



Garrett County Multi-Jurisdictional Hazard Mitigation Plan

Released 2024

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GARRETT COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN



**RELEASED 2024
FOR THE COUNTY JURISDICTION OF GARRETT COUNTY, MARYLAND AND THE
MUNICIPAL JURISDICTIONS THEREIN**

**GARRETT COUNTY MULTI-JURISDICTIONAL
HAZARD MITIGATION PLAN
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1.0 INTRODUCTION

This section introduces the *Garrett County Multi-Jurisdictional Hazard Mitigation Plan* and defines its purpose, scope, and authority.

Background

Natural, technological, and human-caused hazards have prompted disasters resulting in injury and death, damaged and destroyed property, and disrupted business and government function across the nation. To lessen the effects of disaster, Garrett County and the eight municipalities in the county participated in this planning process to identify hazards and potential actions to mitigate vulnerability to those hazards.

Purpose

The purpose of this multi-jurisdictional hazard mitigation plan is to identify and evaluate risks and vulnerabilities from hazards that affect Garrett County, Maryland and its various municipalities. With these risks and vulnerabilities identified, local officials can reduce loss of life, injuries, and limit future property and environmental damages, and economic disruptions by developing methods and strategies to mitigate, and where possible, eliminate such damages. Mitigation is an investment in Garrett County's future safety, community resilience and sustainability. Without mitigation, the same people, property and community lifelines are affected over and over again.

Garrett County, the municipalities in the county, and other preparedness partners updated this hazard mitigation plan to:

- protect life, safety, and property by reducing the potential for future damages and economic losses that result from natural, technological, and human-caused hazards;
- aid in recovery and development following future disaster events;
- demonstrate a firm local commitment to risk reduction principles;
- qualify for grant funding in both pre- and post-disaster environments; and to
- comply with state and federal legislative requirements for local hazard mitigation plans.

Scope

The *Garrett County Multi-Jurisdictional Hazard Mitigation Plan* follows a planning methodology that includes public involvement, a risk assessment for various identified hazards, an inventory of critical facilities and at-risk areas, a mitigation strategy for high-risk hazards, and a method to maintain and update the plan. The provisions of this plan are applicable to all unincorporated areas of Garrett County as well as the municipalities, and encouraged whole-community involvement. The plan addresses the natural, technological, and human-caused hazards identified by the Federal Emergency Management Agency (FEMA), Maryland Department of Emergency Management (MDEM), and the Garrett County mitigation planning team. All hazards that have, or can affect the residents of the county have been analyzed. Hazard mitigation goals, objectives, and projects are discussed, as are project lead agencies and potential funding sources.

The plan complies with the Federal Emergency Management Agency (FEMA) and Maryland Department of Emergency Management (MDEM) guidelines for funding eligibility and technical assistance from state and federal hazard mitigation programs. Thus, it applies to the county and eight municipalities and is their official hazard mitigation plan. It addresses natural, technological, and human-caused hazards significant to the county and its municipalities. The steering committee reviews the plan annually; a complete plan update will occur at least every five years.

Plan Authority

This plan is “multi-jurisdictional,” meaning that it includes several jurisdictions. The Garrett County Department of Emergency Management (GCDEM) acted as the lead coordinating agency for the completion of this plan at the local level. They further monitored the original planning as well as subsequent updating processes. Stakeholders prepared this plan per the federal requirements outlined in Section 104 of the Disaster Mitigation Act of 2000 (DMA2K), Public Law 106-390, as amended, which requires communities to formulate a hazard mitigation plan to be eligible for mitigation funds made available through FEMA. Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C., requires that local jurisdictions develop and submit plans meeting the criteria outlined in the Code of Federal Regulations (CFR); Title 44: Emergency Management and Assistance, Parts 201 and 206: Local Mitigation Plans (44 CFR 201.6). The plan has also been developed to satisfy the requirements contained in the National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001, et seq.



Authority for this plan also originates from the following State of Maryland sources, Maryland Natural Resources Code Ann. §3-1015 and Maryland Public Safety Code Ann. §14-101. The steering committee reviews the plan on an annual basis; a complete plan update occurs at least every five years.

The following guidelines and reference documents assisted in the preparation of this document.

REFERENCED DOCUMENTS		
Document Type	Document Citation	How Incorporated into Plan
USDHS/FEMA Resources		
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2001). <i>Understanding your risks: Identifying hazards and estimating losses</i> (FEMA 386-2). https://mitigation.eeri.org/wp-content/uploads/FEMA_386_2.pdf	Legacy resource used as guidance to support hazard profiling
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2002). <i>Getting started: Building support for mitigation planning</i> (FEMA 386-1). https://mitigation.eeri.org/files/FEMA356-1.GettingStarted.pdf	Legacy resource used as guidance to support planning committee formation
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2003). <i>Bringing the plan to life</i> (FEMA 386-4). https://mitigation.eeri.org/wp-content/uploads/FEMA_386_4.pdf	Legacy resource used as guidance to support plan development and maintenance efforts
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2003). <i>Developing the mitigation plan</i> (FEMA 386-3). https://mitigation.eeri.org/wp-content/uploads/FEMA_386_3.pdf	Legacy resource used as guidance to support mitigation action planning
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2005). <i>Integrating historic property and cultural resource considerations into hazard mitigation planning</i> (FEMA 386-6). https://mitigation.eeri.org/wp-content/uploads/FEMA_386_6.pdf	Used as general guidance for incorporating historical property and cultural protection
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2007). <i>Using benefit-cost review in mitigation planning</i> (FEMA 386-5). https://www.hsdl.org/c/abstract/?docid=486846	Legacy resource used as general guidance for the action plan discussion
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2008). <i>Using the hazard mitigation plan to prepare successful mitigation projects</i> (FEMA 386-9). https://www.hsdl.org/c/abstract/?docid=28466	Used to support the action planning discussion
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2013a). <i>Integrating hazard mitigation into local planning: Case studies and tools for community officials</i> . https://www.fema.gov/sites/default/files/2020-10/fema_integrating-hazard-mitigation_case-studies_tools-community-officials.pdf	Used as general guidance on existing plan integration for hazard mitigation

REFERENCED DOCUMENTS		
Document Type	Document Citation	How Incorporated into Plan
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2013b). <i>Local mitigation planning handbook</i> . https://www.fema.gov/sites/default/files/2020-06/fema-local-mitigation-planning-handbook_03-2013.pdf	Used as general guidance on the mitigation planning process
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2013c) <i>Mitigation ideas: A resource for reducing risk to natural hazards</i> . https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf	Used as general guidance for stakeholders and jurisdictions on mitigation ideas
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2015). <i>National fire incident reporting system 5.0: Complete reference guide</i> . https://www.usfa.fema.gov/downloads/pdf/nfirs/NFIRS_Complete_Reference_Guide_2015.pdf	Used as a resource to support an understanding of reported NFIRS data
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2016). <i>National mitigation framework</i> , 2 nd ed. https://www.fema.gov/sites/default/files/2020-04/National_Mitigation_Framework2nd_june2016.pdf	Used as general guidance on mitigation planning
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA), Mitigation Framework Leadership Group. (2019). <i>National mitigation investment strategy</i> . https://www.fema.gov/sites/default/files/2020-10/fema_national-mitigation-investment-strategy.pdf	Used to ensure alignment with national strategies for advancing mitigation investment
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2022). <i>Local mitigation planning policy guide</i> (FP 206-21-0002). https://www.fema.gov/sites/default/files/documents/fema_local-mitigation-planning-policy-guide_042022.pdf	Updated guidance on refinements to the process, particularly regarding the NFIP, hazard mitigation assistance, HHPD program, and the FEMA building codes strategy
Technical Information	U.S. Department of Homeland Security (USDHS)/Federal Emergency Management Agency (FEMA). (2023c). <i>Local Mitigation Planning Handbook</i> , May 2023. https://www.fema.gov/sites/default/files/documents/fema_local-mitigation-planning-handbook_052023.pdf	Used as general guidance on the revised mitigation planning process, particularly upon the receipt of state and federal review comments
MDEM Resources		
Technical Information	Maryland Historical Trust. (2018). <i>Flood mitigation guide: Maryland's historic buildings</i> . https://aecmviz.com/MEMA-Maryland-360/Downloads/2018-06-30_MD%20Flood%20Mitigation%20Guide.pdf	Used as a resource regarding risk reduction for historic and cultural resources



REFERENCED DOCUMENTS		
Document Type	Document Citation	How Incorporated into Plan
Plan	Maryland Department of Emergency Management (MDEM). (2021). <i>State hazard mitigation plan</i> . https://www.mdem.maryland.gov/community/Pages/Mitigation.aspx	Used to ensure consistency, document state hazard rankings, etc.
Miscellaneous Resources		
Technical Information	USDHS FEMA. (2010). <i>Flood Insurance Study: Various Counties and Unincorporated Areas</i> . Federal Government: Washington, DC.	Used as a resource for identifying flood-prone areas in the flooding profile.
Assessment	USDA Natural Resources Conservation Service. (n.d.). <i>Soil Surveys various counties</i> . Federal Government: Washington, DC.	Used to support consideration of subsidence and other geologic hazards.
Technical Information	National Fire Protection Association (NFPA). (2019). <i>Standard on continuity, emergency, and crisis management</i> (NFPA 1600). https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1600	Used as a general guide to ensure a comprehensive planning process
Technical Information	U.S. Environmental Protection Agency (USEPA). (2018). <i>Storm smart cities: Integrating green infrastructure into local hazard mitigation planning</i> (EPA 903-K-18-001). https://www.epa.gov/sites/default/files/2018-04/documents/storm_smart_cities_508_final_document_3_26_18.pdf	Outlines ways low-impact development and green infrastructure can support mitigation planning

1.0 INTRODUCTION

1.1 Documentation of the Planning Process

§ 201.6(c)(1)	Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
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Every five (5) years, a community must review and revise its existing plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities and resubmit it to the Federal Emergency Management Agency (FEMA) for approval. Garrett County, through the direction of the Garrett County Department of Emergency Management (GCDEM) began the process to update this plan in September of 2023; the GCDEM contracted the services of JH Consulting, LLC, (the consultant) to aid in the process.

This plan is only as good as the process and people involved in its development. This plan has been developed to represent the current needs and values of Garrett County and to be useful for local officials and stakeholders. The consultant met with the GCDEM to layout the process and timeline for the update and determine the agency, department, organization, and jurisdictional representatives who would serve as steering committee members.

1.1.1 Planning Steering Committee

This plan update was developed utilizing a tiered outreach strategy consisting of an overall steering committee, plan stakeholders, and the public. Garrett County utilized a steering committee, and its consultant, to interface with the individual participating jurisdictions, stakeholders, and the public separately as part of the outreach strategy. The steering committee approach allowed for more interaction between committee members and enabled more strategic discussions regarding implementing hazard mitigation and risk reduction in Garrett County. This plan update represents the collaborative work of elected and appointed governmental officials, health and medical representatives, utility representatives, dam owners, business leaders, academia representatives, community organizations, and local residents. The steering committee utilized for this plan update was organized by the consultant “JH Consulting, LLC”, by reaching out to agencies and organizations that participated in the previous plan update; as well as contacting several other local, and state level agencies and organizations, to include those in neighboring communities.



The committee is comprised of key officials representing municipal, county, state, and private entities with a stake in mitigation and is comprised of 46 members. The Garrett County Department of Emergency Management (GCDEM) sent an email in late June of 2022 to each municipality requesting updated point of contacts for each municipality. The table below outlines the steering committee members that actively participated in the updating of this plan.

STEERING COMMITTEE MEMBERS AND AFFILIATIONS		
<i>Name</i>	<i>Agency/Affiliation</i>	<i>Title</i>
Marcia Barben	Maryland Dept. of Emergency Mgmt.	Hazard Mitigation Project Officer
Don McLaughlin	Environmental Protection Agency	Federal On-Scene Coordinator
Alex Kelly	Maryland Institute for EMS System	Acting Administrator
Megan Roderick	Maryland Hospital Association	Assist. Dir. Hospital Preparedness Program
Trip Martin	State Highway Administration	Resident Maintenance Engineer
Todd Dewitt	State Highway Administration	Assistant Resident Maintenance Engineer
Michael Sigmund	Maryland State Police	McHenry Barrack Commander
Bradley Williams	Maryland State Police	McHenry Barrack Assistant Commander
Jeffrey Sweitzer	Maryland Natural Resources Police	Natural Resources Police Officer
Kevin Null	Garrett County Administrator	Garrett County Administrator
Sam Grant	Garrett County Dept. Emerg. Mgmt.	Director
Wayne Tiemersma	Garrett County Dept. Emerg. Mgmt.	EMS Chief
Justin Orendorf	Garrett County Dept. Emerg. Mgmt.	Communications Chief
David Middleton	Garrett County Dept. Emerg. Mgmt.	Emergency Planner
Lou Bastisella	Emergency Services Board	Chairperson
Robert Stephens	Garrett County Health Department	Health Officer
Craig Umbel	Garrett County Health Department	Environmental Health Director
Lori Peck	Garrett County Health Department	Public Health Emergency Planner
Eric Cvetnick	Garrett County Health Department	Nursing Supervisor – Personal Health
Alicia Streets	Department of Human Services	Director
Paul Harvey	Garrett County Roads	Roads Division Chief
Jay Moyer	Garrett County Public Works	Director of Public Works
Nathaniel Watkins	Garrett County IT Department	Chief Information Officer
Michael Bittinger	Garrett County Board of Education	Manager of Safety
Ronald Bray	Garrett County Board of Education	Transportation Manager
Michele Walker	Garrett County United Way	Director
Misty Deal	Garrett County United Way	Director of Finance
Richard Carlson	Town of Accident	Mayor
Donald Dawson	Town of Deer Park	Mayor
Spencer Schlosnagle	Town of Friendsville	Mayor
Edward Kelley	Town of Friendsville	Council Member
Emily Newman-Edwards	Town of Grantsville	Mayor
Robert Reckart	Town of Kitzmiller	Mayor
Carolyn Corley	Town of Loch Lynn Heights	Mayor
Donald Sincell	Town of Mountain Lake Park	Mayor
Kathryn Shaffer	Town of Oakland	Mayor
David Taylor	Garrett Regional Medical Center	Regional Director of Facilities
Brooks Carr	Garrett Regional Medical Center	Safety and Compliance Officer
Christopher Painter	Garrett College	Director of Campus Facilities Security



STEERING COMMITTEE MEMBERS AND AFFILIATIONS		
Name	Agency/Affiliation	Title
Shelley Menear	Garrett College	Director of Institutional Compliance & Safety
David Kline	FirstEnergy	External Affairs Manager
Andrew Fusco	Verizon	Crisis Response Team
Bobby Bodenschatz	Corsa Coal Company	Director of Safety
Shawn Bender	Beitzel	Chief Operating Officer
Jeff Harvey	JH Consulting, LLC	Managing Member
Doug Britvec	JH Consulting, LLC	Safety Division Manager

The committee came together three times throughout the process, as described below. See Appendix 1 for agendas, meeting minutes, etc.

2022 Status Update Meeting

September 7, 2022 (In-Person @ Garrett College Extension Service)

This meeting was held in-person at the Garrett College Extension Service in Accident, Maryland. At this meeting the Hazard Mitigation Planning Committee (HMPC) reviewed previously identified hazards within the *2018 Garrett County Hazard Mitigation Plan*. During the review of newly gathered hazard data a hazard identification and ranking exercise was performed for inclusion into the 2024 plan update. Hazard data coupled with local knowledge from various committee members was utilized to assess the county's vulnerabilities to hazards during this meeting. Public outreach materials were distributed to all eight municipalities within the county. These materials contained data collection handouts and information pertaining to the plan development process.

Project Kickoff & Committee / Public Meeting #1

October 11, 2023 (Hybrid In-Person @ GCDEM Office & Virtual)

This meeting was held in-person at the Garrett County Department of Emergency Management (GCDEM) Office in McHenry, Maryland and was made available virtually for those who could not attend in person. The meeting started at 1:00 p.m. and lasted for approximately one and half hours, ending at 2:30 p.m., 17 individuals attended this meeting. The steering committee, and their consultant (JH Consulting) worked together to establish a workflow for the project and to go over Maryland Department of Emergency Management (MDDEM) and Federal Emergency Management Agency (FEMA) planning requirements (i.e., Title 44 CFR, Part 201.6, Disaster Mitigation Act of 2000; Section 104). The planning process to be utilized to update the plan was discussed and finalized, public involvement opportunities throughout the planning



process was outlined, planning committee member responsibilities were identified, and the setting of schedules for future planning meetings was established.

This meeting gave steering committee members the opportunity to familiarize themselves with each other and with the 2018 plan. The primary action items for Committee Meeting #1 was to describe the planning area and identify problem areas and discuss development trends, as well as to discuss and approve the hazards to be included in the 2024 plan update. An engagement strategy was also discussed during this meeting, and the committee brainstormed to generate different methods that may be implemented to allow more participation from under-represented and socially vulnerable populations.

The consultant presented a comprehensive list of hazards (i.e., natural, technological, and human-caused) along with information regarding total occurrences, period of occurrences, warning times, probability estimates, and previous disaster declarations for each hazard. The consultant and the steering committee evaluated the comprehensive list of hazards and determinations were made as to which hazards should be included in the plan update. As a result, all hazards included in the 2018 plan will remain in the 2024 plan with the exception of major fire / explosion. The severe summer weather hazard profile now includes high wind, hurricane remnants, and thunderstorms, and the epidemic profile has been renamed the public health emergencies profile to broaden the content of the profile.

Committee / Public Meeting #2

December 7, 2023 (Google Meet Web Conference)

The second committee/public meeting was held online via a web conference. The meeting was held on Thursday, December 7th, and lasted approximately two hours from 1:00 p.m. to 3:00 p.m., 15 individuals attended this meeting. The main agenda items for this meeting was to update and assigning status indicators to existing county mitigation projects and identifying new mitigation projects for inclusion in to the plan update. The existing mitigation projects were sent out to the committee via email prior to this meeting to allow them an opportunity to review the information prior to the meeting.

The contractor facilitated a discussion amongst committee members, who assigned status indicators to the existing mitigation projects for the county. The consultant read each mitigation project, allowed the committee to discuss each project, then a status (i.e., completed, deleted, deferred, or on-going) was assigned to each project. It was discovered that several of the existing mitigation projects were on-going, and a few were deleted due to lack of available funding.

The committee also developed new mitigation projects for each hazard identified in the plan across all jurisdictions of Garrett County, and discussed the methodology that would be utilized to prioritize all mitigation projects included in this plan update. The contractor provided several sample mitigation projects for all the hazards included in the plan in an effort to generate discussion amongst steering committee members and the public. Those in attendance discussed the relevance of the sample mitigation projects presented, and utilized information from the samples to develop a few of their own mitigation projects. A few new mitigation projects were developed as a result of this meeting and are included in Section 3.2 of the plan.

The contractor presented the methodology that would be utilized for the prioritization of the newly identified mitigation projects. Attendees discussed this methodology and agreed to utilize the scoring method proposed by the county which was focused around the STAPLEE method to prioritize the newly developed mitigation projects.

The consultant then advised all committee members to review and send any changes they would like to see made to the Plan Maintenance Section of the plan.

1.1.2 Jurisdictional Involvement

During the plan update process, each municipality was provided information from the previous plan for review and update, as well as draft materials for review of this update. Additionally, a municipal hazard mitigation questionnaire was distributed to each municipality to obtain updated information for inclusion into the plan. Also, phone calls and visits to municipalities were conducted by county staff and their consultant. The county's consultant also met with, or held conference calls with each municipality to review their specific information to be included in Section 1.2 – Description of the Planning Area to this update, to complete a capabilities survey for inclusion into this update, to obtain mitigation project status updates, to develop new mitigation projects, and to go over the plan adoption process (see meeting details below), several representatives from each town (i.e., Mayors, Town Administrators, Clerks, Council Members, Zoning Boards, and Planning Commissions) were invited to those meetings. Follow-up information was sent to the municipalities including potential grant funding sources and mitigation project examples. Each municipality was asked to provide mitigation actions and/or projects specific to the hazards identified as impacting or potentially impacting their jurisdiction. All of the jurisdictions within Garrett County participated in the update to this plan. All eight towns had the opportunity to provide input for the plan in the following ways.

- Attending in-person and virtual meetings
- Completing the online capabilities survey and public survey
- Updating their mitigation project lists (which could include updating status of existing projects or adding new projects)
- Providing information for the plan to the Garrett County Department of Emergency Management (GCDEM) or the consultant via phone or email

The following table identifies what activities jurisdictions completed.

GARRETT COUNTY HAZARD MITIGATION PLAN (2024 UPDATE) JURISDICTIONAL TASKS							
<i>Community</i>	<i>Attended Planning Meetings</i>	<i>Capability Survey</i>	<i>Projects Update</i>	<i>Added New Projects</i>	<i>Provided Info to county or Consultant</i>	<i>Promoted Public Involve</i>	<i>Overall Participation Assessment</i>
Garrett County	YES	YES	YES	YES	YES	YES	YES
Accident	YES	YES	YES	YES	YES	YES	YES
Deer Park	YES	YES	N/A	YES	YES	NO	YES
Friendsville	YES	YES	YES	YES	YES	YES	YES
Grantsville	YES	YES	YES	YES	YES	YES	YES
Kitzmillier	NO	YES	N/A	YES	YES	NO	YES
Loch Lynn Heights	YES	YES	YES	YES	YES	NO	YES
Mountain Park Lake	YES	YES	YES	YES	YES	YES	YES
Oakland	YES	YES	YES	YES	YES	YES	YES

MUNICIPAL PLANNING MEETING – TOWN OF ACCIDENT							
<i>Meeting Date</i>	<i>Participants</i>		<i>Description of Planning Area Reviewed</i>	<i>Capability Survey Completed</i>	<i>Mitigation Project Status</i>	<i>New Mitigation Projects</i>	<i>Plan Adoption Discussed</i>
	<i>Name</i>	<i>Title</i>					
1/26/2024	Richard Carlson	Mayor	X	X	X	X	X
	Ruthann Hahn	Town Clerk					

MUNICIPAL PLANNING MEETING – TOWN OF DEER PARK							
<i>Meeting Date</i>	<i>Participants</i>		<i>Description of Planning Area Reviewed</i>	<i>Capability Survey Completed</i>	<i>Mitigation Project Status</i>	<i>New Mitigation Projects</i>	<i>Plan Adoption Discussed</i>
	<i>Name</i>	<i>Title</i>					
1/26/2024	Donald Dawson	Mayor	X	X	X	X	X

MUNICIPAL PLANNING MEETING – TOWN OF FRIENDSVILLE							
Meeting Date	Participants		Description of Planning Area Reviewed	Capability Survey Completed	Mitigation Project Status	New Mitigation Projects	Plan Adoption Discussed
	Name	Title					
1/24/2024	Ed Kelley	Council Member	X	X	X	X	X
	Rob Smith	Zoning Board					
	Lynn Aycock	Planning Comm.					
	Wanda Guard	Clerk-Treasurer					

MUNICIPAL PLANNING MEETING – TOWN OF GRANTSVILLE							
Meeting Date	Participants		Description of Planning Area Reviewed	Capability Survey Completed	Mitigation Project Status	New Mitigation Projects	Plan Adoption Discussed
	Name	Title					
2/05/2024	Emily Newman-Edwards	Mayor	X	X	X	X	X
	Robin Jones	Town Administrator					

MUNICIPAL PLANNING MEETING – TOWN OF KITZMILLER							
Meeting Date	Participants		Description of Planning Area Reviewed	Capability Survey Completed	Mitigation Project Status	New Mitigation Projects	Plan Adoption Discussed
	Name	Title					
2/20/2024	Robert Reckart	Mayor	X	X	N/A	X	X
	Becky Glofelty	Town Administrator					

MUNICIPAL PLANNING MEETING – TOWN OF LOCH LYNN HEIGHTS							
Meeting Date	Participants		Description of Planning Area Reviewed	Capability Survey Completed	Mitigation Project Status	New Mitigation Projects	Plan Adoption Discussed
	Name	Title					
1/25/2024	Wayne Callis	Planning Comm.	X	X	X	X	X
	Donna Callis	Resident					
	Barb Rexroad	Town Council					
	Jillian Friend	Resident					

MUNICIPAL PLANNING MEETING – TOWN OF MOUNTAIN LAKE PARK							
Meeting Date	Participants		Description of Planning Area Reviewed	Capability Survey Completed	Mitigation Project Status	New Mitigation Projects	Plan Adoption Discussed
	Name	Title					
1/24/2024	Patrick Damon	Town Council	X	X	X	X	X

MUNICIPAL PLANNING MEETING – TOWN OF OAKLAND							
Meeting Date	Participants		Description of Planning Area Reviewed	Capability Survey Completed	Mitigation Project Status	New Mitigation Projects	Plan Adoption Discussed
	Name	Title					
2/02/2024	Nicole McCullough	Business Coordinator	X	X	X	X	X
	Cindy Coddington	Town Clerk					

1.1.3 Public Involvement

Garrett County involved the public through the use of online surveys, in person public involvement was encouraged at in-person planning meetings. Online, partners promoted a survey that asked residents about their views on hazards, their support for various mitigation actions, social vulnerabilities that may increase risk, and their level of personal preparedness. In total, 77 individuals completed the survey. The public felt most concerned about the following hazards; severe winter weather, cyber-threats, and public health emergencies (approximately 25 to 30% of respondents indicated they were “very concerned” about these three hazards). Residents also reported concern regarding dense fog and hazardous materials releases, (approximately 30% of respondents indicated they were “concerned” about these hazards). Residents were the least concerned about landslides, dam failures, and tornadoes. References to the results of the survey appear in subsequent sections below, as applicable to the topic of discussion as well as in Appendix 4 – Public Participation.

1.1.4 Outreach to Historically Underserved & Socially Vulnerable Populations

Revised hazard mitigation planning guidance from FEMA (2023b, p. 35) advises communities to create an equitable planning process. Garrett County and the participating municipalities support boosting participation by historically under-served communities and socially vulnerable populations, and they took several steps in the 2023 update to ensure more equitable participation by inviting representatives from the list below to be on the planning committee. Representatives with Garrett College, Garrett County Board of Education, Garrett County Health Department, and Garrett County United Way served as members of the planning committee and attended planning meeting.

Attempts to identify underserved populations, though necessary and admirable, run the risk of inadvertently excluding various groups as focus narrows on various types of population groupings. Garrett County and its partners are sensitive to this reality. This section identifies several populations to which the outreach efforts were made; however, it is likely there are other underserved communities that were missed. As such, the efforts contributing to the 2024 update



should be considered initial steps on a pathway for more thorough participation by underserved communities moving forward.

The planning committee focused on engaging several providers whose regular clientele are communities and populations that have not regularly participated in emergency preparedness or hazard mitigation planning (an example of “procedural equity” [FEMA, 2023c, p. 235]). Those providers included the following.

- Garrett College (serving a largely transient population who may be unfamiliar with the area)
- Garrett County Public Schools (serving youth [i.e., aged four to 18 years])
- Garrett County Health Department (serving various populations, often through partnerships with an array of service providers with varying clientele)
- Garrett Transit Service (serving individuals without access to a vehicle)
- Garrett County United Way (educational, economic and health resources)
- Garrett County Behavioral Health / Mindful Roots, LLC / Mountain Haven Wellness and Recovery Center / Mountain Laurel Medical Center (serving individuals with behavioral and mental health needs)

1.1.5 Previous Versions

The *Garrett County Multi-Jurisdictional Hazard Mitigation Plan* was originally developed in 2005, and required five-year updates were conducted in 2012, and 2018.

1.0 INTRODUCTION

1.2 Description of the Planning Area

The description of the planning area contextualizes the remainder of this document. It provides background information on the areas impacted by various hazards and serves as a foundation for mitigation decisions.

1.2.1 Garrett County Details

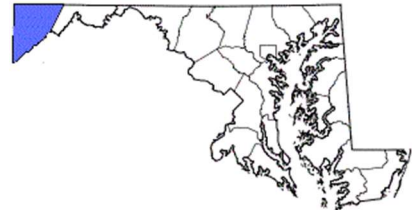
This first sub-section provides demographics and other details for Garrett County. It includes unincorporated areas as well as municipal areas.

Geography

Garrett County is the western-most county in the State of Maryland and is nestled in the Allegheny Mountain Plateau province which forms the western flank of the Appalachian Mountain Range. The county falls within the federally recognized region known as the Appalachia Region. The county is bordered on the south and west by the Potomac River and four West Virginia counties and to the north the Maryland-Pennsylvania boundary known as the Mason-Dixon Line. Its neighbor to the east is Allegany County, from which Garrett was created on November 4, 1872 making it the last county to be formed in the state. Garrett County is conveniently situated less than a three-hour drive from the metropolitan areas of Washington D.C. and Baltimore, less than two hours from Pittsburgh, PA and Winchester, VA and a 45 minute drive from Morgantown, WV, Cumberland, MD, and Uniontown, PA. The county was named for John W. Garrett (1820-1884) who was president of the Baltimore and Ohio Railroad from 1858 until his death.

The county seat is the Town of Oakland, the county contains seven other towns shown in the table above, and displayed graphically in the map below. Garrett is one of 23 counties in Maryland, and one of three counties that make up the Appalachian Maryland Region. The county has a total area of 656 square miles, of which 647 square miles is land and 8.6 square miles is water (U.S. Census Bureau). Garrett is the second largest of Maryland's 23 counties regarding area. The county has a population density of 44 persons per square mile.

GARRETT COUNTY JURISDICTIONS	
<i>Political Jurisdiction</i>	<i>Type</i>
Accident	Town
Deer Park	Town
Friendsville	Town
Grantsville	Town
Kitzmiller	Town
Loch Lynn Heights	Town
Mountain Lake Park	Town
Oakland	Town



The landscape of Garrett County is considered to be anywhere from rolling to mountainous and rugged, with 29 named mountains with elevations over 3,000 feet, typical of a dissected plateau. As is typical in the Allegheny region, elevations range from 3,360 feet above sea level at Hoyer-Crest, a summit along Backbone Mountain which is the highest point in the State of Maryland, to 500 feet in the broad flats that lie below the ridge crests. River valleys are generally narrow and deep, with ravines typically 1,000 to 1,800 feet below surrounding peaks.



Aerial View of Oakland, Maryland

Garrett County is drained by two river systems, the Potomac and the Youghiogheny. The Savage River, a tributary of the Potomac, drains about a third of the county. The Casselman River, a tributary of the Youghiogheny, flows north from the county's central section into Pennsylvania. The Youghiogheny itself drains the westernmost area of the county and flows north into Pennsylvania, where it empties into the Monongahela River at McKeesport, just south of Pittsburgh. Other major streams include Bear Creek and Deep Creek both in the Youghiogheny Basin.

The Eastern Continental Divide runs along portions of Backbone Mountain, it is a hydrological divide in eastern North America that separates the easterly Atlantic Seaboard watershed from the westerly Gulf of Mexico watershed. The western part of Garrett County, drained by the Youghiogheny River, is the only part of Maryland within the Mississippi River drainage basin. All other parts of the county are in the Chesapeake Bay basin. (Reference the Rivers & Topography map below).

Geologic points of interest within the county include the Glades and Loess Dunes. The Glades' 601 acres is of great scientific interest because it is an ombrotrophic system (i.e., fed solely by rainwater) with peat layers up to nine feet thick, and is one of the oldest examples of mountain peatland in the Appalachians. On the western edge of the Savage River State Forest along State Route 495 lies the community of Bittinger, on the eastern edge of Bittinger is one of the largest glades area of Garrett County. Geographically, this is an area that seems to have been affected by the last great ice sheet of North America. Two miles southeast of Bittinger, there is a large deposit of peat moss. In the Casselman River valley, approximately one mile south of Grantsville along State Route 495, one can see remains of geological evidence pertaining to the last great ice sheet over North America known as Loess Dunes. A series of low mounds can be seen in the fields on the west side of State Route 495 that are "loess" (i.e., wind-blown) material. It is believed that these are the only ones still visible in the northern part of Garrett County. The mounds were formed when a glacier lake existed in the Casselman valley, and the ice around the edges of the frozen lake melted. Wind blew fine grains of earth into the water around the edges where it sank to the bottom, and the mounds were the result of the deposit of this wind-blown material.



The Glades | The Nature Conservancy MD/DC

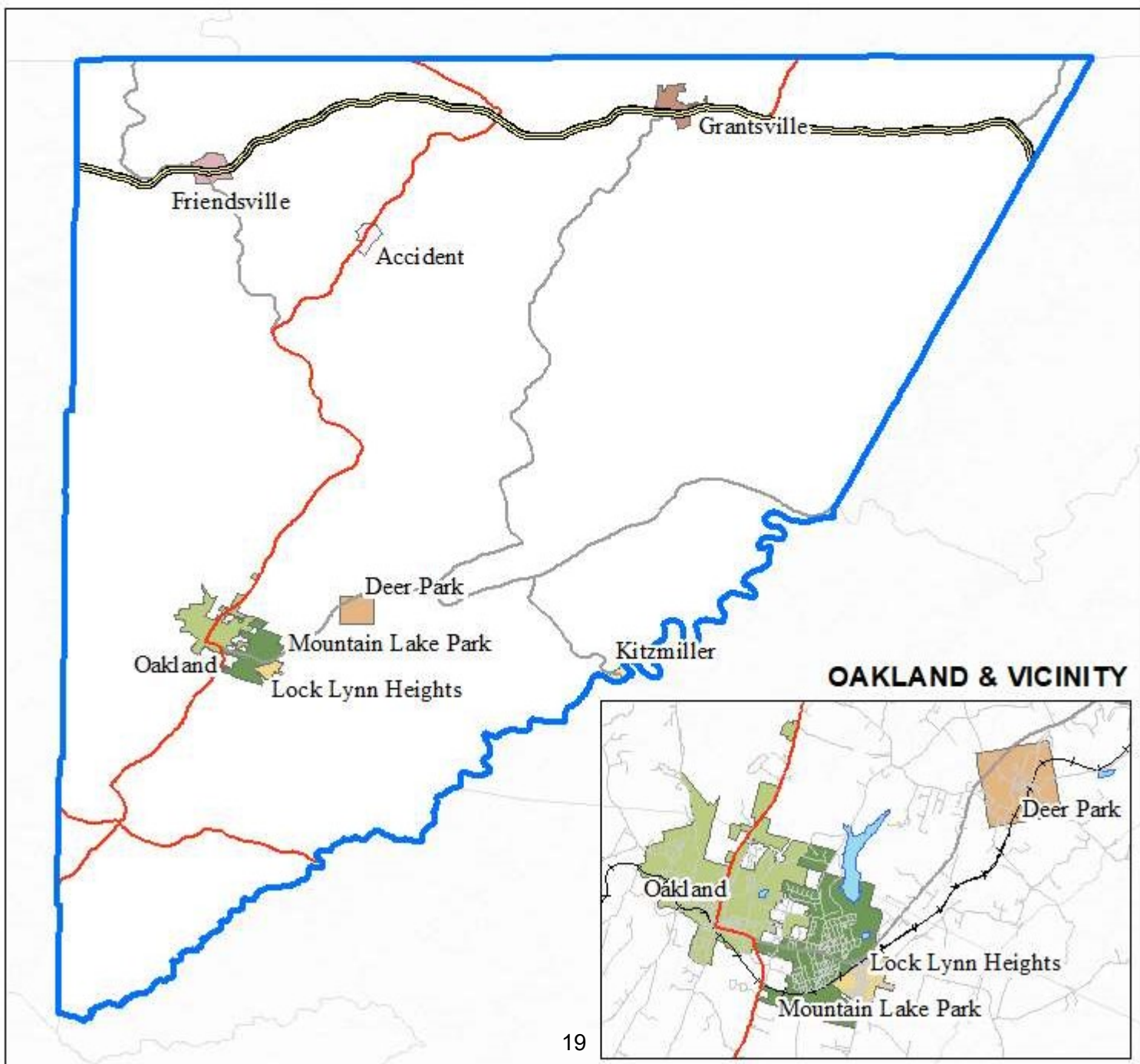
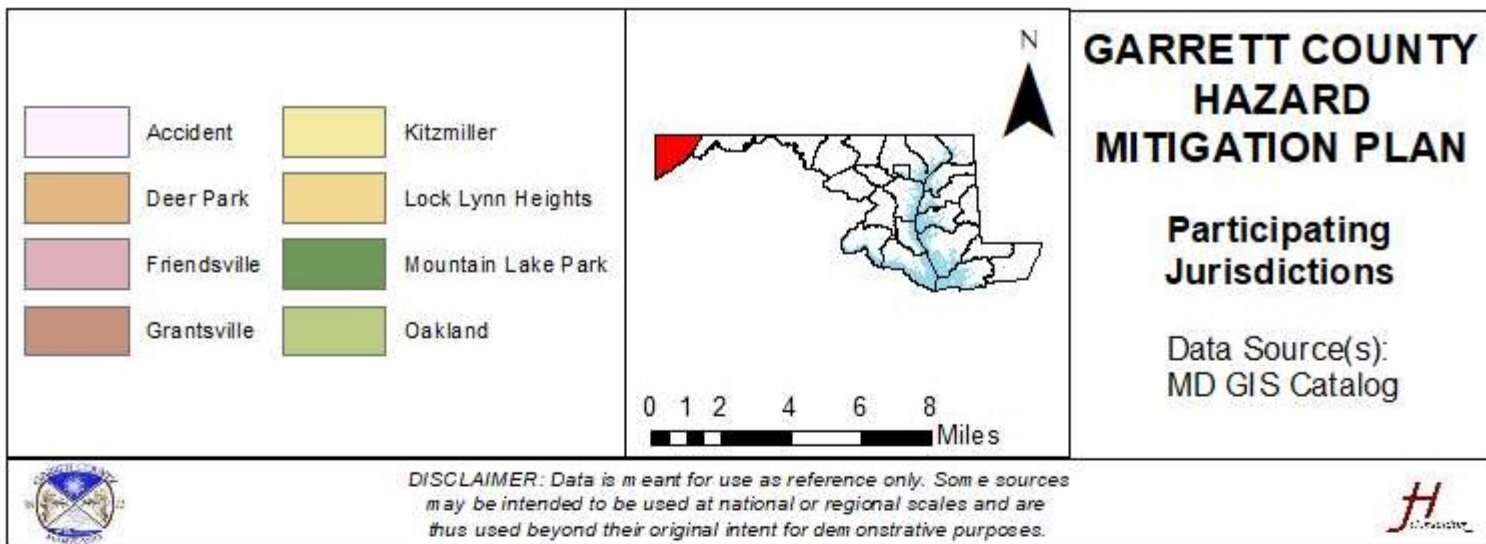
Garrett County is home to four waterfalls, including; Gap Falls, Muddy Creek Falls, Swallow Falls, and Tolliver Falls. Swallow Falls State Park located on the west bank of the Youghiogheny River nine miles northwest of Oakland features Maryland's highest free-falling waterfall, the 53-foot Muddy Creek Fall as well as smaller waterfalls on the Youghiogheny River and Tolivar Creek.



Muddy Creek Falls

There are five named caves located in Garrett County. Crabtree Cave was the largest cave in Maryland, recently surpassed by Tanglefoot Cave in Allegany County. It is located 200 yards west of the Savage River Dam at Bond Station on the Baltimore and Ohio Railroad. The cave has at least 4,200 feet of mapped passage and is protected by the Nature Conservancy.

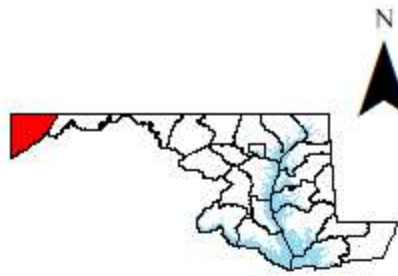
The John Friends Cave located east of Sang Run, has been known to exist since 1751, a stream enters the cave in several areas of its passages. The Muddy Creek Falls Shelter is comprised of two small shelter caves which lie at the base of Muddy Creek Falls. The largest shelter is 25 feet long, 15 feet wide and 4 feet high. These caves belong to the upper part of the Pottsville Formation. Sand Cave which is located southwest of Kelso Gap paralleling Backbone Mountain is the largest shelter type cave in Maryland. In its past the cave was used as a habitat by Native Americans as evident from arrowheads, charcoal, flint chips, and other items found within. Woods Place Cave is located four miles north of Oakland, the cave is described as having an entrance leading down step-like terraces for 50 feet to a passage of unknown length.



— Rivers & Streams

Statewide DEM

- 3371.83
- 2663.75
- 1955.68
- 1247.6
- 539.525
- 168.551



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Miles

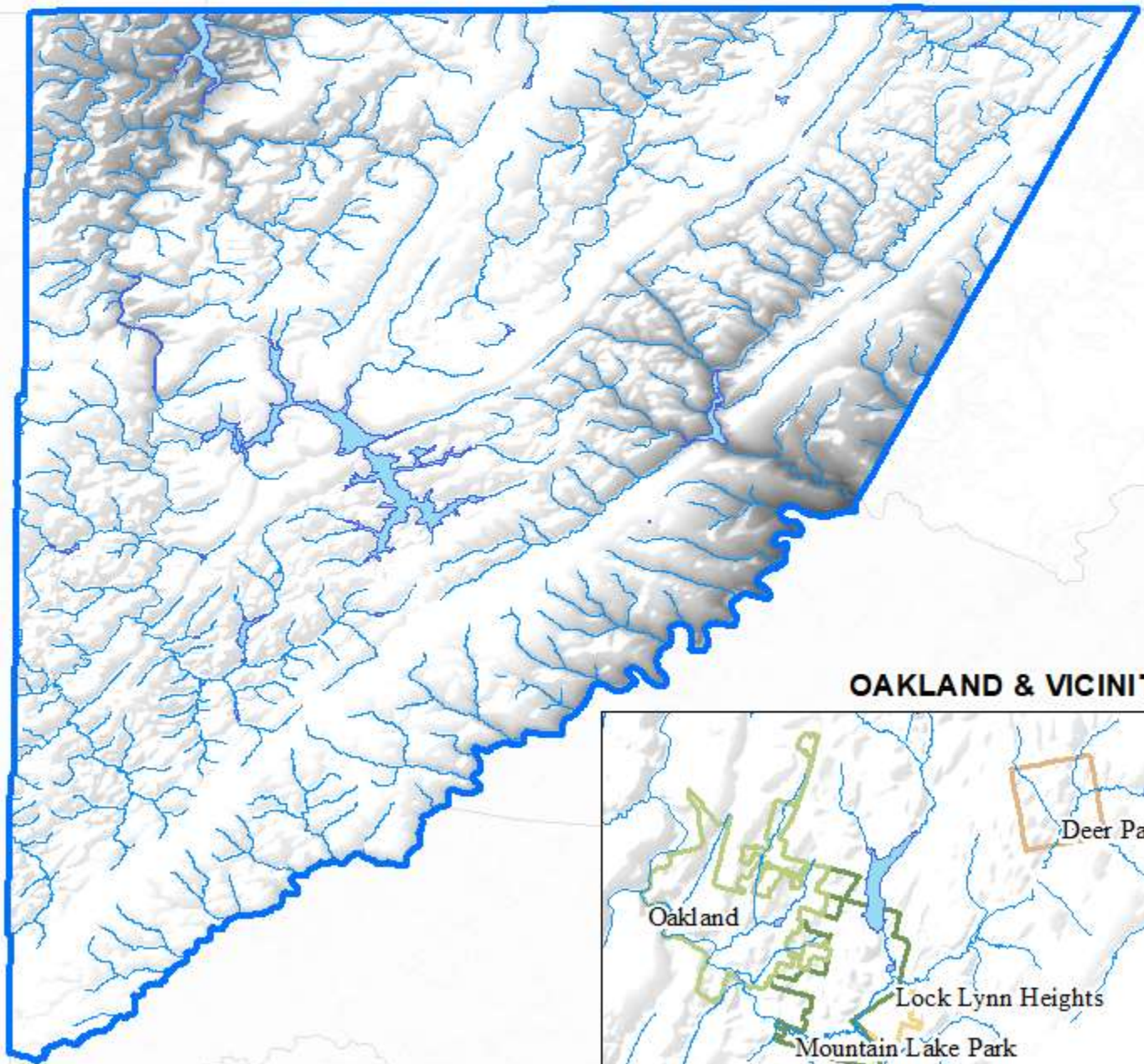
GARRETT COUNTY HAZARD MITIGATION PLAN

Rivers & Topography

Data Source(s):
US Census (Tiger Data),
USGS



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



Demographics

Garrett County's population growth has mirrored the economic periods with higher rates of growth occurring during the early settlement of the county, during the coal and timber booms of the early part of the 20th century, and during the period of recreation and tourism development that continues into the present. The total population of Garrett County, according to 2022 Census estimates is 28,579, which is a decrease of 1,397 over the past decade. Due to a cool climate and lack of any large city, Garrett County has remained a sparsely populated rural area. Of the population, 24% (i.e., 6,838) live within the eight municipalities while 76% (i.e., 21,741) live in the unincorporated county. Census figures also indicate that there are 18,621 housing units in Garrett County with an average of 2.27 persons per household. A substantial percentage of new housing is related to recreation development around Deep Creek Lake and does not represent year-round occupancy. The median age in Garrett County is 46.8, above the state median age of 39.7 (U.S. Census Bureau, 2020).

