4.71 acres identified on Tax Map 10 as Parcels 4, 171, and 304 from Resource Conservation Area (RCA) to Limited Development Area (LDA) within the County's Critical Area program. He advised that the growth allocation is needed to accommodate the construction of a proposed 46,000-square-foot warehouse and associated parking area at the facility on North Piney Point Road in Bishopville, as new commercial, industrial, and institutional uses are not permitted in a RCA. He concluded that the Planning Commission reviewed this request and gave it a favorable recommendation, and 373.89 acres of growth allocation are available if the Commissioners are inclined to approve this request.

Commissioner Purnell opened the floor to receive public comment.

Mr. Cropper stated that the property was acquired by the Hudson family, commercial fishermen in the boat repair business, in 1894. He further stated that the site has been used for boat repairs, heavy lifts, and other heavy equipment and machinery for more than 100 years, and it was one of the first marine railways to operate in Worcester County and all of Maryland. He asked the Commissioners to include the staff and Planning Commission reports as evidence, along with Mr. Mitchell's testimony here today and a 1989 photo capturing heavy industrial activities that were taking place on the property at that time. Mr. Cropper stated that, when the County established the Critical Area program, a portion of this site was lumped in with the residential subdivision Holiday Harbor and thus reclassified to 4.63 acres LDA and 4.71 acres RCA. He stated that this was clearly a mistake and asked the Commissioners to approve the requested growth allocation.

Land Planner Bob Hand stated that this project meets or exceeds all standards. He also reviewed the proposed environmental enhancements proposed in the Buffer Management Plan for the site, including upgrading the septic to Best Available Technology (BAT), eradicating phragmites and bamboo from the wetlands, and constructing rain gardens to enhance water quality. For these reasons, he asked the Commissioners to grant their request for a waiver to reduce the required setback from 300 to 100 feet.

Environmental Consultant Chris McCabe advised that the proposed enhancements to improve water quality meet or exceed all the criteria required for the awarding of the growth allocation, and he asked the Commissioners to approve the request.

There being no further public comment, Commissioner Purnell closed the public hearing.

Upon a motion by Commissioner Mitrecic, the Commissioners unanimously adopted the Findings of Fact and Resolution No. 19-10 awarding growth allocation to Moore's Boatyard, LLC on the east side of North Piney Point Road in Bishopville within the Atlantic Coastal Bays Critical Area, with the waiver reducing the 300-foot setback to 100 feet based on the proffered environmental enhancements.

Atlantic General Hospital (AGH) President and Chief Executive Officer Michael Franklin

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met with the Commissioners to discuss the Atlantic General Hospital and Health System 2018 in Review/What's Coming in 2019 community update. Mr. Franklin presented a PowerPoint, which covered AGH's 2020 Vision and Mission (care.coordination); Year Over Year Comparison for FY17 and FY18 for billing, cost of care, operating margin, community support, along with the total margin and State assessment; Community Impact of $13.5 million on the economy (more than 900 positions for local residents and a total payroll of over $55 million) and quality of life; AGH 2019 Goals - Focused on the "Quadruple Aim" and Strategic Plan and Structure - Right Care, People, Place, Partners, Hospital; FY19 Strategic Initiatives; Strategic Investment in Our Community - the AGH Foundation $10 million capital campaign to upgrade five existing facilities; Women's Health Center project, which has been completed and offers numerous diagnostic and therapy treatments, and its impact; Vision for a Regional Cancer Care Center, which broke ground in 2017 and the program's impact since opening June 27, 2018 (41% increase in new patients and 52% increase in total patients); FY19 Strategic Initiatives - Master Facility Planning for modernization of patient care areas, surgical services renovation, and Emergency Department expansion; Global and Domain Comparisons, which show a need to upgrade the actual hospital environment; and the Concept Design for the new outpatient center on MD Rt. 589 near Ocean Pines; Healthcare in Maryland: What's Coming in 2019; The Maryland Primary Care Program; Care Transformation Organizations; Medication Nonadherence: Data and Analytics Can Make an Impact (50% of patients are nonadherent at any given time); Medication Therapy Management (MTM) Actual vs Projected Volume of Participants; Readmissions from MTM Population during the first year of the program, including total readmissions avoided, the readmission rate of 1.3%, and estimated cost avoidance of $135,648 per 150 patients; and MTM Recognition, which earned AGH the Maryland Rural Health Practitioner Award for 2018 and recognition as a model program in the State. Mr. Franklin extended his thanks to the more than 400 volunteers who support AGH services and save the hospital roughly $650,000 in salary costs per year, noting that AGH runs on volunteers. The Commissioners thanked Mr. Franklin for his presentation.

The Commissioners met with Housing Program Administrator Jo Ellen Bynum regarding a request by the Maryland Department of Housing and Community Development (DHCD) for Worcester County's continued participation in the "On Behalf Of" (OBO) Maryland Mortgage Program, which provides low interest loans primarily to first-time home buyers as well as to those home buyers who have not owned their principal residence within the last three years, as well as the Maryland Home Credit Program. Upon a motion by Commissioner Bertino, the Commissioners unanimously agreed to irrevocably transfer Worcester County's full $1,842,085 tax-exempt housing bond allocation to the DHCD Community Development Administration for use in issuing housing bonds or mortgage credit certificates on behalf of Worcester County, as set forth in the 2019 allocation of the Maryland State Ceiling for use under the Maryland Mortgage Program and the Maryland Home Credit Program.

Pursuant to the request of Local Management Board (LMB) Director Jessica Sexauer and upon a motion by Commissioner Mitrecic, the Commissioners unanimously authorized Commission President Purnell to sign the 2020 LMB grant proposal for funding totaling $832,918 through the Governor's Office for Children to fund the following programs: WE3:

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Worcester Employment, Education, and Empowerment Program; Building Bridges; Comprehensive Parenting; Adverse Childhood Experiences Training and Education; Mentoring Services; and Growing a Healthy Community.

Pursuant to the request of Economic Development Deputy Director Kathryn Gordon and upon a motion by Commissioner Bertino, the Commissioners unanimously authorized Commission President Purnell to sign the 2019 County Video Program agreement between CGI Communications, Inc. and the County Commissioners, with CGI to produce a total of six, one-minute videos to be featured on the County website, which could include but are not limited to the following topics: economic development, business and industry, quality of life, tourism and attractions, real estate development, healthcare, education, and parks and recreation. Ms. Gordon advised that Economic Development will use the videos as marketing tools and will work with CGI to develop content and scripts for these videos. The County will also be required to provide a letter of introduction for the program on County letterhead to be used by CGI in conjunction with their program.

Pursuant to the request of Emergency Services Director Billy Birch and upon a motion by Commissioner Mitrecic, the Commissioners unanimously accepted the proposal from Smith Planning and Design, LLC of Cumberland, Maryland at a total cost of $19,950 to prepare the Worcester County Hazard Mitigation Plan Update. Mr. Birch advised that the County must update this plan every five years to remain eligible for disaster relief funding from the Federal Emergency Management Agency (FEMA).

Pursuant to the request of Mr. Birch and upon a motion by Commissioner Elder, the Commissioners unanimously approved the request for proposals (RFP) for design, delivery, and installation of a new communications shelter at the Snow Hill water tower. Chief Administrative Officer Harold Higgins advised that $300,000 was previously set aside within the Assigned Fund Balance for this purpose.

Pursuant to the request of Environmental Programs Director Bob Mitchell in response to a written request from Maryland Coastal Bays Program (MCBP) Executive Director Frank Piorko and upon a motion by Commissioner Mitrecic, the Commissioners voted 6-1, with Commissioner Elder voting in opposition, to approve an in-kind match of approximately $550,000 for the Environmental Protection Agency (EPA) National Estuary Program (NEP) grant for the period of October 1, 2019 to September 30, 2020. Mr. Mitchell explained that the County will provide an equivalent match using non-federal Rural Legacy Program funds and potentially any remaining Bay Restoration Fund (BRF) grant funds, and Maryland Department of Natural Resources (DNR) Coastal Resiliency grant funds, all from the above-stated time period for this match, so there will be no direct cost to the County.

The Commissioners met with Public Works Director John Tustin to review and discuss the Mosquito Control Program budget for the 2019 season, as outlined in a letter to the County from Brian Prendergast, Maryland Department of Agriculture (MDA) Mosquito Control Program Manager. Mr. Tustin stated that the proposed budget requires County funding of $83,940 for the

Mosquito Control Program in Worcester County, with State funding of $82,260 and community funding of $240,300 for a total budget of $406,500. Mr. Tustin stated that staff is recommending no changes to last year's program.

Upon a motion by Commissioner Church, the Commissioners approved the proposed budget for Worcester County Mosquito Control for Calendar Year 2019 between MDA and the County Commissioners. Mr. Tustin advised that, like last year, area residents who participate in the program would be required to pay the $65 fee per residential household up front to cover a portion of the cost of spraying.

The Commissioners met with Mr. Tustin to discuss a proposed final payment adjustment to Allan Meyers for the completion of Cell No. 5 construction project at the Central Landfill, as recommended by EA Engineering. Mr. Tustin stated that the substantial completion of the project exceeded the contract completion date, which could result in the assessment of liquidated damages of $25,000 to Allan Meyers. He stated that given the excessive rainfall during the course of construction and Allan Myers staff's extraordinary efforts to deal with the issues, including working 10-hour days, seven days per week during the project, he concurred with EA's assessment and recommended the Commissioners withhold $12,500 from the final payment, as liquidated damages for this project in lieu of attempting to legally collect the $25,000, which Allan Meyers would contest. He concluded that the project is complete, and Allen Meyers has agreed to this $12,500 withholding.

Upon a motion by Commissioner Mitrecic, the Commissioners unanimously approved staff's recommendation to withhold $12,500 from the final payment to Allen Myers for the reasons previously stated.

Pursuant to the request of Budget Officer Kathy Whited and upon a motion by Commissioner Mitrecic, the Commissioners unanimously approved the required advertisement entitled "Notice of Public Hearing FY20 Requested Operating Budgets," which will run in area newspapers the weeks of April 25 and May 1, 2019 advising the public that the budget hearing will take place on Tuesday, May 7, 2019 at 7:00 p.m. at Stephen Decatur High School (SDHS).

The Commissioners met with Ms. Whited to review the proposed FY20 Constant Yield Advertisement, which has already been approved by the Maryland Department of Assessments and Taxation, to be advertised in area newspapers during the week of April 25, 2019. Ms. Whited explained that, in accordance with State law, the notice states that, for the tax year beginning July 1, 2019, the estimated real property assessable base will increase by 1.4%, from $15,393,741,626 to $15,616,625,511, and if the County maintains the current tax rate of $0.835 per $100 of assessment, real property tax revenues will increase by $1,861,080 or 1.4%. The notice states that, to fully offset the effect of increasing assessments, the real property tax rate should be reduced to $0.8231 per $100 of assessment, the Constant Yield Tax Rate (CYTR). The County is considering not reducing its real property tax rate enough to fully offset increasing assessments and instead proposes to adopt a real property tax rate of $0.8666 per $100 of assessment. This tax rate is 5.3% higher than the CYTR and will generate an additional $6,793,232 in real property tax revenues. Ms. Whited reiterated that this language is required by State law, even though she understands that the Commissioners do not intend to actually increase the real property tax rate to

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$0.8666 per $100 of assessment.

Upon a motion by Commissioner Bertino, the Commissioners unanimously approved the FY20 Constant Yield Tax Rate advertisement, as required by State law.

Mr. Higgins informed the Commissioners that staff just confirmed that the County obtained a 2.35% effective interest rate from Fidelity Capital Markets for the Consolidated Public Improvement Bonds, 2019 Series to build the new Showell Elementary School, a new athletic field and track at SDHS, to complete construction of Cell No. 5 at the Central Landfill, and to complete various water and wastewater improvements in the Ocean Pines and Riddle Farm Sanitary Service Areas. He advised that the details are being finalized now, and staff will present a final bond resolution for the Commissioners to review and approve at the start of their budget work session later that afternoon.

In response to a question by Commissioner Bunting, Assistant Chief Administrative Officer Kelly Shannahan confirmed that the County was assigned a stable outlook and thus retained its current ratings from the three rating agencies as follows: AA+ for Standard and Poor's, Aa2 for Moody's Investors Service, and AA for Fitch.

Following a motion by Commissioner Bunting, seconded by Commissioner Bertino, with Commissioners Church and Mitrecic temporarily absent, the Commissioners unanimously voted to meet in closed session at 2:54 p.m. in the Commissioners' Meeting Room to discuss legal and personnel matters permitted under the provisions of Section 3-305(b)(8) of the General Provisions (GP) Article of the Annotated Code of Maryland and to perform administrative functions, permitted under the provisions of Section GP 3-104. Also present at the closed session were Chief Administrative Officer Harold L. Higgins, Assistant Chief Administrative Officer Kelly Shannahan, County Attorney Maureen Howarth, and Public Information Officer Kim Moses. Topics discussed and actions taken included receiving legal advice related to an ongoing lawsuit.

Following a motion by Commissioner Mitrecic, seconded by Commissioner Nordstrom, the Commissioners unanimously voted to adjourn their closed session at 2:57 p.m. to meet again in Budget Work Session on April 9, 2019.

The Commissioners met with Finance Officer Phil Thompson and Financial Consultant Joe Mason of Davenport & Company, LLC to review the bids for the Consolidated Public Improvement Bonds, 2019 Series as referenced earlier. The winning bid by Fidelity Capital Markets included a premium of $6.6 million that will be used to reduce the total amount borrowed. As a result, the County received proceeds of $46 million for the needed planned capital projects, while only being required to pay back $39.8 million. Mr. Thompson stated that this will result in a savings of more than $5.98 million over the life of issue, with approximately $370,000 to be saved in FY20 alone.

Mr. Mason congratulated the County on receiving 11 bids, which included four bids below an interest rate of 2.4%, which he characterized as extraordinary. After some discussion and upon a motion by Commissioner Bertino, the Commissioners unanimously adopted Resolution No. 19-11, a supplemental resolution of the County Commissioners, supplementing

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Resolution No. 19-7, providing for the acceptance of bids received and awarding the 2019 Series Bonds to Fidelity Capital Markets at a rate of 2.353561%.