GARRETT COUNTY DEMOGRAPHICS	
Total Population (2022)	28,579
Male	14,261
Female	14,318
Total Housing Units	18,621
Percent high school diploma or higher	90.5%
Percent Bachelor's degree or higher	24.6%
Median Household Income	\$64,447
Families below poverty level	11.0%
Unemployment Rate (2021)	4.9%

Source: U.S. Census, 2020

Approximately 90.5% of the population in Garrett County has at least a high school diploma or GED, which is slightly less than the statewide percentage of 91.0%. The Median Household Income (MHI) is \$64,447, considerable below the state MHI of \$94,991. The poverty rate of the county has waxed and waned from 12.5% in 2010, to 12.7% in 2016, to 11.0% in 2022. The table above shows this and other basic demographic data for Garrett County (U.S. Census 2022, Maryland Department of Business and Economic Development, 2022).

As stated prior, there are eight municipalities in Garrett County. The demographics for these municipalities are shown in the table below. All data are from the U.S. Census Bureau.

GARRETT COUNTY DEMOGRAPHICS														
	Population (2021 Est.)	White	African American	American Indian & Alaska Native	Asian	Native Hawaiian	Hispanic or Latino	Veteran	65+	Under 18	Housing Units	MHI ¹	Persons in Poverty	Pop. Per Mile
Garrett County (Total)	28,579	27,750	286	86	142	0	400	2,004	6,888	5,030	18,621	\$64,447	11.0%	44
Accident	338	320	2	0	2	0	9	28	81	59	161	\$54,333	25.8%	690
Deer Park	303	286	4	0	0	2	2	24	84	41	155	\$50,536	19.9%	303
Friendsville	438	400	3	1	0	0	12	72	120	74	251	\$44,375	18.7%	438
Grantsville	968	932	3	0	1	0	10	25	294	181	417	\$37,917	27.5%	931
Kitzmillier	300	284	1	0	0	0	6	24	61	52	147	\$45,208	22.5%	1,200
Loch Lynn Heights	493	479	3	0	0	0	6	36	116	75	217	\$49,808	10.6%	1,541
Mountain Lake Park	2,147	2,032	15	2	10	1	28	118	524	429	999	\$55,000	13.0%	1,068
Oakland	1,851	1,749	14	0	7	0	23	254	533	307	1,001	\$61,568	12.5%	712

Source: US Census Bureau (Annual Estimates of the Resident Population for Incorporated Places in Maryland: April 1, 2022 to July 1, 2023)

US Census Bureau (QuickFacts) & Census Designated Place (CDP) Search

Note: ¹ – Median Household Income (MHI)

As illustrated in the table above Garrett County has a higher population of individuals over the age of 65 (i.e., 6,888) compared to those under the age of 18 (i.e., 5,030). According to the U.S. Census Bureau the race that comprises the majority of the population in Garrett County is white, which makes up approximately 97% of the population, Hispanic or Latino make up approximately 1.4% of the population. Approximately 3.1% (i.e., 890) of individuals above the age of five speak a language other than English.

Transportation Infrastructure

The transportation infrastructure in Garrett County consists of highway, railway, and airway elements.

Throughout its history Garrett County has served as an east-west transportation corridor, with Interstate 68 replacing U.S. Route 40 as the main highway route through the northern portion of the county in the 1970's. Today Interstate 68 serves as a major trucking route, spanning 29.78 miles across northern Garrett County, passing near the Towns of Grantsville and Friendsville.



I-68 / US 40 Eastbound – Garrett County

Other highway routes in Garrett County include: U.S. Route 50, which is an east-west highway that crosses the southern portion of the county and intersects with U.S. 219 south of Oakland. U.S. 219 is a major north-south route that passes through the Town of Accident and connects U.S. Route 50 and I-68. State Route 38 (Kitzmiller Road) enters the southeastern portion of the county from West Virginia and provides access to the Town of Kitzmiller and intersections with State Route 135. State Route 39 (Hutton Road) enters Garrett County from Preston County, West Virginia, and provides access to the Town of Oakland. State Route 42 (Friendsville Road) enters the county from the north crossing the Mason-Dixon Line, it intersects with I-68 near the Town of Friendsville and continues south where it intersects with U.S. Route 219. State Route 135 enters the eastern portion of the county from Allegany County and provides access to the Towns of Deer Park and Oakland. State Route 495 (Swanton Road) runs north/south and carries traffic from the southern portion of the county northward to I-68 and the Town of Grantsville. State Route 546 (Finzel Road) enters the northeastern corner of Garrett County where it intersects with I-68. State Route 560 (Gorman Road) enters the southern portion of the county from West Virginia, and carries traffic to the Town of Oakland. State Route 669 (Springs Road) enters the county from the north where it intersects with U.S. Route 40 Alt (National Pike) near the Town of Grantsville.

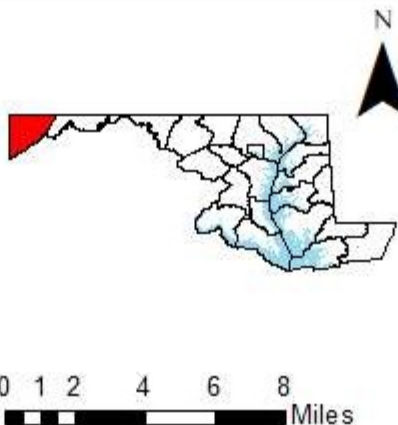
“The Maryland State Highway Administration owns and maintains 194 miles of roadway in Garrett County. The Garrett County Roads Department is responsible for the upkeep of approximately 680 miles of roads and 127 bridges. This includes the design, management and construction of County roads, bridges and associated structures. The eight incorporated towns within the county are responsible for the operation and maintenance of their local roads. There are 64 miles of roadway maintained by the municipalities” (Garrett County Comprehensive Plan, 2022).

Garrett Transit Service is an on-demand response public mass transit system operated by the Garrett County Community Action Committee, which provides transportation for elderly and handicapped residents through a state subsidized bus service. All buses and vans are equipped to handle wheelchairs. Greyhound Bus Lines includes scheduled service along U.S. Route 40 in the northern section of the county as part of its Baltimore-Pittsburgh run.

In addition to highways, Garrett County is serviced by railway infrastructure. During the 1970’s the B&O Railroad became part of the CSX transportation system. CSX serves as both a through rail system and a local rail service to coal mining facilities. There are two existing CSX freight rail lines in Garrett County. Both lines pass through the community of Bloomington, and connect in Luke (in Allegany County) where Verso Corporation was located prior to closing. One line extends from Luke along the North Branch Potomac River, alternately traversing Garrett County and Grant County, West Virginia, before exiting Maryland at Kempton, Garrett County’s southwestern most point. The other line extends from Luke, along the Savage River traversing into Deer Park, Loch Lynn Heights and Oakland, before leaving the county near Hutton. This freight rail line serves a wood-products business in Oakland.

The Garrett County Airport (2G4) located north of McHenry is a general aviation airport surrounded by the mountains of Western Maryland. Garrett County Government owns and operates the airport. The airport enhances the region’s tourism industry and provides emergency air service evacuation and landing facilities for general aviation. The airport has no scheduled commercial air service. The runway has recently been extended to 5,000 feet with a parallel taxiway, construction of a new terminal building as well as twelve new T-Hangars has recently been completed. The closest international airports to Garrett County include Ronald Reagan Washington National Airport, Washington Dulles International Airport, and the Pittsburgh International Airport, all of which are less than 200 miles away.

-  Airport Runway
-  Bridges
-  Interstates
-  U.S. Routes
-  State Routes
-  Miscellaneous Roads
-  Railroads



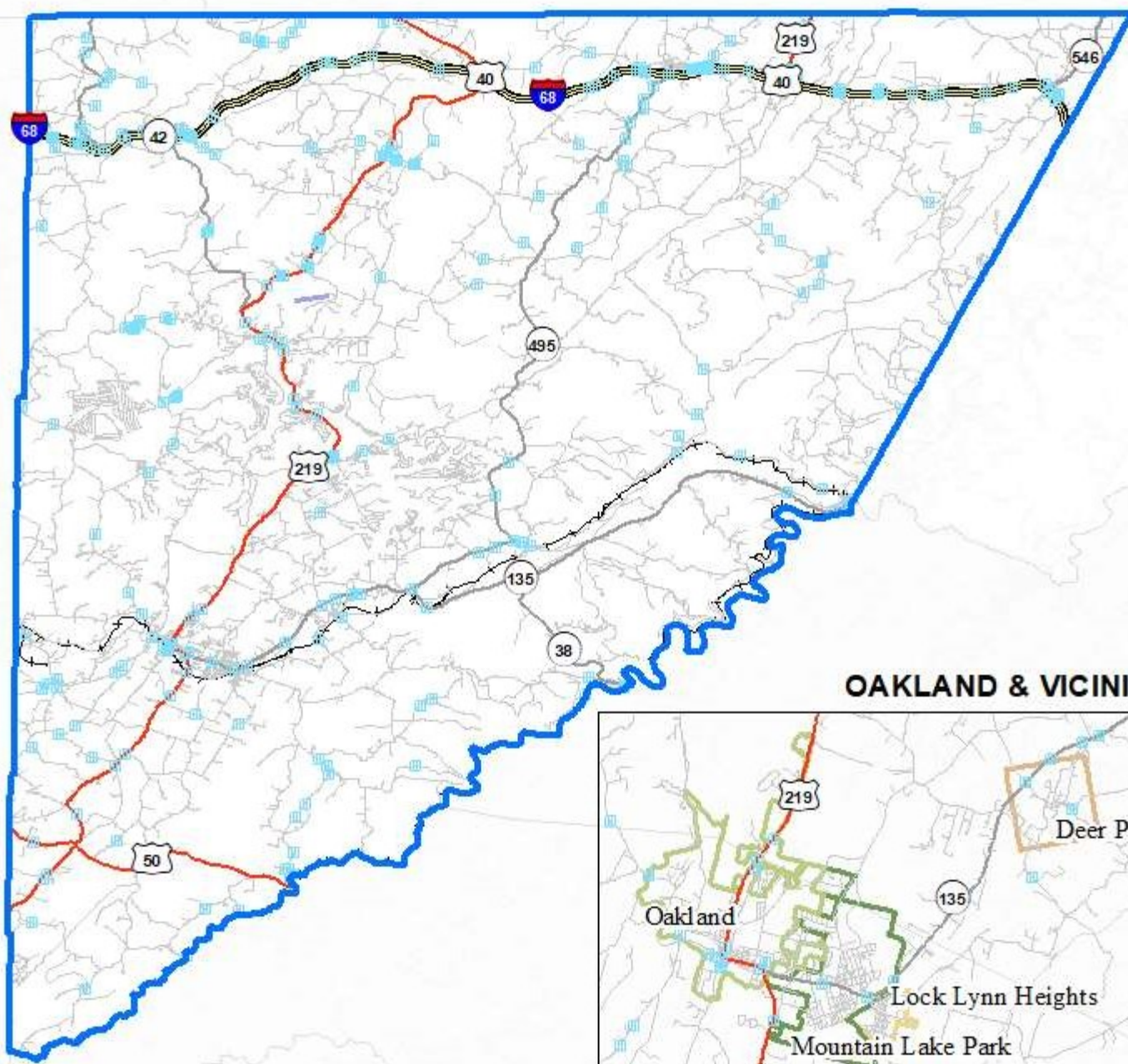
GARRETT COUNTY HAZARD MITIGATION PLAN

Transportation Infrastructure

Data Source(s):
MD GIS Catalog,
US Census (Tiger Data)



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



Utilities

The table below outlines the major utility providers serving Garrett County and its municipalities.

GARRETT COUNTY UTILITY PROVIDERS		
Utility	Name	
Electric	Ambit Energy Clean Choice Energy Direct Energy FirstEnergy Inspire Energy Potomac Edison WGL Energy	
Natural Gas	Columbia Gas of Maryland	
Solid Waste	Deep Creek Refuse Service Garrett County Solid Waste & Recycling Perry's Solid Waste Disposal Sunrise Sanitation Services	
Telecommunications / Cable / Internet	Comcast NeuBeam Shentel Spectrum Suddenlink Verizon Vision Telecommunications Xfinity	
Water / Wastewater Systems	Water Systems Bloomington Carmel Cove Crellin Deer Park Friendsville Gorman Keyser's Ridge Kitzmiller McHenry Mt. Lake Park & Loch Lynn Heights Pee Wee Hill Shallmar Willows	Wastewater Systems Bloomington Chestnut Ridge Crellin Deep Creek Lake Deer Park Friendsville Gorman Hutton Jennings Kitzmiller Meadow Mountain Shady Acres Weber Road

According to the *2022 Garrett County Comprehensive Plan*, all municipalities in the county have public water and sewer service. The unincorporated communities of Bloomington, Crellin, and Gorman also have public water and sewer service. In addition, a large area around Deep Creek Lake is served by a public sewer system managed by the Department of Public Works – Utilities Division. The Deep Creek Lake area also has many private water systems that serve portions of the lake community.

Economy

Since its initial settlement, Garrett County has gone through several phases of economic development, including a period of frontier hunting and trapping beginning before the French and Indian War. The county then saw a period of rapid transportation development when the National Road (later U.S. Route 40) and the Baltimore and Ohio Railroad were built across the county, linking the east coast with the developing mid-western states. The county also experienced a period of agricultural development when much of present day farmland was created, this was followed by a period of resource development when timbering and deep mining of coal created employment opportunities that led to the creation of a number of smaller communities in the county.

In the early 20th century, the railroad and tourism started to decline. Coal mining and timber production continued at a much slower pace. Today, Garrett County has an economy that retains much of its past flavor while attracting new industrial and commercial growth, particularly in the area near the county seat of Oakland. Natural gas production, logging, and farming making up the greatest part of the economic base. Garrett is the only county in Maryland to produce natural gas.

Recreation and tourism has made a dramatic rebound in the county, linked primarily to the construction of Deep Creek Lake and its subsequent development with several secondary home sites located around the lake. During the winter months the Wisp Ski Resort located in Oakland and New Germany State Park's cross-county skiing trail are frequented destinations, and Deep Creek Lake sees a great deal of activity during summer months, and the state parks within the county are frequented year-round.

During the Covid-19 Pandemic, tourism boomed as many people from Washington D.C., Baltimore, and Pittsburgh wanted to get away from densely populated cities. The average sale price for a home within Garrett County jumped approximately \$250,000 from July of 2020 to July of 2021. As of July 2021, the average price for a home in the county was \$642,805, the second-most expensive in Maryland, behind only Montgomery County.

According to 2021 information from the Garrett County Department of Business Development, the largest areas of employment are Trade, Transportation, and Utilities (with an average employment of 2,469 and \$654 in weekly wages), Leisure & Hospitality (with an average employment of 1,704 and \$406 in weekly wages), Education and Health Services (with an average employment of 1,590 and \$813 in weekly wages), and Local Government (with an average employment of 1,326 and \$823 in weekly wages).

Top 10 Employers	Business Type	Total Employed
Garrett Regional Medical Center	Healthcare	502
Beitzel Corp. / Pillar Innovations	Metal Fabrication	403
ClosetMaid Corporation	Storage Products	232
Wisp Resort	4-Season Resort	200*
First United Corporation	Banking Services	192
Goodwill Retirement Community	Nursing Care	190
Appalachian Parent Association	Disability Services	150
Uno Chicago Grill / Arrowhead Deli / Garrett 7 Cinema	Entertainment	150
Dennett Road Manor, Inc.	Nursing Care	145
Total Biz Fulfillment, Inc.	Retail Services	134

Source: Human Resource Offices, Individual Employers, 2018
* Increases to approximately 600 during winter ski season

The unemployment rate in Garrett County had been steadily falling over the past several years, from a high of 5.5% in 2016 to a low of 4.3% in 2019; the unemployment rate jumped back up to a high of 6.6% in 2020, most likely influenced by the Covid-19 pandemic (Garrett County Department of Business Development, 2020). Portions of the economy in Garrett County have seen a moderate change over the past 15 years. The Leisure and Hospitality Sector has seen a 10% increase in employment, and the Local Government Sector has seen a 9% decrease in employment.

Year	Unemployment Rate
2016	5.5%
2017	5.1%
2018	4.6%
2019	4.3%
2020	6.6%

Education

The Garrett County public school system is operated by Garrett County Public Schools, which offer K12 education in modern learning facilities with low student to teacher ratios. There are two public high schools in the county, Southern Garrett High School and Northern Garrett High School, two public middle schools, Southern Garrett Middle School and Northern Garrett Middle School, and seven public elementary schools which include; Accident Elementary, Broad Ford Elementary, Crellin Elementary, Friendsville Elementary, Grantsville Elementary, Route 40 Elementary, and Yough Glades Elementary. There is also one K-8 public school in the county, which is Swan Meadow School.

EDUCATIONAL ATTAINMENT STATISTICS		
	Number	Percent
Population over Age 25	21,472	100%
No high school diploma	1,417	6.9%
High school graduate	19,303	89.8%
Some college, no degree	3,500	16.3%
Associate degree	1,997	9.3%
Bachelor's degree	2,469	11.5%
Master's degree or higher	2,018	9.4%

Source: U.S. Census, ACS 2015-2019

In total, there are 12 public school facilities at which approximately 3,502 students attended and 285 teacher are employed. The current graduation rate is 91.9%, and the expenditures per students is approximately \$17,125. The table above illustrates educational attainment statistics for individuals 25 years of age and over in Garrett County. There are also four private schools in the county including; Bittering Mennonite School, Casselman Valley School, Mountain Top Seventh Day Adventist School, and Swanton Mennonite Fellowship School.



Northern Garrett High School

Post-secondary educational opportunities within the county include Garrett College, which is a two-year accredited public community college located in McHenry. The college has three outreach centers located in Accident, Grantsville, and Oakland. Garrett College currently offers several different associate degrees and certificate programs; including, business management, computer science, dental hygiene, natural resources technology, nursing, paramedic studies, physical therapy, and teacher education.



Garrett College – McHenry, Maryland

Public school enrollment decreased by 138 students from 2019 to 2020, most likely influenced by the Covid-19 pandemic. According to the Maryland Department of Planning, the declining trend in public school enrollment has slowly continued in recent years with 3,550 students in 2022, to 3,520 in 2023. School enrollment is projected to see a slight increase (i.e., approximately 60 students) by the year 2030.

The Ruth Enlow Library, founded in 1915 served as the Oakland free public library. Since then, an additional four branches have been added to the library system located in Accident, Friendsville, Grantsville, and Kitzmiller. The libraries contain physical collections of materials, as well as several on-line resources.

GARRETT COUNTY PUBLIC SCHOOL ENROLLMENT STATISTICS	
Year	Public School Enrollment (Pre-K through 12)
2015	3,682
2016	3,638
2017	3,650
2018	3,662
2019	3,629
2020	3,491
2021	3,570
2022	3,550
2023	3,520
2030 Projection	3,580

Source: Maryland Department of Planning, Public School Enrollment Statistics, 2023

Healthcare

The Garrett Regional Medical Center is an award-winning, Joint Commission-accredited, acute care facility located in Oakland, Maryland. The hospital serves a population of 46,000 within Garrett County and surrounding communities in Maryland, Pennsylvania, and West Virginia. Originally established

in 1950, the hospital has continuously evolved to advance the health and wellness needs of the region. The facility includes 55 inpatient beds; a four-bed intensive care unit; a 10-bed subacute rehabilitation unit; a family-centered maternity



Garrett Regional Medical Center – Oakland, Maryland

suite; a 13-bed outpatient surgical unit with a four-bed surgical suite; and 24/7 emergency services. As a member of the WVU Health System, the hospital offers comprehensive healthcare services to include, cardiopulmonary, heart and vascular, cancer care, infusion therapy, nephrology, orthopedics, and wound care among others.

Garrett Regional Medical Center expanded its healthcare services with the 2019 launch of its Oakland regional behavioral health clinic and the establishment of the Grantsville Medical Center in 2017, offering primary, urgent, and specialty care in northern Garrett County.

There are four nursing homes in Garrett County, including; Cherry Hill Assisted Living, Dennett Road Manor, Goodwill Retirement Community, and the Oakland Nursing & Rehabilitation Center. Additionally, the Garrett County Health Department provides health serves throughout the county. The health department offers adult and child immunizations, nursing services, general health screenings, dental care, behavioral health services, infectious/communicable disease reporting and surveillance, vital records (i.e., birth and death), and environmental health services. The table below illustrates the health and wellbeing facilities located in Garrett County.

HEALTH & WELLBEING FACILITIES			
<i>Behavioral & Mental Health</i>	<i>Medical Facilities</i>	<i>Nursing Homes & Assisted Living</i>	<i>Pharmacies</i>
<ul style="list-style-type: none"> • Garrett County Center for Behavioral Health • Mountain Haven Wellness and Recovery Center • Mindful Roots, LLC • GRMC Regional Behavioral Health Center • Mountain Laurel Medical Center 	<ul style="list-style-type: none"> • Garrett Regional Medical Center • Grantsville Medical Center 	<ul style="list-style-type: none"> • Cherry Hill Assisted Living • Dennett Road Manor • Goodwill Retirement Community • Oakland Nursing & Rehab. Center 	<ul style="list-style-type: none"> • Beachys Pharmacy • Deep Creek Pharmacy • Gregg's Pharmacy • Jarryl M Wolford Pharmacy • Proudfoots Oakland Pharmacy • Revco Discount Drug Center • Walgreens • Walmart

The rate of insurance coverage plays a part in the accessibility of healthcare among a population. The majority of residents in Garrett County have health insurance. Approximately 92.6% of residents age 0 to 64 are insured. This is slightly below the state rate of insured individuals, which is 93.9%, but slightly above the national average, which is 91.2%.

Residents of Garrett County are slightly less likely to be insured compared to Maryland residents as a whole. According to information obtained from the U.S. Census Bureau, the percentage of individuals with a disability in Garrett County is exactly the same as the percentage for the State of Maryland at 11.9%.

Land Cover / Climate

Garrett County is a natural resource-rich county. Of the 647 square miles of land area, approximately 90% is comprised of resource lands; primarily forest and agricultural land. Approximately 10% is comprised of developed lands. Approximately 25% of the county's land area is regulated or protected by virtue of federal, state, or county ownership (primarily state forest and parks); utilities; wetlands; or the presence of protective easements established through agricultural or other preservation programs. The entire Bear Creek Watershed in the northern portion of Garrett County is a state-designated Rural Legacy Area, an area of focused land conservation efforts.



Agricultural Land – Garrett County

“Approximately 707 individual farms operate in Garrett County, with an average size of 128 acres per farm” (Census of Agriculture, 2017). The topography of Garrett County is relatively rugged and mountainous which does offer protection against strong straight line winds and tornadoes that may form and touchdown; however, lends its self to possible increases in landslides, severe winter weather, and wildfires.

Garrett County has a humid subtropical climate, except at its higher elevations. This statement carries extra weight for Garrett County, as elevations range from 3,360 feet above sea level at Hoyer-Crest, a summit along Backbone Mountain which is the highest point in that State of Maryland, to 500 feet in the broad flats that lie below the ridge crests. The climate is predominantly influenced by air from the west. There is considerable variation in seasonal temperatures, with none of the temperatures being considered severe. The climate of Garrett County is seasonal in nature, with wet stormy springs, hot humid summers, colorful falls, and cold winters. Due to its mountainous terrain and relatively high elevation the county is susceptible to heavy rains and winds during summer thunderstorms and heavy snowfall and blizzard conditions during the late fall and winter months.

High July temperatures average in the upper 70s°F, while low averages are in the mid to upper 50s°F. Temperatures above 90°F in the summer are rare. January highs average about 33°F, with lows in the lower 20s°F. Temperatures around, or even below 0°F occur during most winters. The average annual temperature in the Allegheny Mountains is 49.4°F, and 52.8°F in the Ridge and Valley. Mean annual temperature decreases by 2.9°F for each 1,000 foot increase in elevation (Pauley, n.d.).

Temperatures usually average 5-10 degrees cooler in Garrett County than in the rest of Maryland. In fact, according to the National Weather Service, the coldest temperature recorded in the state was -40°F occurring in January 1912, and was recorded in Garrett County.

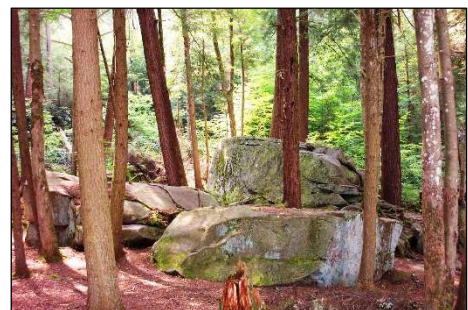
The mean annual precipitation for Garrett County is 44.6 inches, of which a significant portion falls as snow and ice between the months of November and March. Most communities in Garrett County record an annual snowfall of 92 inches. Some communities at higher elevations, like Bittinger, at an elevation of 2,700 feet, receives on average, more than 100 inches of snow per season. In addition, the county often experiences dense fog conditions following precipitation events, creating low hanging clouds that severely hamper visibility. These events occur an average more than 50 times per year. Temperature inversions, which are common in winter, cause foggy conditions, particularly when warmer air contacts accumulated snow. Occasionally these fog events will last several hours and have a greater impact on transportation than snow or ice.

Attractions

The county contains over 76,000 acres of parks, lakes, and publicly accessible forestland. Popular activities in the county include camping, hiking, backpacking, rock climbing, alpine and cross-country skiing, snowmobiling, hunting, ice fishing, fly fishing, whitewater canoeing, kayaking, rafting, boating, swimming, sailing, horseback riding, and water skiing.

There are seven state parks in Garrett County. All offer picnic and fishing areas; all but Casselman River State Park have hiking paths. Mountain bike paths, swimming areas, and boat launches and rentals are available at Deep Creek, Herrington Manor, and New Germany state parks. Rental cabins are available at Herrington Manor and New Germany state parks. Big Run, Deep Creek, Herrington Manor, and New Germany state parks all offer canoeing, while campsites may be found at Big Run, Deep Creek, New Germany, and Swallow Falls state parks.

Swallow Falls State Park is a public recreation area located on the west bank of the Youghiogheny River nine miles northwest of Oakland. The park features Maryland's highest free-falling waterfall, the aforementioned 53-foot Muddy Creek Falls. The park is notable for its stand of old hemlock trees, some more than 300 years old, "the last stand of its kind in Maryland".



Hemlock trees in Swallow Falls State Park

Deep Creek Lake State Park occupies more than 1,100 acres on the northeast side of Deep Creek Lake approximately 18 miles south of Interstate 68 on U.S. Route 219. The lake was created on a tributary of the Youghiogheny River, with the completion of the Deep Creek Dam by the Pennsylvania Electric Company in 1925. It is Maryland's largest freshwater lake with 65 miles of shoreline. The state took charge of recreation on the lake in 1980, in 2010, the Appalachian Regional Commission funded a study of potential development at



Deep Creek Lake

Deep Creek Lake. An official tourism website promoting the lake was launched soon after by the Garrett County Chamber of Commerce. Lake activities include motor boating, water skiing, swimming, fishing, and canoeing, as well as a campground with 112 campsites, 26 with electricity.

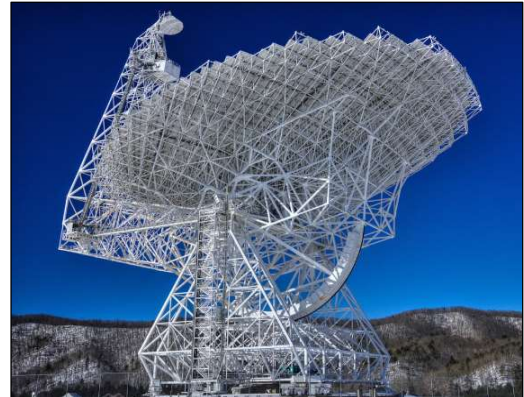
Wisp Resort is located in far-west Garrett County next to the scenic Deep Creek Lake. Wisp is the only ski resort in Maryland and is a destination resort. Visitors are rewarded with snow conditions that are often better than other resorts in the region, thanks to Wisp's western location in the "snow belt" of Maryland which averages 100 inches of snow each year. The slopes have a vertical drop of 700 feet, with 33 trails (24% beginner, 45% intermediate and 33% expert), 137 skiable acres, 13 lifts and night skiing. The resort also offers twelve, 750 foot long tube chutes services by two conveyor carpet lifts.



Wisp Report – Garrett County, MD

The county also has numerous whitewater rafting locations and is home to one of the only two recirculating whitewater courses in the western hemisphere. A man-made whitewater course is located near Wisp Resort in McHenry, and was the site of the International Canoe Federations 2014 world whitewater paddling championships.

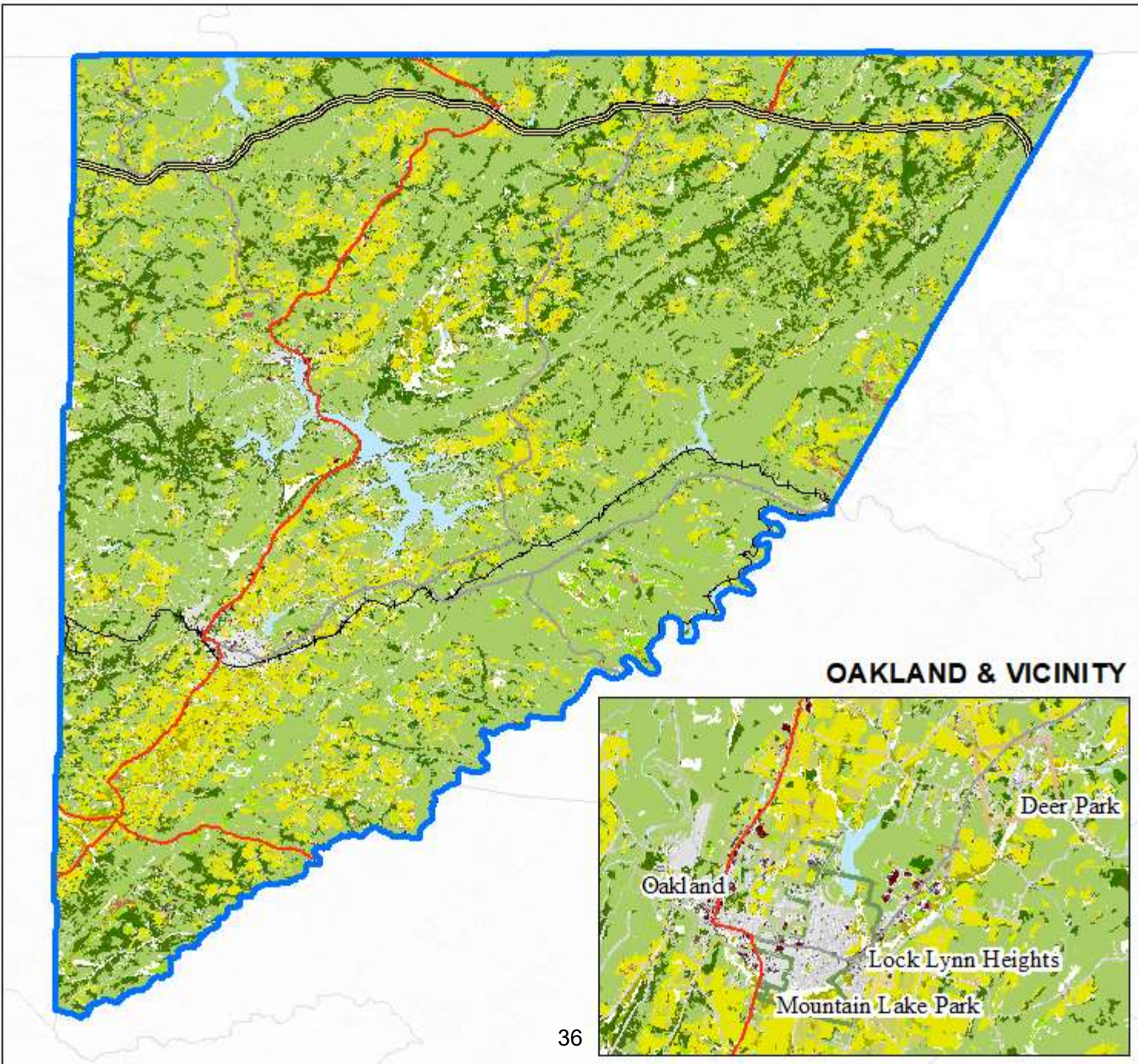
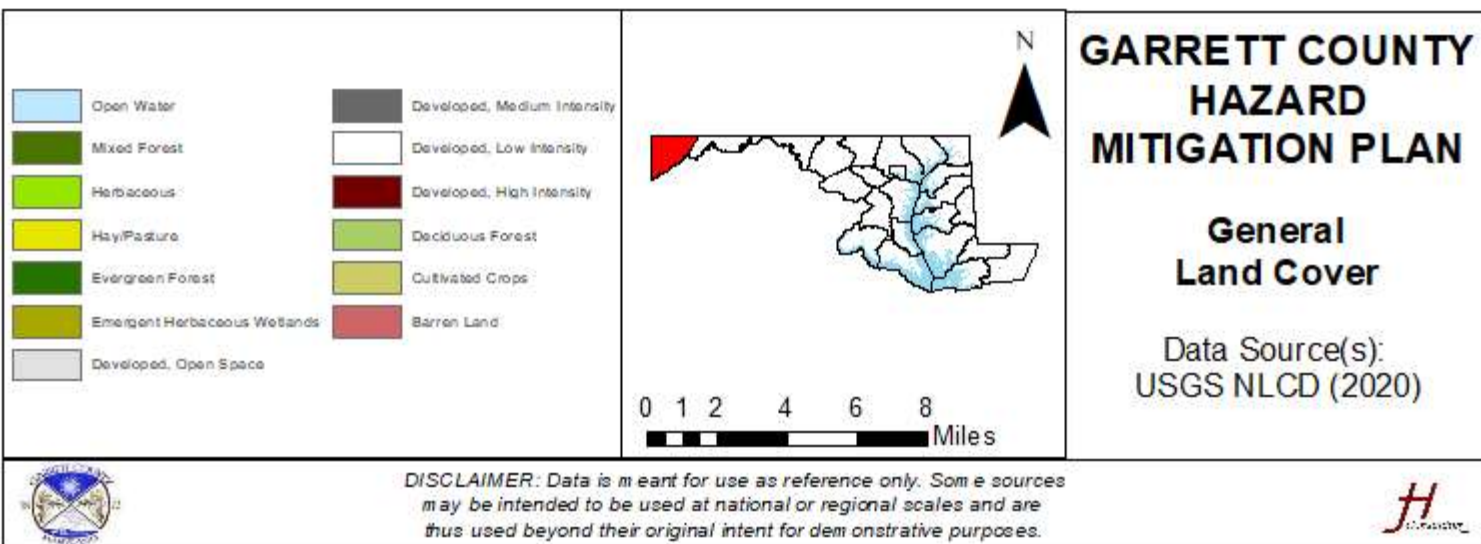
The extreme southern portion of the county lies within the United States National Radio Quiet Zone which is an area of nearly 13,000 square miles located in the mountainous eastern United States in which radio transmissions are restricted to aid scientific research and military intelligence facilities.



A radio-telescope at Green Bank Observatory

Other attractions include annual celebrations such as the Autumn Glory Festival which is a five day celebration of autumn that celebrates the beauty of the local fall foliage and features a grand parade. The Garrett County Celtic Festival is held annually at the Friendsville Community Park on Old River Road in Friendsville, and celebrates the Celtic culture which in modern times may be via dance, Celtic music, food, and Celtic art. The Little Yough Summer Music Festival is a free summer concert series which takes place at the Mountain Fresh Pavilion in the heart of the Oakland Arts & Entertainment District every Friday evening from July through September. The festival showcases area and regional singers, songwriters, and talent. The Garrett County Agricultural Fair is held annually during the month of July.

There are 20 properties and districts listed on the National Register of Historic Places in Garrett County, including Casselman Bridge, and National Road which is a national historic landmark. The Garrett County Historical Society and Museums include a historical museum, a transportation museum, the Grantsville Museum, and the Leo Beachley Photographic Archives.



1.2.2 Municipalities

This section provides demographics and other general details for each of the participating jurisdictions in Garrett County.

Town of Accident

The Town of Accident is located in northwestern Garrett County north of Deep Creek Lake, along U.S. Route 219 in the center of a large agricultural area.

Accident was one of the early settlements in the far west of Maryland, and was incorporated in 1916. The town has been noted for its unusual name, a person from Accident is called an “Accidental”. The name originates about the time of the 1786 land survey. Though the origin or meaning of the name is unknown, one popular story is that a grant of land was given to Mr. George Deakins by King George II, of England, in payment of a debt. According to the terms, Mr. Deakins was to receive 600 acres of land anywhere he chose in Western Maryland. Mr. Deakins sent out two corps of engineers, each without knowledge of the other group to survey the best land in the area. After the survey, the engineers returned with their maps of the plots they had surveyed. To their surprise, they discovered they had surveyed a tract of land starting at the same tall oak tree and returning to the start point. Mr. Deakins chose this plot of ground and had it patented “The Accident Tract”, hence, the name of the town.



The Town of Accident has a total area of 0.49 square miles, all of which is land (U.S. Census Bureau). The town is positioned at a general elevation of 2,385 feet in the plateau region of the Appalachian Mountains. The town has a population density of 690 persons per square mile.

The primary method of transportation to and from Accident is via roadway. One state-maintained highway, U.S. Route 219, serves the town directly, following Main Street through the middle of the town. To the north, U.S. Route 219 connects Accident to Interstate 68 and U.S. Route 40, along with the Town of Grantsville before heading into Pennsylvania. Heading south, U.S. Route 219 connects to State Routes 42, 39, 135 and U.S. Route 50, along with the Towns of Oakland and Mountain Lake Park, before it enters West Virginia.



James Drane House – NRHP listed 1985

Public education in the Town of Accident is provided by Garrett County Public Schools. Campuses serving the town include Accident Elementary which offers Pre-K (3-years old) through fifth grade levels and is a Maryland 5-Star rated school, as well as Northern Garrett Middle School, and Northern Garrett High School. Garrett College is a public community college located in McHenry, Maryland. The college has three outreach centers, one of which is located in the Town of Accident. The town also contains one of the four branches of the Ruth Enlow Library. Approximately 19.2% of the population has obtained a Bachelor's of Science Degree.

The Town of Accident has a volunteer fire department, planning and zoning department, public works department, and road maintenance garage. Two buildings within the town are listed on the National Register of Historic Places, the Kaese Mill was listed in 1984, and the James Drane House listed in 1985.

The Town of Accident hosts their annual Accident Fourth of July Homecoming on July 4th which features a parade, food, games and music. Accident also hosts an annual town-wide yard sale on the second Saturday of July, and a Concert in the Park held on a Sunday in September at the pavilion at Town Park West.

The town is also home to four town owned parks and a pond. The Town Park West located on the western end of Wood Street contains a large pavilion which is used for reunions, birthday parties and many more activities that require a large pavilion with picnic tables and restrooms. There is also a sliding board, seesaw and swing set located near a pavilion. The Town Park East which is located on the southern end of South Street. It contains a full playground with equipment for all ages. Park East also contains the little league field used by the Central Garrett Little League for Softball, t-ball and baseball. The concession stand and restrooms are located near the ballfield. The park also contains a quarter-mile walking trail, pitching booth, eight horseshoe pitching pits, tennis court and a small pavilion.

Accident Community Pond is located at the corner of Cemetery Road and North South Street. The pond is stocked several times a year by the State of Maryland. With a donation received from the estate of Francis and Olive Spoerlein, the town was able to clean and install an aeration fountain in 2017 to increase the water's health for the fish.

Veteran's Park is located at the intersection of South Main Street and Main Street Extended. The Accident American Legion Post #208 had a memorial built and sponsored a "Buy a Brick" campaign to form a memorial walk around the monument with bricks engraved with the names of United States veterans from the Accident area. Marjorie Fratz Memorial Park is located next to the Town Hall at 104 South North Street. Ms. Fratz was town clerk for over 10 years and was very instrumental in obtaining funding to restore the Drane House.



Data from the 2020 U.S. Census Bureau shows the total population of Accident at 338 people. With 161 housing units in the town, there is an estimated 2.10 persons per household. The median household income for the town is \$54,333. The median age for the town is 32.6 years old, making it the youngest population in Garrett County, with only 15.9% of residents being over 65, and 22.3% of the population being under the age of 18, which is the highest percentage in Garrett County. Accident is the only municipality in Garrett County with a media age younger than the states median age of 39.7. Approximately 25.8% of the population is below the poverty line as determined by the U.S. Census Bureau. Approximately 16.6% of the population suffers from a disability the lowest percentage in Garrett County, and only 2.3% currently do not have healthcare coverage, that is the lowest percentage in Garrett County and is lower than the state percentage of 6.1.

Town of Deer Park

The Town of Deer Park is positioned in southern Garrett County just east of the towns of Mountain Lake Park and Oakland within the Little Youghiogheny River watershed. Deer Park is primarily residential in nature and is part of the Pittsburgh Media Market.

The Town of Deer Park traces its history back to the 1770s, long before Garrett County was established. The town was part of property owned by Lord Baltimore and was originally surveyed on April 14, 1774, the town incorporated in 1884. Deer Park saw immense growth during the mid to late 1880s, primarily because of the Baltimore and Ohio Railroad. The Deer Park Hotel, constructed in 1872, served as the focal point for visitors who came to the mountaintop to enjoy the area's scenery and cool temperatures during the summer months. Numerous large cottages were subsequently erected and made available to wealthy visitors. President and Mrs. Grover Cleveland spent their first night of their honeymoon in Deer Park, on June 3, 1886.

As automobiles became more readily available in the early 1900s, transportation was no longer limited to railroad service, and Deer Park lost its appeal as a vacation destination. The fortunes of the town took a gradual downturn.



Deer Park Hotel

Fires and demolitions have destroyed many of the fine homes and hotels that once were abundant in the area. Pennington Cottage was listed on the National Register of Historic Places in 1976, and Glamorgan was listed in 1984.

Several grocery stores and gas stations throughout the Mid-Atlantic offer bottles of Deer Park Natural Spring Water, this prolific brand is a household name, and while its parent company is now headquartered in Connecticut, it has humble beginnings in Maryland, born just south of the railroad tracks in its namesake, making Deer Park one of the oldest water companies in the United State. Water from the spring, which gushes forth 150,000 gallons a day, has been bottled and sold as Deer Park Spring Water since 1873.

The Town of Deer Park has a total area of 1.00 square mile, all of which is land. The town has a population density of 303 persons per square mile making it the least densely population municipality in the county. The general elevation of the town is 2,510 feet making it the highest incorporated town in the county.

The main method of transportation to and from Deer Park is by roadway. The major thoroughfare accessing the town include State Route 135. State Route 135 runs east-west across southern Garrett County, connecting with State Route 495 to the east and State Route 560 and U.S. Route 219 to the west. State Route 135 itself provides access to the towns of Mountain Lake Park and Oakland to the west and to Luke and Westernport to the east. Via State Route 495, the town of Grantsville is accessible, while State Route 560 provides access to Loch Lynn Heights.

Public education in the Town of Deer Park is provided by Garrett County Public Schools. Campuses serving the town include Southern Garrett High School, Southern Garrett Middles School, and Broad Ford Elementary School. Approximately 13% of the population has obtained a Bachelor's degree. The town is also home to the Central Garrett Industrial Park which houses the Garrett College Career Technology Training Center, Garrett Container Systems, Phenix Technologies and Quality Machining. The town also has a fire department, police department, and water and wastewater department.

Information obtained from the 2020 Census indicates that the Town of Deer Park has a total population of 303, of which approximately 13.6% are under the age of 18 and 27.6% are over the age of 65. The median age of the town is 52.5 making its population the second oldest amongst the municipalities of Garrett County. The town also had the second highest percentage of non-English speaking individuals at 4.3% of the population. There are 155 housing units in the town with an estimated 1.95 persons per household.

The median household income for the town is \$50,536, with approximately 19.9% of the population of the town living below the poverty line. Approximately 19% of the town's population suffers from a disability, and only 5.3% of population do not have health care coverage.

Town of Friendsville

The Town of Friendsville is positioned in the northwestern corner of Garrett County along the Youghiogheny River. Friendsville is named after its first European settler, John Friend, who came to what is now Garrett County before the American Revolution. Many of Friend's descendants live in Garrett County today, and the headquarters and library of the Friend Family Association are in Friendsville because of this connection. Friendsville is Garrett County's oldest settlement established in 1763, the town was officially incorporated in 1902.



The Unique Milling Company was established by local business man Leslie Friend. The facility was constructed to specification to house milling equipment inside. The mill provided milling for the local farmers and produced all sorts of milled grain, from flour to dog food. It was one of the first electric mills west of the Allegheny Front.

The Town of Friendsville has a total area of 1.00 square mile, all of which is land (U.S. Census Bureau). The town has a population density of 438 persons per square mile. The general elevation of the town is 1,499 feet making it the lowest incorporated town in the county.

The main mode of transportation to Friendsville is by road. Interstate 68 passes through the town, with access provided via an interchange at State Route 42. State Route 742 also serves Friendsville, following the old alignment of State Route 42 through the center of town. The town also maintains its own water and wastewater facilities.

Students in Friendsville are served by Garrett County Public Schools. Campuses serving the town include Northern Garrett High School, Northern Garrett Middle Schools and Friendsville Elementary School. The town contains one of the four branches of the Ruth Enlow Library. Approximately 12% of the town's population have obtained a Bachelor's degree.



Whitewater Section on Youghiogheny River

Friendsville may be most well-known for their world-class whitewater rafting and kayaking on the Youghiogheny River, whitewater enthusiasts have come from around the country, and even the globe to take on the Class IV/V rapids.

Riverside Community Park hosts the Garrett County Celtic Festival each June featuring Celtic music, Irish dancers, pipes and drum bands, workshops, food and more. The town is also home to a wide variety of outdoor activities including excellent trout fishing on Bear Creek and the Youghiogheny River, shopping, and the only winery in Garrett County.