The Commissioners answered questions from the press, after which they adjourned for lunch and to conduct a budget work session.

PRESS RELEASE

Worcester County Government ♦ Phone (410) 632-1194 ♦ Fax (410) 632-3131

TO:	Local Media
FROM:	Worcester County Commissioners
DATE:	June 3, 2019
FOR RELEASE:	Immediately
TOPIC:	WORCESTER COUNTY EMERGENCY SERVICES UPDATING HAZARD MITIGATION PLAN
CONTACT:	Kim Moses, public information officer, at (410) 632-1194; and Tina Vickers, WCES planner, at (410) 632-1315

Worcester County Emergency Services (WCES) is currently updating the Hazard Mitigation Plan. Mitigation plans identify potential hazards and vulnerabilities, set goals, and establish specific mitigation actions to reduce risk of hazards to people, buildings, infrastructure, and the environment. Local mitigation plans are required under Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as enacted under the Disaster Mitigation Act of 2000 in order to be eligible for federal hazard mitigation grants.

HISTORY OF THE WORCESTER COUNTY HAZARD MITIGATION PLAN

The Worcester County Hazard Mitigation Plan was originally adopted in 2006 and then again in 2014. Comprehensive updates are required by the Federal Emergency Management Agency (FEMA). The 2019 plan update is multi-jurisdictional in scope. The plan update will include unincorporated areas of Worcester County and the towns of Berlin, City of Pocomoke, and Snow Hill.

2019 PLANNING PROCESS

The first step in the planning process involves the identification of key stakeholders to serve on the planning committee. Forty-eight people from various agencies, departments, organizations, and municipalities joined WCES at the plan development kick-off meeting on May 22 at the Berlin Branch of the Worcester County Library. The plan will be developed over the summer months. Additional information developed over the course of the planning process will be posted on the county website at www.co.worcester.md.us/departments/emergency.

For more information on the plan development process and how you can participate, please call WCES Planner Christina Vickers at 410-632-1315.

PRESS RELEASE

Worcester County Government ♦ Phone (410) 632-1194 ♦ Fax (410) 632-3131

TO:	Local Media
FROM:	Worcester County Commissioners
DATE:	July 3, 2019
FOR RELEASE:	Immediately
TOPIC:	Public Invited to Comment on Worcester County Emergency Services Hazardous Mitigation Plan Update
CONTACT:	Kim Moses, public information officer, at (410) 632-1194; and Tina Vickers, WCES planner, at (410) 632-1315

Public Invited to Comment on Worcester County Emergency Services Hazard Mitigation Plan Update

Worcester County Emergency Services (WCES) officials invite area citizens to partner with them as they work through summer 2019 on an update to the 2014 Hazard Mitigation Plan. The project goal is to minimize impacts from hazard events, and area residents can help in the planning process in two ways.

First, WCES officials are placing special emphasis on citizens' concerns related to hazards, and they invite all to take part in a public survey, which is available online at http://www.co.worcester.md.us/departments/emergency. Survey results will be included in the updated plan document.

Second, WCES will host the next public meeting on the hazard mitigation plan update on July 25, 2019 at 1 p.m., in room 1102 of the Worcester County Government Center, which is located at One West Market Street in Snow Hill. Citizens are encouraged to attend and participate in the meeting.

"Input from our citizens will not only create a strong Hazard Mitigation Plan, but will serve to strengthen the resilience of our community and increase awareness of potential hazards we may face if the unthinkable were to happen," WCES Planner Tina Vickers said.

For more information on the plan development process and how you can participate, please call Vickers at 410-632-1315.

Worcester County Hazard Mitigation Planning Committee (HMPC)

Minutes

Meeting:	**HMPC Midpoint Meeting**		
Date of Meeting:	July 25, 2019	**Time:**	1:00 pm – 3:00 pm
Meeting Facilitator:	Virginia Smith – Smith Planning & Design	**Location:**	Worcester County Government Center - Room 1102; One W. Market St., Snow Hill, MD 21863

Meeting Topics Discussed

Agenda Topics

- ✓ **What is Hazard Mitigation?**
- ✓ **Mitigation Plan Title**
- ✓ **Hazard Event Photos**
- ✓ **Public Outreach Initiative**
- ✓ **Group Discussion**
  - o **Items for Review & Comment**
  - o **Items for Completion**
- ✓ **Next Steps**

Attendees

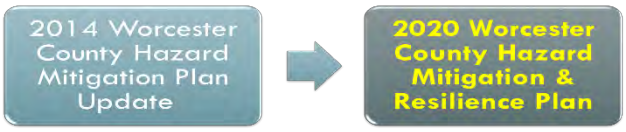
Name	Organization	Name	Organization
Tina Vickers	Department of Emergency Services	Bob Mitchell	Environmental Programs
Kelly Henry	Department of Development Review & Permitting	Mark Dunlevy	Department of Development Review & Permitting
Ed Tudor	Department of Development Review & Permitting	Tess Wimbrow	Department of Development Review & Permitting
Bill Bradshaw	Department of Development Review & Permitting	John Tustin	Department of Public Works
Shannon Chapman	Department of Social Services	Ken Whited	DPW – Maintenance Division
Robyn Tytomi-Dalton	Health Department	Frank Adkins	DPW – Roads Division
Kristy Kagan	Health Department	Doug Parks	Ocean Pines Board Member
Laura Allen	Town of Berlin	Ed Werkheiser	MEMA
Mary Bohlen	Town of Berlin	Virginia Smith	Smith Planning & Design (SP&D)
Martin Sullivan	Town of Snow Hill	Michele King	Smith Planning & Design (SP&D)
Carolyn Clemens	Ocean Pines Resident	Brian Reynolds	Ocean Pines Resident
Richard Clemens	Ocean Pines Resident	Don O'Grince	St. Paul's by the Sea Episcopal Church

What is Hazard Mitigation?

For new Hazard Mitigation Planning Committee (HMPC) members, a brief overview of the hazard mitigation planning process was discussed. Hazard mitigation planning is a Federal requirement under the *Disaster Mitigation Act of 2000*. Hazard mitigation is sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Worcester County's Hazard Mitigation Plan is the roadmap to evaluating hazards, identifying resources and capabilities, selecting appropriate actions, and implementing mitigation measures to eliminate or reduce future damage from those hazards.

Mitigation Plan Title

During the kick-off meeting held May 22, 2019, HMPC members discussed the hazard mitigation plan title. Members emphasized that the plan is multi-jurisdictional and should include resilience. Therefore, the 2014 Plan title will be updated to *2020 Worcester County Hazard Mitigation & Resilience Plan*.



Hazard Event Photos

Committee members were asked to provide any hazard event photos for inclusion in the plan. Members were asked to provide photos via email to either Tina Vickers (tvickers@co.worcester.md.us) or Michele King (mking@smithp-d.com).

Public Outreach Initiative

SP&D discussed several public outreach initiatives that have occurred since the kick-off meeting. A *HMPC and Public Stakeholders Meeting Summary* (**attached**) table was provided to the group for review. The table provided information on all meetings and outreach efforts completed to date. Committee members were asked to provide additional information on any meetings or outreach events they have attended, for inclusion into the summary table. Please provide information to Tina Vickers, tvickers@co.worcester.md.us.

Also, a public opinion survey has been developed and is available on Worcester County Department of Emergency Services webpage: http://www.co.worcester.md.us/departments/emergency.

> ***Public Survey:*** *The Worcester County Hazard Mitigation Plan is a project that aims to ensure the County is prepared for all kinds of hazards. The Department of Emergency Services is placing special emphasis on understanding citizens' concerns regarding hazards. Community members input to the process is incredibly valuable. This survey is being used to collect your insight and perspective. https://www.surveymonkey.com/r/P28Y7T9.*

Committee members were asked to share the Public Opinion Survey link with colleagues, friends and family.

Finally, a Citizen Alert & Notification flyer was developed and distributed to increase the number of residents utilizing the CodeRED Notification System. This system provides citizens with warnings, such as severe weather, via voice calls, text messages or emails. Committee members are encouraged to distribute this information during meeting(s) or outreach events, the flyer has been **attached** for your convenience. SP&D is requesting members to provide information on the event at which the flyer was distributed.

Group Discussion

For the group discussion portion of the meeting, committee members were divided into 4 groups. Discussion topics were broken down into 2 tasks: Items for Review & Comment and Items for Completion. Groups were provided with folders containing the following for each task:

- Task 1: Items for Review & Comment
  - Hazard Identification & Risk Assessment
  - Probability & Future Risk
  - Group Discussion Questionnaire Results
  - Goals & Objectives
- Task 2: Items for Completion
  - Safe Growth Audit
  - Mitigation Actions – Status Table
  - Hazard Impact Sheets

One of the four groups were designated as a citizen group. Both hazard impact information and mitigation action and project ideas were collected. Impact sheets and photos of mitigation ideas are included.

Task 1: Items for Review & Comment

As part of Task 1, members were asked to review and provide comment and/or modifications. Modifications made during the meeting have been integrated and the revised *Group Discussion Questionnaire Results* handout, **attached**.

Goals and objectives associated with mitigation action items were provided for review and comment. Comments received at the Midpoint meeting have been integrated into the **attached** updated *Goals & Objectives*.

Task 2: Items for Completion

Committee members were asked to provide information on the sheets provided in Task 2. A draft of the *Safe Growth Audit* was provided for review and members were asked to provide recommendations as a result of the review.

The Mitigation Actions Status table was a compilation of the 2014 mitigation actions. Members were asked to provide a status update for the action items that pertained to their agency or community. All feedback provided on the *Mitigation Actions Status Report* has been included on the table and is **attached** for review.

Finally, as part of Task 2, committee members were asked to provide information on Hazard Impacts. A hazard impact sheet was completed for each identified hazard: Coastal, Flood, Wildfire, Wind, Drought, Thunderstorm, Tornado and Winter Storm. SP&D attended the Local Emergency Planning Committee (LEPC) meeting earlier in the day and requested the HazMat Hazard Impact sheet be completed by the LEPC committee members. Information gathered during the meeting was incorporated into each hazard impact sheet and are **attached** for review.

The meeting concluded with each group providing new mitigation action ideas developed during the group discussion.

Next Steps

Next Steps

- Survey Results
- CRS Presentation
- Safe Growth Audit Recommendations
- Hazus Results
- Identify New Mitigation Action – Ongoing
- Send Doodle Poll for September Meeting Date
- Public Outreach
- Regional Collaboration
- Prioritization of New Mitigation Actions

#4

Thunderstorm Hazard Impact *(Thunderstorm, Hail, and Lightning)* ***Please provide community perspective impacts from thunderstorm hazard events to Worcester County.***	
Health & Safety of the Public	PROPER PUBLIC ANNOUNCEMENTS ON MEDIA
Health & Safety of the First Responders	FOLLOWS STANDARD OPERATIONAL PROCEDURES
Continuity of Operations (including Delivery of Services)	EVALUATE THE PLANS IMPLEMENTED
Property, Facilities, & Infrastructure	DOCUMENT IMPACT AND PRIORITIZE NEEDS
Environment	CHECK FOR IMPACTS RECOGNIZED
Economic Conditions	
Public Confidence in Government	

#4

Coastal Hazard Impact *(Coastal Flooding, Coastal Storms, Storm Surge, Hurricane/Tropical Storm, Nor'easter, Potential Sea Level Rise, Shoreline Erosion and Tsunami)* ***Please provide community perspective impacts from coastal hazard events to Worcester County.***	
Health & Safety of the Public	ADEQUATE EVACUATION OR NOTICE ROUTES OUT TO A ID SHELTER CONSIDER ADDING EMERGENCY ROUTE.
Health & Safety of the First Responders	PROPER PLAN + EQUIPMENT
Continuity of Operations (including Delivery of Services)	INTEROPERABILITY OF COMMUNICATIONS
Property, Facilities, & Infrastructure	DOCUMENT LEVEL OF DAMAGE & ELEVATED LINES OF SEA LEVEL RISE
Environment	
Economic Conditions	
Public Confidence in Government	

#4

Flood Hazard Impact (Riverine Flood)	
Please provide community perspective impacts from flood hazard events to Worcester County:	
Health & Safety of the Public	MEDIA MESSAGES TO IDENTIFY IMPACT ZONES
Health & Safety of the First Responders	HAVE PLANS + ADEQUATE EQUIPMENT
Continuity of Operations (including Delivery of Services)	THE ACCESS TO ENOUGH DELIVERY VEHICLES + TRAINED DRIVERS + DELIVERY STAFF
Property, Facilities, & Infrastructure	
Environment	
Economic Conditions	
Public Confidence in Government	