According to 2020 census data, the Town of Friendsville has a population of 438 people, there are 251 housing units in the town creating an estimated 1.75 persons per household. Approximately 17% of the population is under the age of 18 and 27.3% is over the age of 65, the median age of the town is 52.9, making the town's population the oldest amongst the municipalities of Garrett County and significantly older than the median age of the state at 39.7. Approximately 12% of the town's population is Hispanic. The median household income of the town is \$44,375, and approximately 18.7% of the populace lives below the poverty line. Approximately 32% of the population of the town suffers from a disability, this is the highest percentage in Garrett County, and is well above the state percentage of 11.9.

Town of Grantsville

The Town of Grantsville is located in northern Garrett County just below the Mason Dixon Line near the junction of U.S. Route 219 and Interstate 68 along old U.S. Route 40. The town is located a half mile west of the Casselman River and such that it provides easy access to five state parks and is 20 miles from the popular Deep Creek Lake area.

In 1785, Daniel Grant of Baltimore acquired a 1,100 acre tract of land called "Cornucopia." The town of Grantsville is located in the center of this tract, named in honor of Daniel Grant. Little Crossings was the town center of those days. It was located where we find Stanton's Mill and the old Casselman Bridge today. This area was mostly wilderness but saw traffic from such famous men as George Washington and General Braddock. The area began as a small Amish and Mennonite settlement, and later flourished as a stop along the nearby National Road, U.S. Route 40. The Town of Grantsville was incorporated in 1864.



The main mode of transportation to Grantsville is by road. Interstate 68, U.S. Route 40 and U.S. Route 219 all traverse Grantsville via the National Freeway, an east-west freeway traversing western Maryland and northern West Virginia. Direct access to Grantsville is provided by an interchange with State Route 495. U.S. Route 40 Alternate, and State Route 669 also serve Grantsville. Grantsville was served by Greyhound bus until 2005.

Since January 2011, it has been served by a Bayrunner Shuttle that originates in Grantsville and serves Frostburg, Cumberland, Allegany College of Maryland – Cumberland Campus, Hancock, Hagerstown, Frederick Transit Center, Frederick Airport, BWI Amtrak Station, and Baltimore Greyhound Station.

The town covers an area of 1.04 square miles, all of which is land and has a population density of 931 persons per square mile. The general elevation of the town is 2,303 feet.

Students in Grantsville are served by Garrett County Public Schools. Campuses serving the town include Northern Garrett High School, Northern Garrett Middle Schools, Grantsville Elementary School and Route 40 Elementary School. Garrett College is a public community college located in McHenry, Maryland. The college has three outreach centers one of which is in the Town of Grantsville. The town contains one of the four branches of the Ruth Enlow Library. Approximately 26.1% of individuals in Grantsville have obtained a Bachelor's degree.

There are several attractions located in Grantsville along the Historic National Road including, Casselman River Bridge State Park. When the Casselman River Bridge was constructed in 1813 it was the largest single-span stone arch bridge in the world. It is a designated National Historic Landmark and is listed on the National Register of Historic Places. The Casselman Inn sits in the center of town, where it has provided food and lodging to travelers since 1824. A sign outside displays a replica 1842 stagecoach advertisement. Grantsville is a designated Arts & Entertainment District and the town's Spruce Forest Artisan Village, plays a significant role in that designation. Spruce Forest Artisan Village founded in 1957 by Alta Schrock, is a part of the extended Penn Alps campus and has grown from a few cabins to some 12 log and frame structures of early vintage, two of which date to the Revolutionary War Period. Near the Casselman Bridge, are Penn Alps Restaurant which is housed in the last log hospitality house on the National Pike. It is situated between a 1797 gristmill and the Casselman Bridge.



Casselman River Bridge State Park

Grantsville is home to Big Run State Park, which is situated at the mouth of the Savage River Reservoir and surrounded by the Savage River State Forest. Big Run offers rustic camping opportunities with 30 unimproved campsites and a youth group camping area. Campers at Big Run have easy access to fishing, boating, hiking or hunting opportunities.

Savage River State Forest is Maryland's largest state forest with 55,185 acres of forestland, streams and wildlife habitat.

Data from 2020 Census show the total population of Grantsville is 968. The median age of the town is 47, and approximately 30.4% of the town's population is over the age of 65 this is the highest percentage among the municipalities of Garrett County and is significantly above the state's percentage of 16.9. There are 417 housing units in the town, with an estimated 2.32 persons per household. The town's homeownership rate is 38.8% the lowest in Garrett County. The median household income for the town is \$37,917, and approximately 27.5% of the town's population live below the poverty level, the highest percentage in Garrett County. The U.S. Census Bureau indicates that approximately 24.5% of the population suffers from a disability, and only 3.7% of the populace do not have health insurance. Grantsville also has the highest percentage of individuals that speak a language other than English in Garrett County at 6.2% of the population.

Town of Kitzmiller

The Town of Kitzmiller is located in southeastern Garrett County in an area rich with natural resources, along the North Branch of the Potomac River above the Bloomington Dam. The Town was incorporated in 1906. According to the U.S. Census Bureau the town has a total area of 0.25 square miles, of which 0.22 square miles in land, and 0.03 square miles in water. Kitzmiller is the smallest municipality of Garrett County with regards to land area. The town has a population density of approximately 1,200 persons per square mile. The town sits at a general elevation of 1,604 feet above sea level, steeply sloping terrain (i.e., gradients of 20-25% and 30% or greater), along with the Potomac River floodplain and its associated wetlands characterizes much of Kitzmiller.



The first Europeans came to the Kitzmiller Valley around 1740. An entrepreneur, Mr. Ebenezer Kitzmiller moved to the area with a dream of starting a mill. Kitzmiller built a woolen mill in 1853 which produced wool of such superior quality that clothing and blankets made from the mill were prized by woodsmen and lumbermen from Canada to the Gulf of Mexico. In 1877 the Government was working to establish a post office and the town needed a name. Since the citizens respected Ebenezer for his contributions to the community's well-being, they insisted on naming the town after him.

The main method of transportation to and from Kitzmiller is by road. State Route 38 is the only state highway serving the town, connecting northward to State Route 135 near Altamont and southward across the North Branch Potomac River to West Virginia Route 42 in Blaine.

Students in Kitzmiller are served by Garrett County Public Schools. Campuses serving the town include Southern Garrett High School, Southern Garrett Middle Schools, and Broad Ford Elementary School. The town contains one of the four branches of the Ruth Enlow Library. Approximately 8% of the town's population has obtained a Bachelor's degree, this is the lowest percentage among the municipalities of Garrett County, and significantly below the state's percentage of 43.8

The Kitzmiller Volunteer Fire Department was organized in June of 1932. Today, the fire department owns and operates nine different apparatuses to provide fire protection and suppression, with 21 firefighters, five emergency medical technicians, and seven swift water technicians.

Attractions within the town include the Kitzmiller River Walk atop the Kitzmiller floodwall which follows the North Branch of the Potomac River. This walk offers peaceful, scenic views along with excellent opportunities for recreation, like fishing and swimming. While this river is calm and peaceful most of the time, it has caused some major flooding, which is reason the floodwall was established in 1964 by the Army Corp of Engineers, Mayor and Town Council, and the County Commissioners. The floodwall failed on March 31, 1924, according to Newspaper articles, flood waters swept away 15 homes, two of which struck the bridge that spanned the river forming a dam that resulted in severe flooding across the entire town. During this flood, a family of five was lost due to the swift waters.



Kitzmiller River Walk / Floodwall

The floodwall failed on March 31, 1924, according to Newspaper articles, flood waters swept away 15 homes, two of which struck the bridge that spanned the river forming a dam that resulted in severe flooding across the entire town. During this flood, a family of five was lost due to the swift waters.

Kitzmiller is also home to Garrett County's Wolf Den Run State Park, a 2,039 acre multi-use park that offers hiking, biking, fishing birdwatching, hunting and ORV (off-road vehicle) riding. The park comprises three distinct parcels, including unique rocky bluffs, approximately three miles of river access on the Potomac River's North Branch, and two cold water trout streams, Short Run and the park's namesake, Wolf Den Run.

Wolf Den Run State Park protects areas of sensitive wetland ecosystems in the Huckleberry Rocks area and protects and provides access to the cold water trout streams.

Information made available by the 2020 census indicates that the Town of Kitzmiller has a population of 300 people, making it the least populated municipality in Garrett County. The median age of the town is 48.2 with approximately 20% of the population being over the age of 65 and 17% being under the age of 18. There are 147 housing units in the town with an estimated 2.04 persons per household. The town has the highest homeownership rate in Garrett County at 77.7%, this is also above the state percentage of 67.7%. The town has a median household income of \$45,208 and approximately 22.5% of the town's population live under the poverty line. U.S. Census Bureau information suggests that 24.1% of individuals in Kitzmiller suffer from a disability and only 5.4% do not have health care coverage.

Town of Loch Lynn Heights

The Town of Loch Lynn Heights is located in southwestern Garrett County near the Towns of Oakland and Mountain Lake Park, approximately eight miles south of Deep Creek Lake. Loch Lynn Heights was incorporated in 1896. Once known for its resort industry, the town is now primarily residential in nature.

Like Deer Park, Loch Lynn Heights became a popular resort area once the B&O Railroad came to town. Trains carried visitors from Baltimore, Washington or Pittsburgh to the station in Mountain Lake Park, just across from Loch Lynn Heights. The most popular destination, Loch Lynn Hotel, was destroyed by a fire in 1918, and the adjacent casino - once home to an indoor swimming pool and bowling alley - was demolished in 1985. On May 19, 1967 an F3 tornado struck the town, resulting in one fatality. The tornado reportedly lifted and threw a small framed house approximately 100 yards.



According to the United States Census Bureau, the town has a total area of 0.32 square miles, all of which is land. The town has a population density of approximately 1,541 persons per square mile and is the most densely populated municipality in Garrett County. The town sets at a general elevation of 2,448 feet.

The main method of travel to and from Loch Lynn Heights at present is by road. The only state highway directly serving the town is State Route 560, which head south to U.S. Route 50 in Gorman and north to State Route 135 in Mountain Lake Park.

The town is home to a wetlands trail, with a one mile boardwalk and gravel trail traversing through the wetlands surrounding the Little Youghiogheny River.

Students in Loch Lynn Heights are served by Garrett County Public Schools. Campuses serving the town include Southern Garrett High School, Southern Garrett Middle Schools, Broad Ford Elementary School, and Yough Glades Elementary School. Approximately 16.2% of the town's population have obtained a Bachelor's degree.

Data from the 2020 census indicates that the Town of Loch Lynn Heights has a population of 493 people. The median age of the town is 41.8 with approximately 23.5% of the population being over the age of 65 and 15.3% being under the age of 18. There are 217 housing units in the town with an estimated 2.27 persons per household. The town has a high homeownership rate at 73.7%, this is above the state percentage of 67.7%. The town has a median household income of \$49,808 and approximately 10.6% of the town's population live under the poverty line which is the lowest percentage in Garrett County. U.S. Census Bureau information indicates that 18.9% of individuals in Loch Lynn Heights suffer from a disability and 6.9% do not have health care coverage, this is the highest percentage among the municipalities of Garrett County.



Loch Lynn Heights Wetland Trail

Town of Mountain Lake Park

The Town of Mountain Lake Park is located in southwestern Garrett County, near the county seat of Oakland. The town was established in 1881 as a Chautaugua Summer Resort. On September 3, 1881, four men from Wheeling, West Virginia, and one man from Oakland, Maryland, rode through "Hoyes Big Pasture," now known as Mountain Lake Park, looking for suitable grounds to establish a summer resort founded upon Christian principles, and designed to afford opportunities for religious and literary instruction and healthful recreation.



This wild picturesque spot found "favor in their eyes," and the four gentlemen returned to Wheeling, West Virginia, to recommend to their associates the location of this resort in the Glade region of the Allegheny Mountains. In May 1882, J. M. Jarboe, of Oakland, began the erection of the famous Mountain Lake Hotel. From 1890 to 1900 the Mountain Lake Hotel doubled its capacity; Hotel Dennett and Hotel Chautauqua were enlarged. Hotel Columbia and Mt. View Home had been built.

The 85 original buildings had increased to 200 or more. The town was incorporated in 1931, the last municipality to be incorporated in Garrett County.

Once a booming summer resort town, many of the historic buildings from yesteryear remain today. The Mountain Lake Park Historic District, a group of 145 buildings lying within the town of Mountain Lake Park, was listed on the National Register of Historic Places in 1983. 61 original structures remain in Mountain Lake Park today.



Mountain Lake Park Train Station

According to the United States Census Bureau, the town has a total area of 2.01 square miles, of which 1.94 is land and 0.07 square miles is water. The town has a population density of approximately 1,068 persons per square mile making it the second most densely populated municipality in Garrett County. The town sits at a general elevation of 2,454 feet. Mountain Lake Park is the second largest incorporated municipality in Garrett County with regards to land area and contains a large portion of the county's economic assets and critical infrastructure.

The main method of travel to and from Mountain Lake Park is by road. Several state-maintained highways serve the town, the most prominent of these being U.S. Route 219 (Garrett Highway). US 219 brushes the western edge of Mountain Lake Park on Garrett Highway on its north-south journey across the region. To the south, US 219 connects to U.S. Route 50 before entering West Virginia. Heading north, U.S. 219 passes through the towns of Oakland, Accident and Grantsville while having junctions with State Routes 39, and 42, U.S. Route 40, and Interstate 68 before heading into Pennsylvania. State Route 135 and 560 also serve Mountain Lake Park, with State Route 135 providing connections eastward towards Deer Park and Luke, while State Route 560 heads south through Loch Lynn Heights to Gorman.

Students in Mountain Lake Park are served by Garrett County Public Schools. Campuses serving the town include Southern Garrett High School, Southern Garrett Middle School, Swan Meadow School, Broad Ford Elementary, and Yough Glades Elementary School. Approximately 21.3% of the town's population have obtained a Bachelor's degree.

Data from the 2020 census indicates that the Town of Mountain Lake Park has a population of 2,147 making it the most populous municipality in Garrett County. The median age of the town is 44.3 with approximately 24.4% of the population being over the age of 65 and 20.0% being under the age of 18. The town also has the most diverse population in the county, 15% of the population is African American, 10% is Asian, and 28% is Hispanic.

There are 999 housing units in the town with an estimated 2.15 persons per household. The town boasts a median household income of \$55,000 and approximately 13% of the town's population live under the poverty line. U.S. Census Bureau information indicates that 19.5% of individuals in Mountain Lake Park suffer from a disability and only 5.6% do not have health care coverage.

Town of Oakland

The Town of Oakland is positioned in southwestern Garrett County just north and west of the towns of Loch Lynn Heights and Mountain Lake Park. The town is situated in a small valley a few miles from the source of the Potomac River, which flows directly into the Chesapeake Bay. The town was incorporated in 1862, making it the first incorporated municipality in the county. The town serves as the county seat of Garrett County and is part of the Pittsburgh media market.



The town is home to a historic B&O railroad station, which was listed on the National Register of Historic Places in 1973, and was restored in the 2000s. Trains still run on the rail tracks behind the station, but it is mainly used for special organizations or gatherings at present. In the late 19th century and early 20th century, a large hotel named the Oakland Hotel was located near the downtown railroad station. It was constructed in 1878 by the B&O Railroad. The hotel was a major tourist attraction for that time period until it was torn down in the early 20th century.

Main Street of Oakland consists mainly of historic two to four story edifices that house the main shopping facilities in the area, such as a theatre, museum, book store, a local pharmacy, antique shops, clothing stores and banks. Many of the homes and businesses in the downtown area are examples of Victorian architecture. Much of the central section of Oakland is part of the Oakland Historic District, listed on the National Register of Historic Places in



Second Street in Oakland (part of the Oakland Historic District)

1984. One of the most prominent and historic churches in Oakland is St. Matthew's Episcopal Church, where U.S. Presidents Ulysses S. Grant, James Garfield, Grover Cleveland, and

Benjamin Harrison have all attended services. Because of this, it is now called the "Church of Presidents. The Garrett County Courthouse located in Oakland also has the distinction of being listed on the National Register of Historic Places.

The Town of Oakland has a total area of 2.60 square miles, of which 2.59 square miles is land and 0.01 square miles is water (U.S. Census Bureau, 2020). The general elevation of the town is 2,398 feet. Oakland is the largest incorporated municipality in Garrett County with regards to land area and is the commercial hub of the county, containing a large portion of the county's economic assets and critical infrastructure. The town has a population density of 712 persons per square mile.

Several state-maintained highways serve Oakland. The most prominent of these is U.S. Route 219, which follows Garrett Highway, Oak Street and Third Street through the town. To the north, U.S. 219 connects to State Route 42, Interstate 68 and U.S. Route 40, along with the towns of Accident and Grantsville, before passing into Pennsylvania. Heading south, U.S. 219 briefly passes through Mountain Lake Park and connects with U.S. Route 50 before entering West Virginia. Two other state highways, State Routes 39 and 135 also serve Oakland. State Route 39 heads northwest to West Virginia, while State Route 135 heads east, connecting to State Routes 560, 38, and 495, as well as the towns of Mountain Lake Park and Deer Park, before entering Allegany County near the town of Luke.

Students in Oakland are served by Garrett County Public Schools. Campuses serving the town include Southern Garrett High School, Southern Garrett Middle Schools, Swan Meadow School, Broad Ford Elementary School, Crellin Elementary School, and Yough Glades Elementary School. Garrett College is a public community college located in McHenry, Maryland. The college has three outreach centers one of which is in the Town of Oakland. Approximately 26.3% of the town's population have obtained a Bachelor's degree, this is the highest percentage among all of Garrett County's municipalities.

The only registered hospital in Garrett County, the Garrett Regional Medical Center, is located along 4th street in the Town of Oakland. Approximately 96.3% of the population of Oakland has healthcare coverage, and 24.2% of the town's population suffers from a disability (U.S. Census Bureau). Attractions located near the Town of Oakland include Wisp Resort, Deep Creek Lake, the Oakland B&O Museum and the Garrett County Museum of Transportation.

Information provided by the 2020 Census indicates that the Town of Oakland has a total population of 1,851 making it the second most populace municipality in Garrett County. Approximately 28.8% are over the age of 65, and 16.6% is under the age of 18. The median age of the town is 50.2 which is considerably older than the state median age of 39.7.



Oakland has one of the more diverse population in the county as 14% of the population is comprised of African Americans and 23% is Hispanic. There are 1,001 housing units in the town with an estimated 1.85 persons per household. The Town of Oakland boasts a median household income of \$61,568 which is the highest in Garrett County, approximately 12.5% of the town's population lives below the poverty line.

1.2.3 Asset Inventory

§201.6(c)(2)(ii)	[The risk assessment shall include a] description of the jurisdiction's vulnerability of the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.
§201.6(c)(2)(ii)(A)	The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

This plan identifies potentially-vulnerable community assets such as critical facilities, critical infrastructure, historic properties, commercial/industrial facilities, etc. "Assets" contribute directly to the quality of life in the community as well as ensure its continued operation.

Methodology

The assets on the inventory are types of facilities recommended for consideration in the new FEMA guidance, defining assets as people (including underserved communities and socially vulnerable populations), structures, community lifelines and other critical facilities, natural historic, and cultural resources and economic and other activities having value in the region's communities (USDHS FEMA, 2023c, p. 60-61). This plan categorizes "assets" under the following headings.

- **People:** Areas of greater population density as well as populations with unique vulnerabilities or diminished response and recovery capabilities. Examples include areas of concentrated populations, areas catering to tourist (i.e., visiting) populations, facilities housing or serving functional and access needs individuals, and facilities that provide health or social services.
- **Economy:** Important economic drivers specific to the community. Examples include major employers and commercial / industrial centers.
- **Built Environment:** Existing structures, infrastructure systems, critical facilities, and cultural resources. The following table includes examples of built environment categories.

“BUILT ENVIRONMENT” ASSETS			
Existing Structures	Infrastructure	Critical Facilities	Cultural Resources
<ul style="list-style-type: none"> Commercial buildings Industrial buildings Single & multi-family residential buildings 	<ul style="list-style-type: none"> Water & wastewater Power utilities Transportation (roads, railways, waterways) Communications systems/centers Energy pipelines & storage 	<ul style="list-style-type: none"> Hospitals & medical facilities Police & fire stations Emergency operations centers Evacuation shelters Schools Airport/heliports <p>HIGH POTENTIAL LOSS FACILITIES</p> <ul style="list-style-type: none"> Nuclear power plants Dams Military & civil defense installations Locations housing hazardous materials 	<ul style="list-style-type: none"> Historic assets Museums Unique geologic sites Concert halls Parks Stadia

- Natural Environment:** Resources that are important to community identity and quality of life in the community, as well as those that support the local economy through agriculture, tourism, and recreation. Examples include areas that can provide protective functions that reduce the magnitude of hazard events and critical habitat areas and other environmental features that are important to protect.

Garrett County Assets

The following table lists Garrett County’s community assets (i.e., people, structures, facilities, and lifelines), and the following map shows their locations graphically. Hazard profiles in 2.0 Risk Assessment reference the facilities from the table located in various hazard susceptibility areas.

The community lifelines identified are the most fundamental services throughout Garrett County that when stabilized, enable all other aspects of society to function. The integrated network of assets, services and capabilities listed below make up community lifelines that support day-to-day recurring needs.

In the 2024 update, the communities had latitude to determine their own asset lists, with the previous list and the broad FEMA definition above as starting points. Thus, while there will be some consistency as to the types of assets appearing on the lists, readers should expect slight variance. The table below are built environment assets. The demographic and social vulnerability discussions above consider people assets in detail, as will the social vulnerability and underserved community discussions in the Hazard Profiles of Section 2.2. Other assets, like natural areas, appear in the discussion of Development Trends & Vulnerability Implications in Section 2.4. Stakeholders recognize the county’s rural nature as a key asset, and this

recognition elevates the status of designated naturalized areas as assets. The county's economy is developing around these natural assets, and while all communities support broad economic growth, such growth must be consistent with a preservation of designated areas. Further, hazards such as floods, land subsidence, and landslides may permanently alter the look, feel of, and access to naturalized areas. Other hazards, such as wildland fires, may represent opportunities and threats for natural areas (e.g., burns and burn scars altering appearances yet serving the natural ecological cycle of the areas). A map of these assets follows the table and shows their locations graphically.

GARRETT COUNTY ASSET INVENTORY						
Asset Name	Street Address	Fire District	Asset Type			
			Infrastructure	Critical Facilities	High Potential Loss	Cultural / Historical Resources
Town of Accident						
Accident-Bitteringer Road Bridge	Accident Bitteringer Road (Bear Creek)	Accident	X			
Accident-Bitteringer Road Bridge	Accident Bitteringer Road (Cherry Creek)	Accident	X			
Accident Elementary	534 Accident Bitteringer Road	Accident		X		
Accident Library	106 S. North Street	Accident				X
Accident Post Office	103 S. South Street	Accident		X		
Accident Road Garage	80 Accident Garage Road	Accident		X		
Accident Town Hall	104 S. North Street	Accident		X		
Accident Town Park East	Accident Bitteringer Road	Accident				X
Accident Town Park West	Accident Friendsville Road	Accident				X
Accident Vol. Fire Dept. Co. #50	109 S. South Street	Accident		X		
Accident Wastewater Treatment Plant	Fratz Street	Accident	X			
Bitteringer Vol. Fire Dept. Co. #90	176 Brenneman Road	Bitteringer		X		
Bitteringer Mennonite School	10707 Bitteringer Road	Bitteringer		X		
Bitteringer Post Office	11357 Bitteringer Road	Bitteringer		X		
Boys Forestry Camp	234 Recovery Road	Bitteringer		X		
Central Garrett Industrial Park	Industrial Park Drive	Accident		X		
Cunningham Lake Dam	4-H Camp Road	Bitteringer	X			
Dung Hill Road Bridge	Dung Hill Road (Casselman River)	Bitteringer	X			
Fish Hatchery Road Bridge	Fish Hatchery Road (Bear Creek)	Accident	X			
Frank Brenneman Road Bridge	Frank Brenneman Rd (S. Branch Casselman)	Bitteringer	X			
Garrett College	116 Industrial Drive	Accident		X		
Garrett County Airport	771 Airport Road	Accident	X			
Garrett County Emerg. Ops Ctr. (EOC)	771 Airport Road	Accident		X		
Hickory Environmental Center	604 Pride Parkway	Accident		X		
Lageer Road Bridge	Lageer Road (N. Branch Casselman)	Bitteringer	X			
Maynardier Ridge Road Bridge	Maynardier Road (S. Branch Casselman)	Bitteringer	X			
Northern Garrett High School	86 Pride Parkway	Accident		X		
Northern Garrett Middle School	371 Pride Parkway	Accident		X		



GARRETT COUNTY ASSET INVENTORY						
Asset Name	Street Address	Fire District	Asset Type			
			Infrastructure	Critical Facilities	High Potential Loss	Cultural / Historical Resources
Pleasant Valley 4-H Park	4-H Camp Road	Bittering				X
Rabbit Hollow Road Bridge	Rabbit Hollow Road (Little Bear Creek)	Accident	X			
Rock Lodge Road Bridge	Rock Lodge Road (N. Branch Casselman)	Bittering	X			
Route 219 Bridge North of Accident	Route 219 (Bear Creek)	Accident	X			
Sewage Pump Station	Industrial Park Drive	Accident	X			
Spectra Comm. Tower	Keysers Ridge	Accident	X			
Texas East Compressor Station	Texas Eastern Drive	Accident	X			
USCOC Tower	Keysers Ridge	Accident	X			
Water Pump Station	Accident Bittering Road	Accident	X			
Water Tank	Accident Friendsville Road	Accident		X		
Town of Deer Park						
Big Run State Park	Savage River Rd. @ Big Run Rd.	Bloomington				X
Bloomington Dam	Walnut Bottom Road	Deer Park	X			
Bloomington Post Office	35 North Hamill Avenue	Bloomington		X		
Bloomington VFD Co. #100	77 North Branch Avenue	Bloomington		X		
Bloomington WWTP	1227 Bloomington Hill Road	Bloomington	X			
Bloomington Water Tank	North Street	Bloomington		X		
Bloomington Water Treatment Plant	North Street	Bloomington	X			
Boiling Springs Road Bridge & Railroad Crossing	Boiling Springs Road at Little Yough.	Deer Park	X			
Boys Forestry Camp	124 Camp Four Road	Bloomington		X		
Calderwood Road Bridge	Calderwood Rd. East of Deer Park	Deer Park	X			
CSX Railroad Bridge	Main CSX Line (N. Branch Potomac)	Bloomington	X			
CSX Railroad Bridge	Former WMRY (N. Branch Potomac)	Bloomington	X			
CSX Railroad Tunnel	Hitchcock near Spring Lick Road	Bloomington	X			
Deer Park Town Hall	100 Church Street	Deer Park		X		
Deer Park Vol. Fire Dept. Co. #20	5353 Maryland Highway	Deer Park		X		
Deer Park Water Treatment Plant	520 Decost Road	Deer Park	X			



GARRETT COUNTY ASSET INVENTORY						
Asset Name	Street Address	Fire District	Asset Type			
			Infrastructure	Critical Facilities	High Potential Loss	Cultural / Historical Resources
Fricks Crossing Road Bridge & Railroad Crossing	West of Deer Park	Deer Park	X			
Garrett Road Bridge	(Black Run)	Deer Park	X			
Mount Zion Sub-Station	Route 135 Backbone Mtn.	Deer Park	X			
Piedmont Weir Dam	Savage River Road	Bloomington	X			
Potomac/Garrett Headquarters	1523 Potomac Camp Road	Deer Park		X		
Route 135 CSX Railroad Bridge	Route 135	Bloomington	X			
Route 135 Savage River Bridge	Route 135	Bloomington	X			
Savage River Dam	Savage River Road	Bloomington	X			
Savage River Road Bridge	Savage River Dam	Bloomington	X			
Savage River Road Bridge	Savage River	Bloomington	X			
Savage River Road Bridge	Big Run	Bloomington	X			
Savage River Road Bridge	Dry Run	Bloomington	X			
Savage River Road Bridge	Crabtree Creek	Bloomington	X			
SCD Dam #7	Little Yough near Deer Park	Deer Park	X			
South Garrett Industrial/Business Park	Route 135 Mt. Lake Park	Deer Park		X		
Route 495 Bridge	Route 495 near Crabtree & Swanton	Deer Park	X			
Swanton Community Center	3335 Swanton Road	Deer Park				X
Swanton Dump Site	12091 Maryland Highway	Deer Park		X		
Swanton Post Office	3320 Swanton Road	Deer Park		X		
Swanton Road Bridge	S. Fork Crabtree near Swanton	Deer Park	X			
Deep Creek						
Agriculture Trade Center	24086 Garrett Highway	Deep Creek		X		
CARC Aquatic & Fitness Centers	695 Mosser Road	Deep Creek		X		
CARC Gymnasium	65 Laker Driver	Deep Creek		X		
Communication Towers	Deep Creek Lake, McHenry, Glendale Rd.	Deep Creek	X			
Deep Creek Lake Dam	Mayhew Inn Road	Deep Creek	X			
Deep Creek Lake State Park	73 Brant Road	Deep Creek				X
Deep Creek Vol. Fire Dept. Co. #30	1906 Deep Creek Drive	Deep Creek		X		



GARRETT COUNTY ASSET INVENTORY						
Asset Name	Street Address	Fire District	Asset Type			
			Infrastructure	Critical Facilities	High Potential Loss	Cultural / Historical Resources
Deep Creek WWTP	90 Towne Centre Way	Deep Creek	X			
Garrett Community College	687 Mosser Road	Deep Creek		X		
Garrett County Airport Hangers	815 & 827 Airport Road	Deep Creek		X		
Garrett County Fairgrounds	24086 Garrett Highway	Deep Creek				X
Garrett Hall	59 Laker Driver	Deep Creek		X		
Garrett Sub-Station	Route 219 North	Deep Creek	X			
Glendale Road-Deep Creek Bridge	Deep Creek Lake	Deep Creek	X			
Hoyes Run Bridge	Hoyes Run	Deep Creek	X			
Hoyes Sub-Station	Route 219 Near Route 42	Deep Creek	X			
Laker Hall	60 Laker Driver	Deep Creek		X		
McHenry Dump Site	1367 Bumblebee Road	Deep Creek		X		
McHenry Post Office	1914 Deep Creek Drive	Deep Creek		X		
McHenry Water Tank	McHenry	Deep Creek		X		
Northern Garrett Rescue Squad St. #2	26017 Garrett Highway	Deep Creek	X	X		
Oakland-Sang Run Road Bridge	Deep Creek Lake	Deep Creek	X			
Rock Lodge Road Bridge	Cherry Creek	Deep Creek				
Route 219 Deep Creek Lake Bridge	Deep Creek Lake	Deep Creek	X			
Sang Run Road Bridge	Youghiogheny River	Deep Creek	X			
Sewage Pump Station (15)	Near Lake Perimeter	Deep Creek	X			
Sithe Energy HP Plant	Sang Run Road near Oakland	Deep Creek	X			
State Police / Maryland DNR Police	67 Friendsville Road	Deep Creek		X		
Thayerville Sub-Station	Route 219 Near Glendale Road	Deep Creek	X			
Urgent Care	24441 Garrett Highway	Deep Creek		X		
Water Front Green Dam	Near Glendale Road	Deep Creek	X			
Eastern Garrett						
American Towers Inc.	Big Savage Mountain	Eastern Garrett	X			
Avilton Lonaconing Road Bridges	Savage River & Little Savage River	Eastern Garrett	X			
Beall School Road Bridge	Savage River	Eastern Garrett	X			
Carlos Reservoir Dam	Staub Run	Eastern Garrett	X			



GARRETT COUNTY ASSET INVENTORY						
Asset Name	Street Address	Fire District	Asset Type			
			Infrastructure	Critical Facilities	High Potential Loss	Cultural / Historical Resources
Church Run Dam	Church Run Road	Eastern Garrett	X			
CMA Cablevision Tower	Big Savage Mountain	Eastern Garrett	X			
Columbia Gas Tower	Big Savage Mountain	Eastern Garrett	X			
Crown Castel International Tower	Big Savage Mountain	Eastern Garrett	X			
Crown Comms. Tower	Big Savage Mountain	Eastern Garrett	X			
Eastern Garrett Recreation Area	Finzel Road	Eastern Garrett				X
Eastern Garrett Vol. Fire Dept. Co. #80	401 Finzel Road	Eastern Garrett		X		
FAA Facility Tower	Pea Ridge Road	Eastern Garrett	X			
FCC Comms. Tower	Big Savage Mountain	Eastern Garrett	X			
Finzel Fire Comms Tower	Finzel Road	Eastern Garrett	X			
Frostburg Water Pump Station	Piney Run Road	Eastern Garrett		X		
I-68 Beal School Road Bridge	Near Finzel	Eastern Garrett	X			
I-68 Green Lantern Road Bridge	Near Avilton	Eastern Garrett	X			
I-68 Old Frostburg Road Bridge	Near Long Strech	Eastern Garrett	X			
Klondike Reservoir Dam	Woodland Creek	Eastern Garrett	X			
Little Savage Reservoir Dam	Little Savage River	Eastern Garrett	X			
MVA Weigh Station	31120 National Freeway	Eastern Garrett		X		
Old Frostburg Road Bridge	Savage River	Eastern Garrett	X			
Piney Creek Reservoir Dam	Piney Run Road	Eastern Garrett	X			
Piney Run Road Bridge	Piney Run	Eastern Garrett	X			
Route 40 – Route 946 Bridge	Near Finzel	Eastern Garrett	X			
Route 40 – Beall School Road Bridge	Near Finzel	Eastern Garrett	X			
Route 40 Elementary School	17764 National Pike	Eastern Garrett		X		
SHA Storage Building	13336 Beall School Road	Eastern Garrett		X		
WFRB Radio Tower	242 Finzel Road	Eastern Garrett	X			
Town of Friendsville						
Accident Friendsville Road Bridge	Bear Creek	Friendsville	X			
Bear Creek Road Bridge	Bear Creek	Friendsville	X			
Buffalo Run Road Bridge	Buffalo Run	Friendsville	X			



GARRETT COUNTY ASSET INVENTORY						
Asset Name	Street Address	Fire District	Asset Type			
			Infrastructure	Critical Facilities	High Potential Loss	Cultural / Historical Resources
Communications Towers	I-68 East of Friendsville	Friendsville	X			
Cranesville Road Bridge	Salt Block Run	Friendsville	X			
Friendsville Community Building	947 Second Avenue	Friendsville				X
Friendsville Community Park	Second Ave / Community Park Drive	Friendsville				X
Friendsville Elementary School	841 First Avenue	Friendsville		X		
Friendsville Dump Site	8397 Friendsville Road	Friendsville	X			
Friendsville Library	315 Chestnut Street	Friendsville				X
Friendsville Post Office	836 First Avenue	Friendsville		X		
Friendsville Town Hall	313 Chestnut Street	Friendsville		X		
Friendsville Vol. Fire Dept. Co. #110	122 Walnut Street	Friendsville		X		
Friendsville Water Treatment Plant	849 First Avenue	Friendsville	X			
Garrett Medical Center-Friendsville	250 Maple Street	Friendsville		X		
I-68 Youghiogheny River Bridge	Friendsville (Youghiogheny River)	Friendsville	X			
Kemp Farm Dam	Near Route 42 & PA boarder	Friendsville	X			
Maple Street Bridge	Friendsville	Friendsville	X			
Northern Garrett Rescue Squad #3	320 Chestnut Street	Friendsville		X		
Old Morgantown Road	Buffalo Run	Friendsville	X			
Route 42 Youghiogheny River Bridge	Friendsville (Youghiogheny River)	Friendsville	X			
Waste Water Treatment Plant	First Avenue	Friendsville	X			
Water Pump Stations	Near Water Street	Friendsville	X			
White Rock Road Bridge	Salt Block Run & White Rock Glade Run	Friendsville	X			
Town of Grantsville						
Casselman Valley School	1317 River Road	Grantsville		X		
Communication Towers	I-68 West of Keyzers Ridge / Chestnut Ridge	Grantsville	X			
County Roads Garage	13266 & 13272 National Pike	Grantsville		X		
Durst Road Bridge	N. Branch Casselman River	Grantsville	X			
Goodwill Mennonite Nursing Home	891 Dorsey Hotel Road	Grantsville		X		
Grantsville Community Park	Miller Street	Grantsville				X



GARRETT COUNTY ASSET INVENTORY						
Asset Name	Street Address	Fire District	Asset Type			
			Infrastructure	Critical Facilities	High Potential Loss	Cultural / Historical Resources
Grantsville Dump Site	13168 National Pike	Grantsville		X		
Grantsville Elementary School	130 Grant Street	Grantsville		X		
Grantsville Library	153 Main Street	Grantsville				X
Grantsville Outreach Community Ctr.	28 Hershberger Lane	Grantsville				X
Grantsville Post Office	159 Main Street	Grantsville		X		
Grantsville Sub-Station	Alt. Route 40	Grantsville		X		
Grantsville Town Hall	171 Hill Street	Grantsville		X		
Grantsville Vol. Fire Dept. Co. # 60	178 Spring Street	Grantsville		X		
Grantsville WWTP	Alt. Rout 40 @ Casselman River	Grantsville	X			
Hare Hollow Road Bridge	S. Branch Casselman River	Grantsville	X			
I-68 Casselman River Bridge	Near Grantsville	Grantsville	X			
I-68 Lower New Germany Road Bridge	Near Red Ridge	Grantsville	X			
I-68 New Germany Road Bridge	Near Grantsville	Grantsville	X			
I-68 Route 219 Bridge	Near Grantsville	Grantsville	X			
I-68 Route 495 Bridge	Near Grantsville	Grantsville	X			
Jennings Road Bridge	S. Branch Casselman River	Grantsville	X			
Jennings Sub-Station	Route 495	Grantsville		X		
Jennings WWTP-Private	Route 495	Grantsville	X			
Lake Louise Dam	Spring Valley Farm Lane	Grantsville	X			
Laurel Mountain Medical Center	104 Parkview Drive	Grantsville		X		
Maple Grove Road Bridge	Casselman River	Grantsville	X			
Meadow Run Dam	Chestnut Ridge Road	Grantsville	X			
New Germany Lake Dam	McAndrew Hill Road	Grantsville	X			
New Germany State Park	349 Headquarters Lane	Grantsville				X
New Germany WWTP	McAndrew Hill Road	Grantsville	X			
Northern Garrett Industrial Park	North Park Road	Grantsville		X		
Northern Garrett Rescue Squad #1	124 Miller Street	Grantsville		X		
Northern Outreach Center	12601 National Pike	Grantsville		X		
River Road Bridge	Casselman River	Grantsville	X			



GARRETT COUNTY ASSET INVENTORY						
Asset Name	Street Address	Fire District	Asset Type			
			Infrastructure	Critical Facilities	High Potential Loss	Cultural / Historical Resources
Route 40 Casselman River Bridge	Near Grantsville	Grantsville	X			
Route 495 North Branch Casselman River Bridge	Near Jennings	Grantsville	X			
Savage River Road Bridge	Poplar Lick Run & Bear Pen Run	Grantsville	X			
SHA-Keysers Ridge	3876 National Pike	Grantsville		X		
The Salem School	605 Salem Drive	Grantsville		X		
Water Tanks	Alt. Rt. 40 near Amish Road & Miller St.	Grantsville		X		
Westernport Road Bridge	Savage River	Grantsville	X			
Town of Kitzmiller						
Barton Reservoir Dam	Bartlett Run Road	Barton	X			
Company Store / Visitors Center	236 West Main Street	Kitzmiller				X
CSX Railroad Bridge	North Branch Potomac River	Kitzmiller	X			
CSX Railroad Bridges	North Branch Potomac River @ Alt House Hill Rd., Wallman Rd., Kempton Rd.	Gorman	X			
Gorman Sub-Station	Route 50 & Gorman Road	Gorman		X		
Gorman Vol. Fire Dept. Co. #120	270 Gorman Road	Gorman		X		
High Rock Fire Tower	Swamp Road	Westernport		X		
Kempton Road Bridge	Laurel Run	Gorman	X			
Kitzmiller Community Building	104 Centre Street	Kitzmiller		X		
Kitzmiller Library	288 West Main Street	Kitzmiller				X
Kitzmiller Municipal Building	610 Third Street	Kitzmiller		X		
Kitzmiller Post Office	103 Centre Street	Kitzmiller		X		
Kitzmiller Reservoir Dam	North American Road	Kitzmiller	X			
Kitzmiller Vol. Fire Dept. Co. #70	249 East Main Street	Kitzmiller		X		
Kitzmiller WWTP	East Main Street	Kitzmiller	X			
Kitzmiller Water Treatment Plant	200 East Main Street	Kitzmiller	X			
Koontz Run Reservoir Dam	Near Beechwood Road	Gorman	X			
Laurel Run Road Bridge	Laurel Run	Gorman	X			
Mettiki Sub-Station	Table Rock Road	Gorman		X		

GARRETT COUNTY ASSET INVENTORY						
Asset Name	Street Address	Fire District	Asset Type			
			Infrastructure	Critical Facilities	High Potential Loss	Cultural / Historical Resources
Moran Air Strip	Westernport Road	Westernport		X		
Route 38 Bridge	North Branch Potomac River	Kitzmiller	X			
Route 50 Bridge	North Branch Potomac River	Gorman	X			
Tri-State Cell Tower	Route 50 & Table Rock Road	Gorman	X			
U.S. Cellular Tower	Westernport Road	Westernport	X			
Water tank	North American Rd. & Near Oak Street	Kitzmiller		X		
Westernport Landfill	Westernport Road	Westernport		X		
White Church Community Building	3420 White Church Sreyer Road	Gorman		X		
Wilson Corona Road Bridge	Shields Run	Gorman	X			
Town of Loch Lynn Heights (LLH)						
Loch Lynn Heights Town Hall	20011 Bonnie Blvd., Mt. Lake Park	LLH		X		
Mountain Lake Park (MLP)						
Broadford Elementary School	607 Harvey Winters Road, Mt. Lake Park	MLP		X		
Broadford SCD #6 Dam	Broadford Street	MLP	X			
Broadford Sub-Station	Route 135	MLP	X			
C&W Plaza	2008 MD Highway	MLP				X
CSX Route 560 crossing	Route 560	MLP	X			
Dennett Road Nursing Home	113 Mary Drive	MLP		X		
Mt. Lake Dam	Oakland Avenue	MLP	X			
Mt. Lake Park Post Office	1325 MD Highway	MLP		X		
Mt. Lake Park Town Hall	1007 Alleghany Drive	MLP		X		
Mt. Lake WWTP	Powells Drive	MLP	X			
Route 135 Bridge	Little Yough River	MLP	X			
Southern Garrett High School	345Oakland Drive, Mt. Lake Park	MLP		X		
Southern Garrett Middle School	605 Harvey Winters Road, Mt. Lake Park	MLP		X		
Southern Garrett Rescue Squad #9	200 Baltimore Avenue	MLP		X		
Water Tank #3	Pittsburgh Avenue	MLP		X		
Town of Oakland						
2nd Street CSX Railroad Crossing	2nd Street	Oakland	X			



GARRETT COUNTY ASSET INVENTORY						
Asset Name	Street Address	Fire District	Asset Type			
			Infrastructure	Critical Facilities	High Potential Loss	Cultural / Historical Resources
Blue Ribbon Road Bridge	Clark Run Creek	Oakland	X			
Broadford Recreation Area	Broadford Road	Oakland				X
Browning Dam	Muddy Creek	Oakland	X			
Communications Tower	17070 Garrett Highway	Oakland	X			
Communications Tower	17 East Oak Street	Oakland	X			
Community Action Agency	104 East Center Street	Oakland		X		
Cranesville Road Bridge	Muddy Creek	Oakland	X			
Crellin Community Park	Crellin Underwood Road	Oakland				X
Crellin Elementary School	115 Kendall Drive	Oakland		X		
Crellin Mine Road Bridge	Snowy Creek	Oakland	X			
Crellin WWTP	Hutton Road	Oakland	X			
Crellin Water Tank	Hutton Road	Oakland		X		
Crellin Water Treatment Plant	Crellin Road	Oakland	X			
CSX Railroad Bridge	Youghiogheny River West of Oakland	Oakland	X			
CSX Railroad Station	West Liberty Street	Oakland		X		
Cuppett/Weeks Nursing Home	706 East Alder Street	Oakland		X		
Dennett Road School/Complex	770 Dennett Road	Oakland		X		
Department of Agriculture	152 Oakland Sang Run Road	Oakland		X		
Department of Natural Resources	Route 219 & Merrill Lane	Oakland		X		
Department of Public Utilities	14689 Garrett Highway	Oakland		X		
Department of Social Services	12594 Garrett Highway	Oakland		X		
Ferndale Christian School	15211 Garrett Highway	Oakland		X		
Fingerboard Road CSX RR Crossing	Fingerboard Road, Hutton	Oakland	X			
Garrett County Animal Shelter	152 Oakland-Sang Run Road	Oakland		X		
Garrett County Courthouse	203 South Forth Street	Oakland		X		
Garrett County Health Department	1025 Memorial Drive	Oakland		X		
Garrett County Landfill	3118 Oakland Sang-Run Road	Oakland		X		
Garrett County Roads Department	12778 Garrett Highway	Oakland		X		
Garrett County Sheriff's Dept. / Jail	311 East Alder	Oakland		X		

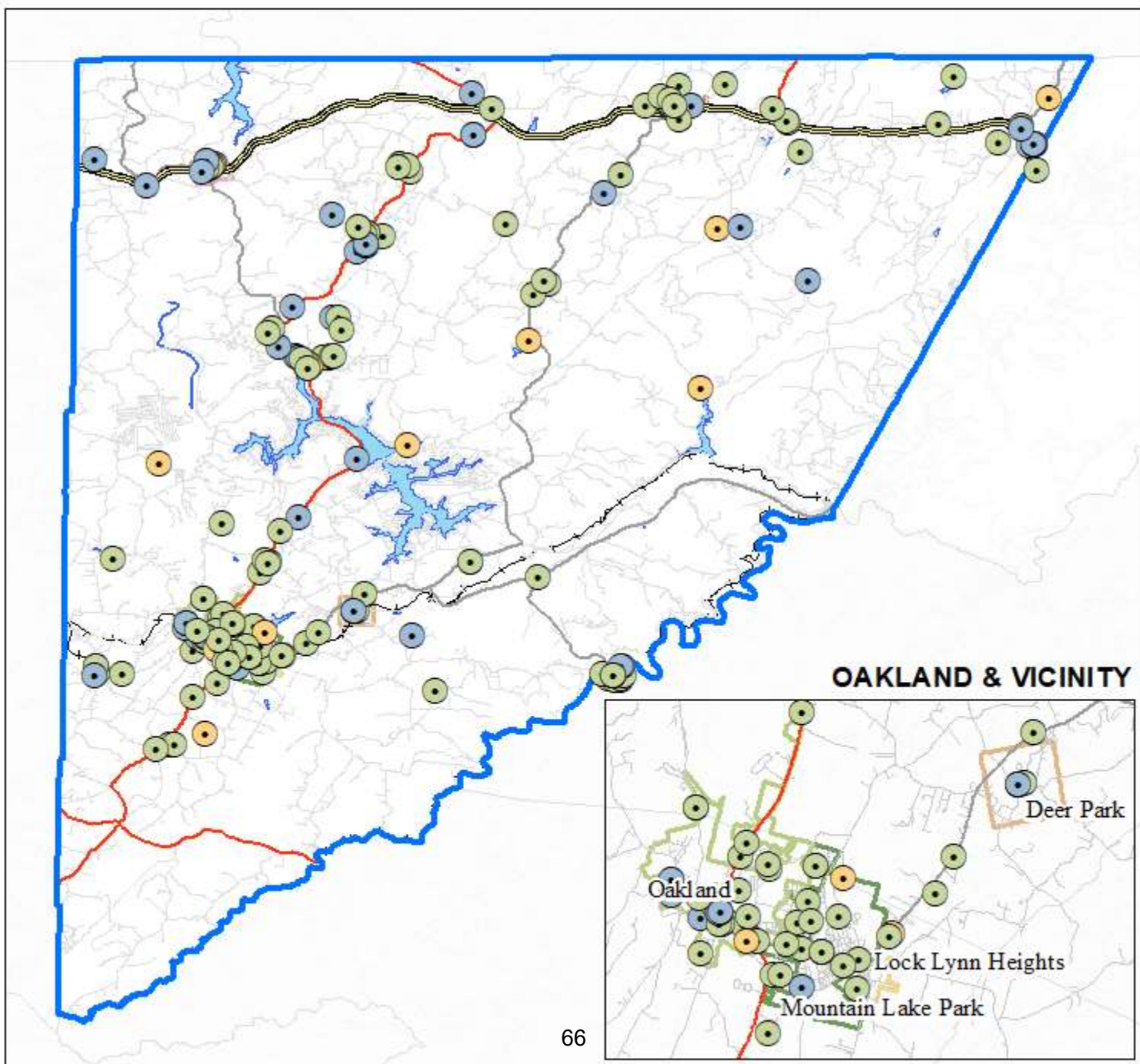
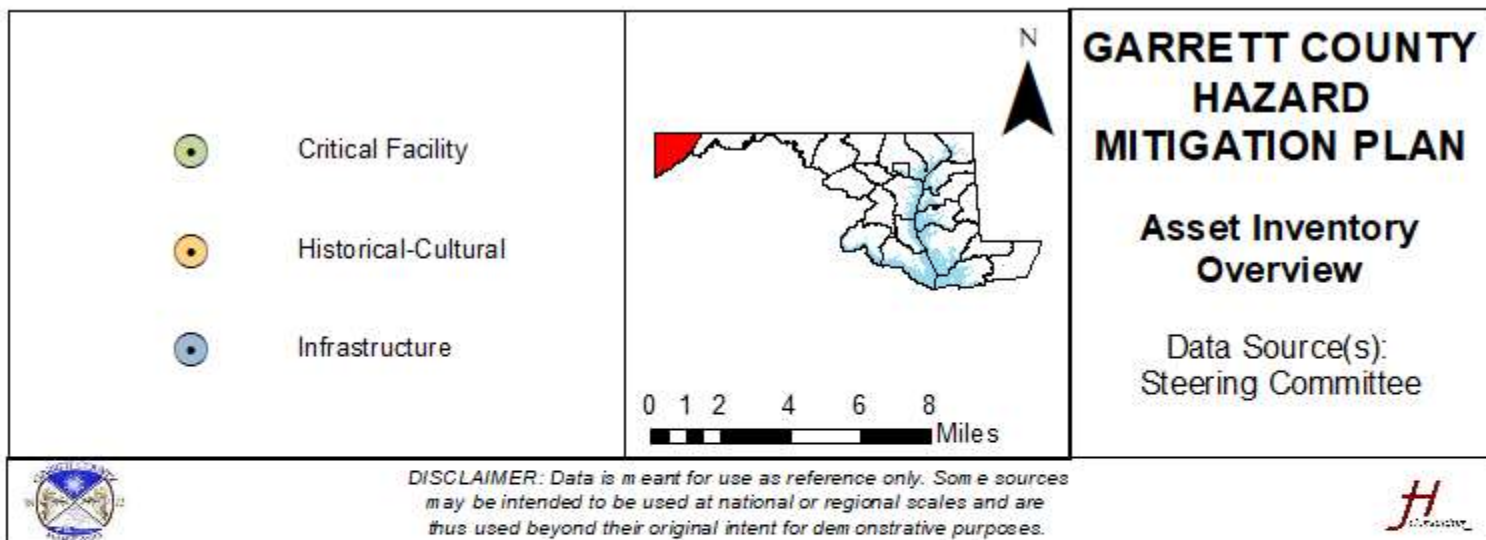


GARRETT COUNTY ASSET INVENTORY						
Asset Name	Street Address	Fire District	Asset Type			
			Infrastructure	Critical Facilities	High Potential Loss	Cultural / Historical Resources
Garrett Regional Medical Center	251 North Fourth Street	Oakland		X		
Gortner Amish Church School	4251 Mason School Road	Oakland		X		
Gortner Airport	4166 Mason School Road	Oakland		X		
Herrington Lake Dam	Herrington Manor State Park	Oakland	X			
Herrington Manor	222 Herrington Lane	Oakland		X		
Herrington Manor Road Bridge	Herrington Run	Oakland	X			
Jasper Riley Road Bridge	Trout Run	Oakland	X			
Kings Run Dump Site	1631 Kings Run Road	Oakland		X		
Kings Run Road Bridge	Broadford Run	Oakland	X			
Lake Koshare Dam	Herrington Manor State Park	Oakland	X			
Liberty Street Bridge	Youghiogheny River	Oakland	X			
Mansfield Road Bridge	Near Redhouse Cherry Creek	Oakland	X			
Maryland Employment Office	216 South Third Street	Oakland		X		
Mason Airport	216 Chloma Lane	Oakland		X		
Mason School Road Bridge	Cherry Creek	Oakland	X			
Motor Vehicle Administration	400 Weber Road	Oakland		X		
Mountain Laurel Medical Center	1027 Memorial Drive	Oakland		X		
Mt. Top Seventh Day Advent.	16335 Garrett Highway	Oakland		X		
National Guard Armory	High Street	Oakland		X		
NRCS & SCD	1916 Maryland Highway	Oakland		X		
Oakland Dump Site	10810 Garrett Highway	Oakland		X		
Oakland Police Department	15 South Third Street	Oakland		X		
Oakland Post Office	22 South Second Street	Oakland		X		
Oakland Rosedale CSX RR Crossing	Rosedale Road	Oakland	X			
Oakland Rosedale Road Bridge	Little Yough River	Oakland	X			
Oakland Sang Run Road Bridge	Miller Run	Oakland	X			
Oakland Sub-Station	Route 135	Oakland		X		
Oakland Town Hall	15 South Third Street	Oakland		X		
Oakland Vol. Fire Dept. Co. #40	23 South Third Street	Oakland		X		



GARRETT COUNTY ASSET INVENTORY						
Asset Name	Street Address	Fire District	Asset Type			
			Infrastructure	Critical Facilities	High Potential Loss	Cultural / Historical Resources
Oakland WWTP	27 Oakland-Rosedale Rd.	Oakland	X			
Oakland Water Treatment Plant	Water Plant Road	Oakland	X			
Oak Park Sub-Station	West Liberty Street	Oakland	X			
Pleasant Valley Road Bridge	Trout Run	Oakland	X			
Pleasant View Baptist Church Homeschool	8931 Garrett Highway	Oakland		X		
Pleasant Valley Community Building	975 Joni Miller Road	Oakland				X
Route 39 CSX Railroad Bridge	Downtown Oakland	Oakland	X			
Route 39 Bridge	Crellin (Youghiogheny River)	Oakland	X			
Route 219 South Bridge	Little Yough River	Oakland	X			
Ruth Enlow Library	315 Chestnut Street	Oakland				X
SHA-Oakland	95 SHA Drive	Oakland		X		
SCD Dam #1	Fourth Street & Memorial Drive	Oakland	X			
SCD Dam #2	Route 219 near Merrill Lane	Oakland	X			
SCD Dam #3	Memorial Drive & Eighth Street	Oakland	X			
SCD Dam #5	Smouse Road	Oakland	X			
Silver Knob Road Bridge	Youghiogheny River	Oakland	X			
Southern Outreach Center	14 North 8 th Street	Oakland		X		
Swallow Falls Road Bridge	Youghiogheny River	Oakland	X			
Swallow Falls State Park	Swallow Falls Road	Oakland				X
Swan Meadow Elementary School	6709 Garrett Highway	Oakland		X		
Underwood Road Bridge	Cherry Creek	Oakland	X			
Underwood Road / CSX RR Bridge	Underwood Road	Oakland	X			
Victory Baptist Church Homeschool	3173 Hutton Road	Oakland		X		
Water Pump Station	West Liberty Street	Oakland	X			
Water Tanks # 1 & 3	Pennington Street	Oakland		X		
Yough Glades Elementary School	70 Wolf Acres Drive	Oakland		X		



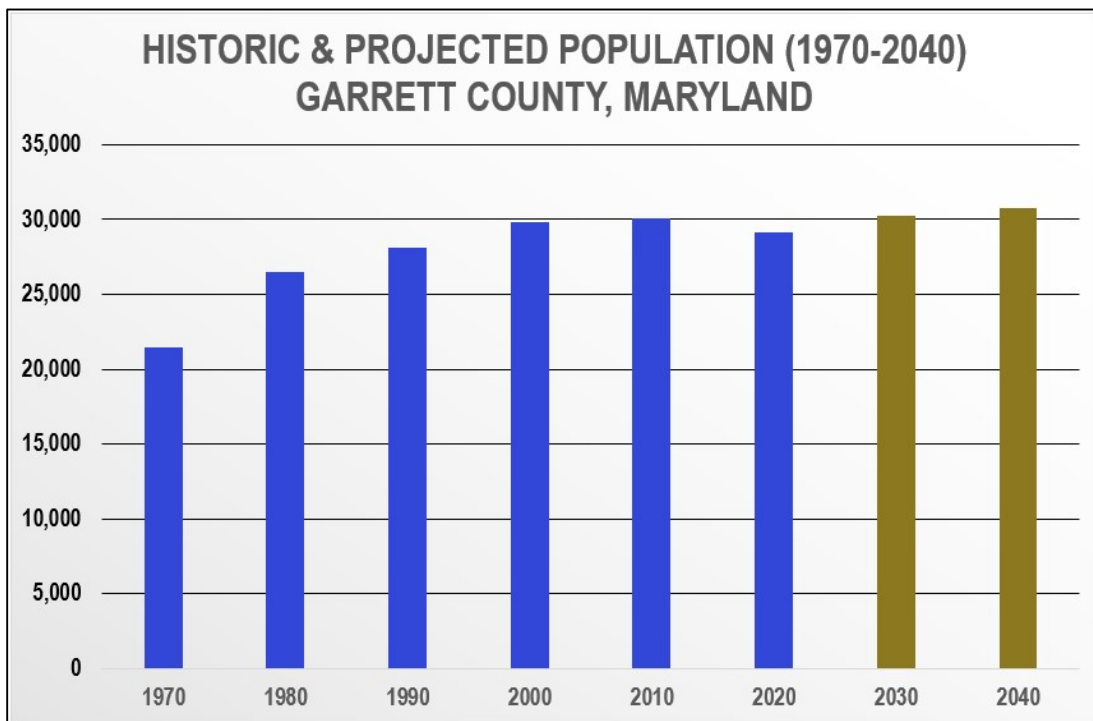


1.2.4 Development Trends

This section examines various development trends by land use type in Garrett County to contextualize future risk to the hazards identified by Section 2.0 – Risk Assessment of this plan. Section 2.4 – Development Trends and Vulnerability Implications, will assess how changes in development over the past five years within known hazard-prone areas have increased, decreased, or had no effect on each community’s vulnerability.

§ 201.6(c)(2)(ii)(C) [The plan should describe vulnerability in terms of] providing a general discussion of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

“People are the essential assets in a community. Understanding population trends and concentrations assists in describing current and future vulnerability, as well as in the design of outreach, and to target mitigation actions” (FEMA, 2013). The Maryland Department of Planning maintains population projects for each jurisdiction of the state. The following table depicts the historic and projected population of Garrett County for the 70 year period, (1970-2040).



Source: Maryland Dept. of Planning, 2020
<https://planning.maryland.gov/MSDC/Documents/popproj/TotalPopProj.pdf>

As the graphic above illustrates, Garrett County's population experienced a steady increase per decennial Census data from 1970 through 2010, growing by approximately 8,600 persons (125 persons per year average). In 2020, the population experienced a slight decrease falling by nearly 1,000 persons from the 2010 population. Projections for 2030, and 2040 indicate a slight increase in population from 2020 statistics. The following table assigns figures to the bars on the above graph.

GARRETT COUNTY POPULATION CHANGE, 1970-2040								
<i>Jurisdiction</i>	1970	1980	1990	2000	2010	2020	2030	2040
Garrett County	21,476	26,490	28,138	29,846	30,097	29,100	30,250	30,760

Source: Maryland Dept. of Planning, 2020

It is also helpful to consider population trends in the incorporated municipalities of Garrett County. "Understanding where people reside or visit in a community informs the appropriate locations for mitigation projects" (FEMA, 2013). The table below illustrates the percent population change in each jurisdiction from 2010 to 2020.

POPULATION CHANGE, MUNICIPALITIES (2010 – 2020)			
<i>Jurisdiction</i>	2010 Pop.	2020 Pop.	% Change
Town of Accident	325	338	+4.00
Town of Deer Park	382	303	-20.68
Town of Friendsville	502	438	-12.75
Town of Grantsville	896	968	+8.04
Town of Kitzmiller	321	300	-6.54
Town of Loch Lynn Heights	548	493	-10.04
Town of Mountain Lake Park	2,163	2,147	-0.74
Town of Oakland	1,895	1,851	-2.32

Source: U.S. Census Bureau

As illustrated in the table above, the 2020 populations of all but two places decreased from the 2010 Census, with Deer Park seeing the largest population decrease. The Towns of Accident and Grantsville both saw a population increase. The towns with the largest overall populations are Mountain Lake Park and Oakland, the towns with larger concentrations of people (i.e., population density) include, Kitzmiller, Loch Lynn Heights and Mountain Lake Park. Of Garrett County's total population only 24% (i.e., 6,838) live within the eight municipalities, while 76% (i.e., 21,741) live in the unincorporated county. While this data is difficult to interpret for hazard mitigation purposes, it suggests that minimal local funding could be available in regular jurisdictional budgets for special mitigation projects.

“From 2000 to 2017 the number of housing units in Garrett County increased by approximately 2,450 (i.e., 15%). This larger housing unit growth rate (compared to the population decrease) reflects the continued popularity and development of vacation homes, primarily in the Deep Creek Lake area. Garrett County has a large number of seasonal, recreational, or occasional use homes” (Garrett County Comprehensive Plan, 2022). Due to the county’s relatively small population, the effects of vacation homes is pronounced, especially in the Deep Creek Lake area.

Economic and Business Development

Hazard Mitigation Relevance: Describing economic and business development trends helps to assess dependencies between economic sectors and the infrastructure needed to support them (FEMA, 2013).

The Maryland Department of Labor, Licensing, and Regulation (DLLR), reported that there were 11,644 jobs in Garrett County as of September, 2022. Of these jobs, business-generated reports indicate that 900 were in the county’s major industrial sites (i.e., the North Garrett, Central Garrett, and Southern Garrett Industrial Parks).

According to 2021 information from the Garrett County Department of Business Development, the largest areas of employment are Trade, Transportation, and Utilities (with an average employment of 2,469 and \$654 in weekly wages), Leisure & Hospitality (with an average employment of 1,704 and \$406 in weekly wages), Education and Health Services (with an average employment of 1,590 and \$813 in weekly wages), and Local Government (with an average employment of 1,326 and \$823 in weekly wages).

Top 10 Employers	Business Type	Total Employed
Garrett Regional Medical Center	Healthcare	502
Beitzel Corp. / Pillar Innovations	Metal Fabrication	403
ClosetMaid Corporation	Storage Products	232
Wisp Resort	4-Season Resort	200*
First United Corporation	Banking Services	192
Goodwill Retirement Community	Nursing Care	190
Appalachian Parent Association	Disability Services	150
Uno Chicago Grill / Arrowhead Deli / Garrett 7 Cinema	Entertainment	150
Dennett Road Manor, Inc.	Nursing Care	145
Total Biz Fulfillment, Inc.	Retail Services	134

Source: Human Resource Offices, Individual Employers, 2018
* Increases to approximately 600 during winter ski season

The unemployment rate in Garrett County had been steadily falling over the past several years, from a high of 5.5% in 2016 to a low of 4.3% in 2019; the unemployment rate jumped back up to a high of 6.6% in 2020, most likely influenced by the Covid-19 pandemic (Garrett County Department of Business Development, 2020).

Portions of the economy in Garrett County have seen a moderate change over the past 15 years. The Leisure and Hospitality Sector has seen a 10% increase in employment, and the Local Government Sector has seen a 9% decrease in employment.

Year	Unemployment Rate
2016	5.5% (U.S. 4.9%)
2017	5.1% (U.S. 4.4%)
2018	4.6% (U.S. 3.9%)
2019	4.3% (U.S. 3.6%)
2020	6.6% (U.S. 6.9%)

Transportation

Hazard Mitigation Relevance: The transportation infrastructure is a vital community asset, particularly in the response and recovery phases. Ensuring open arterial routes helps with emergency response, the movement of life-saving (or sustaining) supplies, etc. Identifying critical transportation assets and understanding their potential vulnerabilities can inform projects designed to support their continuity in emergencies.

Economic development often correlates with roadway development and improvements, particularly where and to what extent transportation improvements are needed. Roadways within Garrett County are owned and maintained primarily by the Maryland State Highway Administration (194 miles), the Garrett County Department of Public Works – Roads Division (680 miles), and the eight municipalities (64 miles). Private entities including developers and property owners' associations have responsibility for some local roads. Outside of the Deep Lake area, the county's road system is primarily rural, and much of the land it serves is targeted for resource conservation. However, there are locations near I-68 where development will nonetheless occur.

Each year the Maryland Department of Transportation (MDOT) solicits priority letters from counties across the state that identify a limited number of priority transportation projects to reflect realistic funding availability. The following projects are included in the Maryland Department of Transportation (MDOT) Consolidated Transportation Program (CTP) under the Primary and Secondary Construction Programs for fiscal years 2019 – 2024.

- U.S. Route 219 Study – A joint study between the states of Maryland and Pennsylvania to explore options to improve U.S. Route 219 to provide better access from I-68 in Maryland to the Pennsylvania Turnpike via Meyersdale, PA.
- U.S. Route 219 Bypass – A 2.4 mile roadway that will relocate U.S. Route 219 to the east from north of Oakland to State Route 135. The intent of this project is to divert

through traffic and truck traffic from downtown Oakland. Project design is underway; however, construction funding has not been allocated.

- U.S. Route 219 Chestnut Ridge Road – A 1.5 mile roadway that will upgrade and relocate U.S. Route 219, from I-68 / U.S. 40 to Old Salisbury Road. This will enhance accessibility and promote economic development. Construction is near completion.
- State Route 39 (Hutton Road) – This project involves the replacement of Bridge 11002 over the Youghiogheny River. This bridge was originally constructed in 1923, and is nearing the end of its useful service life. Should deterioration continue, weight restrictions (i.e., reduced truck loads, school buses, and emergency vehicles) would need to be posted to ensure safety. This would have a significant impact on the area since it serves as a primary route between Oakland and rural communities to the west in both Maryland and West Virginia.
- State Route 135 – Planning to improve safety and better accommodate motorized and non-motorized users along a 1.5 mile section of MD 135 from the intersection of Gorman Street in Loch Lynn Heights, to Third Street in Oakland.
- State Route 135 to Sand Flat Road to U.S. Route 219 – Conduct operational and intersection improvements. Make improvements to Sand Flat Road, from MD 135 to U.S. Route 219; specifically upgrading shoulders to ten feet and geometry of Sand Flat Road's intersection to U.S. Route 219 and MD 135.
- State Route 495 – As development reaches projected levels, consider an alternative access route to serve the Deep Creek Lake area and the municipalities in the Little Youghiogheny River Watershed. The two-lane Deep Creek Bridge, and the segment of U.S. Route 219 act as traffic bottlenecks.

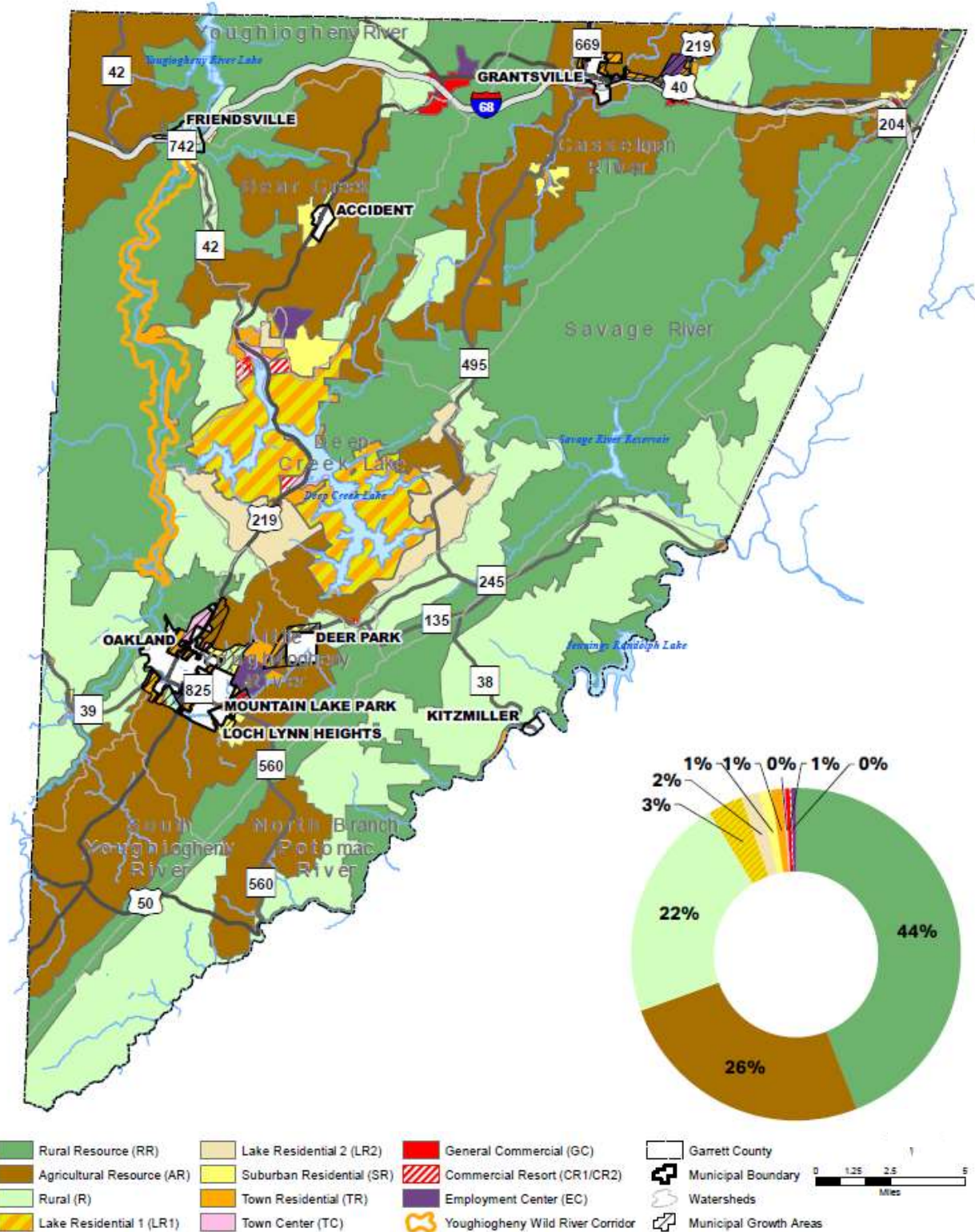
Development Trends

Understanding the risk that the county faces from future hazard occurrences is a multifaceted exercise. The profiles in Section 2.2 provide a background of the risks and provide loss estimates based on historical data, but are generally based in the past. Identifying and analyzing development trends allows for the consideration of future vulnerability. This information comes from a variety of sources, including economic trends, county and municipal comprehensive plans, and interviews with local officials such as the Garrett County Economic Development Department, Garrett County Planning & Land Management Department, Garrett County Commission, and the Garrett County Engineering Department. The following pages contain select examples of how some jurisdictions are dealing with future development.

The northern part of the county is expected to continue to grow, as will the new economic development opportunities resulting from a growing visitor industry in the Deep Creek Lake area, and from the development of new industrial areas, such as the Northern Garrett Industrial Park, the Keyser's Ridge Industrial Park, and expansion of the Southern Garrett Industrial Park. The proposed land use plan for Garrett County is intended to expand opportunities for economic development, such as near the Garrett County Airport and east of Mountain Lake Park, and to increase opportunities for housing development around the towns, including workforce housing, especially near Oakland, Mountain Lake Park, and Grantsville (see graphic below).

The potential encroachment of future development on sensitive environmental, agricultural, and forest resources is an important issue facing the county's sensitive areas. Also, as Garrett County ages, it is apparent that planning must take place to address the needs of the population as well. With an aging population comes more roles for the younger generation to fill which can lead to employment opportunities. However, an aging population also demands an increase in healthcare and transit service needs.

GARRETT COUNTY PROPOSED LAND USE MAP



Source: Garrett County Comprehensive Plan, 2022

Land Use

Hazard Mitigation Relevance: Land use descriptions inform discussions of risk and vulnerability. For example, flooding may exist as a high risk, but may not correlate with high susceptibility in open or unpopulated forested areas. Further, understanding land use may identify valuable areas where natural features can provide protective functions that reduce the magnitude of hazard events (FEMA, 2013). *Proposed* land uses can inform discussions about the types of assets that future hazard occurrences could impact.

The vast majority of Garrett County, Maryland is rural in nature. Much of the county has, in the past, been used for agriculture, timber, and coal mining. While these areas of employment are still important parts of the county's local economy, in recent years, the transportation industry, leisure and hospitality sectors, as well as education and health services have grown significantly in the county.

Rural resource areas comprise approximately 43% of the county. Rural resource areas are comprised of state owned lands, including state parks, state forests and wildlife management areas, land around Jennings Randolph Lake and land along the Youghiogheny River south of Mount Nebo, as well as other large contiguous public and private timber and forest lands. The rural resource category also includes some small scattered areas of agricultural land, low density rural housing, and limited commercial development. The county's intent is for these areas to remain rural and to conserve these areas' natural resources, primarily forest and timber resources, for future generations.

Agricultural Land Uses

Agriculture remains a major land use in Garrett County. Garrett County is a rural county with an abundance of natural resources, "approximately 90% of the county is comprised of resource lands, primarily forests and agricultural land. Agriculture specific resources comprise approximately 25% of the county" (Garrett County Comprehensive Plan, 2022). Among the land use goals identified in the 2022 *Garrett County Comprehensive Plan*, two directly apply to agriculture land use, these goals include, conserving forest resource land and agricultural resource land. In support of this effort the county will continue its Agricultural Land Preservation District program as a precursor to the Maryland Agricultural Land Preservation Foundation (MALFP) Easement program. There are currently 61 MALFP easements in the county totaling 7,330 acres. According to the United States Department of Agriculture's *2017 Census of*



Garrett County Farmland

Agriculture, there are 707 individual farms in Garrett County, with an average size of 128 acres per farm. In total, Garrett County produces over \$6 million worth of agricultural products (based on market prices at time). Major areas of agricultural activity are spread throughout the unincorporated areas of the county and on the perimeter of the towns. There are six large blocks of agricultural areas in the county:

- In the northwest corner of the county, west of Friendsville,
- Large parts of the Bear Creek watershed, surrounding the Town of Accident,
- Large parts of the Casselman River watershed, surrounding, and south of the Grantsville area, stretching into part of the Cherry Creek sub-watershed in the Deep Creek Lake Influence Area, several of these farms are operated by Mennonite and Amish families,
- In the northeast part of the county near the community of Finzel,
- Most of the Southern Youghiogheny and Little Youghiogheny River watersheds, surrounding the Oakland, Mountain Lake Park, and Deer Park area, and extending into the southwestern portion of the Deep Creek Lake Influence Area, over 500 acres of prime agricultural land exist within Loch Lynn Heights and its vicinity.
- North and west of the community of Gorman.

The vast majority of prime agricultural land within the Town of Oakland is developed, small areas still exists northeast and south of the town. Agricultural land use in the county has seen a decrease over the years, decreasing from 95,197 acres in 2012, to 90,357 acres in 2017. The number of farms however have increased from 667 in 2012, to 707 in 2017. The number of farms and the amount of land in farms rank 10th and 5th highest, respectively, amongst counties in the state. The various agricultural land uses in Garrett County consist of cropland 47%, pastureland 15%, woodland 33%, and other 4% (USDA, Census of Agriculture, 2017).

One of the action items contained in the 2022 *Garrett County Comprehensive Plan* is to promote agricultural tourism within the county as well as farm-to-table restaurants, and farmers markets as a means of supporting local farmers.

Approximately 107,142 acres (25%) of the county's land area is regulated or protected by virtue of federal, state, or county ownership (primarily state forest and parks); utilities; wetlands; or the presence of protective easements established through agricultural or other preservation programs. The entire Bear Creek watershed in the northern part of Garrett County is a state-designated Rural Legacy Area.

Regional economies and industries that depend on natural resources and favorable climate conditions, such as agriculture, tourism, and fisheries, are vulnerable to the growing impacts of climate change. Rising temperatures, extreme heat, drought, and heavy downpours are expected to increasingly disrupt agricultural productivity in the United States. Expected increases in challenges to livestock health, declines in crop yields and quality, and changes in extreme events in the U.S. threaten rural livelihoods, and sustainable food security.

Residential Land Uses

Residential land use refers predominantly to the denser living areas in the county, and includes single-family dwellings, as well as two-family and few multi-family residential properties. According to projections contained in the 2022, *Garrett County Comprehensive Plan*, housing units in the county will grow by 6,750 (37%) by 2030. The Deep Creek Lake area will absorb approximately 40% of the housing unit growth. The towns will absorb approximately 10%, and the balance of the county will absorb about 50% of the housing unit growth.



Gateway Townhomes, Garrett County

It is expected, that residential land use growth will be concentrated around the commercial establishments and employment opportunities located in the eight municipalities in Garrett County, as well as areas around Deep Creek Lake, and will consist of primarily of single-family dwellings in low-density developments. The municipalities located within proximity of the Deep Creek Lake area are expected to experience the most growth related to residential land use. The Towns of Loch Lynn Heights and Deer Park are almost exclusively residential in nature. The Garrett County Comprehensive plan states that one of the county's land use goals is to improve the layout and design of residential subdivisions to conserve resource land and the rural character of the county. Housing unit projections for each municipality through 2040 are provided in the table below.

MUNICIPAL HOUSING UNIT PROJECTIONS 2017 to 2040			
<i>Jurisdiction</i>	<i>Projected Number Increase</i>	<i>Percent of County</i>	<i>Proposed Residential Growth Areas</i>
Accident	10	0.7%	West side of U.S. Route 219 opposite of current town residential zone. A proposed subdivision is planned for an area east of town. The town anticipates growth due to employment and population increases at nearby Deep Creek Lake area.
Deer Park	17	1.2%	Town's existing municipal limits and along MD 135. The town does not anticipate much population growth in the near future.
Friendsville	18	1.3%	Town's existing municipal limits. The expansion of Friendsville is somewhat limited by its location in a valley along the Youghiogheny River and Bear Creek floodplains. The town projects modest growth through 2030, the town is somewhat removed from the residential growth occurring in the Deep Creek Lake area and southern region of the county.
Grantsville	27	2.0%	Town's existing population centers. About two-thirds of the town's developed land parcels are committed to residential use. A small area within the town's western boundary is designated as Suburban-Residential.
Kitzmiller	9	0.7%	Town's existing municipal limits. The town anticipates a relatively small amount of residential growth in the near future.
Loch Lynn Heights	14	1.1%	Town's existing municipal limits. There is room to accommodate up to 108 additional housing units. The primary land use of the town is residential. Potential expansion is limited, as the town is confined by a railroad to the north and floodplains to the south and west.
Mountain Lake Park	66	4.8%	Town's existing municipal limits. Single family homes make up much of the town. The town has experienced residential growth associated with the expanding resort and second home development of the Deep Creek Lake area to the north.
Oakland	68	5.0%	Almost all new residential development has occurred just outside the town's limits, there is limited vacant residential land within the town. Land use in the town is a mixture of residential, commercial, limited industrial and governmental. The dominant land use of the town is still residential.

Source: Garrett County Comprehensive Plan, 2022

Commercial Land Use

Commercial land use in the county includes retail, office, services, and other businesses. Commercial land is mainly concentrated in the central business district of Oakland, and in the Towns of Accident, Grantsville, and Mountain Lake Park. There are approximately 14 general commercial areas in the county, including four areas near Oakland and Mountain Lake Park, two near Thayerville, and several near the interchanges along I-68 and on U.S. Route 40 (alt.).



Oakland's Central Business Area

“Between 2007 and 2018 the county issued permits for approximately 1.8 million square feet of commercial space. Commercial development in the Deep Creek watershed accounted for approximately 23% of this new space, while development in the incorporated towns accounted for approximately 35% of the new space. Commercial development in the rest of the county accounted for the remaining 41% of the square footage” (Garrett County Comprehensive Plan, 2022). According to information obtained from the Maryland Department of Planning, business, commercial, industrial, and retail development is projected to increase by approximately 2.8 million square feet by 2040.

Due to current economic conditions commercial land use is not expected to change much over the next few years according to information obtained from the Garrett County Economic Development Department Office. The U.S. Department of Small Businesses Administration has deemed all of Garrett County as a Historically Underused Business Zone (HUBzone). This certification qualifies businesses for preferential status in competition for federal government contracts. Another federal program assisting the economy of Garrett County is the U.S. Department of Treasury’s designation of Census Tracts 2, 6, and 7 as Federal Opportunity Zones. According to information obtained from various municipal comprehensive plans areas that may be targeted for future commercial development include:

- The existing general commercial areas near Oakland, Mountain Lake Park and Thayerville, as well as areas south and east of interchanges along I-68, and U.S. Routes 40 (alt.) and 219.
- Areas around Deep Creek Lake stemming from a growing visitor/tourism industry.

- In the southern portion of the Town of Accident along U.S. Route 219. The 2009 *Accident Comprehensive Plan* projects around 400,000 square feet of new non-residential development will occur in Accident by 2030.
- Commercial development in the Town of Deer Park is targeted for areas at the intersection of Route 135 and Sand Flat Road. This area could accommodate approximately 12,600 square feet of commercial space.
- Planned commercial growth within Friendsville is targeted along Route 42. This town is considering acquiring land in this area for a business park.
- Grantsville is a center of commerce for northcentral Garrett County, as well as destination and intermediated stop for travelers on I-68. Commercial development in the Town of Grantsville is targeted along Route 40 and at the intersection of I-68 and U.S. Route 219, as well as for the Town Center Area along Main Street, Miller Street, and Springs Road.
- Loch Lynn Heights is a small family focused community with a primarily residential base. There are a limited number of businesses and commercial activity within the community. General commercial growth areas are targeted north of Loch Lynn Heights along State Route 135 where large commercial enterprises currently exist.
- There are currently limited commercial uses in Mountain Lake Park, largely found along U.S. Route 219. According to the town's 2010 comprehensive plan, the town would consider expansion of its existing boundaries to incorporate potential commercial development.
- Oakland is the business and governmental center of Garrett County. The 2022 *Garrett County Comprehensive Plan* considers Oakland as a growth area. The major location for commercial growth in the town would be along U.S. Route 219 North and Memorial Drive to the east of town, where businesses are likely to migrate in the foreseeable future.

Industrial Land Use

Like other parts of Western Maryland, Garrett County has been transitioning from an economy based primarily on manufacturing, agriculture, and other resource-based industries. While these industries will continue to play an important role in the county's economy, the development goal is to move toward a more diverse, modern economy that takes advantage of its transportation system (i.e., access to I-68). Garrett County is centrally located to many major markets by way of Interstate 68, U.S. Route 219, and State Route 135, which allows for easy transportation of



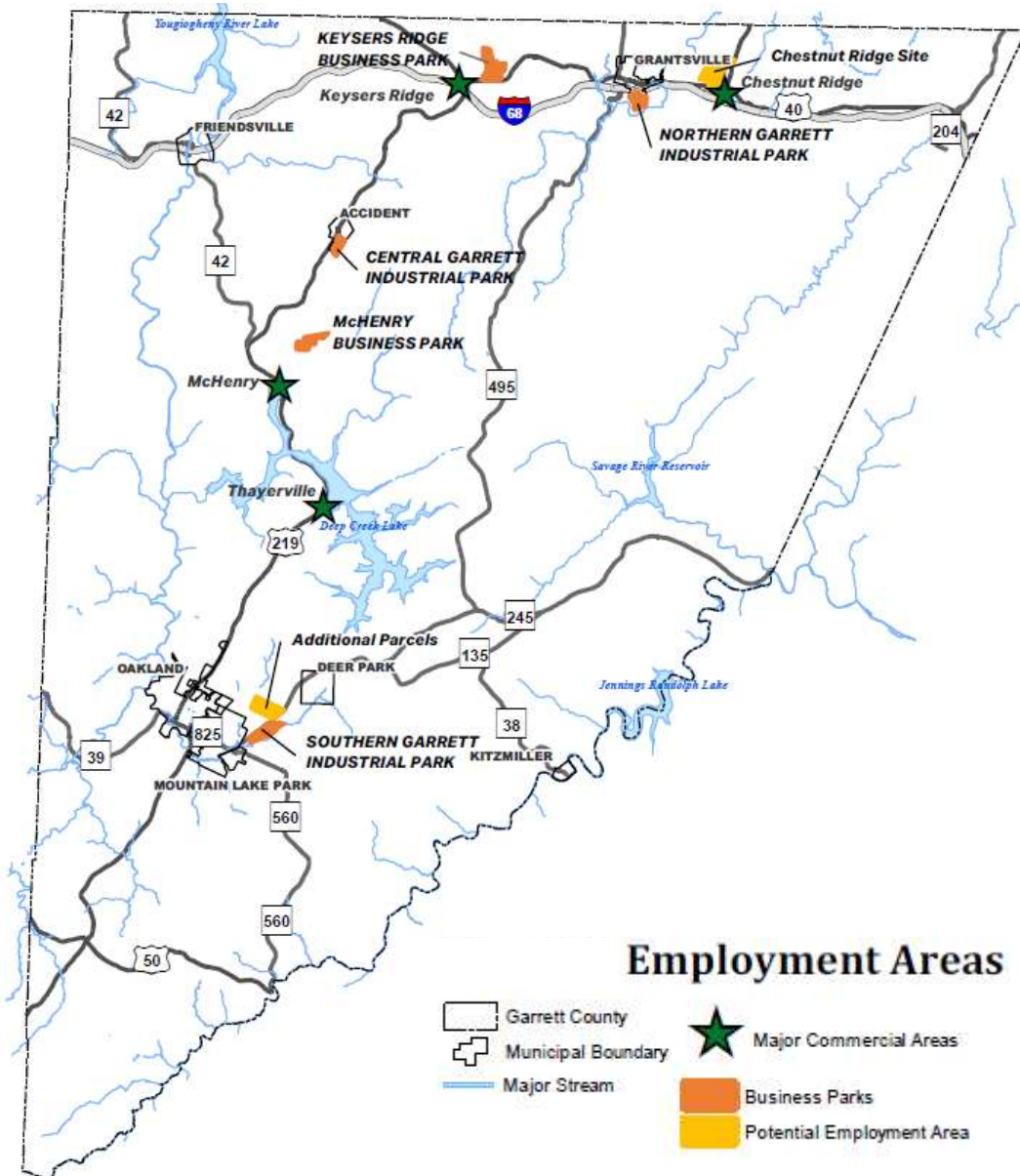
Northern Garrett Industrial Park

goods to a large portion of the U.S. Industrial activities have long played a limited role in Garrett County's economy. Employment Center areas are located at strategic points in the county, with the intent of providing business-park or campus type settings near major highways, with access to public water and sewer services, and where there will be minimal adverse effects on adjoining land uses. The six primary industrial areas of the county include three industrial parks located in or near the Towns of Oakland, Accident, and Grantsville (i.e., Northern, Central, and Southern Garrett Industrial Parks) as well as three business parks (i.e., Keyser's Ridge, McHenry, and Southern Garrett Business & Technology Park). According to the 2022 *Garrett County Comprehensive Plan*, the county's existing infrastructure can accommodate many types of industries. The map below illustrates the locations of the major commercial and industrial areas within Garrett County.

The industrial land use is not expected to change significantly over the next several years, as trends in land use nationwide reveal a continuing decline in manufacturing. The most likely area for future industrial development would be within the existing industrial parks and business parks. According to information obtained from various municipal comprehensive plans other areas that may be targeted for future industrial development include:

- Limited industrial development is targeted around the Town of Accident along U.S. Route 219.
- The Grantsville area could see limited industrial development along U.S. Route 40 and near the intersection of I-68 and U.S. Route 219.
- The Town of Friendsville anticipates light future industrial development mainly along I-68.

- The Northern Garrett Industrial Park is located south of I-68 and within the Town of Grantsville's limits, this is one of the areas where future industrial development would be target for Grantsville. Other areas include along Route 669 to the Pennsylvania line, U.S. Route 219 north to Pennsylvania line, north Peavine Road to Route 669, west of town on Negro Mountain, and east of the town's water tanks.
- Industrial development within Oakland has remained stagnant for some time, and there is limited areas for new industrial development; however, limited industrial development is occurring in the 96-acre Southern Garrett Industrial Park on Route 135. Future industrial development is targeted for the Oakland Industrial Park.



Source: Garrett County Comprehensive Plan, 2022

Public Service Land Use

The public service category of land use includes schools, medical institutions, religious facilities, cultural facility, government office, and other public buildings. With the exception of schools, religious facilities, and government buildings serving the rural areas, many of these land uses are found in urban service areas of the county.



Garrett Regional Medical Center – Oakland, MD

The public schools of the county are operated by Garrett County Public Schools, with oversight provided by the Garrett County Board of Education. The board is responsible for the establishment of public schools, the delineation of geographical attendance areas, the reception and administration of funds, the acquisition of sites and the construction of school buildings. There are seven public elementary schools (grades K-5), two public middle schools (grades 6-8), and two public high schools (grades 9-12) in the county. Another public school is the Swan Meadow School, south of Oakland (grades 1-8), largely serving the Amish and Mennonite population in the Pleasant Valley area. According to the Maryland Department of Education enrollment numbers in Garrett County have been declining. This is a trend that is projected to continue through 2028; however, at a slower rate. Garrett County is the second largest county in the state with regards to land area; however, has one of the smallest populations. The transportation of students, especially travel time to and from schools is a major concern.

Garrett College is the county's only higher education facility and is located in McHenry. Annual enrollment is approximately 600 to 800 students. The college offers full scholarships to any resident who receives a diploma from one of the county's high schools as a means to encourage a better educated workforce in support of economic development. Garrett College has three outreach centers located in Accident, Grantsville, and Oakland, as well as a Career Technology Training Center in Accident.

The Ruth Enlow Library system serves Garrett County, and consists of five branches in Oakland, Friendsville, Accident, Grantsville, and Kitzmiller. A goal of the library system is to assist where possible with the implement of the mitigation projects contained in this plan.

Garrett Regional Medical Center, an affiliate of West Virginia University Medicine, is located in Oakland and is the county's only hospital. The hospital serves a population of 46,000 within Garrett County and the surrounding communities in Maryland, Pennsylvania, and West

Virginia. The hospital includes 55 inpatient beds, a 4-bed Intensive Care Unit (ICU), a 10-bed Subacute Rehabilitation Unit, Family-Centered Maternity Suite, a 13-bed Outpatient Surgical Unit with a 4-bed Surgical Suite, and 24/7 Emergency Services. The hospital expanded health care services with the 2019 launch of the regional behavioral health clinic located in Oakland, and establishment of the Grantsville Medical Center in 2017 providing primary, urgent, and specialty care in northern Garrett County. The hospital is one of the largest employers in the county with more than 500 team members. The hospital is in the process of trying to acquire land for future needs.