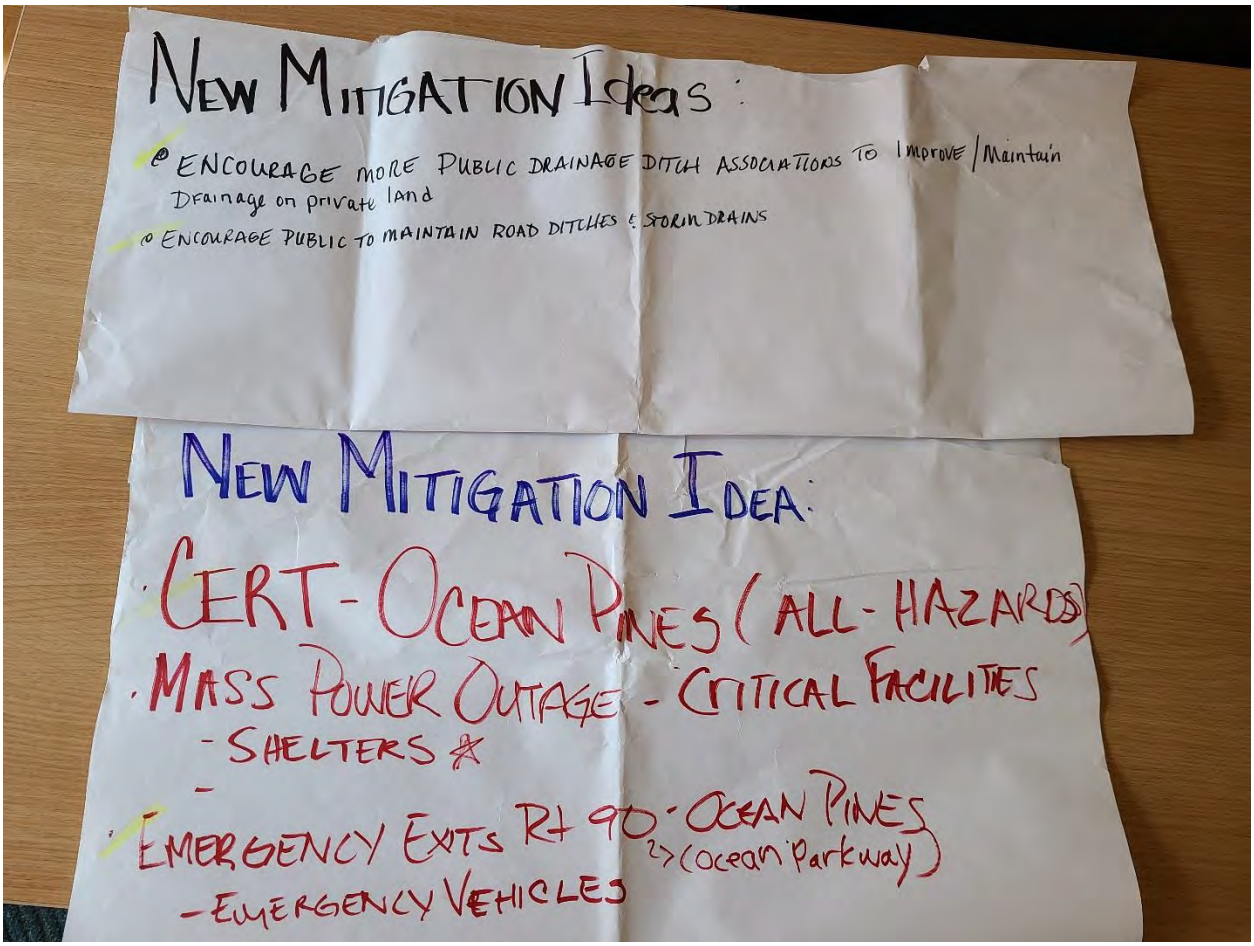
#4

Winter Storm Hazard Impact *(Winter Storm; Extreme Cold; Nor'easter (Snowfall)* ***Please provide community perspective impacts from winter storm hazard events to Worcester County.***	
Health & Safety of the Public	MEDEVIA MESSAGE OF POTENTIAL IMPACT
Health & Safety of the First Responders	BE PREPARED & PROPERLY PROTECTED
Continuity of Operations (including Delivery of Services)	INTEROPER ABILITY OF RADIO SYSTEMS TO COMMAND & CENTER
Property, Facilities, & Infrastructure	
Environment	
Economic Conditions	
Public Confidence in Government	

#4 Public

Tornado Hazard Impact (Tornado)	
Please provide community perspective impacts from tornado hazard events to Worcester County.	
Health & Safety of the Public	VERBAL NOTICE TO POSSIBLE PATH TO CLEAR OUT THE PATH
Health & Safety of the First Responders	SHELTER IN PLACE
Continuity of Operations (including Delivery of Services)	INTEROPERABILITY OF COMMUNICATIONS TO COMMAND CENTER
Property, Facilities, & Infrastructure	ACTION PLAN TO RESPOND TOO.
Environment	DOCUMENT
Economic Conditions	TO BE DETERMINED
Public Confidence in Government	CRITIQUE THE MUNICIPAL TEAMS

EXIT
GROUP DISCUSSION
RESULTS


NEW MITIGATION Ideas:
• ENCOURAGE MORE PUBLIC DRAINAGE DITCH ASSOCIATIONS TO Improve/Maintain Drainage on private land
• ENCOURAGE PUBLIC TO MAINTAIN ROAD DITCHES & STORM DRAINS
NEW MITIGATION IDEA:
· CERT - OCEAN PINES (ALL-HAZARDS)
· MASS POWER OUTAGE - CRITICAL FACILITIES
- SHELTERS
-
· EMERGENCY EXITS Rt 90 - OCEAN PINES
-> (Ocean Parkway)
- EMERGENCY VEHICLES

LOCAL EMERGENCY PLANNING COMMITTEE

Developed under the Federal Emergency Planning and Community Right-to-Know Act and the Clean Air Act the Worcester County Local Emergency Planning Committee (LEPC) meets on a quarterly basis. The meetings are held at the Worcester County Government Office Building, 1 W. Market St. in Snow Hill on the fourth Thursday in January, April, July and October.

MISSION STATEMENT AND BY-LAWS

Active members of the Worcester County LEPC include:

- American Red Cross
- Atlantic General Hospital
- Delmarva Power
- Maryland House of Delegates
- Maryland Department of Agriculture
- Sharp Energy
- Town of Pocomoke
- Tyson Foods
- Worcester County Board of Education
- Worcester County Development, Review, and Permitting
- Worcester County Emergency Services
- Worcester County Environmental Programs
- Worcester County Fire Chief's Committee
- Worcester County Fire Marshal's Office
- Worcester County Health Department
- Worcester County Jail
- Worcester County Public Works
- Worcester County Sheriff's Office
- Worcester County Special Hazards Response Team

The meetings not only discuss planning and response to hazardous materials incidents but usually feature a guest speaker from a field relevant to hazardous materials.

All LEPC meetings are open to the public. For more information you may contact the LEPC's Chairman James Hamilton or Information Coordinator Fred Webster at 410-632-1311.

Source: http://www.co.worcester.md.us/departments/emergency/lepc

Worcester County
Department of Emergency Services
1 West Market Street, Room 1002
Snow Hill, MD 21863
410-632-1311
410-632-2141 fax

WORCESTER COUNTY
LOCAL EMERGENCY PLANNING COMMITTEE
AGENDA
25 July 2019

0900	Welcome	James Hamilton
0905	Introductions	
0910	Old Business	James Hamilton
0925	Committee Reports	
	Plan Development	Tina Vickers
	Public Education	Charlene Sharpe
	Hazmat Team	Jeff McMahon
	Medical Coordination	David Collins/Bill Bounds
	Mutual Aid/Fire Service	Tim Jerscheid
	Bylaws	Doug Dods
	Recruitment & Retention	
	CERT	Tina Vickers
0935	New Business	
	Facility Reports	
	Spill Reports	
	Nomination of new members	
0940	Presentation- Hazard Mitigation Plan	Smith Planning & Design
	Round Table Discussion	
1000	Good of the Committee	
1005	Adjournment	

NOTICE-Entry to the Worcester County Government Center must be made by civilian members through the Washington Street entrance for security purposes. Be prepared to pass through a metal detector upon entry.

PRESS RELEASE

Worcester County Government ♦ Phone (410) 632-1194 ♦ Fax (410) 632-3131

TO:	Local Media
FROM:	Worcester County Commissioners
DATE:	August 26, 2019
FOR RELEASE:	Immediately
TOPIC:	Public Invited to Attend Worcester County Hazard Mitigation Plan Update Meeting September 16
CONTACT:	Kim Moses, public information officer, at (410) 632-1194; and Tina Vickers, WCES planner, at (410) 632-1315

Public Invited to Comment on Worcester County Emergency Services Hazard Mitigation Plan Update

Worcester County Emergency Services (WCES) officials are updating the county's Hazard Mitigation Plan and invite citizens to a September 16, 2019 meeting to voice their concerns about natural and manmade emergencies that have the potential to impact the Lower Eastern Shore. The meeting is free, open to all residents, and will take place at the Pocomoke City Department of Emergency Medical Services, which is located at 137 8th Street in Pocomoke City, from 10 a.m. to noon.

"Public input helps us to better identify hazards and to take steps to reduce their impact, which makes Worcester County a more resilient community," WCES Planner Tina Vickers said.

Residents are also encouraged to share their insights about potential local hazards by completing a 12-question survey online at http://www.co.worcester.md.us/departments/emergency. The survey should take no longer than seven minutes, and results will be included in the updated plan. After completing the survey, residents may provide contact information to receive additional information regarding the Hazard Mitigation Plan.

The purpose of the plan is to ensure the county is prepared to face diverse natural and manmade hazards, and WCES is placing special emphasis on understanding citizens' concerns regarding hazards.

WCES officials extend their thanks to the stakeholders who attended the Hazard Mitigation Plan update meeting in July and identified power outages as a major impact of storm events and emphasized the importance of maintaining power at such times. Local business owners in particular can be adversely impacted by power disruptions, which can lead to potential closures. Being prepared for a power outage not only helps area businesses remain open, but also helps the people who depend on those local businesses.

The Federal Emergency Management Agency (FEMA) offers a Ready Business Toolkit to help business owners and their staff prepare for and respond to a variety of hazards that can impact Worcester County. The FEMA toolkit is available at https://www.ready.gov/business.

For more information about the Hazardous Mitigation Plan development process and how you can participate, call WCES Emergency Management Planner Tina Vickers at 410-632-1315.

PRESS RELEASE

Worcester County Government ♦ Phone (410) 632-1194 ♦ Fax (410) 632-3131

TO: Local Media

FROM: Worcester County Commissioners

DATE: November 13, 2019

FOR RELEASE: Immediately

TOPIC: Worcester County Emergency Services Seeking Public Input to Update Hazard Mitigation and Resilience Plan

CONTACT: Kim Moses, public information officer, at (410) 632-1194; and Tina Vickers, WCES planner, at (410) 632-1315

In May 2019, Worcester County and its planning partners embarked on a planning process to prepare for natural and manmade emergencies that have the potential to impact the Lower Eastern Shore. Public involvement was sought throughout the planning process. Residents were encouraged to share their insights about potential local hazards by completing a 12-question survey. In addition, planning meeting were open to the public and advertised. WCES officials extend their thanks to the stakeholders participated in the process.

Responding to federal mandates in the Disaster Mitigation Act of 2000 (Public Law-106-390), Worcester County Department of Emergency Services led the planning process which resulted in a draft plan for public review and comment. The plan is available at the county website: http://www.co.worcester.md.us/departments/emergency.

The public strongly encouraged to provide input on the draft plan to WCES Emergency Management Planner Tina Vickers at tvickers@co.worcester.md.us or call 410-632-1315.

Public Survey & Results

Worcester County Hazard Mitigation Plan Update

Public Survey

The Worcester County Hazard Mitigation Plan is a project that aims to ensure the County is prepared for all kinds of hazards. The Department of Emergency Services is placing special emphasis on understanding citizens' concerns regarding hazards. Community members input to the process is incredibly valuable. This survey is being used to collect your insight and perspective.

The survey consists of 12 questions and will take an average of 7 minutes or less to complete.

We thank you sincerely for your time.

This will not be your only opportunity to provide input. You may provide your contact information at the end of the survey for additional information regarding the plan.

OK

Public Survey: The Worcester County Hazard Mitigation Plan is a project that aims to ensure the County is prepared for all kinds of hazards. The Department of Emergency Services is placing special emphasis on understanding citizens' concerns regarding hazards. Community members input to the process is incredibly valuable. This survey is being used to collect your insight and perspective.

Demographics

Are you a resident Worcester County? Worcester County has an unincorporated area and 4 municipalities. Please select the area where you currently live.

- 88% were Worcester County Residents
    - 52% Unincorporated area of the county
    - 20% Town of Snow Hill
    - 16% Town of berlin
    - 8% city of Pocomoke
    - 4% Ocean city

In what age group do you belong?

- 60% – 45-60 age range
- 28% – 65 & Older
- 12% – 25-44 age range

Do you work in Worcester County?

- 79% – Yes
- 18% – No
- 4% – Unemployed

Identified Hazards in 2020 Plan – Level of Concern

Please indicate your level of concern for each hazard.

- Worcester County citizens are concerned about the following identified hazards:
    - High wind & thunderstorms – 55% Concerned
    - Riverine Flooding – 52% Concerned
    - Coastal flood & Storms – 48% Concerned
    - Drought – 48% Concerned
    - Shoreline erosion & sea level rise – 37% Concerned
    - Winter storms – 37% Concerned
    - Tornado – 37% Concerned
    - Hazardous materials incidents – 33% Concerned
    - Wildfires – 29% Concerned

Have you been personally affected by one or more of these hazards?

- High wind & thunderstorms – 83%
- Riverine Flooding – 25%
- Coastal flood & Storms – 50%
- Drought – 17%
- Shoreline erosion & sea level rise – 13%
- Winter storms – 67%
- Tornado – 8%
- Hazardous materials incidents – 8%
- Wildfires – 0%

Other hazards

Are you concerned about any of the events, emergencies, or crises?

Order of priority

1. Opioid crisis
2. Cyber attack
3. Active shooter
4. Terrorism

Hazard event that affect your area of the county or town:

Top five:

1. High wind & thunderstorm
2. Opioid crisis
3. Coastal flooding & storms
4. Winter storms
5. Active Shooter

Vulnerable population

Please indicate the group(s) that could be impacted based hazards that affect your area:

Top three:

- Age group
- Disabled or mobility impaired/medically dependent
- Homeless

Hazard event that may affect identified groups:

Top Five:

- Winter storms
- High wind & thunderstorms
- Coastal flooding & storms
- Shoreline erosion & sea level rise
- Tornado

Appendix F

NFIP Compliance & FEMA Repetitive Loss Properties

APPENDIX F: NFIP COMPLIANCE & FEMA REPETITIVE LOSS PROPERTIES

Worcester County NFIP Compliance

Participation in the NFIP is based on a voluntary agreement between the County and its community and FEMA; however, complying with the NFIP extends beyond participation. Three components are utilized for complying with the NFIP and include: 1) floodplain identification and mapping risk, 2) responsible floodplain management and 3) flood insurance.

As requested by the Federal Emergency Management Agency (FEMA), additional information regarding Worcester County's strategy for complying with the National Flood Insurance Program (NFIP) has been provided by Worcester County Development Review and Permitting.