The nationally-accredited Garrett County Health Department provides a wide range of public health services throughout the county. The health department provides leadership in several vital processes and convenes numerous groups to address public health issues throughout the county.

The eight incorporated municipalities in Garrett County all have public water and sewer service for residents and businesses within their boundaries. The County owns and operates all water and wastewater systems (including transmission and collection infrastructure) with the exception of those in the Towns of Accident, Grantsville, and Oakland. The Towns of Mountain Park Lake and Loch Lynn Heights own the wastewater collection lines within their boundaries. The Garrett County Department of Public Works, Public Utilities Division operates all of the county water and wastewater facilities.

The Garrett County Airport is an essential element in the national and statewide transportation network and plays a large role in the economic development of Garrett County. The county government owns and operates the airport. The airport is located off of Bumble Bee Road north of McHenry, and is a general aviation airport serving private aircraft, the airport has no scheduled commercial air service. A number of recent improvements have been at the airport, to include the extension of the runway to 5,000 feet with a parallel taxiway, the construction of a new terminal building, as well as 12 new T-Hangars. The McHenry Business Park is located along Bumble Bee Road adjacent to the airport, approximately 125 acres are available for development.

According to information obtained from the 2022 *Garrett County Comprehensive Plan* the majority of the categories under the public service land use are sufficient to meet current demands, and there is no anticipation of future development in the near term with regard to this land use.

Recreational Land Use



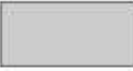

According to the 2022 *Garrett County Comprehensive Plan*, one of the county's economic development goals is to emphasis development centered-around nature-based tourism to include the county's forests, lakes, rivers, man-made whitewater park, state parks, trails, and recent renovations to the Wisp Ski Resort. The county would like to become a regional destination market for second homeowners and retirees that desire an area with a slower pace. Recreational land use has seen growth

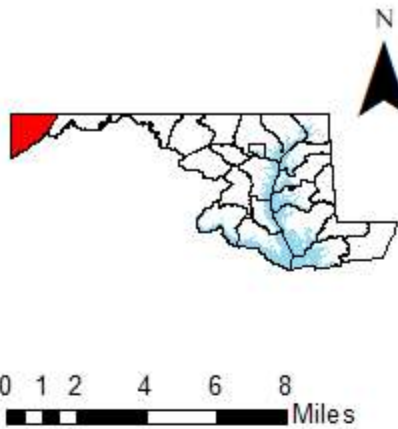


Deep Creek Lake

over the years, the state owns and maintains almost 89,000 acres devoted to parks, forests, nature preserves, scenic waterways, and wildlife areas. These state-owned lands are an asset to the county, contributing to its rural character and supporting resource-based industries. "Deep Creek Lake, created in 1923, has become a major recreational area for residents of the Pittsburgh region, as well as the Baltimore and Washington D.C. regions. With Deep Creek Lake, the Wisp Ski Resort, Adventure Sports Center International (the world's only mountain top whitewater recirculating course), and numerous other recreational opportunities, Garrett County is sometimes referred to as "Maryland's mountaintop playground, and is considered the epicenter of outdoor recreation in the Interstate 68 region" (Garrett County Comprehensive Plan, 2022). One of the land use goals identified in the comprehensive plan is to continue to encourage well planned residential and commercial growth around Deep Creek Land and its associated resort activities.

An emerging market in Garrett County is biking and hiking tourism through an extensive trail network. An opportunity is the anticipated Eastern Continental Divide Loop Trail, which has formally been recognized as part of the Potomac Heritage National Scenic Tail network. This trail would connect residents and visitors to the county's state parks, forests, and the Deep Creek Lake area.

-  Developed, Open Space (Imp. <20%)
-  Developed, Medium Intensity (Imp. 50-79%)
-  Developed, Low Intensity (Imp. 20-49%)
-  Developed, High Intensity (Imp. >80%)



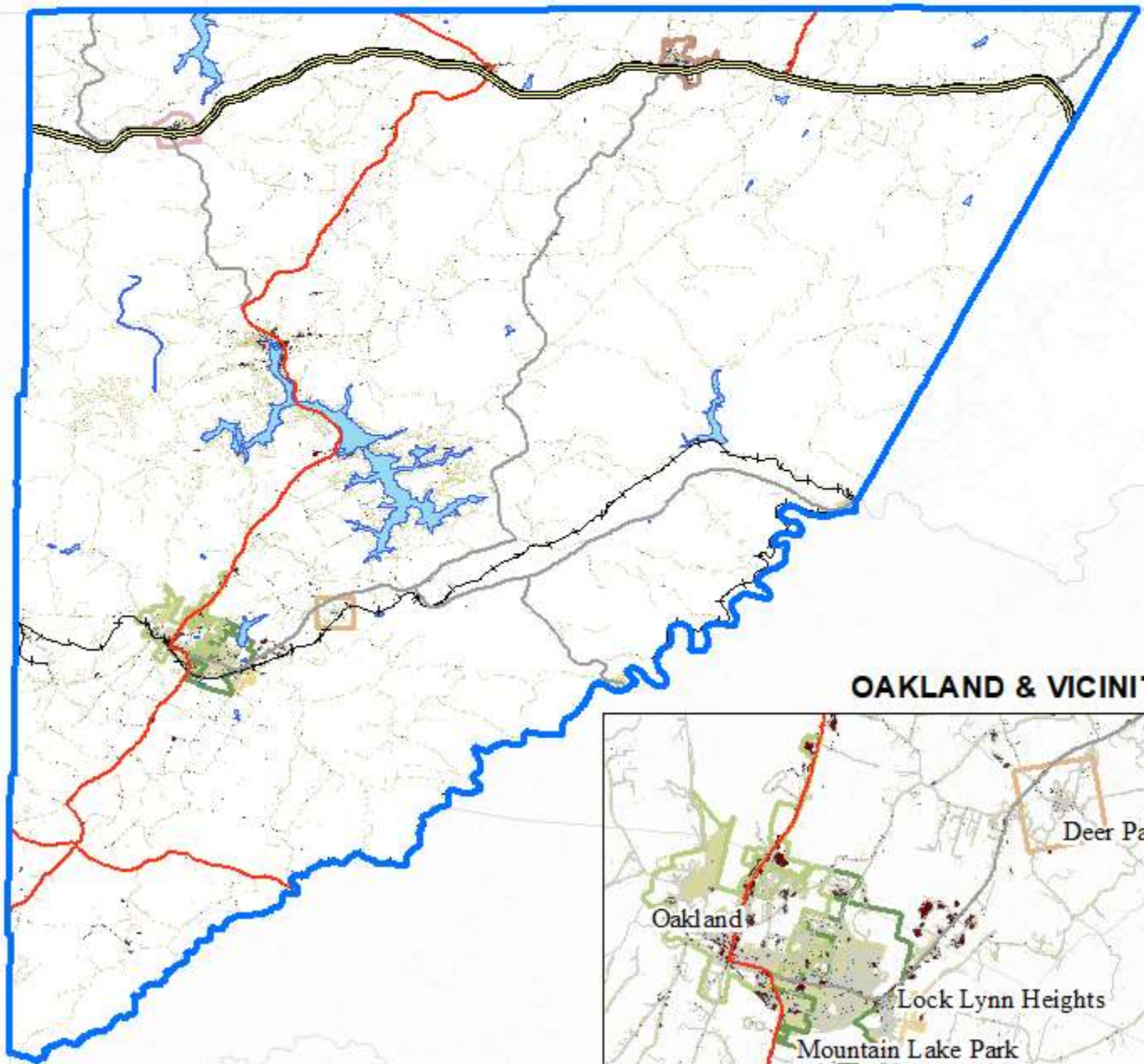
GARRETT COUNTY HAZARD MITIGATION PLAN

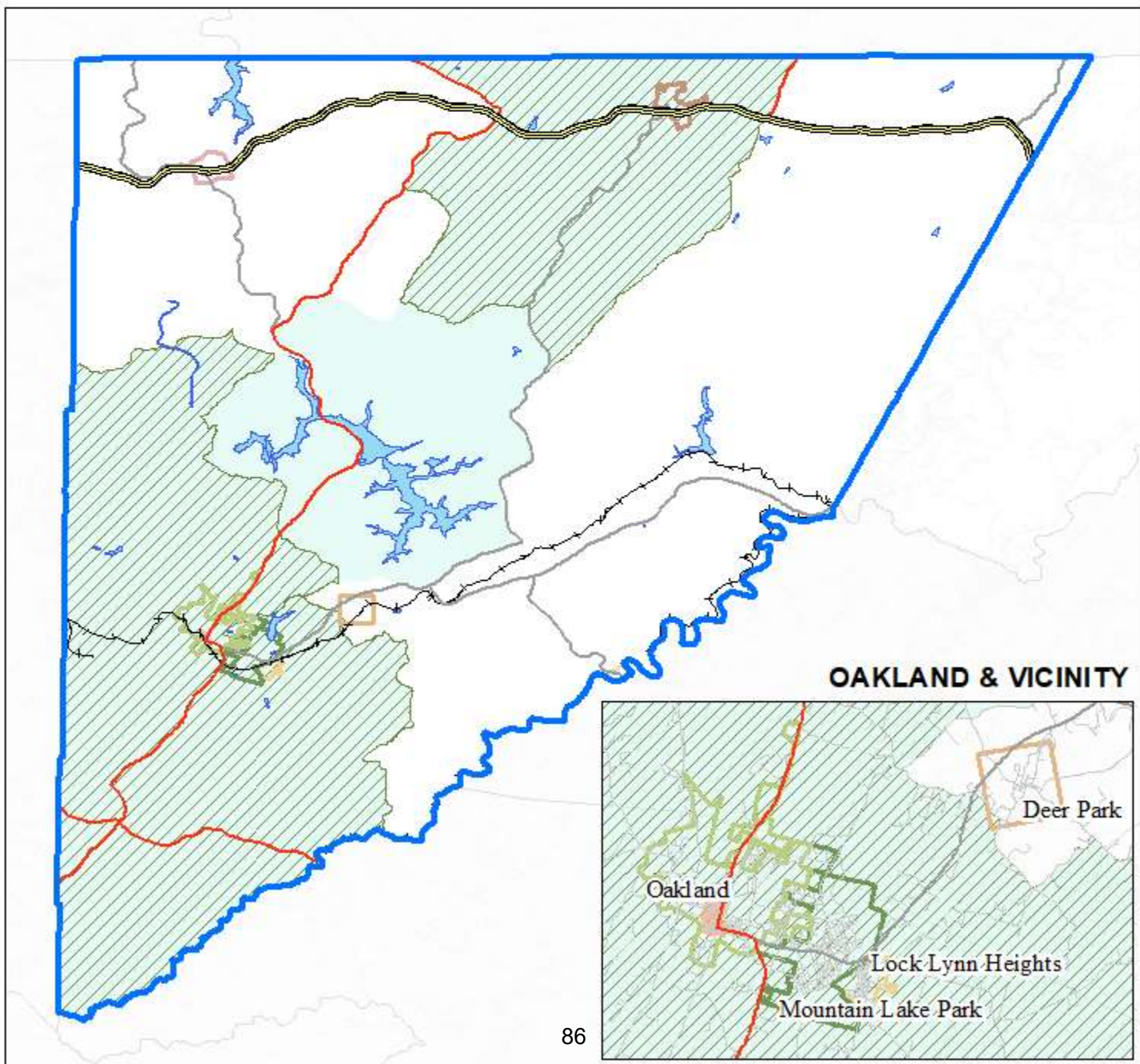
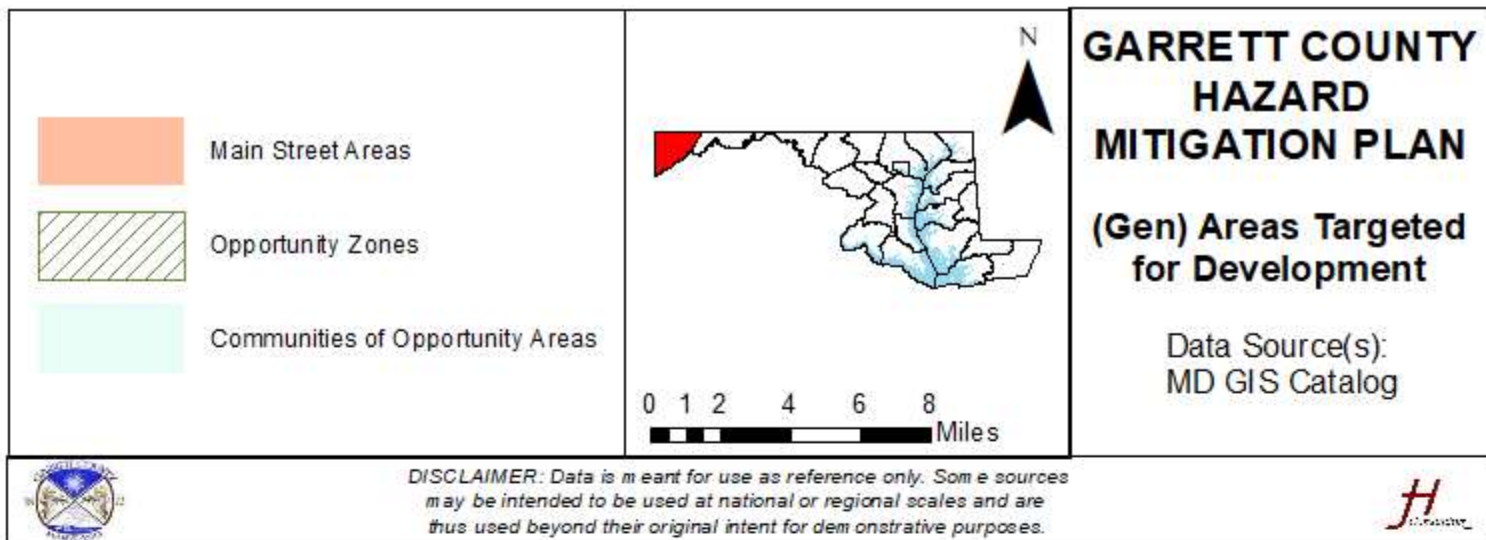
Land Use, Developed Areas

Data Source(s):
USGS NLCD (2020)



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.





1.0 INTRODUCTION

1.3 Capabilities

§201.6(b)(3)	Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
§201.6(c)(4)(ii)	[This plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

This section discusses the capabilities present within Garrett County that can support risk reduction. Understanding what capabilities need to be changed or enhanced to reduce disaster losses allows the planning team to address those shortfalls when developing the mitigation strategies. The county and the municipalities within the county have many resources to implement mitigation activities, including complementary plans, development ordinances, available state and federal funding sources, and various materials to support educational outreach. These resources facilitate community resilience by supporting actions before, during, and after hazard occurrences.

Capability Assessment Findings

This section presents the findings of the capability assessment; the table below summarizes the capabilities by municipality. Data sources for the summary included the self-assessment survey responses as well as web-based searches for existing ordinances.

JURISDICTIONAL CAPABILITIES (SUMMARY)								
<i>Jurisdiction</i>	<i>Planning Body / Commission</i>	<i>Comprehensive Plan</i>	<i>NFIP¹</i>	<i>Building Codes</i>	<i>Zoning Ordinance</i>	<i>SALDOs</i>	<i>Capital Budget</i>	<i>Public Works Budget</i>
Garrett County	YES	YES	YES	YES	YES	YES	YES	YES
Accident	YES	YES	YES	NO	YES	YES	YES	YES
Deer Park	YES	YES	YES	NO	NO	NO	YES	YES
Friendsville	YES	YES	YES	NO	YES	YES	NO	NO
Grantsville	YES	YES	YES	NO	YES	NO	NO	NO
Kitzmiller	YES	YES	YES	NO	NO	NO	YES	NO
Loch Lynn Heights	YES	YES	YES	NO	YES	NO	YES	NO
Mountain Lake Park	YES	YES	YES	YES	YES	YES	YES	YES
Oakland	YES	YES	YES	YES	YES	YES	YES	YES

¹ See Section 2.2.5: Flooding for additional information on the NFIP.

All eight of the jurisdictions in Garrett County (100%) took the survey. In addition to questions about specific codes and ordinances, the survey asked respondents to generally rank their jurisdiction's capabilities under four headings: (a) planning and regulatory, (b) administrative and technical, (c) financial, and (d) political. The following table depicts the results.

SELF-ASSESSMENT: GENERAL CAPABILITIES			
Capability	Low	Moderate	High
Planning & Regulatory	55.6%	11.1%	33.3%
Administrative & Technical	66.7%	11.1%	22.2%
Financial	33.3%	44.4%	22.2%
Political	22.2%	66.7%	11.1%

Self-assessment respondents indicated that the planning and regulatory capability is the most developed in Garrett County. While that is a positive sign, planners noted that the majority of the municipal comprehensive plans were last updated in 2009. Mountain Lake Park's plan was updated in 2010, and Oakland's was last updated in 2002; however, was in the process of being updating during the completion of this plan update. Garrett County's Comprehensive Plan was updated in 2022.

Another section of the self-assessment survey asked respondents to rank five potential mitigation projects by how willing they felt their jurisdiction would be to implement them. The two sample projects suggesting moving development away from known hazard areas saw the "very willing" and "willing" responses increase. Together, these responses suggest that the perceived benefit of moving development away from known hazard areas is increasing.

Finally, the most striking finding of the self-assessment is that respondents indicated a moderate to high financial capability for their jurisdictions, with only 22% indicating a low capability. Though there could be several reasons for this increase (e.g., the successful implementation of several acquisition projects could lead respondents to recognize the grant sources funding those projects as more readily available, the visibility of the press surrounding the reasonably new Building Resilient Infrastructure in Communities [BRIC] program, etc.). Another contributing variable could be a growing understanding of the types of complementary projects (e.g., stormwater management, utility system maintenance and upgrades, etc.) that can support risk reduction.

Planning and Regulatory Capability

Several planning commissions serve the jurisdictions in Garrett County. These commissions support general community planning within their designated jurisdictions. Miscellaneous powers and duties (Md. Land Use Code Ann. §2-105) include (but may not be limited to) the following.

- Promote planning
- Enter on any land and make examinations and surveys
- Accept and use gifts and public or private grants for the performance of the commission's functions (i.e., planning activities)
- Enact, adopt, amend, and execute a comprehensive plan
- Adopt zoning regulations to control street congestion; promote health, public safety, and general welfare; provide adequate light and air; promote the conservation of natural resources; prevent environmental pollution; properly manage growth and development; and promote or facilitate adequate transportation, water, sewerage, schools, recreation, parks, and other public facilities
- Recommend subdivision regulations to the legislative body
- Support the preservation of historic structures

Though the planning commissions do not directly coordinate hazard mitigation planning in Garrett County, their responsibilities for coordinating community-level planning make them valuable resources for creating actionable mitigation strategies. All of the municipal planning commissions were invited to participate in individual municipal mitigation planning meetings. A planning commission representative from Friendsville, and Loch Lynn Heights did attend those meetings (see Section 1.1.2, page 12).

Comprehensive Plans

Comprehensive plans promote sound land use and regional cooperation among local governments to address planning issues. These plans serve as the official policy guide for influencing the location, type, and extent of future development by establishing the fundamental decision-making and review processes on zoning matters, subdivision and land development, land uses, public facilities, and housing needs over time. Despite minor updates at various intervals, the existing countywide comprehensive plan for Garrett County was adopted in 2022. It includes some goals and objectives that promote mitigation activities. The county plan complies with the Maryland Economic Growth, Resource Protection, and Planning Act of 1992. The Act

requires each county to address visions that, in large part, promote hazard mitigation through land use regulation. These visions concentrate development in suitable areas having existing or planned water and sewer service, protect sensitive areas, including 100-year floodplains and steep slopes, and direct growth to existing population centers. For additional information, see the development trends discussion (specifically "growth areas").

The comprehensive plan goals include measures designed to meet the visions. These measures include the provision of adequate environmental safeguards to control and minimize development in floodplain areas and on steep slopes. The plan also calls for measures to control or eliminate environmental health hazards and to provide adequate public safety services. The county zoning ordinance, subdivision regulations, sensitive areas ordinance, sediment and erosion control ordinance, stormwater management ordinance, floodplain regulations, Deep Creek Watershed Zoning Ordinance and related municipal ordinances all serve as capabilities that broadly support hazard mitigation.

All of the jurisdictions in Garrett County maintain comprehensive plans (i.e., county plus eight municipal jurisdictions). The following table summarizes these documents.

OPPORTUNITIES FOR EXPANDING & IMPROVING EXISTING CAPABILITIES COMPREHENSIVE PLANS		
<i>Jurisdiction</i>	<i>Current Plan Date</i>	<i>Considerations for Expansion or Improvement</i>
Accident	2009	The latest comprehensive plan for the town indicates that stewardship and protection of natural and historic resources and community facilities is paramount. The plan states that excluding steep slopes from development potential and protection certain other open areas from urban development can reduce demand for water and sewer services. A land use goal for the town is to ensure future development avoids environmentally sensitive areas, and that they be preserved as open space for recreation. The plan also includes goals for maintaining a safe and adequate water supply. Accident's plan highlights the benefits of small-town life and expresses a desire to remain a small town.
Deer Park	2009	Deer Park's plan states that one of the land use goals is to preserve open space in sensitive areas in and around Deer Park. A policy within the plan is that steep slopes are not appropriate areas for new development and the efforts should be made to restrict development in areas with slopes greater than 25%. The plan suggests that there is a desire to maintain historic structures and the historic character of Deer Park for future generations. A plan policy is that the farmlands that surround Deer Park continue to be used for farming through 2030.
Friendsville	2009	The town's comprehensive plan states that much of the existing developed town is within floodplains, and the plan recommends that development intensity as measured in impervious surface area be reduced over time and that overall density of population in these areas be reduced. Goals within the plan include the preservation of the historic character and sensitive environmental areas, restricting new development within floodplains, as well as areas of steep slopes (greater than 25%).

OPPORTUNITIES FOR EXPANDING & IMPROVING EXISTING CAPABILITIES COMPREHENSIVE PLANS		
Jurisdiction	Current Plan Date	Considerations for Expansion or Improvement
Grantsville	2009	The Grantsville Comprehensive Plan indicates that the town has been working to purchase and revitalize vacant parcels totaling between 10 and 20 acres. The primary goals listed in the plan include; preserving the joys of small community life, continuing to be family-oriented and provide a safe community, to preserve the town's historic character as well as farmlands and natural areas. The plan states that the only formal stream buffer in the vicinity of Grantsville is the Casselman River.
Kitzmillier	2009	Kitzmillier's most recent plan highlights the use of zoning to regulate land development in the town to protect community health, safety, and welfare, efforts will include open space conservation and protection of environmentally sensitive areas, and restriction of development in areas with slopes 25% or greater. One of the plans implementation strategies is to include stream and floodplain preservation in the zoning ordinance for areas along the Potomac River not protected by the town's levee should remain heavily forested. A goal listed in the plan is to preserve and enhance the historic character and natural setting of the town.
Loch Lynn Heights	2009	The Loch Lynn Height's plan discusses the possibility of annexation of a 158-acre tract adjoining the western town boundary for the primary purpose of natural area preservation, as 82 acres of this site is covered by the Little Youghiogheny River floodplain. The plan states the need to restrict development in floodplains to reduce potential flood damage and to preserve open space corridors. The plan suggests updating the zoning ordinance to further restrict development within floodplains and establish 300 foot buffers around streams.
Mountain Park Lake	2010	One of the plan's goals is to guide land use development in a way that protects the existing residential character of Mountain Lake Park. The plan states that efforts should be made to restrict future development in sensitive areas and preserve areas as open space and for recreational purposes. The plan indicates that the historic character of the town should be maintained for future generations.
Oakland	2002	The comprehensive plan for Oakland states that the town has adopted with slight modifications, the state's model ordinance for floodplain protection. The plan's overarching goal is to guide future development without compromising the town's unique character and heritage. The plan discusses efforts to avoid development that will be harmful to sensitive natural areas such as streams, floodplains, and steep slope areas; as well as methods to ensure permanent open space is established in conjunction with future land development wherever feasible.

Building Codes

Building codes regulate construction standards for new construction and substantially renovated buildings. Communities can adopt standards that require resistant or resilient building design practices to address common hazard impacts. Most jurisdictions in Garrett County have adopted the *Maryland Performances Building Code Standards*, including the *2018 International Guideline Code (IBC)*, the *2018 International Residential Code (IRC)*, and the *2018 International Energy Conservation Code (IECC)*. This code contains wind and snow loading requirements for new structures tailored to the county's climate. The code also has footing depth requirements related to the frost line and tie-down requirements for mobile homes. The building codes in the county also include mechanical codes (e.g., the *2018 International Fuel Gas Code* and the *2018*

International Mechanical Code), electrical codes (e.g., *the 2017 National Electrical Code*), and the *2018 International Plumbing Code*. Several jurisdictions indicated they enforce these codes through a building inspector or a zoning officer. Only two municipal jurisdictions have adopted locally specific building codes, Mountain Lake Park and Oakland.

OPPORTUNITIES FOR EXPANDING & IMPROVING EXISTING CAPABILITIES BUILDING CODES		
<i>Jurisdictions</i>	<i>Existing Capability</i>	<i>Considerations for Expansion or Improvement</i>
Garrett County	Yes	Review opportunities to address high-potential impact hazards
Accident	No	Consider creating and adopting a locally specific building code
Deer Park	No	Consider creating and adopting a locally specific building code
Friendsville	No	Consider creating and adopting a locally specific building code
Grantsville	No	Consider creating and adopting a locally specific building code
Kitzmilller	No	Consider creating and adopting a locally specific building code
Loch Lynn Heights	No	Consider creating and adopting a locally specific building code
Mountain Lake Park	Yes	Review opportunities to address high-potential impact hazards
Oakland	Yes	Review opportunities to address high-potential impact hazards

Subdivision and Land Use Development Ordinances

Subdivision and land development ordinances (SALDOs) regulate the development of housing, commercial, industrial or other uses, including associated public infrastructure, as communities and developers subdivide land into buildable lots. Within these ordinances, guidelines on how to divide the land, the placement and size of roads, and the location of infrastructure can reduce exposure of development to hazard events. Five of the nine jurisdictions in Garrett County have adopted and enforced a subdivision and land development ordinance, though some coordinate with the county regarding enforcement.

Zoning Ordinances

Zoning ordinances allow local communities to regulate the use of land to protect the interests and safety of the general public. Zoning ordinances can address unique conditions or concerns within a given community. They may be used to create buffers between structures and high-risk areas, limit the type or density of development, or require land development to consider specific hazard vulnerabilities. All but two Garrett County respondents reported having zoning ordinances in place (7 “yes” response [78%] with only two “no” responses [22%]).

OPPORTUNITIES FOR EXPANDING & IMPROVING EXISTING CAPABILITIES ZONING ORDINANCES		
<i>Jurisdictions</i>	<i>Existing Capability</i>	<i>Considerations for Expansion or Improvement</i>
Garrett County	Yes	Consider designated known hazard risk areas as restricted areas (similar to floodplain management designations)
Accident	Yes	Consider designated known hazard risk areas as restricted areas (similar to floodplain management designations)
Deer Park	No	Consider the creation of generalized zoning measures
Friendsville	Yes	Consider designated known hazard risk areas as restricted areas (similar to floodplain management designations)
Grantsville	Yes	Consider designated known hazard risk areas as restricted areas (similar to floodplain management designations)
Kitzmillier	No	Consider the creation of generalized zoning measures
Loch Lynn Heights	Yes	Consider designated known hazard risk areas as restricted areas (similar to floodplain management designations)
Mountain Lake Park	Yes	Consider designated known hazard risk areas as restricted areas (similar to floodplain management designations)
Oakland	Yes	Consider designated known hazard risk areas as restricted areas (similar to floodplain management designations)

National Flood Insurance Program (NFIP) Participation and Floodplain Management Ordinances

Through the administration of floodplain ordinances, municipalities can ensure that all new construction or substantial improvements to existing structures located in the floodplain are flood-proofed, dry-proofed, or built above anticipated flood elevations. Floodplain ordinances may also prohibit development in certain areas. The National Flood Insurance Program (NFIP) establishes minimum ordinance requirements which must be met for that community to participate in the program. However, a community is permitted and (in fact) encouraged to adopt standards that exceed NFIP requirements. Garrett County and all of its municipalities participate in the NFIP; however, the county nor any of its municipalities are enrolled in the Community Rating System (CRS) at this time. The table below identifies the designated floodplain administrators for each jurisdiction of Garrett County.

DESIGNATED FLOODPLAIN ADMINISTRATORS – GARRETT COUNTY				
<i>Jurisdiction</i>	<i>Agency</i>	<i>Address</i>	<i>Point of Contact</i>	<i>Phone</i>
Garrett County	STATE	STATE	STATE	STATE
Accident	Maryland Department of Environment – Water & Science Administration	1800 Washington Blvd. Baltimore, MD 21230	Dave Guignet, State NFIP Coordinator Kevin Wagner, State NFIP Coordinator	410.537.3775
Deer Park				301.689.1495
Friendsville				
Grantsville				
Kitzmiller				
Loch Lynn Heights	COUNTY	COUNTY	COUNTY	COUNTY
Mountain Lake Park	Garrett County Department of Community Development – Permits and Inspections Division	203 South Fourth Street Room 208 Oakland, MD 21550	Chad Fike, Assistant Director Eli Helbig, Permits & Inspections Coordinator	301.334.1922
Oakland				301.334.1927

Communities that are participating in the NFIP are required to adopt and enforce regulations and codes that apply to new development in Special Flood Hazard Areas (SFHAs). These local floodplain management regulations must contain, at a minimum, NFIP requirements and standards that apply not only to new structures, but also to existing structures which are Substantially Improved (Sub-I), or Substantially Damaged (Sub-D) from any cause, whether natural or human-induced hazards.

According to 44 CFR 59.1; Substantial Improvements (Sub-I) means any reconstruction, rehabilitation, addition or other improvement to a structure, the total cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement. Likewise, Substantial Damage (Sub-D) means damage of any origin sustained by a structure whereby the cost of restoring the structure to it's before damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred. Sub-I / Sub-D requirements are also triggered when any combination of costs to repair or make improvements to a structure in a SFHA equals or exceeds 50% of the structure's market value (excluding land value), see equation below.

$$\frac{(\text{Cost to Repair}) + (\text{Cost of Improvements})}{\text{Market Value of Structure}} \geq 50\%$$

Enforcing the Sub-I/Sub-D requirements is a very important part of a community's floodplain management responsibilities. The purpose of the Sub-I/Sub-D requirements is to protect the property owner's investment and safety, and, over time, to reduce the total number of buildings that are exposed to flood damage, thus reducing the burden on taxpayers through the payment of disaster assistance.

Sub-I/Sub-D requirements are enforced by the local floodplain administrator and monitored by the Maryland Department of the Environment (MDE) – Water and Science Administration during Community Assistance Visits. If a local floodplain administrator is overwhelmed by the number of Sub-I/Sub-D inspections after a large event, MDE has developed a network of building code officials that are trained in conducting Sub-I/Sub-D field determinations. Help with Sub-I/Sub-D inspections can be requested through the Garrett County Department of Emergency Management (GCDEM) Director. Further information regarding Sub-I/Sub-D can be obtained from [FEMA's Substantial Improvement / Substantial Damage Desk Reference, Pg. 758](#), or by contacting the [MDE – Water and Science Administration](#), which is Maryland's coordinating office for the NFIP.

Garrett County has adopted a Floodplain Ordinance. The ordinance has been amended various times since it was originally adopted, the ordinance establishes criteria for new development in the floodplain of mapped streams. One such requirement includes one foot freeboard for the first floor of new structures and additions. The ordinance also requires a setback from stream channels. Projects located within the floodplain are also regulated by the Maryland Department of the Environment's Non-tidal Waterway Construction Division to ensure they do not create flooding on upstream or downstream properties, maintain fish habitat and migration, and protect waterways from erosion. The county has also adopted a Stormwater Management Ordinance as well as an Erosion Control Ordinance, which prescribes controls for runoff in newly developing area.

The county FIRM maps were originally prepared in 1985, while the Little Youghiogheny Basin maps were updated in 1994. This update included the Towns of Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park.

All nine governmental jurisdictions within the county have floodplain regulations in place as they have adopted the county ordinance. The image below show a sampling of how these ordinances appear. Garrett County nor any of the municipalities currently participate in the Community Rating System (CRS). The CRS is a voluntary program that encourages community floodplain management practices that exceed minimum NFIP requirements. The Town of Oakland makes floodplain ordinances, as well as general floodplain information available on their web pages. The sample image below show how the information appears.

Oakland
ecode360.com/106949

Town of Oakland, MD

Garrett County

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Town of Oakland, MD / The Code / Part II, General Legislation

Chapter 153 Floodplain Management

[HISTORY: Adopted by the Mayor and Town Council of the Town of Oakland 9-3-2013 by Ord. No. O2013-05.^[1] Amendments noted where applicable.]

GENERAL REFERENCES

Water and sewers — See Ch. 204.

Zoning — See Ch. 300.

[^[1]] Editor's Note: This ordinance also superseded former Ch. 153, Floodplain Management, adopted 11-4-1991 by Ord. No. O91-01, as amended.

§ 153-1 Establishment of special flood hazard areas.

§ 153-2 Adoption of county regulations.

§ 153-3 Delegation of responsibility; designation of Floodplain Administrator.

§ 153-4 Enforcement.

§ 153-5 Violations and penalties.

Typical means of keeping new and substantially-improved construction reasonably safe from flooding, per floodplain ordinances, include anchoring, using flood-resistant materials, and designing/locating utilities and services to prevent water damage. Garrett County adopted the 2013 Floodplain Management Ordinance on August 3, 2013, this action was necessary to update the county's current Flood Management Regulations to reflect the adoption of a revised "Flood Insurance Study for Garrett County and incorporated areas effective October 2, 2013. The update includes adoption of all accompanying updated Flood Insurance Rate Maps (FIRMS) effective October 2, 2013 and amendments to the current Ordinance. The following table identifies the current map date for the jurisdictions in Garrett County (FEMA, 2022a).

CURRENT EFFECTIVE MAP DATE (PER NFIP PARTICIPATION)					
CID	Jurisdiction	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Reg-Emer Date
240034	Garrett County – Unincorporated	7/15/1977	6/05/1985	2/01/2019	6/05/1985
240093	Accident	4/15/1977	9/01/1978	10/02/2013	9/01/1978
240102	Deer Park	11/08/1974	8/16/1994	10/02/2013	8/16/1994
240035	Friendsville	6/28/1974	9/14/1979	10/02/2013	9/14/1979
240165	Grantsville	7/15/1977	6/05/1985	10/02/2013	9/29/1988
240036	Kitzmilller	11/08/1974	10/15/1985	10/02/2013	10/15/1985
240037	Loch Lynn Heights	6/28/1974	8/15/1979	10/02/2013	8/15/1979
240038	Mountain Lake Park	6/28/1974	10/16/1984	10/02/2013	10/16/1984
240039	Oakland	6/14/1974	7/16/1979	10/02/2013	7/16/1979

Notification to residents about flood insurance and other flooding issues is typically through websites. Public service announcements about the benefits of flood insurance appear regularly. Some local governments publish this information via social media accounts.

The self-assessment survey included several questions regarding NFIP management. One question asked respondents the adoption date of their most current DFIRM/FIRM map. As can be seen in the table above the county's most current adopted DFIRM/FIRM was in 2019, and all municipalities were in 2013.

Responses varied when asked about how municipalities share DFIRM/FIRM data. Some, like the towns of Accident and Mountain Lake Park, refer residents to their municipal building or town website. All other municipalities indicated that the data is made available by contacting or visiting the Garrett County Planning and Land Development Office or the county's website. Garrett County Planning and Land Development manages the county's floodplain development, and it makes a variety of information available via its website (i.e., FEMA maps, the county ordinance, NFIP information, etc.).

Most Garrett County municipalities indicated that they do not support requests for map updates independently, stating they coordinate with the county and state. General technical assistance provided to residents includes encouragement to work with a civil engineer, and the County Planning and Land Development Office. The vast majority of municipalities indicated that the County Planning and Land Development Office maintained records of Letters of Map Changes, Mountain Lake Park and Oakland indicated that these records were maintained at the Town Clerks Office. The Garrett County Planning and Land Development Office was contacted to ensure that they do assist certain municipalities with the sharing of DFIRM/FIRM data and requests for map updates.

SUMMARY OF KEY FLOODPLAIN MANAGEMENT REQUIREMENTS			
<i>Jurisdiction</i>	<i>FP Coordinator</i>	<i>Enforcement</i>	<i>Substantial Improvement (Sub-I) / Substantial Damage (Sub-D)</i>
Garrett County	Garrett County Planning and Land Development	Via the permitting process, compliant driven, and on-site inspections during construction	<p>Sub-I: Any reconstruction, rehabilitation, addition, or other improvement of a building/structure, the cost of which equals/exceeds 50% of the market value of the structure before the start of construction</p> <p>Sub-D: Notify owners of the need to obtain a permit to repair, rehabilitate, or reconstruct substantially damaged buildings (and prohibit noncompliant repair) except for temporary emergency protective measures for property protection/stabilization</p> <p>Calculated per 50% of the <i>market value</i> of the building or structure <u>before the damage occurred</u></p> <p><u>Damage Assessments in SFHA</u> Garrett County Planning and Land Development in coordination with Garrett County Department of Emergency Management would make Sub-I / Sub-D determinations. Damage calculations would be made, if a structure qualifies as Sub-I / Sub-D then permits would be based on whether the value of damage is less than 50% of the structures value.</p>
Accident	Solely in consultation with the county (with the Mayor as the point of contact)	Via the permitting process, compliant driven, and on-site inspections during construction	
Deer Park	Solely in consultation with the county (with the Mayor as the point of contact)	Via the permitting process, compliant driven, and on-site inspections during construction	
Friendsville	Planning Commission & Zoning Board (in consultation with the county)	Via the permitting process, compliant driven, and on-site inspections during construction	
Grantsville	Planning Commission & Zoning Board (in consultation with the county)	Via the permitting process, compliant driven, and on-site inspections during construction	
Kitzmiller	Solely in consultation with the county (with the Mayor as the point of contact)	Via the permitting process, compliant driven, and on-site inspections during construction	
Loch Lynn Heights	Planning Commission & Zoning Board (in consultation with the county)	Via the permitting process, compliant driven, and on-site inspections during construction	
Mountain Lake Park	Planning Commission & Zoning Board (in consultation with the county)	Via the permitting process, compliant driven, and on-site inspections during construction	
Oakland	Code Enforcement Officer (in consultation with the county)	Via the permitting process, compliant driven, and on-site inspections during construction	

Per the Assistant Director of Garrett County Planning & Land Management, a couple of personnel from their department along with a building inspector will visit flooded locations to evaluate structures for safety and to document damages (following significant flooding events). This outreach is an opportunity to leave property owners with contact information and other materials. If a property is in the SFHA, a Garrett County floodplain permit and a Maryland Department of the Environment (MDE) non-tidal wetlands and waterways permit is necessary to make improvements to the structures. Properties within the SFHA will be evaluated against substantial improvement / substantial damage criteria using the *Substantial Improvement / Substantial Damage Desk Reference Publication* (FEMA P-758), May 2010, as part of the floodplain permit review process.

Additional tools to help make a Sub-I / Sub-D determination may include:

- Maryland DFIRM outreach mapping <https://mdfloodmaps.net/map/>,
- Property and zoning search GIS mapping and SDAT links to determine the assessed value of the structure(s) and the year the primary structure was built <https://gis.garrettcounty.org/apps/webappviewer>,
- Elevation certificates (existing and/or new),
- Electronic plan review software for electronic submission of documentation and drawings for floodplain permit applications and building permit applications,
- Documentation of market value of structures, and/or
- Documentation of cash value of all proposed work.

If a property is outside of the SFHA, the floodplain manager provides information on how to build back safer, better, and stronger through the FEMA publication: https://agents.floodsmart.gov/sites/default/files/fema_nfip-rebuilding-safer-stronger-after-flood-guide-12-2022.pdf.

Water and Sewer Plans

The water and sewer plan shared many of the goals and objectives outlined in the comprehensive plans (particularly at the county level), including the concentration of development in areas having adequate water and sewer service and the elimination or treatment of hazardous pollutants, as well as a requirement for water and sewer services utilities being elevated three feet above the base 100-year flood elevation. During the 2018 mitigation plan update, the committee reviewed the 2015 *Garrett County Water and Sewer Master Plan* to identify some of the problems experienced in the county and the corrective actions being taken. The Garrett County Department of Public Works Utilities Division pursues wastewater projects to address health and water quality issues in the county. These projects appear in the county's capital improvement plan as well.

The unincorporated communities of Bloomington, Crellin, and Gorman also have public water and sewer service. In addition, a large area around Deep Creek Lake is served by a public sewer system managed by the Department of Public Works – Utilities Division. The Deep Creek Lake area also has many private water systems that serve portions of the lake community. Planned extensions to water and sewer systems are also addressed in the Water and Sewer Plan.

Administrative and Technical Capability

Administrative capability refers to the adequacy of departmental and personnel resources for implementing mitigation-related activities. Technical capability relates to the adequacy of local government employees' knowledge and technical expertise to effectively execute mitigation activities (or the ability to contract outside resources for this expertise). Common examples of skill sets and technical personnel for hazard mitigation include planners with knowledge of land development/management practices, engineers or professionals trained in construction practices related to buildings or infrastructure (e.g., building inspectors), planners or engineers with an understanding of natural and human-caused hazards, emergency managers, floodplain managers, land surveyors, scientists familiar with hazards in the community, staff with the education or expertise to assess community vulnerability to hazards, personnel skilled in geographic information systems, resource development staff or grant writers, and fiscal staff to handle complex grant application processes.

The table below shows the results from the self-assessment survey regarding the availability of these resources. The results from these questions are somewhat surprising. For instance, only two respondents indicated the presence of a floodplain manager. Yet, all possible respondents participate in the National Flood Insurance Program (NFIP), which would suggest the presence of a floodplain manager. Some jurisdictions may partner with, for example, the county, which may have skewed the data. Regardless, the variety of responses suggests that education on the types and quantities of administrative and technical mitigation-centric resources may be helpful.

Technical Specialists	% of Respondents
In-house planners with knowledge of land development/management practices	33.3%
Contracted planners with knowledge of LOCAL land development/management practices	77.8%
In-house engineers	22.2%
Contracted engineers with intimate LOCAL knowledge	77.8%
In-house building inspectors	33.3%
In-house planners with an understanding of natural and human-caused hazards	22.2%
Contracted planners with an understanding of LOCAL natural and human-caused hazards	77.8%
Emergency Manager(s)	44.4%
Floodplain Manager(s)	22.2%
In-house land surveyor(s)	0%
Local scientists familiar with hazards in your community (e.g., staff at a nearby/local university)	22.2%
In-house staff with education or expertise to assess vulnerability to hazards	44.4%
In-house GIS Mappers	11.1%

The Garrett County Planning & Land Management Division and Garrett County Department of Emergency Management provide technical assistance to municipalities. Other local organizations that could act as partners in mitigating natural and human-caused hazards include the Community Trust Foundation of Garrett County, Garrett County Community Action Committee, environmental advocacy groups, and watershed associations.

State agencies that can provide technical assistance for mitigation activities include, but are not limited to:

- Governor's Grants Office,
- Governor's Office of Homeland Security,
- Maryland Department of Emergency Management,
- Maryland Department of the Environment,
- Maryland Department of Housing and Community Development,
- Maryland Economic Development Corporation, and
- Maryland Environmental Service.

Federal agencies which can provide technical assistance for mitigation activities include, but are not limited to:

- U.S. Army Corps of Engineers (USACE)
- U.S. Department of Agriculture (USDA)
- U.S. Department of Homeland Security (USDHS), Federal Emergency Management Agency (FEMA)
- USDHS/FEMA Emergency Management Institute (EMI)
- U.S. Department of Housing and Urban Development (HUD)
- U.S. Economic Development Administration (USEDA)
- U.S. Environmental Protection Agency (USEPA)
- U.S. Small Business Administration (SBA)

Financial Capability

The decision and capacity to implement mitigation-related activities often depend on funding availability. While some mitigation actions are less costly than others, money must be available locally to implement policies and projects. Financial resources are particularly important if communities are trying to take advantage of state or federal mitigation grant funding opportunities that require local-match contributions. Three jurisdictions indicated having a grants specialist on their payroll, and the county also has grants specialists. Often, these individuals are not *dedicated* grant personnel; e.g., the town manager may have the grant experience.

Several jurisdictions noted the availability of local funds in capital and public works budgets to support mitigation projects. State programs that may provide financial support for mitigation activities include, but are not limited to the following.

STATE PROGRAMS WITH POTENTIAL FINANCIAL SUPPORT FOR MITIGATION ACTIVITIES		
Program	Notes	Relevant Hazard(s)
319 Nonpoint Source Program Maryland Department of the Environment	Grant funds from the Federal Clean Water Act Section §319(h) to fund projects to help reduce water quality impairments caused by nonpoint sources.	Hazardous Materials Reportable Disease Epidemic (possible waterborne illnesses)
Brownfields & Voluntary Cleanup Programs Maryland Department of the Environment	<u>Brownfields Revitalization Incentive Program (BRIP)</u> Competitive grant and loan funding to support economic development through identifying and redeploying underutilized properties, making efficient use of existing infrastructure, and providing an alternative to developing open space that contributes to urban sprawl. <u>Voluntary Cleanup Program (VCP)</u> TECHNICAL ASSISTANCE: Seeks to increase the number of sites cleaned by streamlining the process while ensuring compliance with environmental regulations.	Hazardous Materials
Emergency Management Performance Grant (EMPG) Program Maryland Department of Emergency Management	Reimbursement for expenditures related to operating an emergency management program in local communities (focused on all phases of emergency management).	All Hazards
Hazardous Materials Emergency Preparedness (HMEP) Program Maryland Department of Emergency Management	Grant funds to support planning for transportation-based hazardous materials emergencies.	Hazardous Materials
Non-Profit Security Grant Program (NSGP) Maryland Department of Emergency Management	Grant funds for physical and cybersecurity enhancements and other security-related activities to non-profit organizations at high risk of terrorist or other extremist attack.	Cybersecurity

STATE PROGRAMS WITH POTENTIAL FINANCIAL SUPPORT FOR MITIGATION ACTIVITIES		
<i>Program</i>	<i>Notes</i>	<i>Relevant Hazard(s)</i>
Resilient Maryland Revolving Loan Fund Maryland Department of Emergency Management	Low-interest loans to local governments to help finance projects and activities that mitigate the effects of natural hazards. Local governments can take out loans on behalf of homeowners, businesses, non-profit organizations, and communities.	Drought Flooding Extreme Temperatures Severe Winter Weather Tornadoes Wildfires
State Homeland Security Grant Program (SHSP) Maryland Department of Emergency Management	Risk-based grants to support local efforts in preventing, protecting against, mitigating, responding to, and recovering from acts of terrorism and other threats.	Terrorism
State (Drinking Water) Revolving Loan Fund Maryland Department of the Environment	Low-interest loan assistance for projects that provide safe drinking water and protect the quality of a community's drinking water supply.	Drought Reportable Disease Epidemic (possible waterborne illnesses)
Sewerage Facilities Supplemental Assistance Program Maryland Department of the Environment	Grants to supplement water quality loan funds to correct public health or water quality problems; typically helps to plan, design, and construct wastewater facilities.	Hazardous Materials Reportable Disease Epidemic (possible waterborne illnesses)
Water Supply Program Maryland Department of the Environment	Grant funds to local governments or water supply systems for wellhead protection projects or direct loans for land acquisition for source water protection.	Drought Reportable Disease Epidemic (possible waterborne illnesses)

Federal programs which may provide financial support for mitigation activities include, but are not limited to the following.

FEDERAL PROGRAMS WITH POTENTIAL FINANCIAL SUPPORT FOR MITIGATION ACTIVITIES		
<i>Program</i>	<i>Notes</i>	<i>Relevant Hazard(s)</i>
Building Resilient Infrastructure and Communities (BRIC) Federal Emergency Management Agency	Grant funds (via a competitive program) for research-supported, data-driven and proactive investment in community resilience and risk reduction.	Natural Hazards
Community Development Block Grant (CDBG) U.S. Dept. of Housing & Urban Development	CDBG-MIT grant funds enable communities to carry out strategic and high-impact activities to mitigate disaster risks and reduce future losses.	Natural Hazards
Emergency Conservation Program U.S. Department of Agriculture	Matching grant funds to repair damage to farmlands and to put in place water conversation measures during severe drought.	Drought Flooding Severe Summer Weather
Emergency Watershed Protection Program USDA Natural Resources Conversation Service	Technical assistance and grant funds to help relieve imminent threats to life and property that impair a watershed. Eligible activities can include debris removal from streams channels, culverts, and bridges; streambank protection; correct damaged drainage facilities; establish vegetative cover on eroded lands; repair levees and structures; repair certain conservation practices; or EWP buyouts.	Flooding Severe Summer Weather Severe Winter Weather Tornadoes Wildfires

FEDERAL PROGRAMS WITH POTENTIAL FINANCIAL SUPPORT FOR MITIGATION ACTIVITIES		
Program	Notes	Relevant Hazard(s)
Flood Mitigation Assistance (FMA) Program Federal Emergency Management Agency	Grant funds (via a competitive program) to states and local governments to eliminate or reduce the risk of repetitive flood damage to buildings insured by the NFIP.	Flooding
Hazard Mitigation Grant Program (HMGP) Federal Emergency Management Agency	Grant funds to state, local, tribal, and territorial governments to develop hazard mitigation plans or rebuild in a way that reduces future losses. Available after a Presidentially-declared disaster, HMGP funds also often fund mitigation projects such as acquisition, elevation, etc.	Natural Hazards
High-Hazard Potential Dams (HHPD) Program Federal Emergency Management Agency	Grant funds for technical, planning, design, and construction assistance to rehabilitate eligible high-hazard potential dams.	Dam Failure
Individuals and Households Program (IHP) Federal Emergency Management Agency	Financial assistance and direct services to eligible individuals and households affected by a disaster; regarding mitigation, IHP can help eligible homeowners repair or rebuild stronger, more durable homes.	Natural Hazards
Non-Insured Crop Disaster Assistance Program (NAP) U.S. Department of Agriculture	Grant funds to producers of non-insurable crops when low yields, loss of inventory, or prevented planting occur due to natural disasters.	Natural Hazards
Repetitive Flood Claims (RFC) Program Federal Emergency Management Agency	Grant funds to reduce flood damages to insured properties that have had one or more claims with the NFIP.	Flooding
Section 108 Loan Guarantee Programs U.S. Dept. of Housing & Urban Development	Loan program that allows CDBG recipients to leverage grant allocations to access low-cost, flexible financing for economic development, housing, public facility, and infrastructure projects.	Natural Hazards (for purposes of the mitigation plan)
Severe Repetitive Loss (SRL) Program Federal Emergency Management Agency	Grant funds to states, territories, and local governments to reduce or eliminate the long-term risk of flood damage to severe repetitive loss properties insured under the NFIP.	Flooding
Weatherization Assistance Program (WAP) U.S. Department of Energy	Administered at the state level (through the Maryland Department of Housing and Community Development); assists income-eligible homeowners and renters reduce heating and cooling costs through energy conservation measures.	Extreme Temperatures Severe Summer Weather Severe Winter Weather

Political Capability

One of the most challenging capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to mitigate hazard losses. Some officials may view adopting mitigation measures as an impediment to growth and economic development. Further, mitigation may not generate interest among local officials compared to competing priorities. The local political climate must be considered when designing mitigation strategies, as it could be the most difficult hurdle to overcome in accomplishing the adoption or implementation of specific actions.

The results of the self-assessment indicate 78% of respondents felt that they had a moderate or high political capability, which is a positive response. It is important to exercise caution when categorizing mitigation projects with politically-sensitive topics or terms (e.g., climate change); by framing mitigation as risk reduction (from known risks), the willingness to engage in mitigation often improves.

Expanding and Improving Local Capacities

The jurisdictional capabilities summary table at the start of Section 1.3 indicates the presence of numerous local and county-level capacities for supporting overall risk reduction; however, there are opportunities to expand and improve upon those capacities. The following table quickly summarizes these opportunities. Importantly, the considerations listed in the table are just that – considerations. They are not requirements, nor are they meant to imply that existing capabilities are not effective. As local officials examine the changing nature of hazard risks, these considerations may serve as a roadmap for advancing proactive stances toward risk reduction.

OPPORTUNITIES FOR EXPANDING AND IMPROVING LOCAL CAPABILITIES		
Capability (and Jurisdictions)	Capability in Place	Considerations for Expansion or Improvement
PLANNING BODY / COMMISSION		
Garrett County	Yes	Add a Garrett County Department of Emergency Management representative; advocate for risk reduction to be included, as appropriate, as a "Vision"
Accident	Yes	Invite emergency services representatives to meetings; advocate for risk reduction to be included as a "Vision"
Deer Park	Yes	Invite emergency services representatives to meetings; advocate for risk reduction to be included as a "Vision"
Friendsville	Yes	Invite emergency services representatives to meetings; advocate for risk reduction to be included as a "Vision"
Grantsville	Yes	Invite emergency services representatives to meetings; advocate for risk reduction to be included as a "Vision"
Kitzmillier	Yes	Invite emergency services representatives to meetings; advocate for risk reduction to be included as a "Vision"
Loch Lynn Heights	Yes	Invite emergency services representatives to meetings; advocate for risk reduction to be included as a "Vision"
Mountain Lake Park	Yes	Invite emergency services representatives to meetings; advocate for risk reduction to be included as a "Vision"
Oakland	Yes	Invite emergency services representatives to meetings; advocate for risk reduction to be included as a "Vision"
COMPREHENSIVE PLAN		
Garrett County	2022	Continue to support green infrastructure/low-impact development and ensure sustainment of naturalized and sensitive areas
Accident	2009	Ensure regular updates (e.g., every five years); address risk/exposure reduction in Impacts of Future Growth Section
Deer Park	2009	Ensure regular updates (e.g., every five years); address risk/exposure reduction in Impacts of Future Growth Section
Friendsville	2009	Ensure regular updates (e.g., every five years); address risk/exposure reduction in Impacts of Future Growth Section
Grantsville	2009	Ensure regular updates (e.g., every five years); include risk/exposure reduction in Plan Implementation Element
Kitzmillier	2009	Ensure regular updates (e.g., every five years); address risk/exposure reduction in Impacts of Future Growth Section
Loch Lynn Heights	2009	Ensure regular updates (e.g., every five years); address risk/exposure reduction in Municipal Growth Elements
Mountain Park Lake	2010	Ensure regular updates (e.g., every five years); address risk/exposure reduction in Impacts of Future Growth Section
Oakland	2002	Ensure regular updates (e.g., every five years); address risk/exposure reduction in Land Use Plan Section
NFIP		
Garrett County	Yes	Consider adding measures beyond minimum requirements
Accident	Yes	Make the floodplain management ordinance more readily available (e.g., via the town's website)
Deer Park	Yes	Make the floodplain management ordinance more readily available (e.g., via the town's website)
Friendsville	Yes	Increase coordination with the county to increase local monitoring capability
Grantsville	Yes	Make the floodplain management ordinance more readily available (e.g., via the town's website)
Kitzmillier	Yes	Increase coordination with the county to increase local monitoring capability
Loch Lynn Heights	Yes	Make the floodplain management ordinance more readily available (e.g., via the town's website)
Mountain Park Lake	Yes	Consider adding measures beyond minimum requirements
Oakland	Yes	Consider adding measures beyond minimum requirements

OPPORTUNITIES FOR EXPANDING AND IMPROVING LOCAL CAPABILITIES		
Capability (and Jurisdictions)	Capability in Place	Considerations for Expansion or Improvement
BUILDING CODES		
Garrett County	Yes	Review opportunities for codes to address high-potential impact hazards
Accident	Yes	Create a locally-specific building code
Deer Park	Yes	Create a locally-specific building code
Friendsville	Yes	Create a locally-specific building code
Grantsville	Yes	Create a locally-specific building code
Kitzmilller	Yes	Create a locally-specific building code
Loch Lynn Heights	Yes	Create a locally-specific building code
Mountain Park Lake	Yes	Review opportunities for codes to address high-potential impact hazards
Oakland	Yes	Review opportunities for codes to address high-potential impact hazards
ZONING CODES		
All Participating Jurisdictions	Yes	Implement specialized engineering and construction techniques and material, as well as environmental Best Management Practices (BMP) specific to the hazards within known risk areas.
SUBDIVISION & LAND DEVELOPMENT ORDINANCES		
While there are four jurisdictions that may consider the development of a SALDO, existing SALDOs work reasonably well with building and zoning codes to support a minimum of new risk exposure.		

Reflection on Potential Mitigation Strategies

The self-assessment survey also asked for respondents' opinions about five types of mitigation actions. Section 3.0: Mitigation Strategy presents a range of actions. Though these actions do not appear in the current mitigation strategy, they provide a platform for discussion as the 2024-2029 planning cycle begins. The percentages in the following table are the percent of the nine responses (i.e., county and eight municipalities) in the denoted category.

SELF-ASSESSMENT: EXAMPLE MITIGATION STRATEGIES					
Strategy	Very Much Unwilling	Unwilling	Neutral	Willing	Very Willing
XYZ community guides development away from known hazard areas.	0.0%	11.1%	0.0%	44.4%	44.4%
XYZ community restricts public investments or public sector capital improvements within hazard areas.	0.0%	11.1%	22.2%	44.4%	22.2%
XYZ community enforces local development standards (e.g., building codes, floodplain management ordinances, etc.) that go beyond minimum state or federal requirements.	0.0%	22.2%	0.0%	55.6%	22.2%
XYZ community offers financial incentives (e.g., through property tax credits) to individuals and businesses that employ resilient construction techniques (e.g., voluntarily elevating structures, using landscape designs to establish buffers, exceeding recommended building code standards, etc.).	0.0%	11.1%	22.2%	55.6%	11.1%
XYZ community offers financial incentives (e.g., through property tax credits) to individuals and businesses that employ green infrastructure techniques (e.g., pave sidewalks and driveways utilizing permeable materials, install drought tolerant plants to capture, clean, and filtrate rainwater, increase green space in urbanized areas, etc.).	0.0%	0.0%	33.3%	66.7%	0.0%

Existing Community Capabilities by Hazard

Through its Department of Emergency Management, Garrett County has developed a network of trained agency and volunteer personnel through the Maryland Emergency Management Assistance Compact (MEMAC). This network includes state agencies such as the Maryland State Police, Department of Natural Resources, Department of the Environment, Maryland Department of Health, State Highway Administration and the Maryland Emergency Management Agency. County agencies include the Department of Public Works – Roads Department and Public Utilities, Department of Planning and Land Development, Board of Education, the Community Action Agency, the Health Department, Department of Social Services, Department of Information Technology and the Sheriff's Office.

Garrett County has mutual aid agreements with all surrounding counties and has also developed working relationships with volunteer organizations including the fire and rescue units that are active in incorporated communities and in rural areas. The county also has mutual aid agreements with the American Red Cross and other groups, such as the Allegany County HazMat team, that may be called upon in special circumstances. In addition, the county has agreements to coordinate mitigation activities with private utility companies, including FirstEnergy and Verizon and with private transportation companies such as CSX for rail transportation HazMat events.

In addition, the Maryland Emergency Management Assistance Compact (MEMAC) is a state-wide mutual aid system that allows any jurisdiction in the state to request and receive assets from another Maryland jurisdiction, and all the requesting procedures, and financial and liability issues are worked out through MEMAC ahead of time. If needed assets are not available within the state or have been exhausted, and the Governor has declared a state of emergency, then MEMA can reach out to other states through the EMAC.

Multi-Hazard Warning & Notification Capability

During December of 2017, the National Weather Service (NWS) recognized Garrett County as a StormReady community. Weather stations strategically located throughout the county's 650 plus square miles of varied mountainous terrain, positioned at locations that are constantly monitored which increases the ability to provide timely warnings and notifications. Garrett County now has weather stations at all three county road garage locations and the following schools:

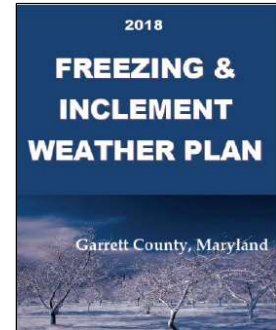
- Route 40 Elementary
- Friendsville Elementary
- Southern High School
- Northern High School

Existing Winter Storm Capabilities

The county roads department, county public utilities division, school board and other local agencies, along with the State Highway Regional Office have long been equipped to deal with major snowstorms that develop in the mountainous terrain of Garrett County. The Garrett County Department of Emergency Management (GCDEM) maintain a close relationship with both FirstEnergy and Verizon which provide electrical and telephone service respectively to the citizens of the county. Both of these utility companies clear dead or overhanging trees from utility right-of-ways during summer months so that ice and wind damage is lessened during winter storms.

With respect to new construction, the county's Building code has wind and snow loading requirements and footer depth standards that are tailored to the Garrett County climate.

In 2018, Garrett County released the Freezing and Inclement Weather plan. This plan provides critical information on plan activation; decision makers' key department and agencies; warming centers; a cold weather shelter locations and security; outreach; role of Emergency Management; Homeless Management Information System (HMIS).



Existing Flooding Capabilities

With the recent completion of the county's warning system, residents can be made aware of rising stream levels, particularly along major streams which have monitoring stations. The GCDEM has a plan which coordinates evacuation activities with the county roads department and State Highway Administration, local fire and rescue units, the county health department and the American Red Cross (ARC).

The county also has the capability to mitigate future flood losses through its Sensitive Areas Ordinance, its Subdivision Regulations, its Floodplain Management Ordinance and its Stormwater Management Ordinance. The county requires utilities to be elevated three feet above the base flood elevation. The county also participates in the NFIP, this allows property owners to purchase flood insurance.

Existing Dense Fog – Transportation Capabilities

During the winter season of 2017, State Highway Administration used automated Variable Message Signs (VMS) indicating "Icy Roads Possible" messages to travelers. The Road Weather Information System (RWIS) stations sense weather and road conditions and post messages automatically, these messages can be overridden if needed by the Statewide Operations Center (SOC). Fog warning signs are also controlled by RWIS stations. They consist of amber flashing lights mounted to the appropriate static signs.

Unlike most winter storms and heavy rainfall events, there is usually little warning before visibility becomes severely limited. Warning devices placed outside the fog area have had some positive effect. The county utilizes the Coordinated Highways Action Response Team (CHART) to monitor local traffic information, winter storm information, visibility, and precipitation for a particular area. There have also been several display warning signs installed on Interstate 68 in Garrett County to alert motorists of expected traffic conditions, including road closures and fog and

ice hindering roadways. Weather events and traffic incidents are reported on the CHART website as well, which may be accessed by the public at <http://www.chart.state.md.us/>.

Existing Drought Capabilities

When dry conditions disrupt water service in an area of the county, the Garrett County Department of Emergency Management (GCDEM) can ask the Maryland Emergency Management Agency to request the Maryland National Guard to provide temporary water storage tanks for emergency use. Additionally, the Health Department monitors well development through the building permit process and has access to well records through the Department of the Environment to monitor ground water use and replenishment. The Department of Agriculture also monitors soil moisture conditions and provides farmers with information on crop development through the Soil Conservation District during low soil moisture conditions.

Existing Public Health Emergencies Capabilities

The Maryland Department of Health administers the county health department. This administrative setup allow the full capabilities of the state to be utilized to mitigate an epidemic or other outbreak of disease in Garrett County. The Garrett County health Department website contains fact-sheets on many epidemics from the Center for Disaster Control and the Maryland Department of health.

Garrett County has a program in place, which includes two committees, Opioid (meets monthly) and Drug Overdose Committee (meets quarterly). Also an Opioid Interdiction Coordinator was hired by the Health Department.

Existing Landslide Capabilities

Landslides are more prevalent on steep slopes. Mitigation measures currently in place include county-wide ordinances for Sensitive Areas, including steep slopes and 100-year floodplains, as well as Sediment Control and Stormwater Management. Plans for new construction are reviewed for compliance with these ordinances by county staff and the Soil Conservation District, while inspections are performed by county staff. In addition the county's Building Codes has provisions for soil testing in areas where soil conditions are favorable for landslides.

Existing Wildfire Capabilities

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

Existing Dam Failure Capabilities

Garrett County's two largest dams, (i.e., Savage River and Jennings Randolph) are subject to annual inspection by the Upper Potomac River Commission and the Corps of Engineers. All other dams in the county are subject to inspections by the state's Dam Safety Division and the Corps of Engineers. A warning system, originally designed to warn residents in the downstream areas of the Savage River and Jennings Randolph lake dams has been expanded to cover the smaller dams in the county. Emergency Action Plans (EAPs) are updated annually for the Savage River Dam, Deep Creek Lake Dam, and the Oakland Flood Control Dam.

Existing Hazmat Response Capabilities

Garrett County has a strong mutual aid relationship with the Allegany County HazMat Team. A team from Somerset County, Pennsylvania can also be called on for assistance at a HazMat event. The state Department of the Environment is also on call to assist in the cleanup of hazardous materials. In addition, the county's hazard warning system can be activated in the event of an on-site or transportation incident.

Existing Cyber-Threat Capabilities

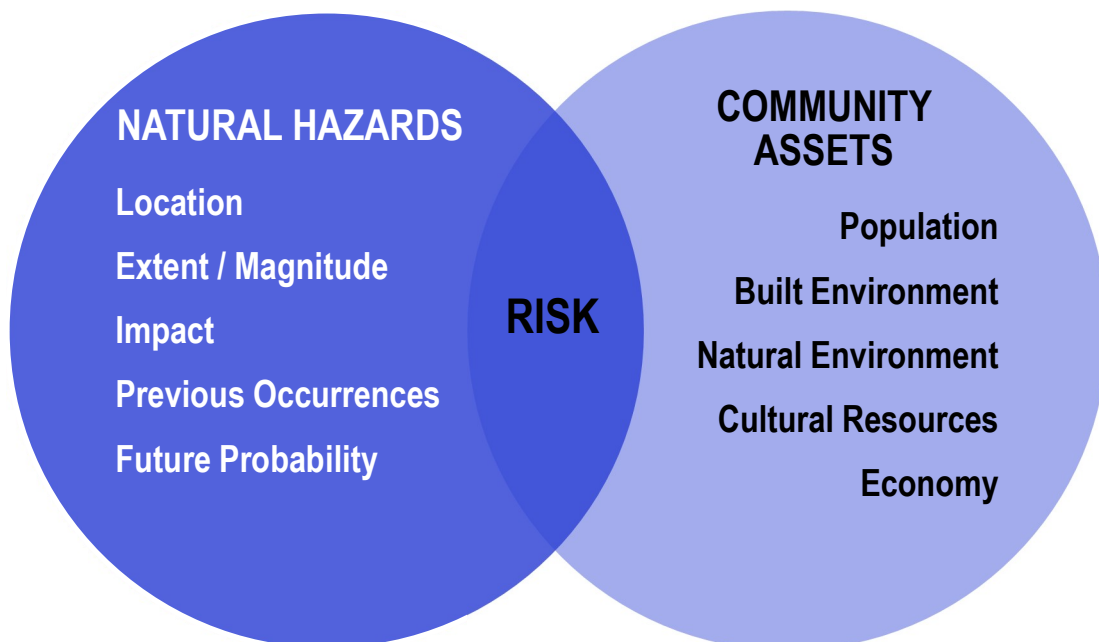
Garrett County takes a layered approach to cyber security and tries to adhere to cyber security best practices, which includes; least privilege model, Windows updates, anti-virus installs. The county uses Carbon Black CB Defense "Next-Gen" endpoint protection solution, host based firewall, perimeter network firewall, end user education, dual-factor authentication, mobile device always on VPN, backups, and Hyper-V replica.

With more and more data accessible from anywhere in the world, passwords are not enough protection alone. The breaches that have been experienced in Garrett County have all been tied back to a password compromise password re-use. The plan is to continue to implement Dual-Factor authentication on all systems accessed from the internet.

2.0 RISK ASSESSMENT

Disasters can cause loss of life, damage buildings and infrastructure, and have devastating consequences on the economic, social, and environmental well-being of Garrett County. A risk assessment analyzes, “the potential for damage, loss, or other impacts created by the interaction of hazards with community assets” (FEMA, 2013). “A risk assessment is a robust, data-driven analysis. It explains what might happen. It also finds where the local jurisdiction is vulnerable to hazards” (FEMA, 2023c, p. 48). This risk assessment section contains information on identified hazards that threaten Garrett County, and the vulnerability of the area as it relates to the county’s assets. This assessment includes a new subsection that ranks the hazards based on a “risk ranking” score. This ranking enables a comparison with data from sources such as the National Risk Index (FEMA, n.d.B).

This risk assessment provides the foundation for the rest of the mitigation planning process, which is focused on identifying and prioritizing actions to reduce risk to hazards. This risk assessment can also be used to establish emergency preparedness and response priorities, inform land use and comprehensive planning efforts, and facilitate decision making by elected officials, county departments, businesses, and organizations in Garrett County. The figure below illustrates the concept of risk as the relationship, or overlap, between hazards and community assets. The smaller the overlap, the lower the risk.



2.0 RISK ASSESSMENT

2.1 Identify Hazards

§201.6(c)(2)(i)

[The risk assessment shall include a] description of the...location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

The committee spent much of the first meeting discussing the hazards to include in the plan update. The discussion started with a list of the hazards from the previous version of the plan. A comprehensive list of hazards (i.e., natural, technological, and human-caused) was then evaluated by the committee along with the number of occurrences of each hazard since 2018. The consultant specifically asked several questions per hazard inclusions (i.e., changes in the locations, frequency and magnitude of occurrences of each hazard; losses and damages suffered from each hazard over the past five years, and changes in vulnerability to each hazard).

During this meeting the committee decided to keep all the hazards included in the 2018 plan with the exception of major fire / explosion. The committee made the decision to remove this hazard based on lack of relevance, previous occurrences, and probability. Other modifications to the existing hazard list included adding levee failure to the existing dam failure profile, epidemic has been retitled to public health emergencies, and extreme heat, high wind, and thunderstorm are now contained under the severe summer weather profile. The following table lists the hazards considered by the remainder of this risk assessment.

HAZARDS IDENTIFICATION	
<i>Hazard</i>	<i>Description</i>
Natural Hazards	
Dense Fog-Transportation	Existing.
Drought	Existing. This profile includes meteorological, agricultural, hydrological, and socioeconomic droughts.
Flooding	Existing. This profile includes both riverine and flash flooding.
Landslide	Revised. Separated from mass movements.
Public Health Emergencies	Revised. This profile replaces the existing epidemic profile.
Severe Summer Weather	Revised. This profile includes high winds, hail, lightning, and hurricane remnants.
Severe Winter Weather	Existing. This profile includes blizzards, heavy snow, ice storms and extreme cold.
Tornado	Existing.
Wildfire	Existing.
Technological Hazards	
Cyber-Threat	Existing.
Dam & Levee Failure	Revised. This profile now includes both dam and levee failure.
Hazmat Release	Existing.

Planners utilized additional sources as lists to ensure the steering committee's consideration of a full range of hazard types. FEMA's National Risk Index (NRI) (2021b) summarizes risks to communities from a range of hazards, including the following.

- Avalanche
- Coastal Flooding
- Cold Wave
- Drought
- Earthquake
- Hail
- Heat Wave
- Hurricane
- Ice Storm
- Landslide
- Lightning
- Riverine Flooding
- Strong Wind
- Tornado
- Tsunami
- Volcanic Activity
- Wildfire
- Winter Weather

In addition to these 12 hazards, there exist other potential natural hazards this plan does not address. The following list presents those natural hazards with an explanation as to why those hazards were not included in this plan update.

- **Avalanche:** Avalanches happen mainly in the western United States and Canada. The terrain and geography of Garrett County is not rugged or severe enough to have avalanches. Though Garrett County does contain elevations over 3,000 feet, they are not snowcapped for extended periods. FEMA's National Risk Index (NRI) notes that this hazard is not applicable to Garrett County.
- **Coastal Storm / Erosion:** Though Garrett County is located within close proximity to the Atlantic coast the county does not contain any coast-lines. According to FEMA's NRI this hazard is not applicable to Garrett County.
- **Earthquake:** According to the Maryland Geological Survey the probability of an earthquake impacting Garrett County is extremely low and damaging earthquakes are rare in the ancient rock of the Appalachians. Only four earthquakes have been centered in Maryland over the past decade. There has never been an earthquake centered in Garrett County. Earthquake was rating as very low in FEMA's NRI.
- **Hurricane:** The Atlantic east coast, where hurricane paths are nearest, is approximately 150 miles away. The region may experience wet weather as the remnants of Atlantic hurricanes pass through the area; however, winds would not likely be near hurricane or tropical storm levels. Hurricane was rated as very low by FEMA's NRI for Garrett County.

- **Storm Surge:** Storm surge occurs along the shorelines of large water bodies such as oceans and the great lakes; the Atlantic east coast is approximately 150 miles away.
- **Tsunami:** Tsunamis occur in oceans; the Atlantic east coast is approximately 150 miles away. The occurrence of a tsunami would have no direct impact Garrett County. FEMA's National Risk Index (NRI) notes that this hazard is not applicable to Garrett County.
- **Volcano:** The closest active volcano is the Dotsero Volcano in western Eagle County in the state of Colorado, approximately 1,470 miles west. It would not affect Garrett County. The volcano last erupted 4,200 years ago, but a 2018 report from the United States Geological Survey lists it as a moderate threat to human activity. FEMA's NRI notes that this hazard does not apply to Garrett County.

Another source was the 2021 *Maryland State Hazard Mitigation Plan*. The state identified 18 hazards. The following table compares the hazards from the state plan with the list generated by the steering committee above.

INCLUDED HAZARD TYPES – COMPARISON OF GARRETT COUNTY & MARYLAND PLAN		
<i>Hazard</i>	<i>In County Plan (Y/N)</i>	<i>Notes</i>
Active Shooter	N	Though active assailant incidents could be quite disruptive, prevention and mitigation are often at the facility or entity level.
Civil Unrest	N	Much like terrorism, law enforcement and other stakeholders coordinate preparedness efforts for civil unrest, often in connection to specific events, instances, or threats.
Coastal	N	Garrett County does not contain any coastlines. The closest coastline is the western Chesapeake Bay, with is roughly 150 miles to the east of Garrett County. FEMA's National Risk Index (NRI) notes that the hazard of Coastal Flooding is not applicable to Garrett County.
Cyber-Attack	Y	Hazard Profile Titled: Cyber-Threat
Dam Failure	Y	Hazard Profile Titled: Dam & Levee Failure
Drought	Y	Hazard Profile Titled: Drought
Extreme Temperature	Y	Hazard Profiles Titled: Severe Summer Weather and Severe Winter Weather
Flooding	Y	Hazard Profile Titled: Flooding
Nuclear Incident	N	The North Anna (VA), and Calvert Cliffs (MD), nuclear power plants are the closest active plants to Garrett County. None of the county's area lies within an emergency planning zone (EPZ) for those plants.
Public Health Emergency	Y	Hazard Profile Titled: Public Health Emergencies – The steering committee recognized the risks associated with pandemics, but it also felt a need to acknowledge risks from other outbreaks, including the potential strains on the small local health departments in the region.



INCLUDED HAZARD TYPES – COMPARISON OF GARRETT COUNTY & MARYLAND PLAN		
Hazard	In County Plan (Y/N)	Notes
Soil Movement	Y	Hazard Profile Titled: Landslide – The previous version of the plan included a broad consideration of soil movement. The steering committee recognized; however, the presence of primarily of landslides in portions of the county and how they impact transportation, potentially cause structural damage, etc.
Terrorism	N	Terrorism, particularly domestic terrorism, could impact Garrett County; however, law enforcement and emergency management stakeholders prepare for those incidents under other arrangements separate from the hazard mitigation planning process.
Thunderstorm	Y	Hazard Profile Titled: Severe Summer Weather – This profile discusses high winds, hail, lightning, and hurricane remnants.
Tornado	Y	Hazard Profile Titled: Tornado
Transportation Accident	Y	Hazard Profile Titled: Dense Fog-Transportation
Wildfire	Y	Hazard Profile Titled: Wildfire
Wind	Y	Hazard Profile Titled: Severe Summer Weather – This profile discusses high winds, hail, lightning, and hurricane remnants.
Winter Storm	Y	Hazard Profile Titled: Severe Winter Weather

Though Garrett County’s hazard list varies slightly from FEMA and the *Maryland State Hazard Mitigation Plan*, (a comparison of the lists suggests that the county’s committee assembled a viable and understandable list. A final step in validating the committee’s thoughts comes by reviewing disaster declarations for Garrett County (FEMA, 2023b). The following table denotes the disaster declarations for the county ($n = 14$). For declarations referenced by the U.S. Small Business Administration (SBA) and the U.S. Department of Agriculture’s Farm Service Agency (FSA), “P” refers to counties designated as “primary,” while “C” refers to those designated as “contiguous.” References to these declarations appear, as appropriate, in the profiles in Section 2.2 below.

DISASTER DECLARATIONS IMPACTING GARRETT COUNTY				
Declaration Information	Incident Type	FEMA (w/ Identifier)	SBA (w/Identifier)	USDA (w/ Identifier)
Severe Snowfall & Winter Storm (1993)	Snowstorm	EM-3100-MD	N/A	N/A
Blizzard of '96 (1996)	Snowstorm	DR-1081-MD	N/A	N/A
Severe Storms & Flooding (1996)	Flood	DR-1094-MD	N/A	N/A
Severe Storms, Flooding, Tropical Storm Fran (1996)	Hurricane Remnants	DR-1139-MD	N/A	N/A
Hurricane Isabel (2003)	Hurricane Remnants	DR-1492-MD	N/A	N/A
Severe Snowstorm (2003)	Snowstorm	EM-3179-MD	N/A	N/A



DISASTER DECLARATIONS IMPACTING GARRETT COUNTY				
<i>Declaration Information</i>	<i>Incident Type</i>	<i>FEMA (w/ Identifier)</i>	<i>SBA (w/Identifier)</i>	<i>USDA (w/ Identifier)</i>
Hurricane Katrina Evacuation (2005)	Hurricane Evacuation	EM-3251-MD	N/A	N/A
Severe Winter Storm & Snowstorm (2010)	Snowstorm	DR-1910-MD	N/A	N/A
Hurricane Sandy (2013)	Hurricane Remnants	EM-3349-MD	N/A	N/A
Hurricane Sandy (2013)	Hurricane Remnants	DR-4091-MD	N/A	N/A
Severe Winter Storm & Snowstorm (2016)	Snowstorm	DR-4261-MD	N/A	N/A
Excessive Rain, Flash Flooding & Flooding (2018)	Flood	N/A	PA-00097 (Garrett = Contiguous)	S4465 (Garrett = Contiguous)
COVID-19 (2020)	Biological	EM-3430-MD	N/A	N/A
COVID-19 Pandemic (2020)	Biological	DR-4491-MD	N/A	N/A

The list of disaster declarations also suggests that the hazards identified by the steering committee are appropriate; all incident types resulting in declarations (except for drought, tornado and wildfire) appear in the hazard list.

2.0 RISK ASSESSMENT

2.2 Describe Hazards

The following profiles detail each hazard considered by this plan, which includes a discussion on how the hazard impacts the county. Within each profile, research and historical data inform the following elements.

- **Hazard Overview:** Defines the hazard and presents a summary table of the hazard.
- **Location and Extent:** Identifies the physical places in the county that are vulnerable to the hazard and the severity of a hazard in a given location.

§201.6(c)(2)(i)	A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
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- **Impacts and Vulnerability:** Describes impacts on different topics such as the environment, economic development, housing and health, infrastructure, and natural and/or cultural resources that may result from the hazard as well as specific populations that may be vulnerable.¹

§201.6(c)(2)(ii)	A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008, must also address NFIP-insured structures that have been repetitively damaged by floods.
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- **Previous Occurrences:** Summarizes significant past events related to the hazard.

§201.6(c)(2)(i)	A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
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- **Loss and Damages:** Outlines the methods used for loss amounts (of deaths, injuries, and property/crop damage depending on available information) and estimates based on historical information and projections.

§201.6(c)(2)(ii)(B)	An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate.
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¹ The “Impacts and Vulnerability” section includes a consideration of the county’s social vulnerability to each of the identified hazards. These discussions vary in length and depth as per both the nature of the hazard itself and the data available. See below for a discussion of specific social vulnerability variables as they are available in the data.

- **Future Occurrences:** Describes the probability of future occurrences of the hazard under consideration. Climate change is increasing the number and intensity of disasters overall and, in many communities, is changing the landscape of risk. These trends make mitigation even more important. By taking future climate change into account and proactively reducing risk, communities increase their climate resilience and chances of withstanding future events.

§201.6(c)(2)(ii)(A)	The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.
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- **Risk Assessment:** Details methods for calculating the probability and severity of each hazard. Includes a summary of public sentiment about the hazard as well as risk categories (see below), and multi-jurisdictional considerations.

§201.6(c)(2)(ii)(A)	The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.
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§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
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- **Maps and Assets:** Graphically shows the geographic locations or populations in the county that are vulnerable to each hazard. This subsection also identifies the assets that fall under the hazard risk area. Although there is not a defined title for this subsection in the profiles, assets and maps appear where they are most fitting within the narrative.

One of the components of the risk assessment is to quantify, to the extent possible, the risk of hazards as determined by the probability of occurrence and the potential severity of those occurrences. This process helps to identify which hazards pose the most significant concerns to Garrett County's communities. It is essential to recognize the value of implementing several categories to determine the overall risk. The following narrative and tables describe the categories utilized by this plan and how they relate to the available data. Historical occurrences inform all calculations, not worst-case scenarios. In cases with zero events, other available data (which varies across the hazards and is outlined in each profile) supports determinations.

“Frequency” refers to the number of times a hazard occurs in a specific period (based on available historical data). In most instances, the total occurrences (e.g., three occurrences) are divided by the length of time (in years) that data is available (e.g., 10 years). Thus, in the example, three occurrences divided by 10 years equals 0.3. The table above translates the resultant numeric values into a narrative frequency description. The hazard would have a “low” frequency in the example described here. At times, no historical data is available; in those cases, the hazard receives the lowest possible points for the category (i.e., one).

FREQUENCY CATEGORIES			
Value	Score	Description	Definition
0.76 - >1.0	5	Excessive	Will occur during a year
0.51 – 0.75	4	High	Likely to occur in a year
0.26 – 0.50	3	Medium	May (or may not) occur in a year
0 – 0.25	2	Low	Unlikely to occur in a year
0	1	None	So unlikely that it can be assumed it will not occur in a year

Other qualitative categories enable a clearer understanding of a hazard's potential impacts. The table below depicts the variables used in this plan. Planners assigned values to these categories based on available research (cited, as appropriate, in the profiles), and each profile includes a brief description to contextualize the selection of the proper variable. Notably, the qualitative nature of these variables enables planners to consider potential future impacts, which is helpful when considering the nexus of risk and future development as well as the potential impacts of climate change. These variables should be considered as a set. For instance, in the following profiles, a hazard like severe summer storms would receive a *Magnitude* score of “catastrophic” simply because the entire county (i.e., well over 50% of the land area) is at risk. A catastrophic score, though, could mislead a reader without the context provided by the other variables that would receive a much lower score (such as *Onset* and *Human*, which would both receive the lowest scores available).

QUALITATIVE RISK VARIABLES						
	Response	Onset	Magnitude	Business	Human	Property
1	< half a day	> 24 hours	Localized (< 10% land area affected)	< 24 hours	Minimum (minor injuries)	< 10% property affected
2	One day	12-24 hours	Limited (10-25% land area affected)	One week	Low (some injuries)	10-25% property affected
3	One week	6-12 hours	Critical (25-50% land area affected)	At least two weeks	Medium (multiple severe injuries)	25-50% property affected
4	One month	< 6 hours	Catastrophic (> 50% land area affected)	More than 30 days	High (multiple deaths)	> 50% property affected
5	> one month	N/A	N/A	N/A	N/A	N/A

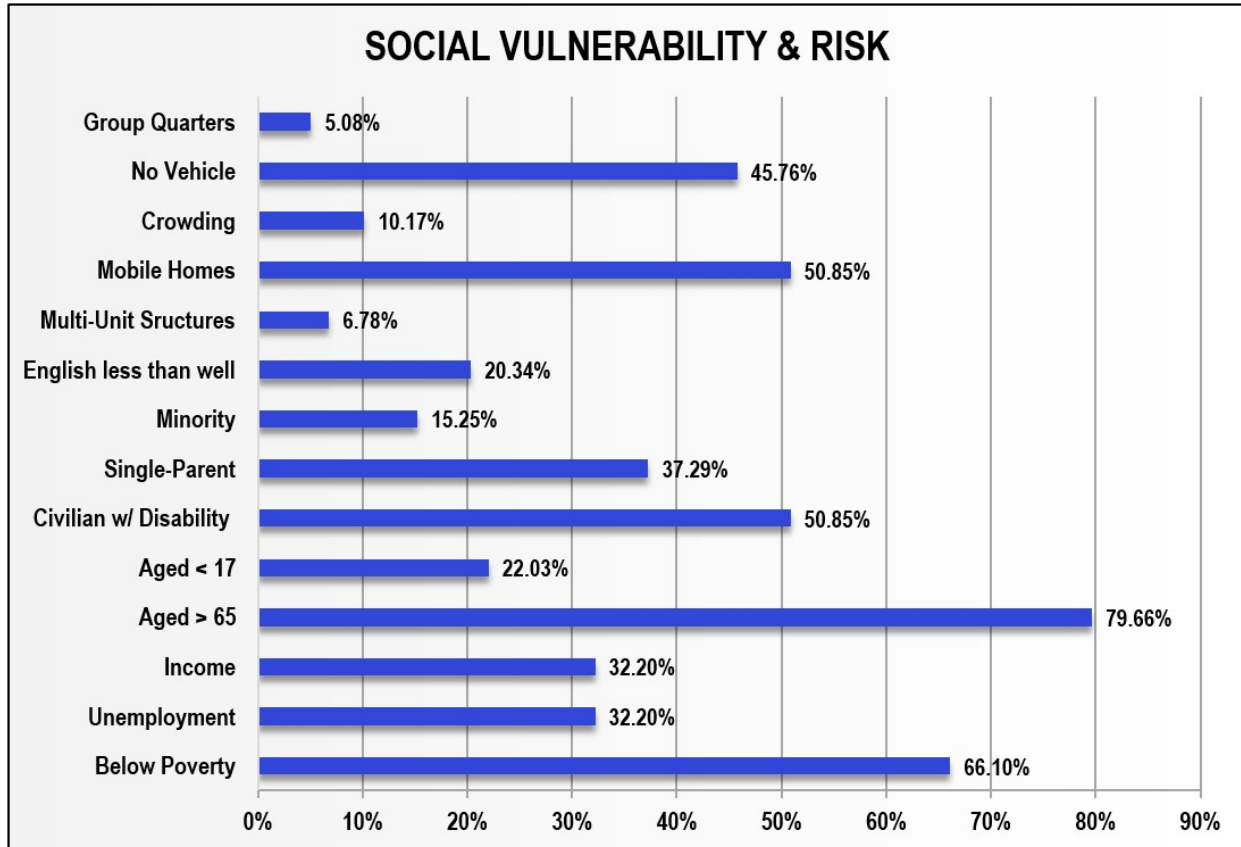
All hazards receive a score for each category corresponding to the number in the far-left column. Hazards receive scores of between 7 (i.e., all seven categories receive a value of one) and 30 points (i.e., all seven categories receive a value of four or five). The list below represents a broad range of which planners ranked all of the hazards in this plan.

<u>Range of Points (Score)</u>	<u>Hazard Ranking</u>
7 – 10	Lowest
11 – 15	Low
16 – 20	Medium
21 – 25	High
26 – 30	Highest

Social Vulnerability

The Agency for Toxic Substances and Disease Registry (ATSDR), a division of the Centers for Disease Control and Prevention (CDC), has developed a “Social Vulnerability Index” (SVI) that measures and compares social vulnerability among census tracts. The ATSDR defines social vulnerability as the degree to which certain social conditions in a community, including poverty, car ownership, or the number of people in a household may affect the community’s ability to prevent human suffering and financial loss in the event of a disaster (2022). The dataset includes numerous variables informed by data collected and developed by the Census Bureau; data sources include the American Community Survey (ACS) administered between 2018 and 2020 (ATSDR, 2022).

The Garrett County steering committee developed and distributed a public survey as part of the plan updating process, a portion of this survey pertained to the public’s perception of social vulnerability. A question on the survey asked respondents which social factors they felt might be at particular risk to the various hazards identified in this plan. A total of 59 individuals completed this portion of the survey, this information was utilized to inform decision making in Section 3.0 – Mitigation Strategy on this plan, see the results below.



Socioeconomic Variables (Poverty and Educational Attainment)

The SVI includes a variable that measures the estimated number of persons who live below the poverty level. Researchers at the CDC, who authored *A Social Vulnerability Index for Disaster Management*, explain that, “economically disadvantaged populations are disproportionately affected by disasters” (Flanagan, Gregory, Hallisey, Heitgard, & Lewis, 2011).

Those with lower income are less likely to have the resources needed to properly prepare for a possible disaster, or to recover after a disaster occurs (Cutter, Boruff & Shirley, 2003). These areas will need significant support during recovery activities, and could greatly benefit from targeted mitigation. Closely associated with the poverty level is the unemployment rate. The Median Household Income (MHI) for Garrett County is \$64,447, and the poverty rate is 11%. This is slightly below the national poverty rate of 12.8%. As illustrated in the table above approximately 66% of survey respondents felt that those living below the poverty line might be at particular risk to the various hazards identified in this plan.

Scholars consider education as a socioeconomic variable, though the relationship between education and vulnerability is not absolutely understood (Flanagan et al, 2011). Education is; however, associated with both income and poverty. This is especially true within the boom and bust cycles associated with natural resource industries. During boom times, these residents can earn decent wages, but when the industry enters a bust cycle there is little to fall back on. Applying for federal aid and other recovery activities requires the proper completion of complex paperwork. For people with less education, the practical and bureaucratic hurdles to cope with and recover from disaster prove increasingly difficult to surmount (Morrow & Gladwin, 1999). While most residents throughout Garrett County have a high school diploma, there are 9.5% of the population who do not.

Access to Internet

During the COVID-19 Pandemic, the internet was keeping many connected to work, school, family and friends. However, a Gallup analysis shows “more than half a billion of the world’s most-vulnerable people, who were struggling to meet even their basic food and shelter needs and didn’t have anyone to help them, didn’t have internet access” (Ray, Pugliese, & Espova, 2020). Inequality in income and of opportunity worsens due to disadvantaged groups of people who live in rural areas having limited, or no internet access (Garcia-Escribano, 2020). Households that subscribe to broadband Internet average 82.7% in Garrett County. This is below the national average of 87%.