1. FLOODPLAIN IDENTIFICATION AND MAPPING			
Requirement	**Recommended Action**	**Yes/No**	**Comments**
a. Does the jurisdiction maintain accessible copies of an effective Flood Insurance Rate Map (FIRM)/Digital Flood Insurance Rate Map (DFIRM)? Does the jurisdiction maintain accessible copies of the most recent Flood Insurance Study (FIS)?	Place these documents in the local libraries or make available publicly.	Yes	A link to the DFIRMs is provided on the County Department website and computers are provided free of charge in all County Libraries. Digital maps can also be viewed in the permit office, GIS maps are provided by request and paper maps may be reviewed in the permit office.
b. Has the jurisdiction adopted the most current DFIRM/FIRM and FIS?	State the date of adoption, if approved.	Yes	July 16, 2015
c. Does the jurisdiction support request for map updates?	If yes, state how.	Yes	Review and provide community comment/signature to LOMA requests.
d. Does the jurisdiction share with Federal Emergency Management Agency (FEMA) any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data?	If yes, specify how.	YES	The County shares data and observations with the State but does not have capability to perform studies or develop data sets.
e. Does the jurisdiction provide assistance with local floodplain determinations?	If yes, specify how.	Yes	Provide determinations to owners, insurance agents and banks as requested.
f. Does the jurisdiction maintain a record of approved Letters of Map Change?	If yes, specify the responsible office.	Yes	Development Review and Permitting

2. FLOODPLAIN MANAGEMENT			
Requirement	**Recommended Action**	**Yes/No**	**Comments**
a. Has the jurisdiction adopted a compliant floodplain management ordinance that, at a minimum, regulates the following:	If yes, answer questions (1) through (4) below.	Yes	
(1) Does the jurisdiction issue permits for all proposed development in the Special Flood Hazard Areas (SFHAs)?	If yes, specify the office responsible.	Yes	Development Review and Permitting
(2) Does the jurisdiction obtain, review, and utilize any Base Flood Elevation (BFE) and floodway data, and/or require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres?	If yes, specify the office responsible.	Yes	Development Review and Permitting
(3) Does the jurisdiction identify measures to keep all new and substantially improved construction reasonably safe from flooding to or above the BFE, including anchoring, using flood-resistant materials, and designing or locating utilities and service facilities to prevent water damage?	If yes, specify the office responsible.	Yes	Development Review and Permitting
(4) Does the jurisdiction document and maintain records of elevation data that document lowest floor elevation for new or substantially improved structures?	If yes, specify the office responsible.	Yes	Development Review and Permitting
b. If a compliant floodplain ordinance was adopted, does the jurisdiction enforce the ordinance by monitoring compliance and taking remedial action to correct violations?	If yes, specify how.	Yes	Permitting, Inspections and Nuisance Complaints

2. FLOODPLAIN MANAGEMENT			
Requirement	**Recommended Action**	**Yes/No**	**Comments**
c. Has the jurisdiction considered adopting activities that extend beyond the minimum requirements? Examples include: • Participation in the Community Rating System • Prohibition of production or storage of chemicals in SFHA • Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in SFHA • Prohibition of certain types of residential housing (manufactured homes) in SFHA • Floodplain ordinances that prohibit any new residential or nonresidential structures in SFHA	If yes, specify activities.	Yes	- Adopted the Coastal A Flood Zone. - Prohibit Manufactured homes in floodways and V flood zones - Critical Facilities are not permitted in coastal high hazard V, coastal A zones or floodways.

3. FLOOD INSURANCE			
Requirement	**Recommended Action**	**Yes/No**	**Comments**
a. Does the jurisdiction educate community members about the availability and value of flood insurance?	If yes, specify how.	Yes	Answer community questions.
b. Does the jurisdiction inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?	If yes, specify how.	Yes	Public outreach meetings and notifications during map adoption process
c. Does the jurisdiction provide general assistance to community members regarding insurance issues?	If yes, specify how.	No	

FEMA Designated Repetitive Loss & Severe Repetitive Loss Properties

FEMA defines a repetitive loss property as:

- Any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP; or10

- A property that has incurred flood damage on two occasions, in which the cost to repair, on average, equaled or exceeded 25 percent of the market value of the structure.

FEMA defines a severe repetitive loss property as:

- A single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

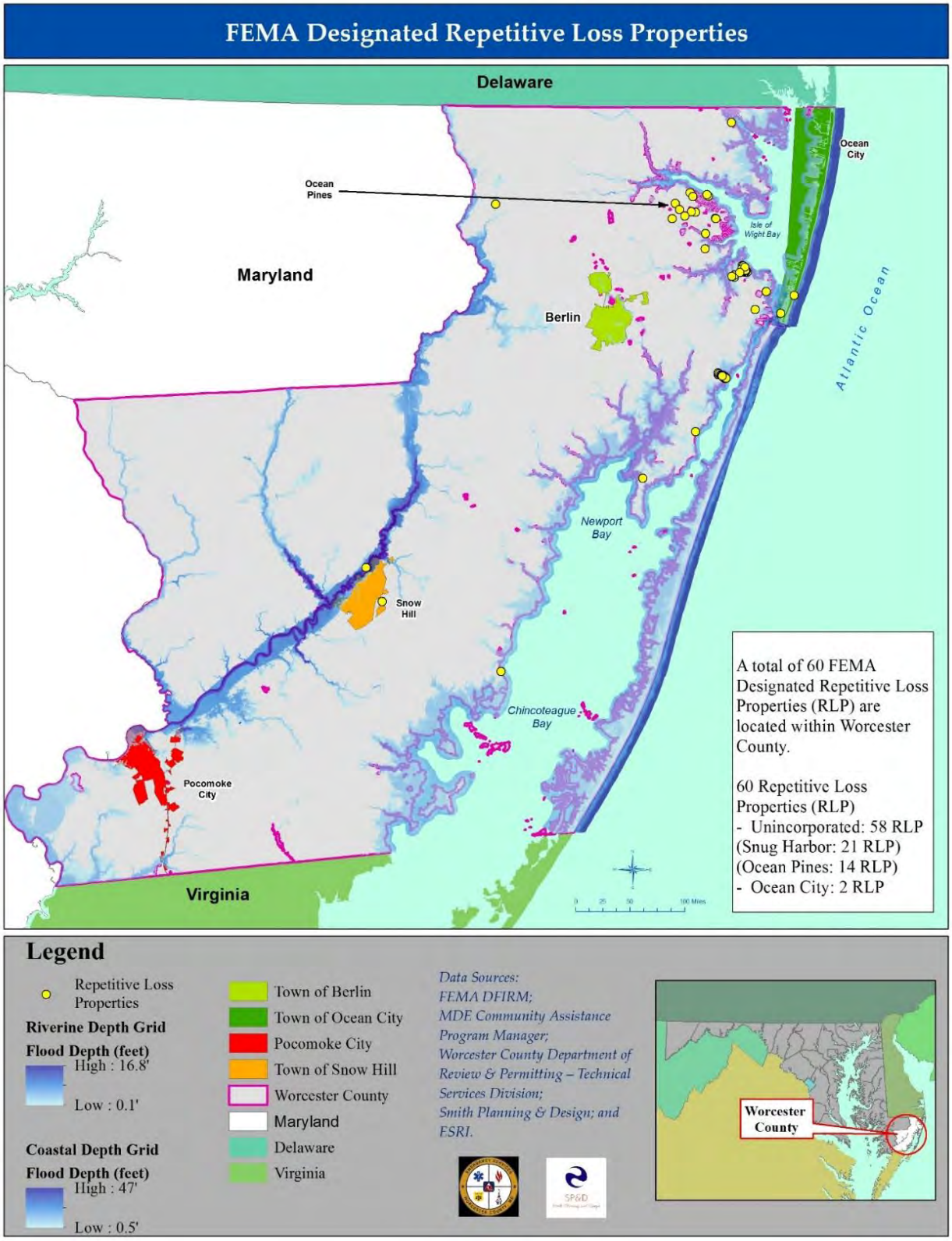
Evidence of actual flood losses can be one of the most compelling factors for increasing a community's flood risk awareness. One indicator is claims through the NFIP. As part of the update process, the repetitive loss listing for Worcester County was obtained. The Maryland State NFIP Coordinating Office provided data on October 31, 2018. A total of sixty (60) FEMA Designated Repetitive Loss Properties (RLP) were within Worcester County. Of the overall total, 58 FEMA Designated RLPs have been identified in the unincorporated portions of Worcester County. Two areas containing a high concentration of RPLs were Snug Harbor and Ocean Pines. Snug Harbor contains 19 RLP and 2 Severe Repetitive Loss Properties with a total of 1,217,183.60 in loss, while Ocean Pines has 14 RLPs with a total of 254,660.85 in loss. Both Ocean Pines and Snug Harbor are at high risk for coastal and storm surge flooding; *Chapter 4: Flooding Related Hazards*.

The table below provides information on each FEMA Designated Repetitive Loss Properties, including the number of losses and the total cost of the loss at each property.

Repetitive Loss Properties (RLP)					
FEMA RL Address	**City**	**Mitigated**	**Insured**	**# of Losses**	**Loss ($)**
Walthan Rd	W Ocean City	No	Yes	2	15,678.80
Brighton Rd	W Ocean City	No	Yes	2	6,802.84
Exeter Rd	W Ocean City	No	Yes	3	5,807.03
Norwich Rd	W Ocean City	No	Yes	4	16,560.23
Norwich Rd	W Ocean City	No	Yes	4	101,690.66
New Quay Rd	W Ocean City	No	Yes	3	29,364.14
Norwich Rd	W Ocean City	No	Yes	2	10,750.81
Atlantic Ave	Ocean City	No	Yes	-	149,704.75
Sheppards Crossing Rd	Whaleysville	No	No	2	102,765.20
Porfin Dr	Berlin	No	Yes	3	63,900.35
Cygnet Ln	Bishopville	No	Yes	3	16,327.97
Snug Harbor Rd	Berlin	No	No	2	20,844.23
Meadow Dr	Berlin	No	No	2	34,378.65
Snug Harbor Rd	Berlin	No	No	2	17,202.88
Ocean Pkwy	Ocean Pines	No	No	2	6,743.97
Snug Harbor Rd	Berlin	No	Yes	2	69,279.95
Snug Harbor Rd	Berlin	No	No	2	44,263.11
Snug Harbor Rd	Berlin	No	Yes	2	152,083.47
Snug Harbor Rd	Berlin	No	Yes	2	57,776.56
Salisbury Rd	W Ocean City	No	No	3	14,801.95
Snug Harbor Rd	Berlin	No	Yes	3	92,027.58
Snug Harbor Rd	Berlin	No	No	2	104,067.66
Snug Harbor Rd	Berlin	No	Yes	2	85,227.24
Snug Harbor Rd	Berlin	No	Yes	2	87,358.22
Snug Harbor Rd	Berlin	No	No	2	89,431.55
Snug Harbor Rd	Berlin	No	No	2	41,057.30
Meadow Dr	Berlin	No	Yes	3	33,007.80
Meadow Dr	Berlin	No	No	2	57,052.82
Meadow Dr	Berlin	No	Yes	2	10,998.20
Snug Harbor Rd	Berlin	No	No	2	20,839.22
Snug Harbor Rd	Berlin	No	Yes	3	35,559.30
Salisbury Rd	W Ocean City	No	Yes	2	2,177.80
W Torquay Rd	W Ocean City	No	Yes	2	19,456.20
Meadow Dr	Berlin	No	Sdf	5	72,568.12
Snug Harbor Rd	Berlin	No	No	2	38,544.86
Snug Harbor Rd	Berlin	No	No	2	53,614.88
Selsey Rd	W Ocean City	No	Yes	3	24,789.10
Rumgate Rd	W Ocean City	No	Yes	3	7,117.65
Selsey Rd	W Ocean City	No	Yes	3	12,637.22
Quay Ln	W Ocean City	No	Yes	2	8,565.39
Riggin Ridge Rd	W Ocean City	No	No	2	2,852.00
Capetown Rd	Ocean Pines	No	No	2	10,430.66
Dockside Ct	Ocean Pines	No	No	2	38,044.98

Windjammer Rd	Ocean Pines	No	No	2	18,066.33
Drake Dr	Ocean Pines	No	Yes	3	15,167.97
Moby Dick Dr	Ocean Pines	No	Yes	3	70,077.41
Dorchester St	Ocean City	No	Yes	-	480,007.77
Figgs Landing Rd	Snow Hill	No	Yes	2	8,350.69
Watertown Rd	Ocean Pines	No	Yes	2	14,596.27
Carriage Ln	Ocean Pines	No	Yes	2	4,576.33
Snow Hill Rd	Snow Hill	No	No	2	14,154.12
Ocean Pkwy	Ocean Pines	No	Yes	2	7,842.21
Ocean Pkwy	Ocean Pines	No	Yes	3	12,524.64
Snow Hill Rd	Snow Hill	No	Yes	3	45,968.67
Moonraker Rd	Ocean Pines	No	No	4	21,141.19
Lookout Pt	Ocean Pines	No	Yes	2	15,766.02
Falconbridge Rd	Ocean Pines	No	No	3	11,800.12
Heritage Rd	Berlin	No	No	2	46,095.05
Lookout Pt	Ocean Pines	No	No	2	7,882.75

As detailed in the table, none of the FEMA Designated RLPs have been mitigated to date and not all properties are insured. The map below depicts the general location of the FEMA Designated RLPs in Worcester County.


FEMA Designated Repetitive Loss Properties
Delaware
Ocean City
Ocean Pines
Isle of Wight Bay
Maryland
Berlin
Atlantic Ocean
Newport Bay
Snow Hill
Chincoteague Bay
Pocomoke City
Virginia
A total of 60 FEMA Designated Repetitive Loss Properties (RLP) are located within Worcester County.
60 Repetitive Loss Properties (RLP)
- Unincorporated: 58 RLP
(Snug Harbor: 21 RLP)
(Ocean Pines: 14 RLP)
- Ocean City: 2 RLP
Legend
Repetitive Loss Properties
Riverine Depth Grid
Flood Depth (feet)
High : 16.8'
Low : 0.1'
Coastal Depth Grid
Flood Depth (feet)
High : 47'
Low : 0.5'
Town of Berlin
Town of Ocean City
Pocomoke City
Town of Snow Hill
Worcester County
Maryland
Delaware
Virginia
Data Sources:
FEMA DFIRM;
MDE Community Assistance Program Manager;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and ESRI.
Worcester County

Appendix G

Sources

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Appendix H

Safe Growth Audit

APPENDIX H: SAFE GROWTH AUDIT

Introduction

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.

Safe Growth Audit

During the preparation of the *2020 Worcester County Hazard Mitigation & Resilience Plan*, a Safe Growth Audit was conducted. Performing a Safe Growth Audit is a way to assess how well the existing planning tools address hazard risks and community resiliency. Safe Growth Audit questions provide a systematic way to review local planning tools and identify the presence of, or need for, hazard-related actions.

The goal of SAFE GROWTH is to build environments that are safe for current and future generations and to protect building, transportation, utilities, and the natural environment from damage.

Local documents reviewed during the Safe Growth Audit include:

- 2006 Worcester County Comprehensive Plan;
- 2010 Town of Berlin Comprehensive Plan;
- 2014 Town of Pocomoke Comprehensive Plan;
- 2010 Town of Snow Hill Comprehensive Plan;
- Worcester County Zoning Ordinance;
- Worcester County Subdivision of Land;
- 2011 Worcester County Hazard Mitigation Plan;
- 2016 Lower Eastern Shore Maryland Coordinated Public – Transit Human Services Transportation Plan; and
- Worcester County Five-Year Capital Improvement Plan - FY 2018 To FY 2022.

- There are four (4) municipalities within Worcester County. All municipalities exercise planning and zoning authority.

Note: Ocean City has completed a Safe Growth Audit during the development of the *2016 Town of Ocean City Hazard Mitigation Plan.*

MUNICIPALITIES	CURRENT PLAN/ ADOPTION DATE
Berlin	CMP-2010
Pocomoke City	CMP-2014
Snow Hill	CMP-2010
Ocean City	CMP-2017 MGE-2009 WRE-2009

Safe Growth Audit

PLAN	*LOCATION*
COMPREHENSIVE PLAN	
LAND USE	
Does the future land-use map clearly identify natural hazard areas?	***Worcester County*** No, the *2006 Worcester County Comprehensive Plan* does not clearly identify natural hazard areas on the Land Use Plan map. The Land Use Plan map (Figure 2-3) only details Agriculture, Green Infrastructure, Village, Existing Developed Areas, Growth Area, Institutional, Commercial Center, Industry, and Municipality. The Pocomoke River and Coastal Bays watershed areas have been provided with special land use and natural resource protection through state critical area legislation. Prescribed buffers, habitat protections and special review procedures are mandated. These areas are mapped on separate specific program maps found within the County Comprehensive Plan: • Figure 3-1 shows the extent of the critical area programs within the county. • Figure 3-2 maps the county's waterways and wetlands. • Figure 3-3 maps the county's forest cover. • Figure 3-4 maps the county's sensitive species review areas, which are generalized locations of special habitats. • Figure 3-5 maps the county's floodplains. • Figure 3-6 depicts the county's prime agricultural soils. • Figure 3-7 shows the county's preserved farm and rural legacy areas. • Figure 3-8 maps the state's local green infrastructure.
	Berlin There is no identified Critical Area within the Town of Berlin.

	Pocomoke City Pocomoke City was granted an exclusion from the Critical Area regulation. However, Critical Area regulations are still applicable for lands annexed after 1997 (see Map 14 in the Plan).
	Snow Hill No. Sensitive Areas are shown separately on *Map 8: Sensitive Areas* within the plan.
Do the land-use policies discourage development or redevelopment within hazard areas?	***Worcester County*** Yes. In *Chapter 1: Introduction*, it states that the Atlantic Coastal Bays Critical Area Program's land use policies have also limited supply of waterfront land. This has shifted growth pressure inland. Pg. 1. Additional land use policies are discussed in *Chapter 2: Land Use.* Pg. 10.
	Berlin Yes. *Chapter 5: Land Use Element* – Goals, Objectives, & Policies Pg.26 *Chapter 12: Plan Integration* - Sensitive Areas Policies and Recommendations Pg. 76.
	Pocomoke City Yes. *Section 5: Natural Resources*, Pg. 65. Pocomoke City was granted an exclusion from the Critical Area regulation. However, Critical Area regulations are still applicable for lands annexed after 1997 (see Map 14).
	Snow Hill Yes. *Chapter 12: Plan Implementation* – Land Use Policies & Recommendations. Pg. 127. *Chapter 10: Sensitive Areas* – Pg. 107.
Does the Plan provide adequate space for expected future growth in areas located outside natural hazard areas?	***Worcester*** Yes. *Figure 2-3 Land Use Plan* – Growth Areas are identified. There is not a separate Future Land Use Map.
	Berlin Yes. *Map 4: Future Land Use* – Growth Areas are identified.
	Pocomoke City Yes. *Map 2: Vacant and Underutilized Land* See Vacant and Underutilized Land Section, Pg. 24
	Snow Hill Yes. *Map 3: Development Capacity* & *Map 4: Future Land Use*
TRANSPORTATION	
Does the transportation plan limit access to hazard areas?	***Worcester County*** No.
	Berlin No.
	Pocomoke City No.
	Snow Hill No.
Is the transportation policy used to guide growth to safe locations?	***Worcester County*** According to the *2016 Lower Eastern Shore Maryland Coordinated Public-Transit Human Services Transportation Plan*, while the *2006 Worcester County Comprehensive Plan* did not offer a specific category of public transportation

	related policies, projects, or recommendations, there were several references to public transportation within the general recommendations for roadways, including: • A recommendation for a regional transportation study for the northern half of the County to provide recommendations for improving traffic capacity, safety, mass transit, and nonvehicle transit • A recommendation to develop a second park and ride lot along U.S. 50 • A recommendation for increased bike and pedestrian mobility • A mention of providing mass transit stops and sidewalks in urban areas, as related to reducing the environmental impacts of roads • A call for the development of a bike/trail system and increased use of mass transit to reduce dependency on automobiles.
	Berlin Yes. *Chapter 8: Transportation* – Pg. 52.
	Pocomoke City Yes. *Section7: Transportation & Circulation* - Pg. 96.
	Snow Hill Yes. Chapter 8: Transportation – Pg. 83
Are movement systems designed to function under disaster conditions (e.g., evacuation)?	***Worcester County*** Yes. The Worcester County website under Emergency Services: Evacuation Zones Map.
	Berlin Yes. *Chapter 8: Transportation* – Pg. 52.
	Pocomoke City Yes. *Section7: Transportation & Circulation* - Pg. 96.
	Snow Hill Yes. Chapter 8: Transportation – Pg. 83
ENVIRONMENTAL MANAGEMENT	
Are environmental systems that protect development from hazard identified and mapped?	***Worcester County*** Yes. These areas are mapped on separate specific program maps found within the County Comprehensive Plan: • Figure 3-1 shows the extent of the critical area programs within the county. • Figure 3-2 maps the county's waterways and wetlands. • Figure 3-3 maps the county's forest cover. • Figure 3-4 maps the county's sensitive species review areas, which are generalized locations of special habitats. • Figure 3-5 maps the county's floodplains. • Figure 3-6 depicts the county's prime agricultural soils. • Figure 3-7 shows the county's preserved farm and rural legacy areas. • Figure 3-8 maps the state's local green infrastructure.
	Berlin Yes. These areas are mapped on separate maps found within the Berlin Comprehensive Plan: • *Map 7: Floodplains* • *Map 8: Sensitive Areas*

	• *Map 9: Wetlands* • *Map 10: Watersheds*
	Pocomoke City Yes. These areas are mapped on separate maps found within the Pocomoke Comprehensive Plan: • *Map 9: Rural Buffer and Transition Area* • *Map 10: 100-Year Floodplain* • *Map 11: Wetlands* • *Map 12: Sensitive Species Habitat* • *Map 13: Potential Impact Area - Sea Level Rise/ Storm Surge* • *Map 14: Critical Areas*
	Snow Hill Yes. These areas are mapped on separate maps found within the Snow Hill Comprehensive Plan: • *Map 7 Floodplains* • *Map 8 Sensitive Areas* • *Map 9 Wetlands – Department of Natural Resources* • *Map 10 Watersheds* • *Map 11 Hydric Soils*
Do environmental policies maintain and restore protective ecosystems?	***Worcester County*** Yes. *Chapter 3: Natural Resources* – Pg. 31. Environmentally Sensitive Design and Green Building Objectives 1. Ensure that new development: A. Uses a systems approach to environmental planning. Planning and regulatory emphasis must be on larger ecological units: the watershed or the ecosystem, rather than an individual site. This will help preserve ecological functions. This is consistent with the development of 52 Total Maximum Daily Loads (TMDLs) as well as the Atlantic Coastal Bays Critical Area Program. In addition, Worcester County has prepared, or is in the process of preparing, small watershed plans for the remaining portions of the Coastal Bays watershed. These watershed plans will identify specific actions to protect the ecological features and address TMDLs and the critical area program.
	Berlin Yes. *Chapter 10: Sensitive Areas Element* – Pg. 63.
	Pocomoke City Yes. *Section 5: Natural Resources* – Pg. 65.
	Snow Hill Yes. *Chapter 10: Sensitive Areas* – Pg. 107
Do environmental policies provide incentives to development that is located outside of protective ecosystems?	***Worcester County*** Yes.
	Berlin Yes
	Pocomoke City Yes

	Snow Hill Yes
PUBLIC SAFETY	
Are the goals and policies of the comprehensive plan related to the FEMA Local Hazard Mitigation Plan?	***Worcester County*** *Chapter 3: Natural Resources* Not specifically, however, *The Maryland Coastal Bay Program*- Part of the National Estuary Program, the Maryland Coastal Bays Program cooperates with the towns of Ocean City and Berlin, National Park Service, Worcester County, U.S. Environmental Protection Agency, and the Maryland Departments of Natural Resources, Agriculture, Environment, and Planning, which have come together to produce the first ever comprehensive management plan for the coastal bays. Worcester County should continue to actively participate in the Program and implement the recommendations of the Program as they are developed over time.
	Berlin Yes. Not specifically, however, The Town of Berlin has worked with the Maryland Coastal Bays Program, Worcester County, the Lower Shore Land Trust.
	Pocomoke City Yes.
	Snow Hill Yes.
Is safety explicitly included in the plan's growth and development policies?	***Worcester County*** Yes.
	Berlin Yes. Specifically, to Emergency Services, *Chapter 6: Municipal Growth Element* – Pg. 42 and Chapter 12: Plan Implementation – Pg. 73. Public Safety • The Town should plan for an increase in officers and the necessary equipment and space; • To answer the demand from Town residents, the Police Department should determine the potential to provide increased foot and bike patrols; • The Town should work with the Volunteer Fire Company to ensure adequate resources are available and that the Company is aware of potential future growth in the Town.
	Pocomoke City Yes. Specifically, to Emergency Services and Transportation, *Section 3 - Community Facilities and Services* – Pg. 30 Goal: Provide adequate public facilities and services to ensure the health, safety, and welfare of residents. Objective #4: Ensure public safety by providing well trained and equipped police force. Support organization providing emergency services to ensure appropriate response times and levels of care. *Section 7—Transportation and Circulation* – Pg. 97 Goal: Ensure the safe and efficient movement of people and goods. Objective #4: Improve pedestrian safety by providing safe routes for pedestrians and nonmotorized transport.

	Snow Hill Yes. Specifically, to Emergency Services and Transportation, *Chapter 6: Municipal Growth Element* – Pg. 69 & *Chapter 12: Plan Implementation* – Pg. 127. Public Safety and Emergency Services • Budget funding for one additional officer in the next year and up to three new officers in the near future as development occurs within the Planned Development District; • Look for funding to help coordinate the Town's Police Department with the County's 911 Center; • Continue to monitor growth of the Town and the need for additional resources to maintain the Town's current level of police service *Chapter 8: Transportation* – Pg. 95 Improvements Plan Short Range (0 to 5 years) The Town should begin immediately on planning the phasing of sidewalk construction, the greenway linking network and developing a safety plan for the former railroad trail. The Town should then estimate the cost of improvements and begin seeking funding or program funding for the various phases as part of the Capital Improvements Plan.
Does the monitoring and implementation section of the plan cover safe growth objectives?	***Worcester County*** Yes. *Chapter 8: Implementation* – Pg. 91.
	Berlin Yes. *Chapter 12: Plan Implementation* – Pg. 72.
	Pocomoke City Yes. *Section 10: Plan Implementation* – Pg. 122.
	Snow Hill Yes. *Chapter 12: Plan Implementation* – Pg. 125
ZONING ORDINANCE	
Does the zoning ordinance conform to the comprehensive plan in terms of discouraging development or redevelopment within natural hazard areas?	***Worcester County*** Yes. Worcester County Code of Ordinances – Zoning Ordinance Subtitle ZS1: II: Primary District Regulations § ZS 1-215 RP Resource Protection District. (a) Purpose and intent - This district is intended to preserve the environmentally significant areas of the County and to protect its natural resources in all areas. The district includes those areas of the County which pose constraints for development or where development could have a substantially adverse environmental effect. This district serves to maintain the environmental functionality of the landscape by avoiding or minimizing disturbance of sensitive areas which generally include tidal and nontidal wetlands, state-owned natural areas, selected riparian corridors, conservation areas, and muck and alluvial soils. Development potential within this district is severely limited; however, some minor development may be carried out, provided it is done in a manner sufficiently sensitive to the existing natural environment and visual character of the site. Subtitle NR3: II Chesapeake Bay Critical Area