Household Composition

The household composition section of the SVI includes variables measuring vulnerable ages and vulnerable households (single parent households with children under 18). Vulnerable ages include those under the age of 18 and those over the age of 65. Multiple researchers have concluded that children and elders are the most vulnerable groups in disaster events (Flanagan, 2011). Nearly 75% of the victims of Hurricane Katrina were elderly (Phillips, Thomas, Fothergill, & Blinn-Pike, 2010). Many elderly citizens have disabilities that require the assistance of either machines (oxygen concentrators, for example) or others (difficulty walking for example). The family members or neighbors who can typically be counted on to assist elderly persons may be either overwhelmed by the disaster, or be physically unable to gain access to elderly persons (Flanagan, 2011). Extended power outages will disproportionality effect elderly populations. Approximately 6,888 citizens of Garrett County are over the age of 65.

As illustrated in the table above, nearly 80% of survey respondents (highest percentage) felt that those over the age of 65 might be at particular risk to the various hazards identified in this plan.

Children, and especially the very young, generally cannot protect themselves and are heavily reliant on their care takers for protection and care. Scholars have determined that children are rarely incorporated into disaster planning and scenario exercises due to the assumption of parental responsibility (Martin, Bush, & Lynch 2006). By not including this population in the planning process, responders are not adequately prepared or equipped to deal with children. Approximately 5,030 citizens of Garrett County are under the age of 18.

The final variable among the housing composition grouping is the percent of households that are single-parent households with children who are under the age of 18, similarly to the previous variables; children are among the most vulnerable of populations while single-parent households are among the lower socioeconomic status households. These households are especially vulnerable during a disaster because all the caretaker duties fall to one parent, who must also deal with the disaster event and recovery from that event (Flanagan, 2011).

Housing/Transportation

The SVI includes a number of variables that describe housing and transportation, three of which appear here: mobile homes, vehicle ownership/access, and institutionalized housing. Housing quality is an important factor in evaluating vulnerability and is closely tied with socioeconomic status and personal wealth (Flanagan et al, 2011). Mobile homes, which typically are inhabited by those of lower socioeconomic groups, are not designed to withstand severe weather events or flooding. Mobile homes are frequently found outside of metropolitan areas, making access difficult in regular conditions, even more so during and immediately after a disaster (Flanagan et al, 2011). Mobile homes are often clustered in communities, which increases the overall vulnerability of these communities (Flanagan et al, 2011). As illustrated in the table above over 50% of survey respondents felt that those living in mobile homes might be at particular risk to the various hazards identified in this plan.

Vehicle ownership or access is crucial to being prepared as well as evacuating, when needed. Those who do not possess, or have access to a vehicle will have difficulty going to stores in order to obtain preparedness supplies and will have less capacity to bring those supplies back to their home. This is even more pronounced in rural areas, which typically lack robust public transportation networks.

The final housing vulnerability variable to discuss is those who live in institutional settings. These include college dorms, farm worker's dormitories, health institutions, and prisons, which present special concerns for evacuations (Flanagan, 2011). Nursing homes and other residential medical facilities are particularly vulnerable. The increased vulnerability is due to the special and timely needs of the residents, and because of understaffing in these institutions in emergencies (Flanagan, 2011). Evacuating these facilities is a time and resource consuming operation, requiring numerous specialty vehicles and staff such as advanced life support ambulances. While these facilities will have backup generators for vital machines, in an extended power outage, these generators will need additional fuel deliveries.

Minority Status/Language

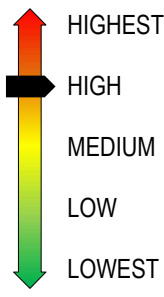
A number of studies have found that the overall marginalization of racial and ethnic minority groups has made these populations more vulnerable during all stages of a disaster (Flanagan, 2011). Specifically, studies have shown that populations of African American, Native Americans, Asian, Pacific Islander and Hispanic origin are correlated with higher vulnerability rate, minorities bear the cost not in absolute dollars, but rather in their proportional losses. In other words minorities are more likely to lose more of their home and belonging even when the dollar amount of that loss is less (Flanagan, 2011). Most of the population in Garrett County is white, but there are nearly 300 who identify as black or African American, and 400 who identify as Hispanic or Latino.

A specific variable among minorities that can greatly increase their vulnerability during a disaster is an inability to speak or read English well, or at all. While small in comparison to the overall population of the county, this population is exceedingly vulnerable. Without accurate translations, these populations may not understand impending disasters, preparedness warnings, or evacuation notices. Research has shown that immigrant populations are more likely to rely on relatives, friends, and neighbors for information, rather than official sources (Flanagan et al., 2011). Approximately 3% of Garrett County's population speaks a language other than English at home. The Town of Grantsville was the municipality with the highest percentage of non-English speaking individuals at 6.2%. There is no area in Garrett County that is close to the percentage of non-English speaking individuals in the State of Maryland, which is nearly 21%.

Section 2.0: Risk Assessment concludes with a “risk ranking” table that summarizes the scores for all hazards included in the plan. Profiles appear in the following order.

- 2.2.1 Cyber-Threat
- 2.2.2 Dam & Levee Failure
- 2.2.3 Dense Fog – Transportation
- 2.2.4 Drought
- 2.2.5 Flooding
- 2.2.6 Hazardous Materials Release
- 2.2.7 Landslide
- 2.2.8 Public Health Emergencies
- 2.2.9 Severe Summer Weather
- 2.2.10 Severe Winter Weather
- 2.2.11 Tornado
- 2.2.12 Wildfire

2.2.1 Cyber-Threat

An assault launched by cybercriminals using one or more computers against a single, or multiple computers, or networks.				
	RISK	Period of Occurrence:	At any time	Garrett County Risk Ranking: High
		Warning Time:	Less than 6 hours	State Risk Ranking: Medium-Low
		Probability:	Medium (may or may not occur in a year)	Impact: Limited (10 to 25% of property affected)
		Type of Hazard:	Technological	Disaster Declarations: None

Hazard Overview

Cybersecurity incidents are generally defined as an event that actually or imminently jeopardizes, without lawful authority, the confidentiality, integrity, or availability of information or an information system; or constitutes a violation or imminent threat of violation of law, security policies, security procedures, or acceptable use policies. According to the Department of Homeland Security – Industrial Control Systems Cyber Emergency Response Team, cyber threats to a control system refer to persons who attempt unauthorized access to a control system device and/or network using a data communications pathway. This access can be directed from within an organization by trusted users or from remote locations by unknown persons using the Internet. Threats to control system can come from numerous sources, including hostile governments, terrorist groups, disgruntled employees, and malicious intruders.

A cyber-attack targets an organization's use of cyberspace for the purpose of disrupting, disabling, destroying, or maliciously controlling a computing environment/infrastructure, or destroying the integrity of the data or stealing controlled information. Cyber-attacks are unpredictable and typically occur without warning. To protect against these threats, it is necessary to create a secure cyber-barrier around the Industrial Control System (ICS). Though other threats exist, including natural disasters, environmental, mechanical failure, and inadvertent actions of an authorized user, this discussion will focus deliberate threats as categorized in the Statement for the Record to the Joint Economic Committee by Lawrence K. Gershwin, the Central Intelligence Agency's National Intelligence Officer for Science and Technology (June 21, 2001). These include: national governments, terrorist, industrial spies, organized crime groups, hacktivists, and hackers. Activities could include espionage, hacking, identity theft, crime, and terrorism.

Location and Extent

According to the FireEye Cyber Threat Map, approximately 725,000 major cyber-attacks occur throughout the world per day. Because cyber-attacks can cause severe disruptions to computers and electronics associated with critical infrastructure, statewide transportation, data centers, public safety, and utility services, all of which use Supervisory Control and Data Acquisition (SCADA) systems, are all vulnerable to attack. Because of this, the county and municipal agencies of Garrett County, as well as individuals, businesses and other institutions are potential targets for cyber-attacks. The actual cause of cyber-attacks can be difficult to identify because the internet provides cover for those responsible for attack initiation.

Although the most numerous and publicized cyber intrusions and other incidents are ascribed to lone computer-hacking hobbyists, such hackers pose a negligible threat of widespread long-duration damage to national-level infrastructure. Nevertheless, the large worldwide population of hackers poses a relatively high threat of an isolated or brief disruption causing serious damage, including extensive property damage or loss of life. As the hacker population grows, so does the likelihood of an exceptionally skilled and malicious hacker attempting and succeeding in such an attack. Hackers are subdivided as follows:

- Sub-communities of hackers.
- Script kiddies are unskilled attackers who do NOT have the ability to discover new vulnerabilities or write exploit code and are dependent on the research and tools from others. Their goal is achievement and to gain access and deface web pages.
- Worm and virus writers are attackers who write the propagation code used in the worms and viruses but not typically the exploit code used to penetrate the systems infected. Their goals is notoriety and to cause disruption of networks and attacked computers systems.
- Security researcher and white hat have two sub-categories; bug hunters and exploit coders. Their goal is profit, to improve security, earn money, and achieve recognition with an exploit.
- Professional hacker-black hat who gets paid to write exploits or actually penetrate networks, also falls into the two sub-categories; bug hunters and exploit coders. Their goal is profit.

Hackers and researchers interact with each other to discuss common interest, regardless of color of hat. Hackers and researchers specialize in one or two areas of expertise and depend on the exchange of ideas and tools to boost their capabilities in other area. Information regarding

computer security research flows slowly from the inner circle of the best researchers and hackers to the general IT security world, in a ripple-like pattern.

The table below was excerpted from NIST 800-82, “Guide to Supervisory Control and Data Acquisition (SCADA) and Industrial Control System Security” and provides a description of the extent of various threats to computer system networks.

UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE THREAT TABLE	
Cyber-Threat	Description
Bot-network operations	Bot-network operators are hackers; however, instead of breaking into systems for the challenge of bragging rights, they take over multiple systems in order to coordinate attacks and to distribute phishing schemes, spam, and malware attacks.
Criminal groups	Seek to attack systems for monetary gain. Organized crime groups are using spam, phishing, and spyware/malware to commit identity theft and online fraud.
Foreign intelligence services	Use cyber tools as part of their information-gathering and espionage activities. In addition, several nations are aggressively working to develop information warfare doctrine, programs, and capabilities. Such capabilities enable them to have a significant impact by disrupting the supply, communications, and economic infrastructures that support military power.
Hackers	Hackers break into networks for the thrill of the challenge or for bragging rights in the hacker community. While remote cracking once required a fair amount of skill or computer knowledge, hackers can now download attack scripts and protocols from the Internet and launch them against victim sites. While attack tools have become more sophisticated, they have also become easier to use.
Insiders	The disgruntled organization insider is a principal source of computer crime. Insiders may not need a great deal of knowledge about computer intrusions because their knowledge of a target system often allows them to gain unrestricted access to cause damage to the system or to steal system data. The insider threat also includes outsourcing vendors as well as employees who accidentally introduce malware into systems.
Phishers	Individuals, or small groups, who execute phishing schemes to steal identities or information for monetary gain. Phishers may also use spam and spyware/malware to accomplish their objectives.
Spammers	Individuals or organizations who distribute unsolicited e-mail with hidden or false information to sell products, conduct phishing schemes, distribute spyware/malware, or attack organizations (i.e., denial of service).
Spyware/malware authors	Individuals or organizations carry out attacks by producing and distributing spyware and malware. Several destructive computer viruses and worms have harmed files and hard drives, including the Melissa Macro Virus, Explore.Zip worm, CIH (Chernobyl) Virus, Nimda, Code Red, Slammer, and Blaster.
Terrorist	Terrorist seek to destroy, incapacitate, or exploit critical infrastructures to threaten national security, cause mass casualties, weaken the U.S. economy, and damage public morale and confidence. Terrorists may use phishing schemes or spyware/malware to generate funds or gather sensitive information.

Source: Government Accountability Office, U.S. DHS-Role in Critical Infrastructure Protection Cybersecurity, GAO-05-434 (Washington, D.C.: May, 2005).

Impacts and Vulnerability

Impacts from a large-scale cyber-attack could disrupt the county's economy and potentially threaten its economic stability. The magnitude of a cyber-attack will vary greatly based on the extent of systems affected, the attacks durations, and the type of attack. The magnitude will vary based upon which specific system is affected by an attack and the ability to preempt and address emerging issues.

While physical structures are generally not at risk, all networked electronic devices are vulnerable to cyber-attacks. Because computer networks contain sensitive information that is integral to the county's security, they will likely continue to be the focus of coordinated cyber-attacks. Computer networks are also entrusted with many forms of personal and financial information, including tax filings, birth and death records, Social Security numbers, medical information, and more. Additionally, many critical facilities that are essential to county operations rely upon computer networks to monitor and control critical functions. For example an attack on the power grid could have detrimental impacts on county services and functions. A large-scale computer breach would likely lead to significant economic costs in lost productivity to the impacted county agencies and potentially related businesses and industries.

Cyber-attack impacts can range from insignificant to catastrophic. The overwhelming majority of cyber-attacks involve targeted attacks on a single computer. These happen every day and cause little impact on the county as a whole. However, a coordinate attack could render county and municipal run networks useless.

In recent years, cyber-attacks have become a significant threat and can impact people, businesses, institutions, local governments, and state agencies to varying degrees. The table below describes the types of cyber-attacks and the associated impacts likely to be encountered.

TYPES OF CYBER-ATTACKS	
Threat	Description
Malware	Malware is a term used to describe malicious software, including spyware, ransomware, viruses, and worms. Malware breaches a network through a vulnerability, typically when a user clicks a dangerous link or email attachment that then installs risky software. Once inside the system, malware can do the following: <ul style="list-style-type: none"> • Block access to key components of the network (ransomware) • Install malware or additional harmful software • Covertly obtain information by transmitting data from the hard drive (spyware) • Disrupt certain components and render the system inoperable
Botnet	A collection of computers subject to control by an outside party, usually without the knowledge of the owners, using secretly installed software robots. The robots are spread by Trojan horses and viruses. The botnets can be used to launch denial-of-service attacks and transmit spam.
Denial-of-Service Attack	Flooding the networks or servers of individuals or organizations with false data requests so they are unable to respond to requests from legitimate users.
Phishing	Phishing is the practice of sending fraudulent communications that appear to come from a reputable source, usually through email. The goal is to steal sensitive data such as credit care and login information or to install malware on the victim's machine. Phishing is an increasingly common cyber-threat.
SQL Injection	A Structured Query Language (SQL) injection occurs when an attacker inserts malicious code into a server that uses SQL and forces the server to reveal information it normally would not. An attacker could carry out an SQL injection simply by submitting malicious code into a vulnerable website search box.
Spoofing	Making a message or transaction appear to come from a source other than the originator. Spyware software that collects information without a user's knowledge and transfers it to a third party.
Trojan Horse	A destructive program that masquerades as a benign application. Unlike viruses, Trojan horses do not replicate themselves, but they can be just as destructive. One of the most insidious types of Trojan horse is a program that claims to rid your computer of viruses but instead introduces viruses onto your computer.
Virus	A program designed to degrade service, cause inexplicable symptoms, or damage networks.
Worm	Program or algorithm that replicates itself over a computer network and usually performs malicious actions, such as using up the computer's resources and possibly shutting the system down. A worm, unlike a virus, has the capability to travel without human action and does not need to be attached to another file or program.

Pursuant to the requirements of Maryland Code, Public Safety Article §14-104.1(c)(2) the State Chief Information Security Officer (SCISO) must establish criteria for local government reporting to cybersecurity incidents. Local governments in Maryland must report any cybersecurity incident that results in the following:

- Impacts such as; the potential of, or confirmed, unauthorized modification or deletion of data, regardless of whether the organization was able to recover or restore data. The disruption of business function resulting from a denial-of-service attack.
- Exfiltration's including; unauthorized access to, or acquisition of, non-public data, regardless of whether the "exfiltration" can be confirmed or is merely suspected.

Exfiltration includes the identification of non-public data attributable to your organization in a forum (e.g., pastebin, darkweb) inconsistent with the expected handling of that data.

Garrett County has established the Department of Technology and Communications (DoTCom) to streamline efficiency in county government and provide excellent services to county residents and other governmental departments/agencies.

Social Vulnerability Considerations

The latest Cybercrime Report from LexisNexis Risk Solutions reveals that the people most vulnerable to cybercrime tend to be adults over the age of 75 and younger adults. “It is believed that the particular vulnerability of young and older adults is largely due to the surge of new customers going online or working from home during the 2020 COVID-19 pandemic” (Cybernews, 2024). The report suggests that it is easy to assume that young adults are tech-savvy and therefore relatively immune from cyberattacks, but they often have a false sense of their capabilities and therefore tend to be more relaxed, especially in terms of their willingness to share personal information. “While younger adults are most susceptible to online fraud attacks, the average fraud loss per customer increases progressively with age, likely influenced by larger disposable incomes later in life” (Cybernews, 2024).

The older demographic, by contrast, are much less familiar with the latest technologies, and their lack of familiarity raises their susceptibility to the various scams and phishing attacks. “Protection of the older, and potentially more vulnerable population, is critical for organizations that are prioritizing a digital-first strategy” (Cybernews, 2024).

Previous Occurrences

In addition to large-scale cyber-attacks, smaller incidents occur on a daily basis. Billions of emails are sent each day, and spam and phishing emails account for a significant share of all email traffic. Brute force attacks, which are trial-and-error attempts to obtain user passwords and pins, are frequently used by criminals to attempt to crack encrypted data or gain access to private accounts. The breaches that have been experienced in Garrett County have all been tied back to a password compromise/password re-use.

The majority of cyber-attacks go either unnoticed or unreported and, therefore, there is no definitive list of attacks. In recent years, several significant cyber-attacks have disrupted or even halted the provision of municipal services. These attacks have increased the urgency and attention to the need for cyber-security protection policies and measures.

Loss and Damages

Cyberattacks can lead to loss of money, theft of personal information, and damage to an individual's or company's reputation and safety. Cyberattacks can be carried out using computers, mobile phones, gaming systems, and other electronic devices. The attacks may include identity theft, fraud, or block access to or delete documents and pictures.

According to a February 2018 report from The Council of Economic Advisers, malicious cyber activity cost the U.S. economy between \$57 billion and \$109 billion in 2016. The IBM Cost of Data Breach Report 2023, indicated that the average cost of a data breach reached an all-time high in 2023 of USD 4.45 million. This represents a 2.3% increase from the 2022 cost of USD 4.35 million. This report revealed that an alarming 83% of organizations experienced more than one data breach during 2022. If a major cyber-attack was to strike the State of Maryland and cripple power plants and other critical lifeline utilities for an extended time, the economic impact would be in the billions.

As cybercriminals become more ruthless, the risks and damages that they can unleash become more serious to include physical losses and personal injury. Such events are now known as "cyber-physical attacks", according to the International Risk Management Institute's online glossary, this is a security breach in cyberspace that impacts on the physical environment. A malicious user can take control of the computing or communication component of water pumps, transportation system, pipeline valves, etc. and cause damage to property and put lives a risk.

Future Occurrences

Based on past historical data and trends, the future probability of cyber-attacks occurring within Garrett County are moderate to high. Cyberterrorism is an emerging hazard that has the potential to impact the county's computer infrastructure and the systems and services that are provided to the public. Concerns about cyber-attacks throughout the United States are growing as its impacts could have potentially crippling effects. Security experts describe the threat of cyberterrorism as imminent and highly likely to occur in any given year.

In today's threat landscape, defenders have a huge disadvantage, attackers have to get it right once to accomplish their goal. Whereas the defender must patch, keep up on every possible vulnerability in all the systems, as you are only as strong as the weakest link. With more and more data accessible from anywhere in the world, passwords are not enough protection along.

Future Climate Considerations

Climate change currently has no known effects on cyber-attacks.

Risk Assessment

This section summarizes the vulnerability of Garrett County to cyber-threats. Garrett County conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding cyber-threats.


PUBLIC SENTIMENT, CYBER-THREAT – GARRETT COUNTY					
Hazard	Level of Concern				Total Responses
	Not at All	Somewhat	Concerned	Very	
CYBER-THREAT	9 (12.68%)	20 (28.17%)	21 (29.58%)	21 (29.58%)	71
Please indicate which hazard event you feel may affect your community?				27 (40.91%)	66

The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above.

CYBER-THREAT RISK RANKING			
Category	Points	Description	Notes
Frequency	3	Medium (may or may not occur in a year)	According to the FireEye Cyber Threat Map, approximately 725,000 major cyber-attacks occur throughout the world per day.
Response	5	More than a month	The IBM's 2022 data security report indicates the average time to identify a breach is 206 days, and another 73 days to contain the breach for a total average response time of approximately nine months.
Onset	4	Less than 6 hours	Cyberattacks are unpredictable and typically occur without warning.
Magnitude	2	Limited (10-25% land area affected)	Cyberattacks can cause severe disruptions to computers and electronics associated with critical infrastructure, transportation systems, and utility services. Magnitude will vary greatly based on the extent of systems affected, the attack durations, and type of attack.
Business	4	More than 30 days	Cyberattacks can impact people, businesses, institutions, local governments, to varying degrees. A large-scale attack could lead to significant economic costs in lost productivity to the impacted agencies.
Human	2	Low (some injuries)	Human impacts would likely stem from cascading effects. A malicious user could take control of critical infrastructure or a transportation system and cause damage to property and put several lives at risk.
Property	2	10-25% property affected	Impacts to property would likely stem from cascading effects.
Totals	22	HIGH	

FEMA's *Local Mitigation Planning Handbook* (2023c) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks or vulnerabilities are more or less prevalent as compared to the other participating jurisdictions. All participating jurisdictions are at equal risk of cyber-threats.

2.2.2 Dam and Levee Failure

A dam is a barrier built across a waterway to control the flow or raise the water level. A dam failure occurs when the barrier constructed does not obstruct or restrain water as designed, which can rapidly result in a large area of completely inundated land. Levees, though similar, are embankments built to prevent the overflow of a body of water.				
	RISK	Period of Occurrence:	At any time, typically following a period of prolonged precipitation	Garrett County Risk Ranking: Low
	HIGH	Warning Time:	6-12 hours	State Risk Ranking: Medium-Low
	MEDIUM	Probability:	Low (unlikely to occur in a year)	Impact: Localized (< 10% of land are affected)
	LOW	Type of Hazard:	Technological	Disaster Declarations: None
	LOWEST			

Hazard Overview

Dams are man-made structures generally made with concrete or earthen materials built across a stream or river to hold water for storage, flood control, or electricity generation (National Geographic, n.d.). There are 91,457 dams in the United States, the average age of which is 57 years old (NID, 2020). The majority of these dams are privately owned. State and local authorities, public utilities, and federal agencies own others. As populations grow and development continues, the overall number of High-Hazard Potential Dams (HHPDs) is increasing. The number of HHPDs with noted deficiencies has also increased, with an estimated 2,330 in 2020 (Association of State Dam Safety Officials).

Dams are an integral component of infrastructure in the United States, the benefits of dams are numerous: they provide drinking water supplies, navigation and recreation opportunities, renewable energy through hydropower, agricultural irrigation, and save lives by preventing or reducing floods.

The failure of a large dam, although a man-made structure, will most likely result in the natural event of flooding. A dam failure is defined as any malfunction or abnormality outside the design assumptions and parameters that adversely affect a dam's primary function of impounding water (FEMA, 2017).

The three leading causes of dam failure in the United States include overtopping, foundation defects and slope instability, and piping.

- **Overtopping** occurs when water spills over the top of the dam. Overtopping failures result from the erosive action of water on the embankment. Overtopping due to inadequate spillway design, debris blockage of spillways, or settlement of the dam crest account for approximately 34% of all dam failures in the U.S.
- **Foundation Defects, Slope Instability, and Structural Failures** can occur in either the embankment or the appurtenances. Large cracks in either an appurtenance or the embankment, major settlement, and major slides will require emergency measures to ensure safety, especially if the problems occur suddenly. These types of failures cause approximately 30% of all dam failures.
- **Piping** is the internal erosion caused by seepage. Seepage occurs around hydraulic structures, such as pipes and spillways, through animal burrows, around roots of vegetation, and through cracks in the dam. Piping accounts for another 20% of dam failures in the U.S.

These types of failures are often interrelated in a complex manner. For example, uncontrolled seepage may weaken the soil and lead to structural failure. A structural failure may shorten the seepage path and lead to a piping failure. Surface erosion may result in structural failure, and so on. Minor defects, such as cracks in the embankment, could be the first visual sign of a significant problem, which could lead to the failure of the structure. Someone experienced in dam design and construction should evaluate the seriousness of all deficiencies as soon as they are detected.

Dam failures can be no-notice failures that occur during non-flooding situations when reservoirs are at normal levels. No-notice failures are generally more hazardous because of their unexpected nature and little warning time for evacuation. Other failures occur during periods of excessive rainfall or flooding and can exacerbate inadequate spillway capacity. Dam failures can be a cascading event following a large wildland fire, where heavy rains may rapidly runoff of burnt areas unable to absorb the excess water into an impoundment that subsequently cannot handle the additional water. Finally, though improbable and likely low-impact, seismic events could destabilize a dam just enough to prompt deterioration or failure.

Though levees are designed to a certain level of potential flood, the U.S. Army Corps of Engineers (USACE) notes that levees are not subject to consistent design, construction, operations, and maintenance standards. Levees function as part of a system.

In other words, a levee in one area may overtop by design to protect larger populations downstream (USACE, n.d.). “Levee failure’ implies that something about the levee failed to prevent flooding on the land side of the levee” (USACE, n.d.). Levee failures can result from overtopping, water flow through or under a levee, erosion, by an object hitting the levee, or by an object on the levee (e.g., tree or building) falling and taking a portion of the structure with it (USACE, n.d.). The USACE also maintains the National Levee Database (NLD).

Location and Extent

The Code of Maryland Regulations (COMAR) defines a dam as any obstruction, wall, or embankment with its abutments and appurtenant works built to store or divert water. The seemingly simple act of impounding water for various uses creates an inherent risk of flooding, downstream property damage, and the potential for loss of life (MDE, n.d.B). The Maryland Department of the Environment (MDE) reports the presence of over 600 dams in Maryland, ranging in height from six to 296 feet (n.d.B). The U.S. Army Corps of Engineers – National Inventory of Dams (NID) (2023) reports a slightly different figure for Maryland, 419 dams, with an average age of 57 years.

For Garrett County, the NID lists 21 total dams (USACE, 2023). The average age of these dams is 72 years, five percent of the dams are federally regulated and the Deep Creek Lake Dam is currently the only dam in the county currently utilized to generate hydro-electrical power. The MDE maintains a Maryland Dam Inventory webmap, which indicates there are 28 dams in Garrett County. For the remainder of this profile, the analysis will be based on these 28 facilities, as noted in the table on the next page.

The largest dams in the county include the Jennings Randolph Lake Dam on the Potomac River, the Deep Creek Lake Dam, and the Savage River Dam. Smaller dams include the Kitzmiller Dam, Casselman River Dam, and the Rock Lodge Dam. Two other dams of significance to the county include the Mount Storm Dam and the Stoney River Dam, both of which are located in West Virginia on the Stony River, a tributary to the Potomac. Failure of either of these dams would affect the downstream communities of Kitzmiller and Bloomington and would also have a direct impact on the Jennings Randolph Lake Dam.

The Town of Friendsville is located downstream from the Deep Creek Lake Dam, and there are six flood control impoundments constructed by the Soil Conservation Service in the 1970s located upstream of parts of Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park in the Little Youghiogheny Watershed.

GARRETT COUNTY DAMS

<i>National ID</i>	<i>Name</i>	<i>Hazard Class</i>	<i>River/Stream</i>	<i>Dam Type</i>	<i>Purpose</i>	<i>Year Completed</i>	<i>EAP (w/ Rev. Date)</i>	<i>Dam Height (ft.)</i>	<i>Normal Storage (Acre ft.)</i>	<i>Dam Length (ft.)</i>
MD00513	Adventure Sports Ctr. Pond Dam	Low	Fork Run	Earth	Recreation	2007	Not Required	27	20	1,530
MD00163	Bittinger Farm Pond Dam	Low	Little Savage River	Earth	Recreation	1968	Not Required	17	49	715
N/A	Browning Dam	Low	Muddy Creek	Gravity	Other	1930	Not Required	7	--	200
MD00501	Casselman River Dam	Low	Casselman River	Concrete	Other	1797	Not Required	6	20	120
MD00004	Deep Creek Lake Dam	High	Deep Creek	Earth	Hydroelectric / Recreation	1925	Yes 5/01/2023	85	93,000	1,300
MD00009	Frostburg Reservoir	High	Big Piney Run	Earth	Water Supply	1990	Yes 4/16/2021	46	1,410	1,275
MD00012	Herrington Manor Dam	Low	Herrington Run	Earth	Recreation / Other	1938	Not Required	24	216	787
MD00069	Jennings Randolph Lake Dam	High	N. Branch Potomac River	Rockfill	Flood Control / Recreation / Water Supply	1981	Yes 6/30/2020	296	94,700	2,130
MD00195	Kemp Farm Pond Dam	Low	Youghiogheny River	Earth	Recreation, Fire / Stock	1971	Not Required	28	15	300
MD00280	Kitzmiller Dam	Low	Wolfden Run	Rockfill	Water Supply	1985	Not Required	7	1	70
MD00114	Lake Louise Dam	Significant	Puzzley Run	Rockfill	Recreation	1930	Yes 4/29/2020	21	252	355
MD00154	Lake Minnetoska Dam	Low	Herrington Run	Masonry	Recreation	1924	Not Required	10	26	243
MD00044	Little Youghiogheny Site 1 Dam	High	Cherry Glade Run	Earth	Flood Control	1964	Yes 2/22/2020	33	23	375
MD00033	Little Youghiogheny Site 2 Dam	High	Cherry Glade Run	Earth	Flood Control	1962	Yes 4/15/2021	35	17	610



GARRETT COUNTY DAMS

<i>National ID</i>	<i>Name</i>	<i>Hazard Class</i>	<i>River/Stream</i>	<i>Dam Type</i>	<i>Purpose</i>	<i>Year Completed</i>	<i>EAP (w/ Rev. Date)</i>	<i>Dam Height (ft.)</i>	<i>Normal Storage (Acre ft.)</i>	<i>Dam Length (ft.)</i>
MD00045	Little Youghiogheny Site 3 Dam	High	Wilson Run	Earth	Flood Control	1965	Yes 4/16/2021	35	17	655
MD00055	Little Youghiogheny Site 5 Dam	High	Landons Run	Earth	Flood Control	1968	Yes 4/17/2021	41	42	550
MD00036	Little Youghiogheny Site 6 Dam	High	Broad Ford Run	Earth	Flood Control / Recreation / Water Supply	1971	Yes 4/16/2021	46	1,410	1,160
MD00032	Little Youghiogheny Site 7 Dam	High	Little Youghiogheny River	Earth	Flood Control	1960	Yes 4/15/2021	45	31	700
MD00057	Meadow Run Dam	High	Meadow Run	Earth	Recreation	1969	Yes 5/02/2020	25	410	1,100
MD00120	Mountain Lake Park Dam	Low	Broad Ford Run	Earth	Recreation	1920	Not Required	11	74	700
MD00102	New Germany Lake Dam	Low	Poplar Lick Run	Earth	Recreation	1930	Not Required	12	52	164
MD00350	Piedmont Water Supply Dam	Low	Savage River	Gravity	Water Supply	1911	Not Required	8	40	118
MD00310	Platter Farm Pond Dam	Low	Church Run	Earth	Recreation	1968	Not Required	22	16	336
MD00410	Rock Lodge Dam	Low	Cherry Creek	Concrete	Recreation	1920	Not Required	7	2	80
MD00014	Savage River Dam	High	Savage River	Earth, Rockfill	Flood Control / Water Supply / Recreation	1952	Yes 5/01/2023	184	20,000	1,050
MD00417	Thousand Acres Dam	Low	Deep Creek	Earth	Recreation / Irrigation	2007	Not Required	14	11	600
MD00227	Waterfront Greens Community Pond Dam	Low	Deep Creek	Earth	Recreation / Irrigation	1986	Not Required	27	28	530
MD00010	Western Maryland 4H Dam	Low	Pleasant Valley Run	Earth	Recreation	1937	Not Required	22	118	598

Source: Maryland Department of the Environment – Dam Safety



The average height of the dams in Garrett County is 40.75 feet, while the average length is 655 feet. Approximately 68% of the dams in the county are of earth-fill construction. The oldest dam is the Casselman River Dam which is 226 years old, constructed in 1797, there are three other dams in the county that are over 100 years old, the Mountain Lake Park Dam (i.e., 1920), Rock Lodge Dam (i.e., 1920), and the Piedmont Water Supply Dam (i.e., 1920). The most recently-constructed dams (i.e., 2007) include the Adventure Sports Center Pond Dam and the Thousand Acres Dam. The majority of the dams in Garrett County were built for recreation at approximately 64% (18), approximately 29% (8) serve the purpose of flood control and 21% (6) for water supply.

The information in the following tables was obtained from dam inundation area mapping obtained from local dam owners, as well as from the Garrett Soil Conservation District, Garrett County Department of Planning and Land Development, and the Maryland Department of Assessments and Taxation. The tables identify residential and commercial areas that would be impacted in the event of a dam failure involving the high hazard dams with in the county, as well as those located in adjacent states that would impact the county (i.e., Stoney River and Mt. Storm Lake Dams). According to information contained in EAPs for Frostburg Reservoir and the Meadow Run Dam, there would be no impacts to residential or commercial structures if these dams were to fail.

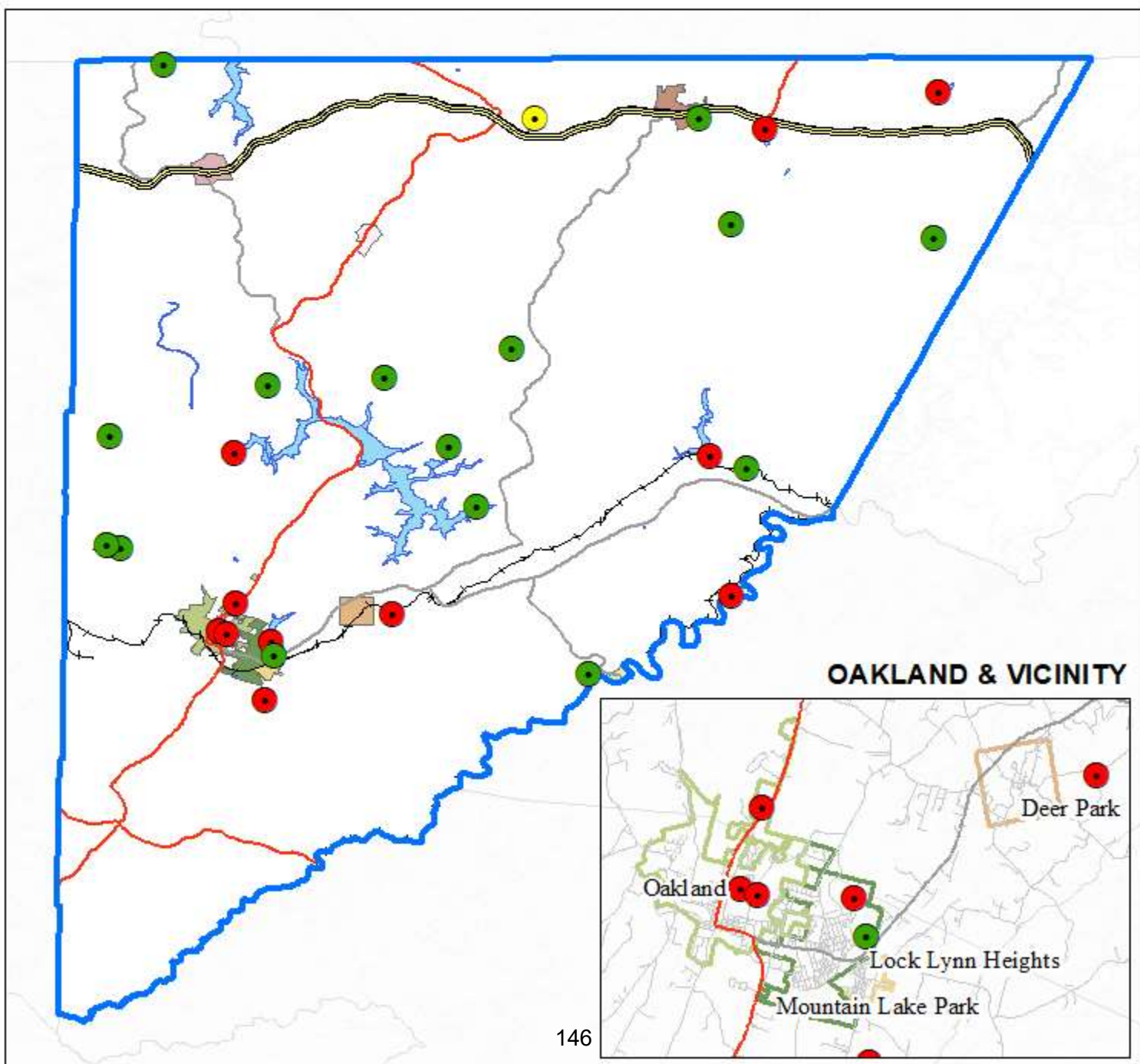
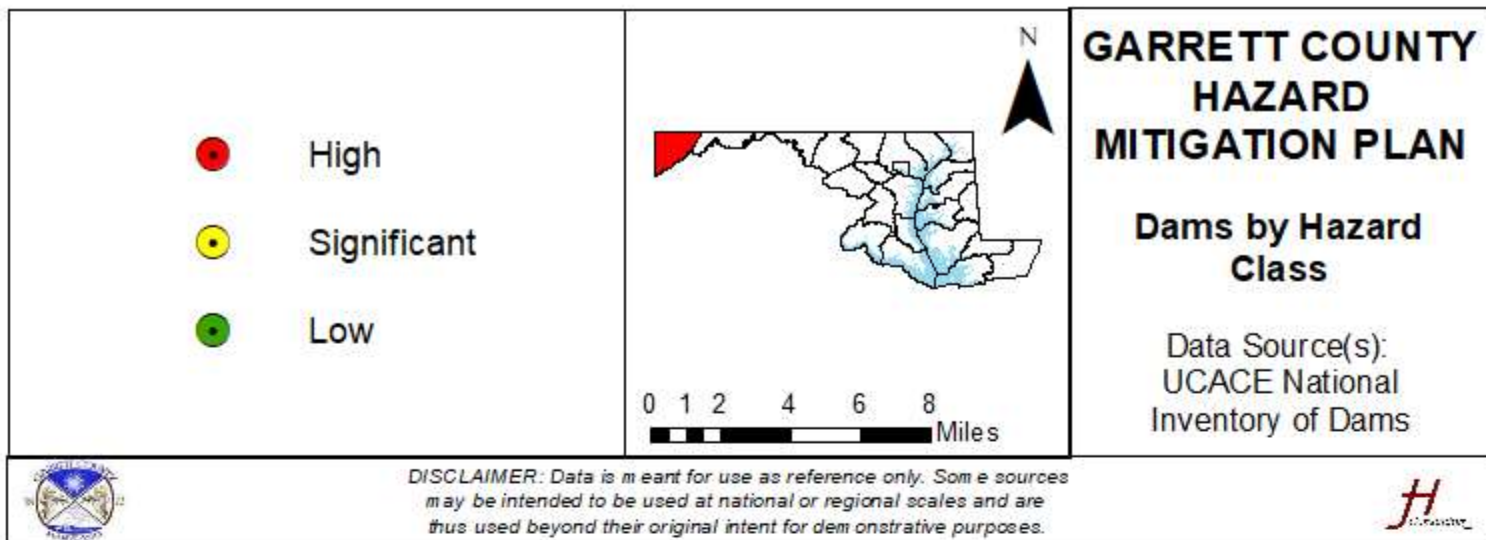
DEEP CREEK LAKE DAM – INUNDATION AREA FRIENDSVILLE		
Street	Residential	Commercial
First Avenue	29	2
Second Avenue	23	0
Third Avenue	1	0
Dave Dixon Road	6	0
Water Street	18	0
Church Lane	5	0
Ross Avenue	9	0
Maple Street	55	2
Chestnut Street	7	0
Oak Street	12	0
Walnut Street	34	0
Park Street	9	0
Sawmill Lane	4	0
Cemetery Road	3	0
Morris Avenue	13	0
Old River Road	7	0
Bear Creek Court	8	0
Friendsville Total	243	4
Sang Run Road (Unincorporated)	10	0
Grand Totals	253	4

JENNINGS RANDOLPH LAKE DAM & SAVAGE RIVER DAM – INUNDATION AREA BLOOMINGTON		
Street	Residential	Commercial
Savage River Road	1	0
Raley Avenue	1	0
North Street	5	0
Parson Avenue	4	0
Hampshire Avenue	5	0
Brick Row	1	0
Knight Street	6	0
North Branch Avenue	14	1
North Hammil Avenue	5	0
Pattison Avenue	7	0
Warnick Avenue	3	0
Howard Avenue	1	0
Maryland Avenue	1	0
Hammill Avenue	5	1
Long Avenue	4	0
Bruster Driver	2	0
Potomac Avenue	4	0
Owens Avenue	7	0
Bloomington Total	76	2
Savage River Road (Unincorporated)	16	0
Grand Totals	92	2
STONEY RIVER & MOUNT STORM DAMS – INUNDATION AREA KITZMILLER – SHALLMAR		
Street	Residential	Commercial
Kitzmiller Road	25	0
Oak Street	5	0
Spring Street	9	0
Hazel Street	3	0
Homestead Street	4	0
Willow Street	5	0
State Street	10	0
Park Street	8	0
W. Main Street	35	0
E. Main Street	30	0
Race Street	3	0
Church Street	10	1
Third Street	4	0
Centre Street	16	0
Second Street	1	0
East Centre Street	2	0
Hedge Lane	1	0
Orchard Street	3	0
Kitzmiller-Shallmar Total	174	1
Shallmar Road (Unincorporated)	20	0
Grand Totals	194	1

SOIL CONSERVATION DISTRICT SITES 1, 2, & 3 – INUNDATION AREA OAKLAND		
Street	Residential	Commercial
All Three Sites		
North Fourth Street	2	1
East Crook Street	0	1
North Third Street	8	1
East Center Street	1	1
South Third Street	17	0
East Green Street	5	0
East Alder Street	15	0
South Second Street	24	0
East Liberty Street	12	0
West Liberty Street	0	1
South First Street	1	1
Town Park Lane	1	0
East Oak Street	9	0
East Water Street	26	0
East Mason Street	3	0
Oakland Total	124	6
Site 2 Only		
Garrett Highway	6	13
Merrill Lane	1	0
Mitchel Drive	1	0
Oakland Total	8	13
Grand Totals	132	19

SOIL CONSERVATION DISTRICT SITE 5, 6 & 7 – INUNDATION AREA DEER PARK / LOCH LYNN HEIGHTS / MOUNTAIN LAKE PARK		
Street	Residential	Commercial
Edgewood Drive	1	0
Main Street	7	0
McGraw Drive	1	0
Hotel Drive	4	0
Siding Street	1	0
Boiling Spring Road	3	0
Calderwood Road	4	0
Hooker Street	5	0
Charles Lane	8	0
Deer Park Total	34	0
First Avenue	10	0
Hoye Street	3	0
Second Street	10	0
Paul Street	1	0
Lewis Street	1	0
Route 135	8	2
Loch Lynn Heights Total	33	2
Maryland Highway	3	6
Mtn. Lake Park Total	3	6
<i>Unincorporated</i>		
Boiling Spring Road	1	0
Fricks Crossing Road	1	0
Leon White Road	1	0
Maryland Highway	3	0
Garrett Road	11	0
Unincorporated Total	17	0
Grand Totals	87	8

The hazard classification breakdown of the dams in Garrett County is as follows: 11 dams are HIGH hazard (39.29%), one is classified as SIGNIFICANT hazard (3.57%), and 16 are considered LOW hazard (57.14%). The average age of the 11 high-hazard dams is 58.7 years. The following map shows locations of the dams in Garrett County (with the hazard classifications denoted).



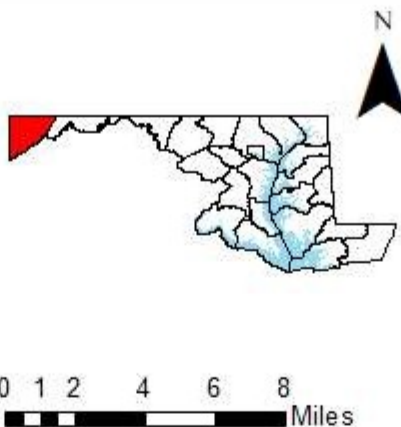
As noted, the Maryland Department of the Environment (MDE) oversees the state's dam safety program. As overseer, the MDE works with dam owners and engineers to ensure design, construction, operation, and maintenance to prevent failures and the resulting consequences to the extent possible. The MDE is also responsible for inspecting dams for safety based on the “hazard classification, downstream hazard conditions, issuing permits for new constructions and repairs to existing structures” (n.d.B).

MDE also coordinates with dam owners and emergency management professionals to develop an Emergency Action Plan (EAP) for high and significant hazard structures. MDE makes an MS Word template available on its website (https://mde.maryland.gov/programs/water/damsafety/pages/model_eap.aspx) for reference and to ensure that EAPs meet a minimum set of requirements. Publications of EAPs are limited by regulations set by the MDE. Completed EAPs are held by the Garrett County Department of Emergency Management (GCDEM), and the MDE. EAPs must include data on event detection, emergency level determination, notifications and communications, expected actions, and plan termination. They should include inundation maps. Currently all 12 dams (i.e., 43% of total dams) that require an EAP have completed one.