	[HISTORY: Adopted by the Board of County Commissioners of Worcester County 1-15-2002 as Subtitle II of Title 3 of Bill No. 01-21. Amendments noted where applicable.] § NR 3-201Purpose; intent; severability. (a) Intent. In 1984, the Maryland General Assembly passed the Chesapeake Bay Critical Area Act in response to growing concern over the decline of the quality and productivity of the waters of the Chesapeake Bay and its tributaries. The decline was found to have resulted, in part, from the cumulative effects of human activity that caused increased levels of pollutants, nutrients, and toxins, and also from declines in protective land uses such as forest land and agricultural land in the Bay region. Subtitle NR3: I Atlantic Coastal Bays Critical Area [HISTORY: Adopted by the Board of County Commissioners of Worcester County 11-19-2002 as Subtitle I of Title 3 of Bill No. 02-13.[1] Amendments noted where applicable.] § NR 3-101Intent; purpose; findings; severability. (a) Intent. In 2002 the Maryland General Assembly passed the Atlantic Coastal Bays Protection Act for the purpose of preserving, protecting, and improving the water quality and natural habitats of the Atlantic Coastal Bays and their tributaries. The Legislature has determined that the Atlantic Coastal Bays require especially sensitive consideration with regard to development. It is the intent of the County Commissioners to establish a local program to implement the requirements of the Act.
	Berlin Town of Berlin Code of Ordinances Chapter 108 – Zoning
	Pocomoke City City of Pocomoke Code of Ordinances Chapter 230 - Zoning
	Snow Hill Town of Snow Hill Code of Ordinances Chapter 200 - Zoning
Does the ordinance contain natural hazard overlay zones that set conditions for land use within such zones?	***Worcester*** Yes. Worcester County Code of Ordinances – Zoning Ordinance Subtitle ZS4: I Overlay Zones [HISTORY: Adopted by the Board of County Commissioners of Worcester County 11-3-2009 as Subtitle I of Title 4 of Bill No. 09-1. Amendments noted where applicable.] § ZS 4-101 Purpose; effect; procedure. (a) Purpose - It is the legislative intent of the County Commissioners to provide for overlay zones for specific properties for specific periods of time by which they may commit to maintain certain zoning classifications and text requirements of the Worcester County Zoning and Subdivision Control Article.
	Berlin Town of Berlin Code of Ordinances Chapter 108 - Zoning

	Pocomoke City City of Pocomoke Code of Ordinances Chapter 230 - Zoning
	Snow Hill Town of Snow Hill Code of Ordinances Chapter 200 - Zoning
Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density use?	***Worcester*** Worcester County Code of Ordinances – Zoning Ordinance Yes. Subtitle ZS1: III Supplementary Districts and District Regulations [HISTORY: Adopted by the Board of County Commissioners of Worcester County 11-3-2009 as Subtitle III of Title 1 of Bill No. 09-1. Amendments noted where applicable.] § ZS 1-304 HCA Historical; Cultural; Agricultural Floating Zone. (a) Purpose - The purpose of this section is to provide for attractions and facilities which are re-creations of historic, cultural or agricultural periods that would be of interest to residents and tourists by utilizing the natural rural setting, crafts, culture and history of Worcester County and to provide for the establishment of such uses that will attract tourism to the County without impacting negatively on the rural character of the agricultural areas of the County. (c) Permitted uses and structures. In the HCA Floating Zone, the following uses and structures are permitted: (1) Private and commercial historic, cultural or agricultural theme parks, recreation areas, villages or guest farms featuring attractions, exhibits, buildings, demonstration workshops and apprenticeship schools all being incidental to the operation of the park, area, village or farm, and crafts and craft making of local historical, cultural or agricultural interest, but not including mechanical or electronic amusement rides or devices and subject to the following: A. The density and intensity of land use within the HCA shall approximate those of the historical site or period sought to be re-created by the theme park, village, farm or recreational area.
	Berlin Town of Berlin Code of Ordinances Chapter 108 - Zoning
	Pocomoke City City of Pocomoke Code of Ordinances Chapter 230 - Zoning
	Snow Hill Town of Snow Hill Code of Ordinances Chapter 200 - Zoning
SUBDIVISION REGULATIONS	
Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?	Yes. Worcester County Code of Ordinances – Subdivision of Land Subtitle ZS2: IV Plat Procedures for Major Subdivisions [HISTORY: Adopted by the Board of County Commissioners of Worcester County 11-3-2009 as Subtitle IV of Title 2 of Bill No. 09-1. Amendments noted where applicable.] § ZS 2-403 Preliminary plat.

	(a) Purpose -The purpose of the preliminary plat is to provide for consideration of a subdivision's design, its conformance with the provisions hereof and its compatibility with the context of its surroundings and sensitive areas. The preliminary plat procedures allow for formal conditional approval and for the determination of what changes and decisions must be made prior to submission of the final plat. The preliminary plat and all information and procedures shall comply in all respects with the provisions of these regulations before approval may be given.
Do the regulations provide for conservation subdivision or cluster subdivisions in order to conserve environmental resources?	Worcester County Code of Ordinances – Subdivision of Land Subtitle ZS2: I General Provisions [HISTORY: Adopted by the Board of County Commissioners of Worcester County 11-3-2009 as Subtitle I of Title 2 of Bill No. 09-1. Amendments noted where applicable.] § ZS 2-104 Definitions. SUBDIVISION, MAJOR Any subdivision of land which creates six or more lots in total, regardless of size, out of what was a single parcel as of July 25, 1967. A series of separate subdivisions out of the same original parcel shall be considered a major subdivision when the cumulative effect of such separate subdivisions meet the criteria of a major subdivision. For the purposes of this Article a rural **cluster** subdivision as defined in § ZS 1-103 hereof shall not be considered a major subdivision. Any undeveloped lot transferred at any time to a bona fide conservation entity for the purpose of perpetual protection, as determined by the Department, shall not be counted as a lot when determining the number of subdivisions of a property. SUBDIVISION, MINOR Any subdivision which is not a major subdivision as herein defined and which creates up to but not more than five lots out of what was a single parcel of land as of July 25, 1967. For the purposes of this Article a rural **cluster** subdivision as defined in § ZS 1-103 hereof shall be considered a minor subdivision. Any undeveloped lot transferred at any time to a bona fide conservation entity for the purpose of perpetual protection, as determined by the Department, shall not be counted as a lot when determining the number of subdivisions of a property.
Do the regulations allow density transfer where hazard areas exist?	Worcester County Code of Ordinances – Subdivision of Land § ZS 2-501 Suitability of land for development. (a) Intent - In order to provide for the health, safety and welfare of the present and future population of the County, the Planning Commission shall only approve a proposed subdivision when such subdivision would not bring about the development of land which is unsuitable due to flooding, poorly drained soils, excessive erosive action by water, unstabilized slope or fill, or other conditions which may cause danger to life, health or property or aggravate erosion or flood hazards or when the lands involved would, in its opinion, become unsuitable through the development proposed. Additionally, the Planning Commission shall only approve a proposed subdivision where it finds that such subdivision would bring about the development of land which is not of such high environmental sensitivity that its development would have undue adverse impacts upon tidal or nontidal wetlands, the one-hundred-year floodplain, forest stands, existing significant trees, greenways, areas of critical or special habitat, water bodies on the state's impaired waters list or having an

	established total maximum daily load requirement, and source water and aquifer recharge protection areas. (i) Standards for lots. The following standards shall apply to the layout of lots: (7) All land being subdivided must either be included in lots meeting the minimum requirements for their intended use, reserved for future development or be set aside for other appropriate uses of benefit to the subdivision in its entirety, including but not limited to open space, recreational areas, conservation areas, utility facilities, etc. and shall be in accordance with the following: A. Where lots or parcels are to be transferred to an owners' association, such organizations shall be created concurrent with recordation of the record plat. B. Where transfer (other than the sale of subdivision lots to prospective buyers) is to be to another property owner or entity, satisfactory evidence of agreement to the transaction by all parties shall be submitted prior to record plat approval. C. Where transfer of land (other than road right-of-way or utilities facilities) consists of dedication to Worcester County, such dedication shall be subject to the separate, specific approval of the County Commissioners.
CAPITAL IMPROVEMENT PROGRAM AND INFRASTRUCTURE POLICIES	
Does the capital improvement program provide funding for hazard mitigation projects identified in the FEMA Mitigation Plan?	No. There is no current funding (FY 2018-FY 2022) for projects identified in the *2014 Worcester County Hazard Mitigation Plan.*
Does the capital improvement program limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?	No.

Recommendations

During the development of the new Worcester County Comprehensive Plan, a list of recommendations to be included in the Plan are as follow:

1. Review recent and proposed annexations for potential critical and/or sensitive areas.
2. Include a review of hazard areas, potential impacts, and mitigation opportunities in future transportation planning, including the County Comprehensive Plan. Consider limiting access to hazardous areas, especially in future and/or proposed transportation plans and projects.
3. Include hazard mitigation in the county comprehensive plan update and municipal growth elements. Identify ideas for plan integration within both the hazard mitigation plan and the comprehensive plan.

4. Include hazard mitigation projects within the County Capital Improvement Plan. Consider incentives for projects that include a hazard mitigation component.

Appendix I

Vulnerable Populations

APPENDIX I: VULNERABLE POPULATIONS

Social Vulnerability Index

According to *Planning for an Emergency: Strategies for Identifying and Engaging At-Risk Groups; A guidance document for Emergency Managers*, at-risk groups or socially vulnerable populations, require special attention in a disaster. During disasters, populations with higher levels of social vulnerability are more likely to be adversely affected. Social vulnerability is defined in terms of the characteristics of a person or group that affect "their capacity to anticipate, cope with, resist, and recover from the impact" of a discrete and identifiable disaster in nature or society. The following types of population are among the most commonly accepted: socioeconomic status, age, gender, English language proficiency, medical issues, and disability.

Results from the Public Opinion Survey indicated Worcester County residences are concerned about the vulnerable populations, therefore, a social vulnerability assessment was conducted. The Centers for Disease Control and Prevention's (CDC) Social Vulnerability Index was utilized for the assessment. The CDC's SVI utilizes U.S. Census data to determine the social vulnerability of every census tract. The following population types were analyzed to determine the location of socially vulnerable populations:

- Below Poverty
- Age 65 or Older
- Civilian with a Disability
- Speak English "Less than Well"
- No Vehicle

Methodology

Step 1: Obtain 2016 Social Vulnerability Index data: https://svi.cdc.gov/data-and-tools-download.html.

Step 2: Extrapolate population types to be utilized for the analyses:

- Below Poverty
    - 2016 Variables (Estimates & Margin of Error) & Description
        - E_POV - Persons below poverty estimate, 2012-2016 ACS
        - M_POV - Persons below poverty estimate MOE, 2012-2016 ACS
            - DEFINITION: Following the Office of Management and Budget's (OMB's) Directive 14, the Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If the total income for a family or unrelated individual fall below the relevant

poverty threshold, then the family (and every individual in it) or unrelated individual is considered in poverty.

- Age 65 or Older
  - 2016 Variables (Estimates & Margin of Error) & Description
    - E_AGE65 - Persons aged 65 and older estimate, 2012-2016 ACS
    - M_AGE65 - Persons aged 65 and older estimate MOE, 2012-2016 ACS
      - DEFINITION: Census Bureau programs define age as the length of time in completed years that a person has lived. For the most recent decennial census, age was the length of time in completed years that a person had lived as of Census Day--April 1, 2010. The Census Bureau's national surveys compute age as of the interview date.
- Civilian with a Disability
  - 2016 Variables (Estimates & Margin of Error) & Description
    - E_DISABL - Civilian noninstitutionalized population with a disability estimate, 2012-2016 ACS
    - M_DISABL - Civilian noninstitutionalized population with a disability estimate MOE, 2012-2016 ACS
      - DEFINITION: A long-lasting physical, mental, or emotional condition. This condition can make it difficult for a person to do activities such as walking, climbing stairs, dressing, bathing, learning, or remembering. This condition can also impede a person from being able to go outside the home alone or to work at a job or business.
- Speak English "Less than Well"
  - 2016 Variables (Estimates & Margin of Error) & Description
    - E_LIMENG - Persons (age 5+) who speak English "less than well" estimate, 2012-2016 ACS
    - M_LIMENG - Persons (age 5+) who speak English "less than well" estimate MOE, 2012-2016 ACS
      - DEFINITION: Term used in Census 2000 data products to identify a household in which all members 14 years old and over speak a non-English language and also speak English less than ''very well.'' In a linguistically isolated household, no one 14 years old or older speaks only English. All the members of a linguistically isolated household are tabulated as linguistically isolated, including members under 14 years old who may speak only English.
- No Vehicle

- 2016 Variables (Estimates & Margin of Error) & Description
  - E_NOVEH - Households with no vehicle available estimate, 2012-2016 ACS
  - M_NOVEH - Households with no vehicle available estimate MOE, 2012-2016 ACS
    - DEFINITION: These data show the number of passenger cars, vans, and pickup or panel trucks of one-ton capacity or less kept at home and available for the use of household members.

Step 3: Determine Total Probability

- Due to the uncertainty of data estimates, the classification method with the highest Total Probability was used for mapping. In order to determine the Total Probability, the ACS Toolkit (https://svi.cdc.gov/data-and-tools-download.html) was utilized.
  - Natural Breaks classification scheme was chosen for the Census tracts
  - Four (4) number of classes were specified for the tool determines class intervals for natural breaks
  - The tool calculated the probability that the true value of each features falls within its assigned class by calculating the area under the curve between the upper- and lower-class limits.
  - The tool sums the probabilities of all features to arrive at a Total Probability.
    - The following data was inputted into the model to determine Total Probability:
      - Feature layer
      - Number of classes
      - Estimated Value
      - Margin of Error Field
      - Margin of Error Confidence Level – 99%
    - Results produced where included within the attribute table of the data layer.
      - PROBX – the probability the estimate will be less than or equal to the lower-class limit
      - PROBY – the probability the estimate will be less than or equal to the upper-class limit
      - PROBAREA – the probability that the estimate falls within the upper- and lower-class limits for a specified classification scheme - the absolute value of PROBX-PROBY.
        - This attribute was used to develop mapping products for the five (5) variables (Below Poverty, Age 65 or Older, Civilian with a Disability, Speak English "Less than Well," and No Vehicle).

Source: ACS ToolKit and Classing Method Assistant Help - https://svi.cdc.gov/data-and-tools-download.html

Step 4: Determine Overall Social Vulnerability

- Census Tracts were assigned Identification Numbers
- Based on the natural breaks classification, Total Probability results scoring is as follows:
  - 1 – Very Low
  - 2 – Low
  - 3 – Medium
  - 4 – High
- The five (5) variables (Below Poverty, Age 65 or Older, Civilian with a Disability, Speak English "Less than Well," and No Vehicle) scoring was determined for each census tract.
- Census tracts scores were tallied and divide by total possible to determine the composite score.
- Results for the five (5) variables and Overall Social Vulnerability for each census tract are provided in the table below.

Social Vulnerability Index for Worcester County							
Census Tract	Identification Number	Poverty	65	Disability	Non-English	No Vehicle	Composite
9800	0	1	1	1	1	3	2
9500	1	4	4	2	1	2	3
9501	2	1	3	2	1	4	3
9503	3	4	1	3	3	3	3
9504	4	4	4	1	1	4	3
9506	5	4	2	4	4	2	4
9507	6	4	2	3	1	4	3
9508	7	2	4	1	1	3	3
9509	8	3	1	4	1	4	3
9510	9	2	3	3	4	1	3
9511	10	3	1	1	1	2	2
9512	11	4	4	4	1	2	3
9514	12	3	1	2	1	3	2
9515	13	1	4	4	3	1	3
9517	14	1	3	3	4	2	3
9513	15	1	4	1	2	2	2

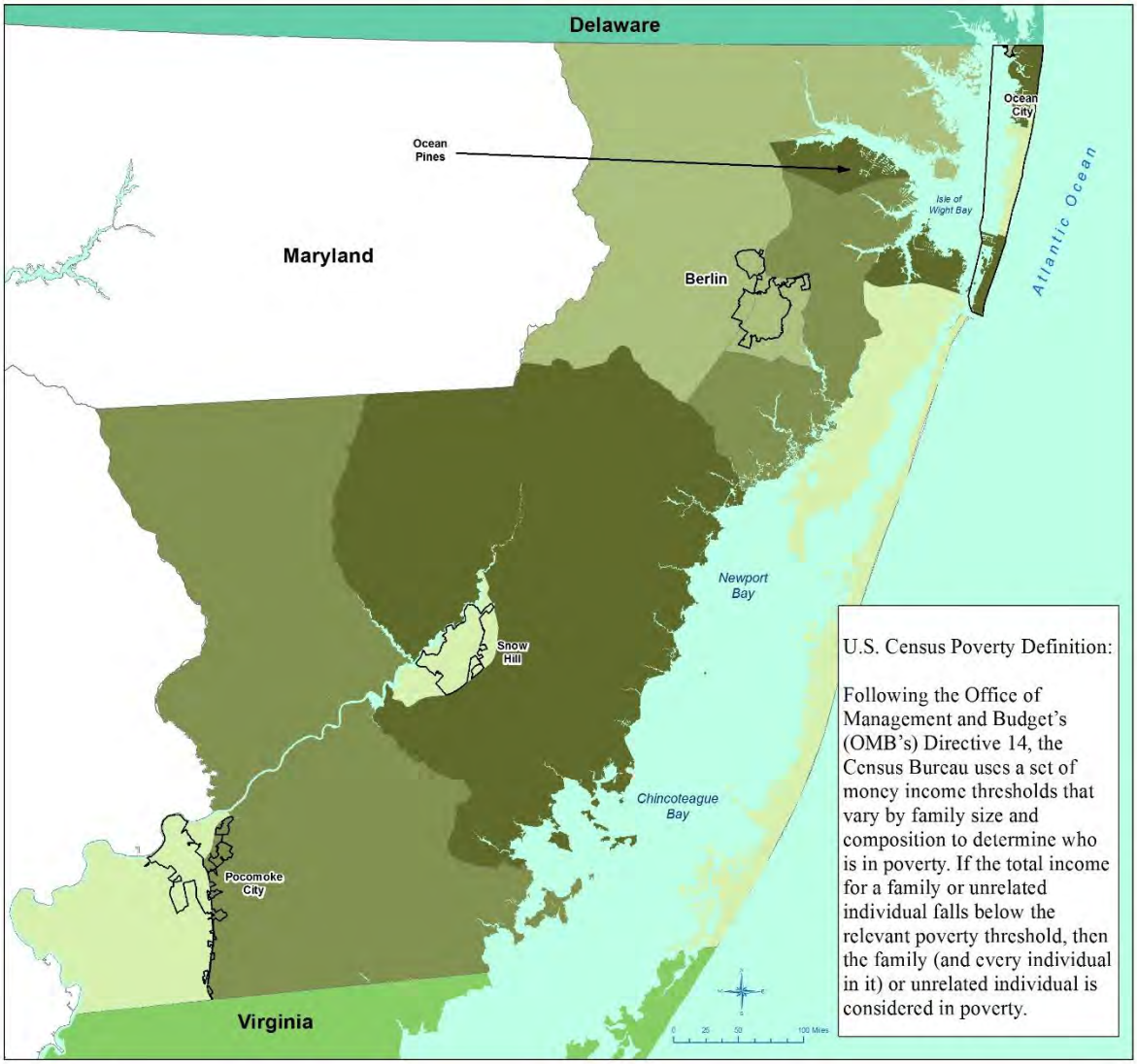
Scoring: 1-Verey Low, 2-Low, 3-Medium, 4-High

The following maps depict the location of vulnerability for each of the five (5) variables:

- Below Poverty
- Age 65 or Older
- Civilian with a Disability
- Speak English "Less than Well"
- No Vehicle

The final map, Overall Social Vulnerability, depicts the composite social vulnerability of communities, at a census tract level, for Worcester County. Overall Social Vulnerability combines all 5 variables (Below Poverty, Age 65 or Older, Civilian with a Disability, Speak English "Less than Well," and No Vehicle) to provide a comprehensive assessment.

Socioeconomic Status: Population Under Poverty Level



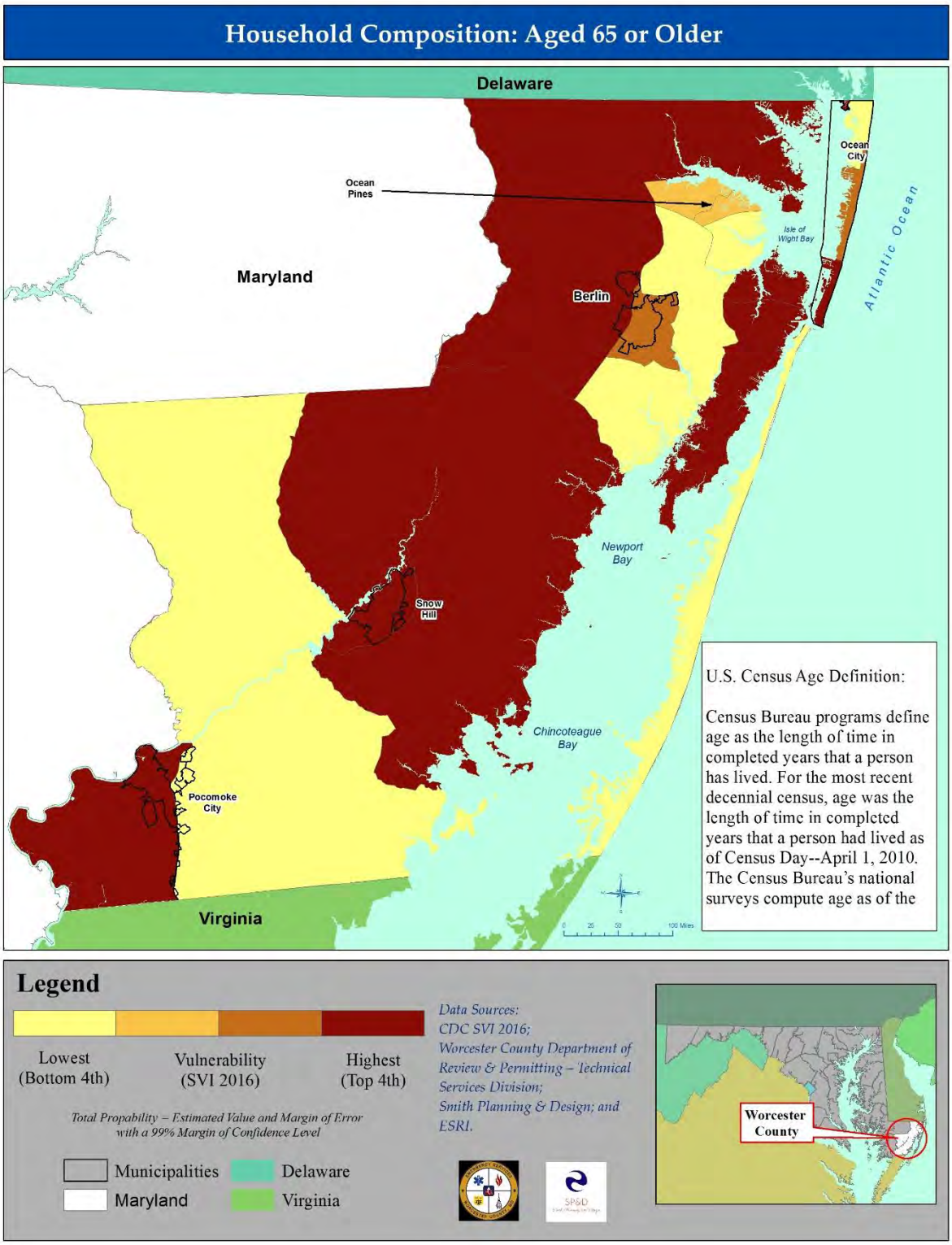
Legend

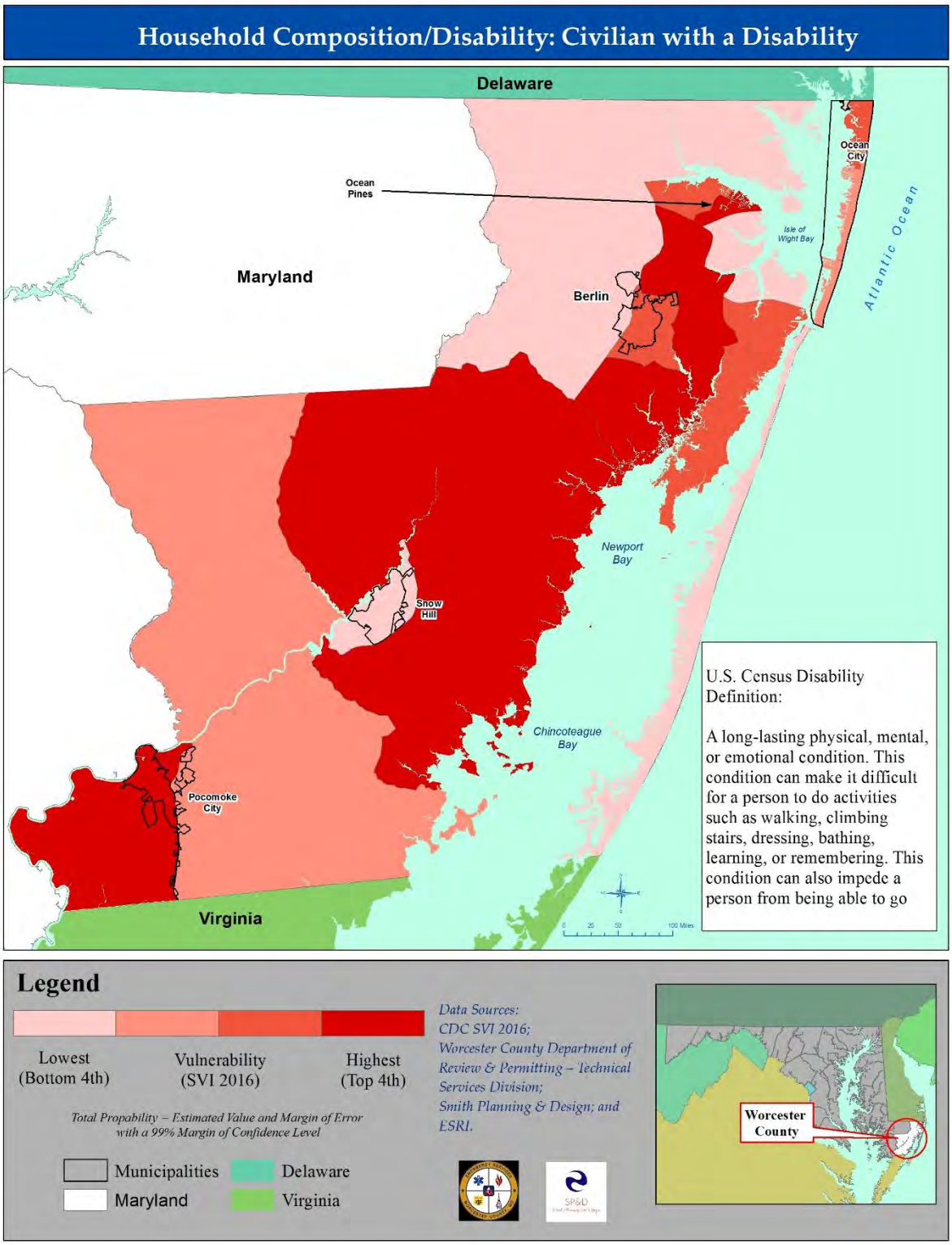
Lowest (Bottom 4th) — Vulnerability (SVI 2016) — Highest (Top 4th)

Total Propability – Estimated Value and Margin of Error with a 99% Margin of Confidence Level

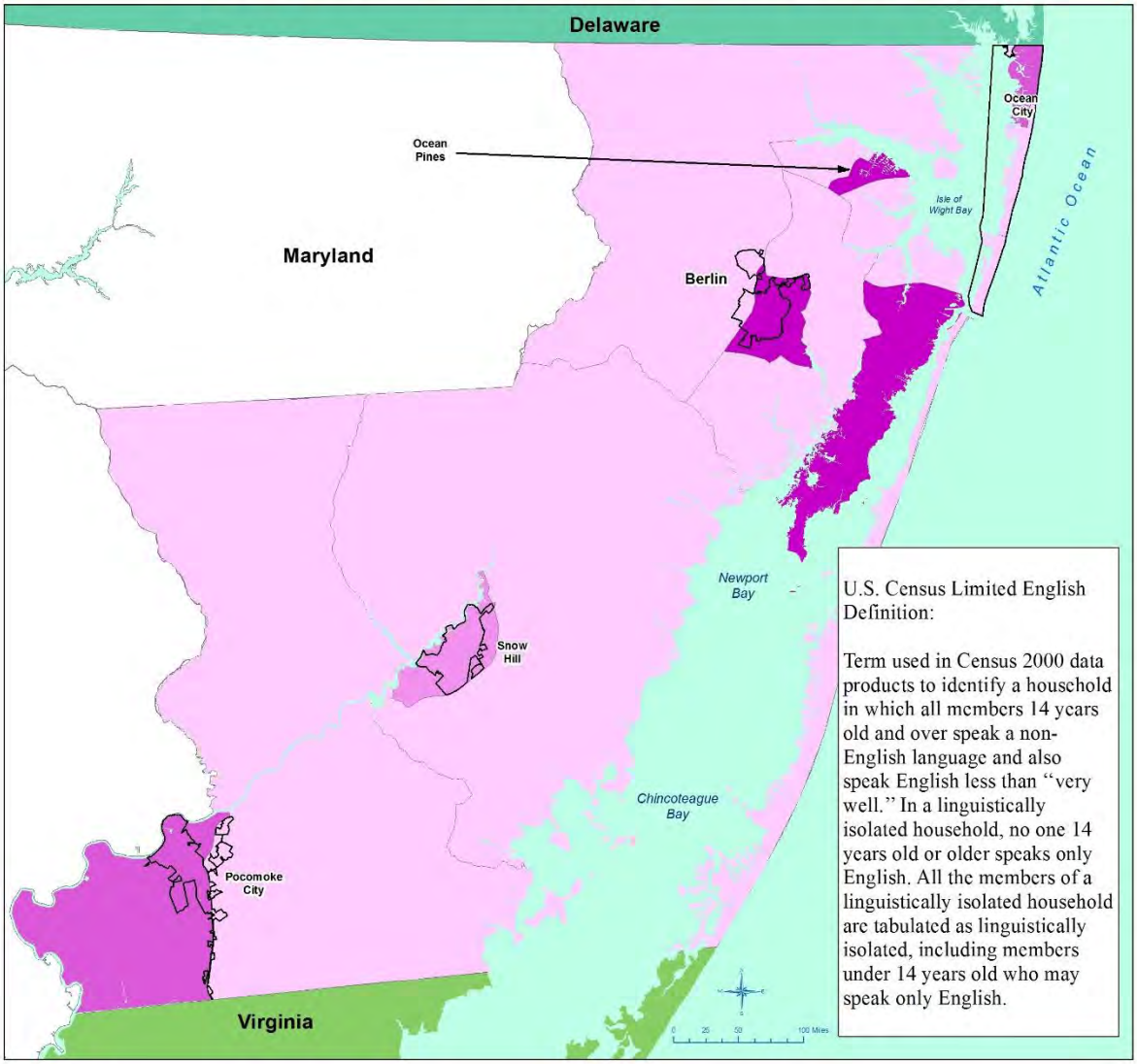
Municipalities
Maryland
Delaware
Virginia

Data Sources:
CDC SVI;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and ESRI.


Household Composition: Aged 65 or Older
Delaware
Ocean City
Ocean Pines
Isle of Wight Bay
Atlantic Ocean
Maryland
Berlin
Newport Bay
Snow Hill
Chincoteague Bay
Pocomoke City
Virginia
U.S. Census Age Definition:
Census Bureau programs define age as the length of time in completed years that a person has lived. For the most recent decennial census, age was the length of time in completed years that a person had lived as of Census Day--April 1, 2010. The Census Bureau's national surveys compute age as of the
Legend
Lowest (Bottom 4th)
Vulnerability (SVI 2016)
Highest (Top 4th)
Total Propability – Estimated Value and Margin of Error with a 99% Margin of Confidence Level
Municipalities
Maryland
Delaware
Virginia
Data Sources:
CDC SVI 2016;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and ESRI.
Worcester County


Household Composition/Disability: Civilian with a Disability
Delaware
Ocean City
Ocean Pines
Isle of Wight Bay
Atlantic Ocean
Maryland
Berlin
Newport Bay
Snow Hill
Chincoteague Bay
Pocomoke City
Virginia
U.S. Census Disability Definition:
A long-lasting physical, mental, or emotional condition. This condition can make it difficult for a person to do activities such as walking, climbing stairs, dressing, bathing, learning, or remembering. This condition can also impede a person from being able to go
Legend
Lowest (Bottom 4th)
Vulnerability (SVI 2016)
Highest (Top 4th)
Total Propability – Estimated Value and Margin of Error with a 99% Margin of Confidence Level
Municipalities
Maryland
Delaware
Virginia
Data Sources:
CDC SVI 2016;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and ESRI.
Worcester County

Language: Persons who Speak English "Less then Well"



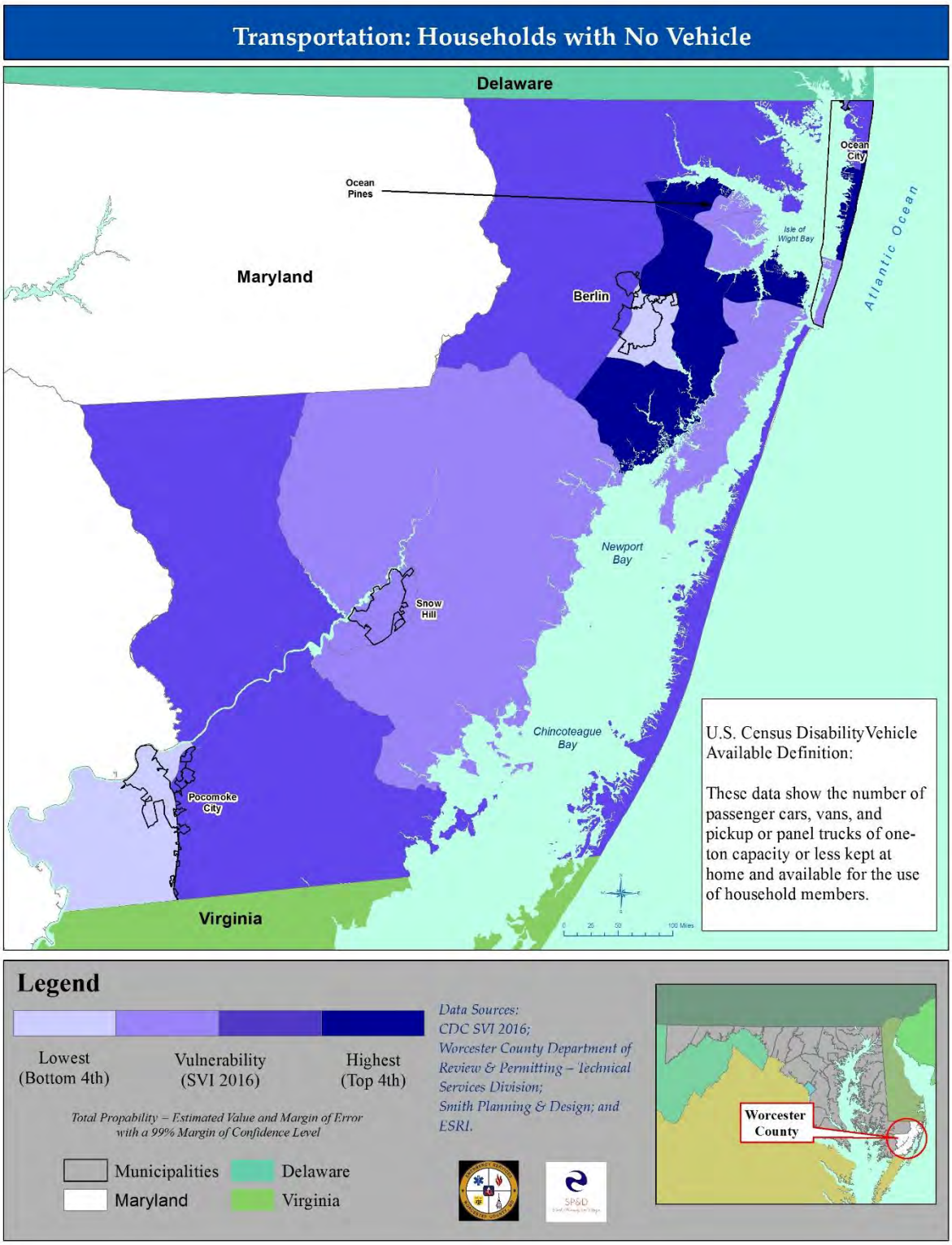
Legend

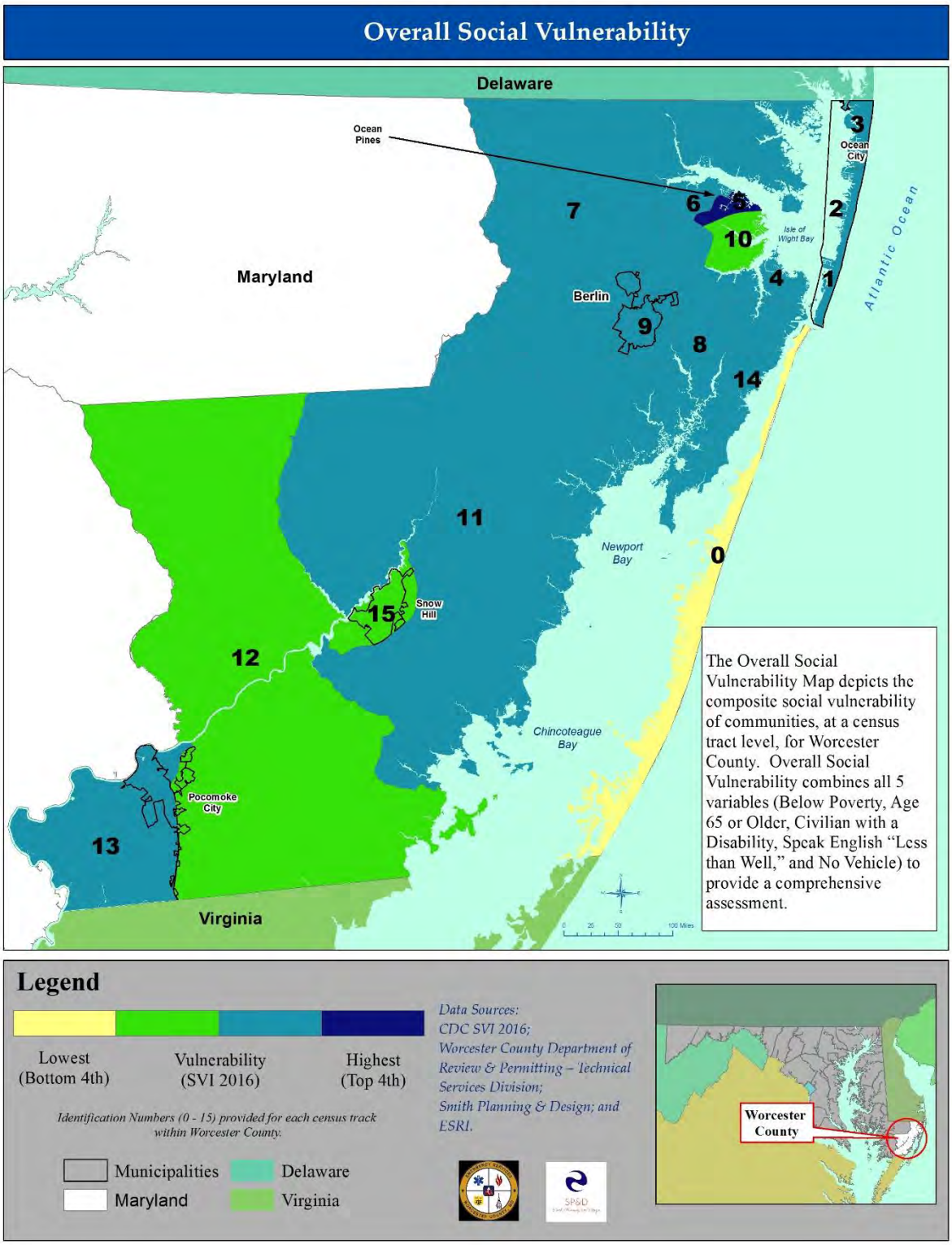
Lowest (Bottom 4th) — Vulnerability (SVI 2016) — Highest (Top 4th)

Total Propability – Estimated Value and Margin of Error with a 99% Margin of Confidence Level

Municipalities
Maryland
Delaware
Virginia

Data Sources:
CDC SVI 2016;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and ESRI.


Transportation: Households with No Vehicle
Delaware
Ocean Pines
Ocean City
Isle of Wight Bay
Atlantic Ocean
Maryland
Berlin
Newport Bay
Snow Hill
Chincoteague Bay
Pocomoke City
Virginia
U.S. Census DisabilityVehicle Available Definition:
These data show the number of passenger cars, vans, and pickup or panel trucks of one-ton capacity or less kept at home and available for the use of household members.
Legend
Lowest (Bottom 4th)
Vulnerability (SVI 2016)
Highest (Top 4th)
Total Propability – Estimated Value and Margin of Error with a 99% Margin of Confidence Level
Municipalities
Maryland
Delaware
Virginia
Data Sources:
CDC SVI 2016;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and
ESRI.
Worcester County


Overall Social Vulnerability
Delaware
Ocean Pines
Ocean City
Maryland
Berlin
Isle of Wight Bay
Atlantic Ocean
Newport Bay
Snow Hill
Chincoteague Bay
Pocomoke City
Virginia
0
1
2
3
4
6
7
8
9
10
11
12
13
14
15
The Overall Social Vulnerability Map depicts the composite social vulnerability of communities, at a census tract level, for Worcester County. Overall Social Vulnerability combines all 5 variables (Below Poverty, Age 65 or Older, Civilian with a Disability, Speak English "Less than Well," and No Vehicle) to provide a comprehensive assessment.
Legend
Lowest (Bottom 4th)
Vulnerability (SVI 2016)
Highest (Top 4th)
Identification Numbers (0 - 15) provided for each census track within Worcester County.
Municipalities
Maryland
Delaware
Virginia
Data Sources:
CDC SVI 2016;
Worcester County Department of Review & Permitting – Technical Services Division;
Smith Planning & Design; and
ESRI.
Worcester County