The EAPs are important in mitigating risk for two primary reasons. First, and most obviously, the plans outline the emergency response guidelines should an incident occur. Part of an EAP discusses how dam owners would notify emergency response personnel and warn those downstream from a dam. During EAP preparation, dam owners should coordinate with local authorities to determine the capabilities and limitations of emergency response agencies. Secondly, EAPs for high-hazard dams identify a potential inundation area that allows responders to work directly with potentially-impacted communities and facilities. Current and accurate inundation areas also identify areas where property owners can consider mitigation actions.

The Dam Safety Division recently applied for, and was granted, the opportunity to work with the FEMA National Dam Safety Program Collaborative Technical Assistance Program (CTA) to assist the community to address issues regarding the “Little Youghiogheny” flood control dams that were constructed in the 1960s. As they continue to age, these dams could pose a significant risk to the downstream community if they are not sufficiently cared for, and if EAPs are not well thought out, understood, and frequently exercised. This programs allowed the town to interface with experts in the field of flood mapping, emergency action planning, and other areas related to dam safety at no cost. The following map shows the dams listed by the age of their EAP.

- Latest EAP 2023
- Latest EAP 2021
- Latest EAP 2020
- EAP Not Required



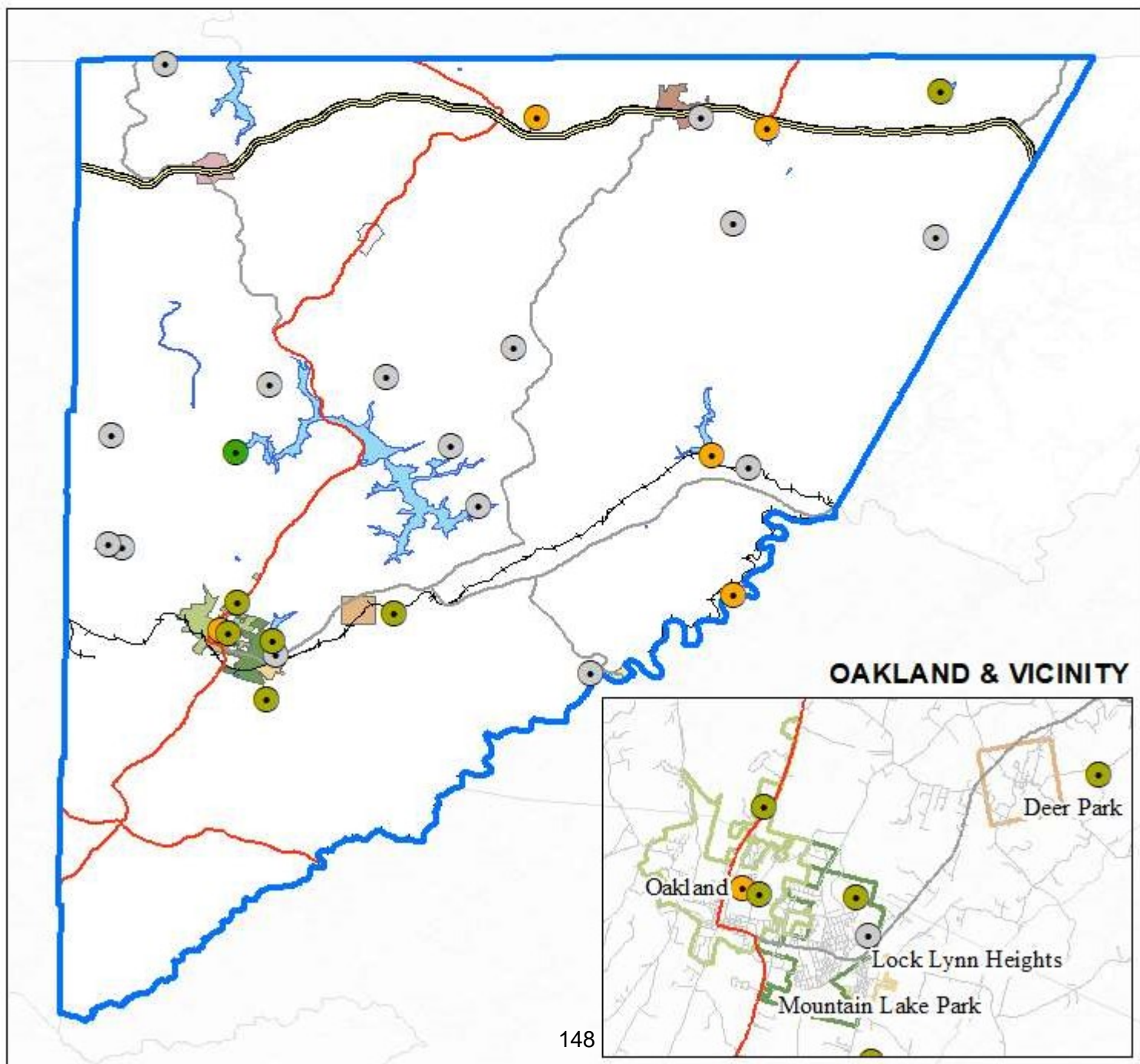
GARRETT COUNTY HAZARD MITIGATION PLAN

Dams by Emg. Action Plan (EAP) Date

Data Source(s):
UCACE National
Inventory of Dams



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



Levees

There are two levee systems located in Garrett County, the Blaine and the Kitzmiller. Both are part of the Kitzmiller federally authorized and constructed Flood Risk Management Project (FRMP) located in Garrett County, Maryland and Mineral County, West Virginia, along both banks of the North Fork of the Potomac River in the vicinity of Kitzmiller. The project was originally designed to provide flood risk management for a discharge of 52,000 cubic feet per second (cfs) on the North Branch of the Potomac River. Both levee system are operated and maintained locally by the Town of Kitzmiller.

The Blain system is comprised of one segment, and is located along the south bank of the North Branch of the Potomac River. The Blain system is across the river from Kitzmiller, the system is designed to reduce the flood risk in Blaine, West Virginia. The system consists of approximately 0.25 miles of levee embankment with a maximum height of 10 feet, with no floodwall, drainage structure, or closure structures. The Blaine Levee system was constructed in 1964, the USACE classified the Blaine Levee as Low risk during their April 7, 2017 assessment. This levee has been loaded up to 82% of its maximum height once in 1985 with some minor erosion concerns that have since been repaired. There is a small population at risk within the leveed area which will experience shallow inundation depths in a small area, this includes a population of 42 people, and 17 buildings with a property value of \$1.18 million.

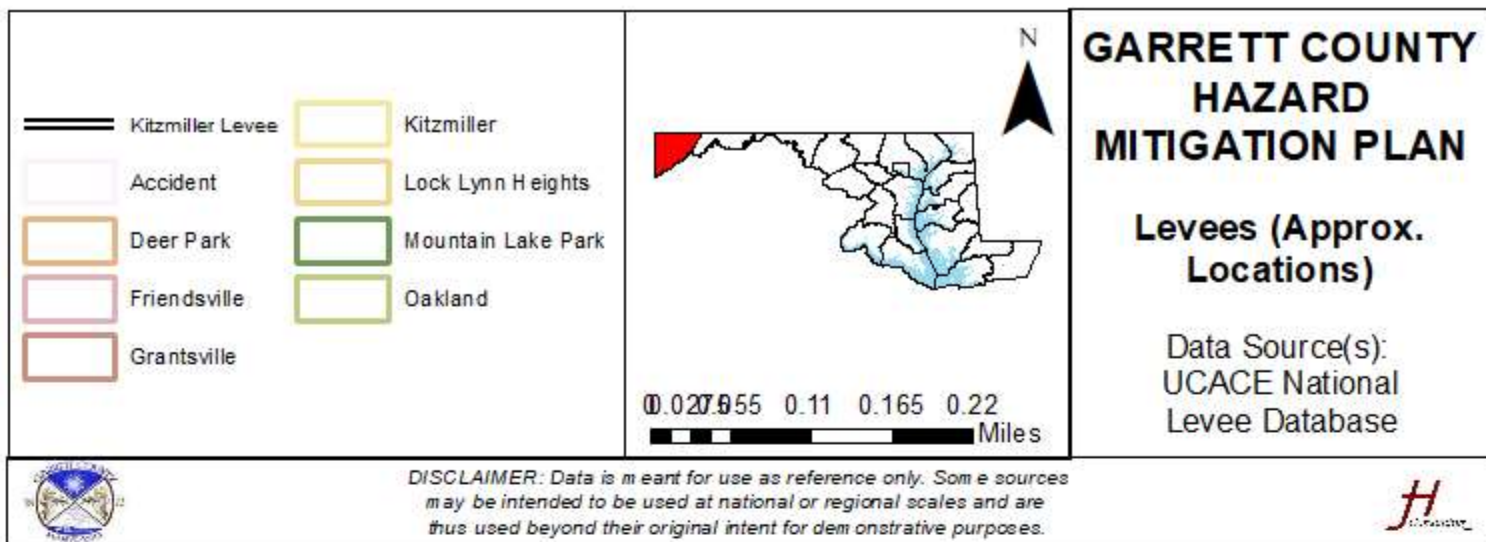
The Kitzmiller system is an NFIP approved levee that provides flood risk protection as detailed on the FIRM. It is comprised of one segment, and is located along the north bank of the North Branch of the Potomac River. The system is designed to reduce the flood risk in Kitzmiller, Maryland. The system consists of approximately 0.84 miles of levee the majority of which is embankment with a maximum height of with 12 feet and only 0.006 miles of floodwall. The system also includes four drainage structures and no closure structures. The Kitzmiller system ties out to high ground at the upstream end approximately 700 feet upstream of the former Kitzmiller Elementary School, and extends downstream to a termination approximately 900 feet downstream of the MD Route 38 Bridge. The Kitzmiller Levee system was constructed in 1964, the USACE classified the Levee as Low risk during their June 20, 2017 assessment.

The biggest risk to people behind the levee would be a break in the levee caused by floodwater flowing over the top of the levee. The levee has been loaded up to 87% of its height in 1985 with minor erosion concerns noted that have been repaired. There are 181 people, and 77 buildings with a property value of \$10.7 million located behind this levee. The following map illustrates the levees in Garrett County.

The USACE has adopted six classes of levees as it pertains to risk. The table below describes the risk classification ratings. Both levee systems in Garrett County are considered low risk.

LEVEE RISK CLASSIFICATIONS		
Classification	Actions for Levee Systems and Leveed Areas in this Class	Risk Characteristics of this Class
Very High (1)	Based on risk drivers, take immediate action to implement interim risk reduction measures. Increase frequency of levee monitoring, communicate risk characteristics to the community within an expedited timeframe; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning systems and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions as very high priority.	Likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in very high risk.
High (2)	Based on risk drivers, implement interim risk reduction measures. Increase frequency of levee monitoring; communicate risk characteristics to the community within an expedited timeframe; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions as high priority.	Likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in high risk.
Moderate (3)	Based on risk drivers, implement interim risk reduction measures as appropriate. Verify risk information is current and implement routine monitoring program; assure O&M is up to date; communicate risk characteristics to the community in a timely manner; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions as a priority.	Likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in moderate risk.
Low (4)	Verify risk information is current and implement routine monitoring program and interim risk reduction measures if appropriate; assure O&M is up to date; communicate risk characteristics to the community as appropriate; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions to further reduce risk to as low as practicable.	Likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in low risk.

LEVEE RISK CLASSIFICATIONS		
<i>Classification</i>	<i>Actions for Levee Systems and Leveed Areas in this Class</i>	<i>Risk Characteristics of this Class</i>
Very Low (5)	Continue to implement routine levee monitoring program, including operation and maintenance, inspections, and monitoring of risk. Communicate risk characteristics to the community as appropriate; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning and evacuation procedures; and recommend purchase of flood insurance.	Likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in very low risk.
No Verdict	Not enough information is available to assign risk.	N/A



Impacts and Vulnerability

In the event of a dam failure a significant amount of water would rapidly be released downstream of the dam possibly resulting in potential loss of life, immense property damage, depleted water supply, and interrupts to utilities. Uncontrolled floodwaters are one of the most powerful and destructive forces in nature. Dams that are not designed to withstand major storms may be destroyed, increasing flood damage downstream. Dams may also be destroyed as a cascading effect of an earthquake.

The potential for damage due to dam failure is increasing along with the increased number of residential and commercial development located within the hydrological shadow of dams. In many cases, existing dams will need to be modified to keep downstream areas safe from catastrophic flooding. Garrett County contains 12 dams that could present the possibility of significant flood damage to the residents and businesses located near or downstream from the dams.

The National Performance of Dams Program (NPDP) was founded in 1994 at Stanford University to collect current and historical information on the performance of dams in the United States. The NPDP defines “incident” as any event that provides insight to the structural and operational integrity of a dam”, thus incidents can be either positive (such as implementation of emergency action plans) or negative (dam failure). The following table presents potential incidents defined by the NPDP.

DAM INCIDENTS	
<i>Event</i>	<i>Description</i>
Inspection Findings	The findings of a dam safety inspection that identify unsatisfactory or unsafe conditions at a dam. These might include observations of deterioration, signs of distress or instability of a dam or appurtenant structures.
Dam Failure	Any event resulting in the breach of a dam (partial or complete) and the uncontrolled release of the reservoir.
Controlled Breach	A planned (non-emergency, non-incident initiated) breach of a dam; possibly carried out to remove the dam from service or to make major repairs.
Downstream Release- Controlled or Uncontrolled	Uncontrolled release of the reservoir (e.g., appurtenant structure misoperation), or controlled release with damage.
Inflow Floods, Earthquakes	The performance of a dam (satisfactory or unsatisfactory; anticipated or unanticipated) generated by a nearby seismic event or inflow flood.
Misoperation, Operator Error	Misoperation of appurtenant structures such as failing to comply with the project rule curve.
Equipment Failure	Failure of mechanical or electrical equipment to perform the functions for which they were intended.
Deterioration	Deterioration of concrete, steel, or timber structures that jeopardizes the structural/functional integrity of a dam or appurtenant structures.

DAM INCIDENTS	
<i>Event</i>	<i>Description</i>
Dam Safety Modification	Modifications to improve the safety of a dam or appurtenant structures such as might be required due to changes in design criteria. Note, repairs following an incident are reported as part of a follow-up to an incident.
Reservoir Incidents	Events that occur in the reservoir (e.g., landslides, waves) that may impact the safety of the dam.
Emergency Action Plans	Implementation of an Emergency Action Plan (or emergency actions) in part or whole.
Regulatory Action	The regulator has determined an unsafe condition exists, or the dam does not meet applicable design criteria (e.g., inadequate spillway capacity), and requires action to be taken by the owner (e.g., reservoir restriction, safety modification).

The hazard classification of a dam is based on the downstream damage that would result if the dam were to fail. The hazard classification has no relationship to the condition of the dam, its structural integrity, operational status, or flood storage capability. In general accordance with dam safety practices nationally, Maryland uses three categories to classify dams. High, Significant, and Low hazard. The table below further describes each classification. The associated classifications in the COMAR 26.17.04.05 and the U.S. Natural Resources Conservation Service (NRCS) are also provided.

NUMBER & CLASSIFICATION OF DAMS – GARRETT COUNTY				
<i>Maryland Classification</i>	<i>Description</i>	<i>COMAR Classification</i>	<i>NRCS Classification</i>	<i>Number in Garrett County</i>
High Hazard	Probable loss of life; major increase in existing flood levels at houses, buildings, major interstates, and state roads with more than six lives in jeopardy.	Category I	Class C	11
Significant Hazard	Possible loss of life; significant increased flood risks to roads and buildings with no more than two houses or six lives in jeopardy.	Category II	Class B	1
Low Hazard	Unlikely loss of life, minor increases to existing flood levels at roads and buildings.	Category III	Class A	16

Further, there are generally three types of risks associated with dams: incremental risk, non-break risk, and residual risk.

- **Incremental Risk:** The risk (likelihood and consequences) to the pool area and downstream floodplain occupants attributed to the presence of the dam should the dam breach prior to or after overtopping or undergo component malfunction or misoperation, where the consequences considered are over and above those that would occur without dam breach. The consequences typically are due to downstream inundation, but a loss of the pool can result in significant impacts in the pool area upstream of the dam.
- **Non-Breach Risk:** The risk in the reservoir pool area and affected downstream floodplain due to 'normal' operation of the dam (e.g., large spillway flows within the design capacity that exceeds channel capacity) or 'overtopping of the dam without breaching' scenarios.
- **Residual Risk:** The risk remaining after completing all mitigation and risk reduction actions. Concerning dams, FEMA defines residual risk as "risk remaining at any time" (FEMA, 2018). It is the risk that remains after decisions related to a specific dam safety issue are made and prudent actions have been taken to address the risk. It is the remote risk associated with the condition that was judged not to be a credible dam safety issue.

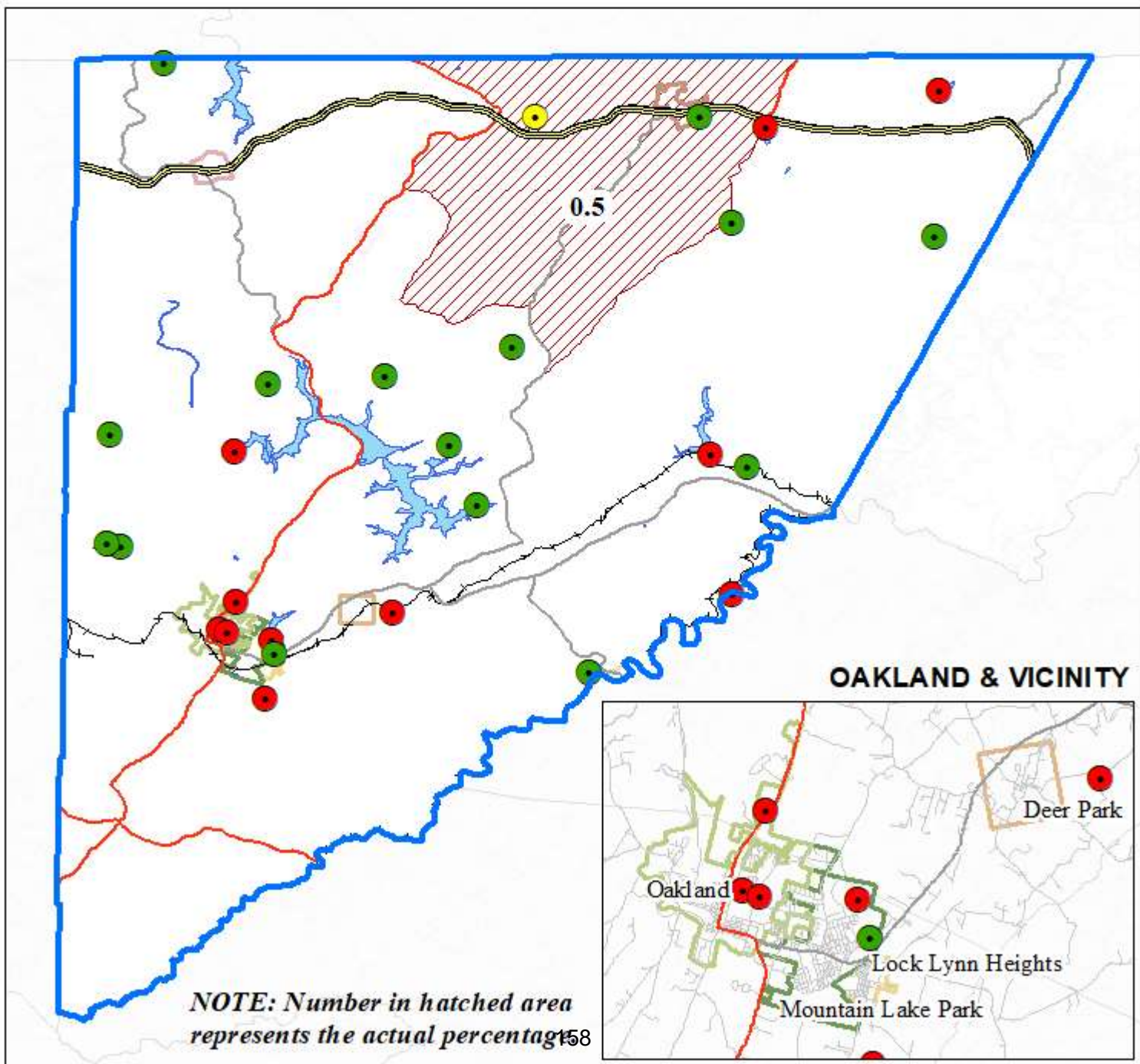
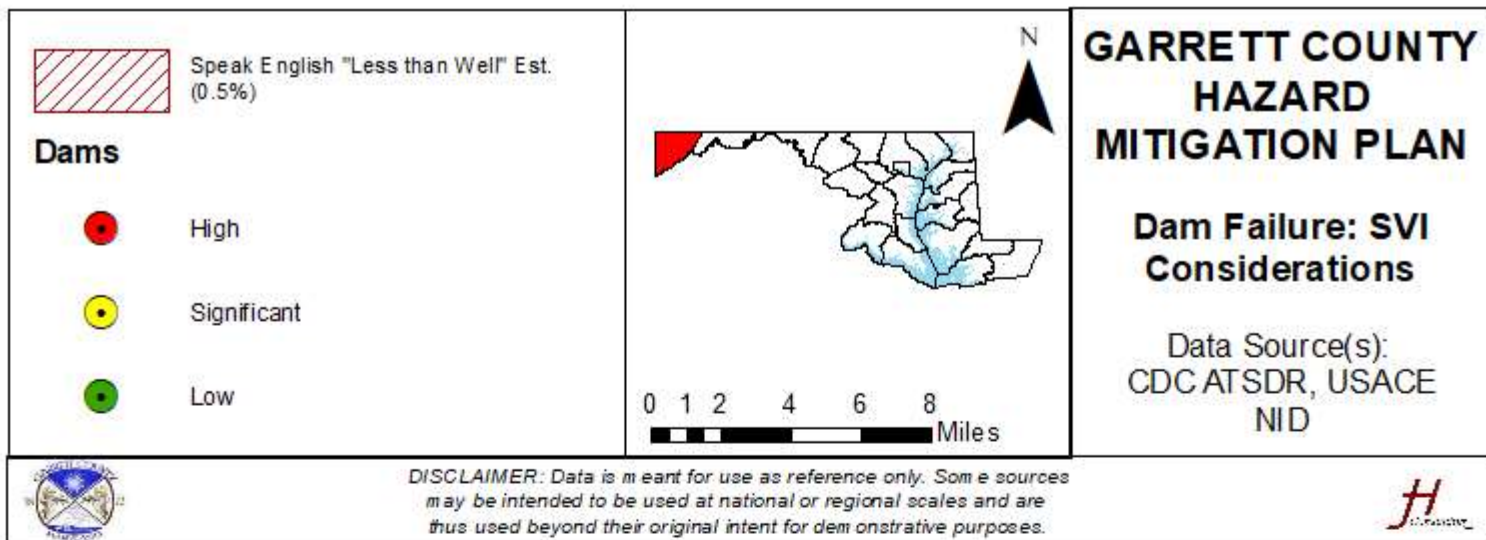
A consequence analysis, derived from the EMAP, has been performed to better understand and outline the impacts that a dam failure would have on the public; responders; continuity of operations, including delivery of services; property, facilities, and infrastructure; the environment; the economic condition of the state; and public confidence in state governance. The results of the consequence analysis are shown in the table below.

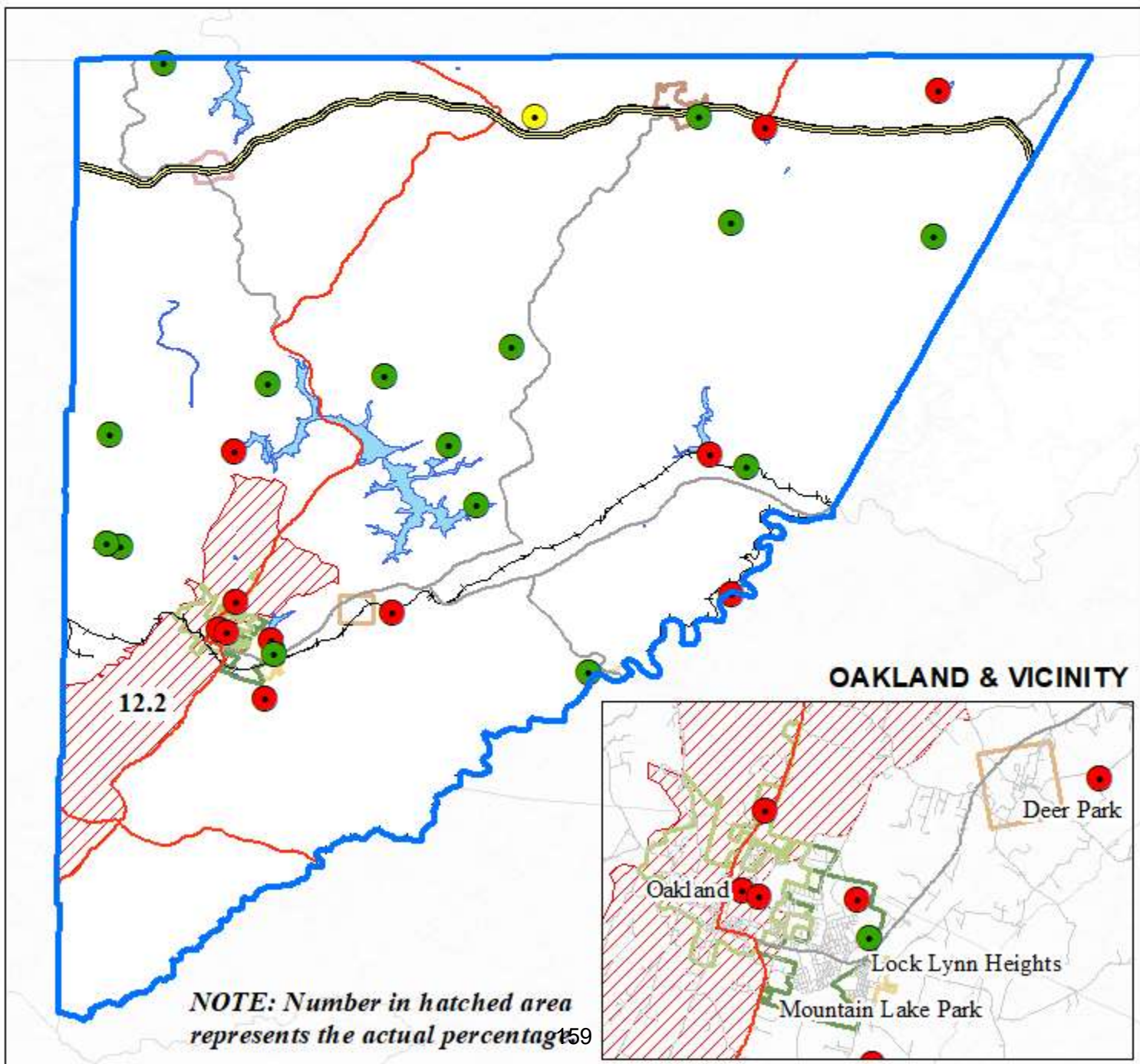
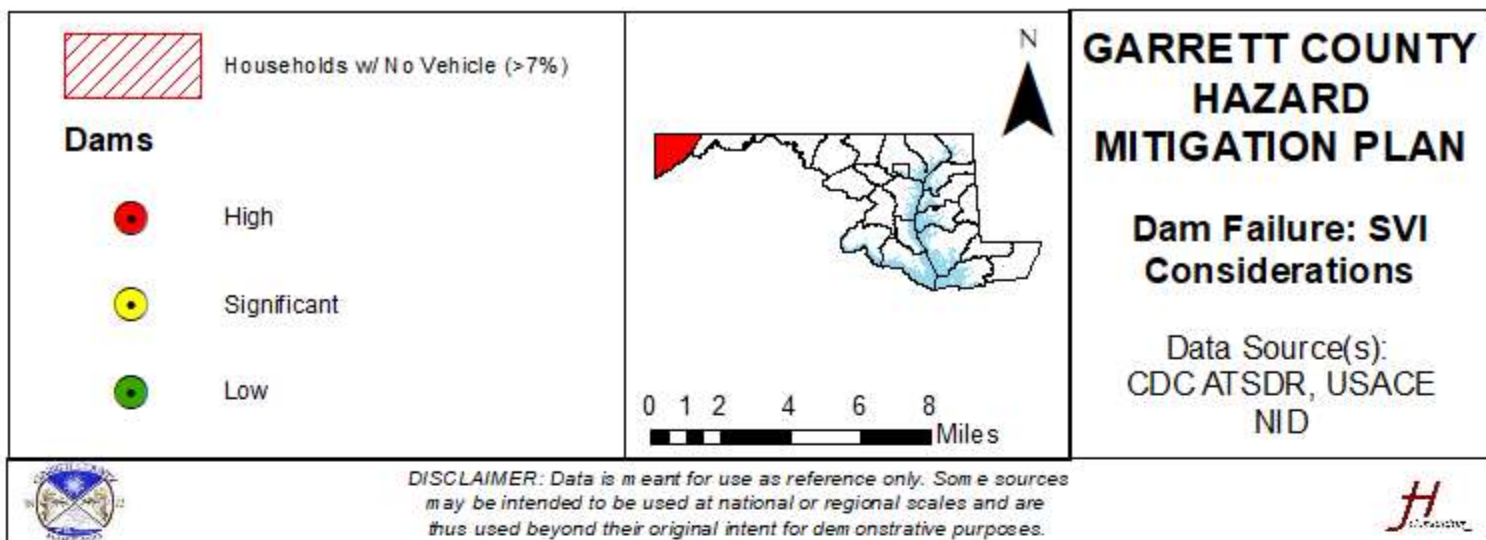
DAM FAILURE CONSEQUENCE ANALYSIS	
Subject	Impacts
Public Health & Safety	Home and landowners within the inundation zone are most at risk to impacts from a dam failure event. Impacts to the public include potential for injury or loss of life and destruction and/or loss of land and property due to flooding.
Responder Health & Safety	First responders, such as fire and police, would be called to the incident area(s) to evacuate people, close roads, and attend to any injured. For a dam failure event, as with all disaster events, responders face the risk of personal injury while performing necessary job functions.
Continuity of Operations	The impacts on continuity of operations would be limited, unless a facility or critical infrastructure component is within the dam failure inundation zone associated with the dam failure. Delivery of services may be slowed or halted in adjacent areas if key roadways become impassable due to flooding or debris blockages.
Property, Facilities & Infrastructure	Home and landowners within dam inundation zones may experience damage to or loss of property depending upon the severity of flooding in the area. Infrastructure may experience impacts in the form of damage to roads and bridges, temporary closure of transportation routes; and the potential inability of the storm water system to handle floodwaters.
Environment	Erosion and debris flows would be the major impact to the environment during a dam failure.
Economic Condition of the County	A dam failure event would be costly for the local government because of the potential for damages from flooding. Some of the costs could be recouped through federal grant reimbursements, but the local government would still feel the fiscal impact of a major event.
Public Confidence in Local Governance	Public confidence would largely depend upon how effectively the county government responds to a dam failure event.

Social Vulnerability Considerations

There may be social vulnerability variables at play with respect to both dam failure risk and impacts. When constructing dams, locations are typically those where should the structure fail, resultant damage would be minimal (e.g., farmland or wildland). There are instances, though, where large infrastructure projects like highway projects displaced socially vulnerable populations thanks to a perception of lower property values (Norwood, 2021). Examples of similar dam projects are much fewer than roadways, and with the benefit of this hindsight, future dam projects can avoid those mistakes, thereby minimizing risks and some impacts exclusively to socially vulnerable populations.

Regarding impacts, imminent dam failure necessitates rapid notification of potentially-impacted populations. Those with low English proficiency may not understand immediate warnings to evacuate. Further, they may be caught off guard by imminent warnings because of similar effects surrounding awareness messages about deteriorating conditions associated with nearby dams. Further, upon receiving an evacuation notice, households with no vehicle can experience difficulty evacuating. The following maps show, first, areas with higher ratios of people speaking English “less than well,” and second, households with no vehicle available.





Previous Occurrences

No one knows exactly how many dam failures have occurred in the U.S., but they have been documented in every state. At least 45 dam failures or near failures have occurred in Maryland since MDE began maintaining records on dams in the 1930s. Some of these incidents required the evacuation of downstream residents and property owners, and fortunately, there has been no loss of life. Multiple dam failures have caused damage to roads, property, and the environment. The National Performance of Dams Program (NPDP) at Stanford University maintains records of all modifications, repairs, incidents and their consequence, and inspections for dams in the U.S. and worldwide. The following are known dam failures that have occurred in Garrett County.

Savage River Dam Overtopped – 1942 & 1948

The partially completed Savage River Dam was overtopped by floodwaters and breached.

Garrett Memorial Flood Control Dam – March, 2007

The most recent dam failure event occurred in March of 2007. Debris clogged the discharge pipe at the Garrett Memorial Flood Control Dam designed to protect the Town of Oakland from flooding. The obstruction apparently created by beavers at the dam caused a backup on Wilson Run resulting in flooding along North Fourth Street and eventually raised water levels in the dam to the



critical stage, prompting officials to consider evacuating the town. In an attempt to mitigate the crisis, the decision was made to locate a dive team to clear the debris. With an impending snow storm forecast for later that night, a request for assistance was sent out across the State through the Maryland Joint Operations Center (MDJOC). A team of divers from Baltimore County was dispatched and transported to Oakland in two Blackhawk helicopters provided by the Maryland Air National Guard.



Although the divers were not able to clear the debris, they were able to evaluate the extent of the problem, which led to the decision to bring in two high-volume water pumps to lower the water level down. This served two purposes, in that it reduced the water level in the dam below the danger level and it allowed workers to better access the discharge pipe. The two pumps and diesel fuel tank had to be placed on the dam, the Maryland National Guard deployed a Chinook helicopter and two support Blackhawk helicopters to place the equipment on the dam. Once the piping was assembled and put into place, the pumps began discharging water at a combined rate of 10,000 gpm. Within a matter of a few days the water level was down to the point that workers could clear the debris and restore the dam to normal operation.

Deep Creek Lake Dam – January, 2008

There was an incident involving the failure of the dam's penstock hardware. The Emergency Action Plan (EAP) was activated for a short period of time as a result. This incident did not result in any evacuations.

Little Youghiogheny Dam – January, 2008

There was an incident involving a plugged spillway conduit which resulted in water flowing down the emergency spillway. A few residents were required to evacuate in the Town of Oakland.

Loss and Damages

Planners can calculate dam failure losses in several ways. Generally, the *2021 State Hazard Mitigation Plan* lists one state owned asset at risk of dam failure in Garrett County, with a building value of \$26,880 and a contents value of \$1,344 (total loss = \$28,224) (MDEM, 2021, pp. 84). Further, the U.S. Army Corps of Engineer's National Inventory of Dams website (<https://nid.sec.usace.army.mil/#/>) will soon include inundation area mapping, which will allow communities to see individual structures potentially at risk (that could serve as the basis of a loss estimate). Similarly, the Maryland Department of the Environment is preparing to finalize and share inundation mapping for all Maryland dams in its inventory using the Decision Support System for Water Infrastructure Security (DSS-WISE)-Lite flood modeling software.

For Garrett County, the available EAPs include structures potentially at risk of a dam failure. The following table summarizes those structures and estimates losses by summing the at-risk structure totals in the EAPs.

LOSS ESTIMATE – DAM FAILURE				
<i>Dam Facility</i>	<i>Structures at Risk</i>	<i>Residences at Risk</i>	<i>Businesses at Risk</i>	<i>Quantifiable Loss Estimate¹</i>
Deep Creek Lake Dam	257	253	4	\$123,039,834
Jennings Randolph / Savage River Dams	98	96	2	\$46,727,417
Soil Conservation District Sites 1, 2, 3	151	132	19	\$65,610,463
Soil Conservation District Site 5	77	71	6	\$34,937,252
Stoney River / Mount Storm Lake Dams	196	195	1	\$94,658,709
Totals	779	747	32	\$364,973,675

Although the Jennings Randolph Dam reduces the risk of flooding to downstream communities, it does not eliminate the risk of flooding. The most likely scenario that could result in downstream flooding would be a high-volume release of water from the dam’s spillway during significant storm events. There are also unlikely, but far more devastating scenarios involving breach of the dam that would produce significant flooding. This could involve situations such as: a rare, extreme rainfall event resulting in water flowing over the earthen dam, eroding the dam, and leading to a breach of the dam, or; unexpected behavior of seepage through the dam eroding soil from within the embankment leading to a breach. If a breach were to occur, an uncontrolled surge of water would flow out of the reservoir, flooding downstream communities. Bloomington, Luke, Westernport, Piedmont, Keyser, Cumberland and adjacent communities are in the most immediate danger in the event of a flood. Other communities along the North Branch Potomac River would also be impacted.

In any of the scenarios described above, the downstream floodwater would be swift and deep, overflowing levees, destroying buildings and key infrastructure, and those caught unaware and/or unable to evacuate could perish. In the less likely dam breach scenarios, the water depth, property damage, and lives lost would likely be far greater.

The following table illustrates Consequence Estimates of different dam failure scenarios involving the Jennings Randolph Lake Dam developed by the USACE. Scenarios are designated as either non-breach or breach. In non-breach scenarios the dam is operating as designed for the given pool level, releasing from outlets and controlled or uncontrolled spillways. In breach scenarios the continuity of the structure has been compromised, resulting in

¹ To calculate losses, planners used the following as a base for calculations.

- \$220,100 per residential structure, which is the median value of owner-occupied housing units in Garrett County, per the U.S. Census Bureau (2022)
- \$83,710 per business, which is the total sales/receipts/revenue for the available economic classifications in U.S. Census (2020) data (i.e., “accommodation and food services,” “health care and social assistance,” “transportation and warehousing,” and “retail”) divided by the total number of business (i.e., employer + non-employer) establishments

uncontrolled water releases that exceed the magnitude of releases in the equivalent non-breach scenario.

The Maximum High (MH) scenario (breach and non-breach) is based on the inflow design flood per FEMA guidelines and indicates the maximum reservoir pool level and likely maximum extent of inundation.

The Normal High (NH) scenario (breach and non-breach) represent normal full reservoir pool elevations with no flooding occurring downstream prior to dam releases. The NH scenarios represent the fair weather or sunny day scenarios per FEMA guidelines.

The Intermediate High (IH), Top of Active Storage (TAS) and Security (SS) scenarios are intermediate pool levels between NH and MH. They are established based on the dam's design characteristics and its operating history. The TAS represents the reservoir pool elevation the structure was designed for (such as top of flood gates) and above which water must be released to ensure the integrity of the dam. The SS represents a high reservoir pool level observed or exceeded 1% of the time during the dam's operating history. The IH represents a realistic operating condition that could be experienced during a major flood where the reservoir pool elevation exceeds Top of Active Storage.

JENNINGS RANDOLPH DAM FAILURE CONSEQUENCE ESTIMATE					
Scenario Type	Pool Elevation	Daytime People at Risk	Nighttime People at Risk	Buildings at Risk	Economic Cost
Max High Pool NON BREACH	1,517.6	15,994	10,979	5,173	\$2,545,693,192
Max High Pool BREACH	1,517.6	23,223	18,164	8,584	\$4,777,788,200
Top of Active Storage Pool BREACH	1,499.2	16,027	10,945	5,176	\$2,703,916,665
High Pool BREACH	1,467.3	14,182	8,520	4,203	\$2,064,717,756
Normal Pool BREACH	1,465.5	14,068	8,291	4,102	\$2,007,802,349
Intermediate High Pool NON BREACH	1,509.5	10,938	7,488	3,424	\$1,372,911,365
Intermediate High Pool BREACH	1,509.5	20,943	15,355	7,279	\$4,005,427,340

Source: National Inventory of Dams

Future Occurrences

The state of dam infrastructure in Maryland is a concern. As dams age, they become susceptible to issues related to that age (concerning the life span of materials used in construction). The average age of dams in Garrett County is 72 years. The communities around dams, particularly upstream along the waterways they impound, also change. While some changes, such as declining population in those upstream areas, might not alter the risk profile in measurable ways, other changes, such as increased development (leading to increased runoff) upstream, can strain dams.

The American Society of Civil Engineers (ASCE) regularly issues a "report card" on America's infrastructure with state-by-state breakdowns. The ASCE's 2021 grade for Maryland's dams was a "C-." The ASCE notes that 45% of the state's dams are classified as high-hazard potential. Maryland performs better than many other states, but funding for repairing dams and ponds, as well as staffing the MDE's Dam Safety Division, is lacking.

In 2001, Garrett County joined with Allegany County and Mineral County to institute a telephone warning system for communities located downstream of the Savage River and Jennings Randolph Lak Dams. This system has since been expanded to include the entire county for all hazards. The Savage River and Jennings Randolph Lake Dams are maintained by the Upper Potomac River Commission and are subject to regular inspection and maintenance by the Corps of Engineers, all other dams are subject to inspection by the state through its Dam Safety Program, and by the Corps of Engineers.

The Maryland Department of the Environment (MDE) in coordination with the Maryland Department of Emergency Management (MDEM) was successful in their application for the 2021 High Hazard Potential Dam (HHPD) Rehabilitation Grant. This allows the Dam Safety Program to reach out to qualified dam owners to determine if they are in a position to accept financial assistance to rehabilitate high-hazards dams that will reduce dam risk and increase community preparedness.

Future Climate Considerations

The National Climate Assessment (USGCRP, 2018) predicts increases in the frequency and intensity of heavy precipitation in the northeast United States (including Maryland). Though not firm conclusions, the Maryland Commission on Climate Change (2008) predicts changes to precipitation patterns (consistent with many other sources) to include increased precipitation in the spring and winter. Most risk assessments assumed a stationary condition in the variability in climate phenomena, including the frequency and magnitude of extreme events (National Research Council, 2009). However, changes in climate factors such as variations in extreme temperatures or frequency of heavy precipitation events (CH2014-Impacts, 2014; IPCC, 2012b; Walsh et al., 2014) are likely to affect the different factors driving dam risks (Bowles et al., 2013a; USBR, 2014). An update of risk components (loads, system response, and consequences) to take into account the new climate change scenarios becomes imperative for adaptation and decision-making support under a more resilient approach.

Risk Assessment

This section summarizes the vulnerability of the county to dam and levee failures. The steering committee conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding dam and levee failure.

PUBLIC SENTIMENT, DAM AND LEVEE FAILURE – GARRETT COUNTY					
Hazard	Level of Concern				Total Responses
	Not at All	Somewhat	Concerned	Very	
DAM AND LEVEE FAILURE	25 (35.71%)	32 (45.71%)	11 (15.71%)	2 (2.86%)	70
Which hazard event have you experienced property damage from?				0 (0.0%)	49
Please indicate which hazard event you feel may affect your community?				3 (4.55%)	66


The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above.

DAM AND LEVEE FAILURE RISK RANKING			
Category	Points	Description	Notes
Frequency	2	Low (unlikely to occur in a year)	Garrett County experienced three dam incidents since 2007 for an average 0.19 incidents per year. There are 11 High Hazard dams in the county. There are four dams in the county that over 100 years old.
Response	2	One day	Though recovery operations may extend past a single day, the initial response to a dam failure would likely be one day.
Onset	3	6-12 hours	The available EAPs include monitoring for potential emergency incidents, and with tracking in place, some warning would be available. While a catastrophic failure could occur without notice, planners used a more plausible scenario as the basis of this estimate.
Magnitude	1	Localized (less than 10% of land area affected)	A catastrophic failure of the largest dam in the county would not impact more than 10% of the county's total land area.
Business	4	More than 30 days	A catastrophic dam failure that impacted a business would likely necessitate rebuilding that business.
Human	1	Minimum (minor injuries)	At least one incident did require localized evacuations; however, there are no injuries on record resulting from a dam-related incident in Garrett County.
Property	1	Less than 10% of property affected	A catastrophic failure of the largest dam in the county would not impact more than 10% of the properties in the county.
Totals	14	LOW	

FEMA's *Local Mitigation Planning Handbook* (2023b) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks are more or less prevalent as compared to the rest of the planning area. The following table quickly synthesizes the data to capture the jurisdiction-specific aspects of risks and vulnerabilities for each participating jurisdiction.

MULTI-JURISDICTIONAL CONSIDERATIONS, DAM & LEVEE FAILURE		
<i>Jurisdiction</i>	<i>Comparison</i>	<i>Notes</i>
Garrett County	More	The majority of the high-hazard dams in the county would impact unincorporated areas including one of the largest, Jennings Randolph Lake Dam.
Accident	Less	There are no dams within or upstream of Accident's corporate limits.
Deer Park	Same	A failure of the Little Youghiogheny Site 7 Dam could negatively impact the town.
Friendsville	More	The failure of the Deep Creek Lake Dam, under the right conditions, would have a significant impact on portions of the town.
Grantsville	Less	There are no dams within or upstream of Grantsville's corporate limits.
Kitzmiller	More	A failure of the Mount Storm or Stoney River Dams in West Virginia could have an impact on the Town of Kitzmiller. A failure of the Kitzmiller Levee System would also negatively impact the town.
Loch Lynn Heights	More	A failure of the Site 5 flood control impoundments located upstream of Loch Lynn Heights on the Little Youghiogheny Watershed could negatively impact the town.
Mountain Lake Park	More	A failure of the Site 5 flood control impoundments located upstream of Mountain Lake Park on the Little Youghiogheny Watershed could negatively impact the town.
Oakland	More	A failure of the Site 1, 2, or 3 flood control impoundments located upstream of Oakland on the Little Youghiogheny Watershed could negatively impact the town.

2.2.3 Dense Fog-Transportation

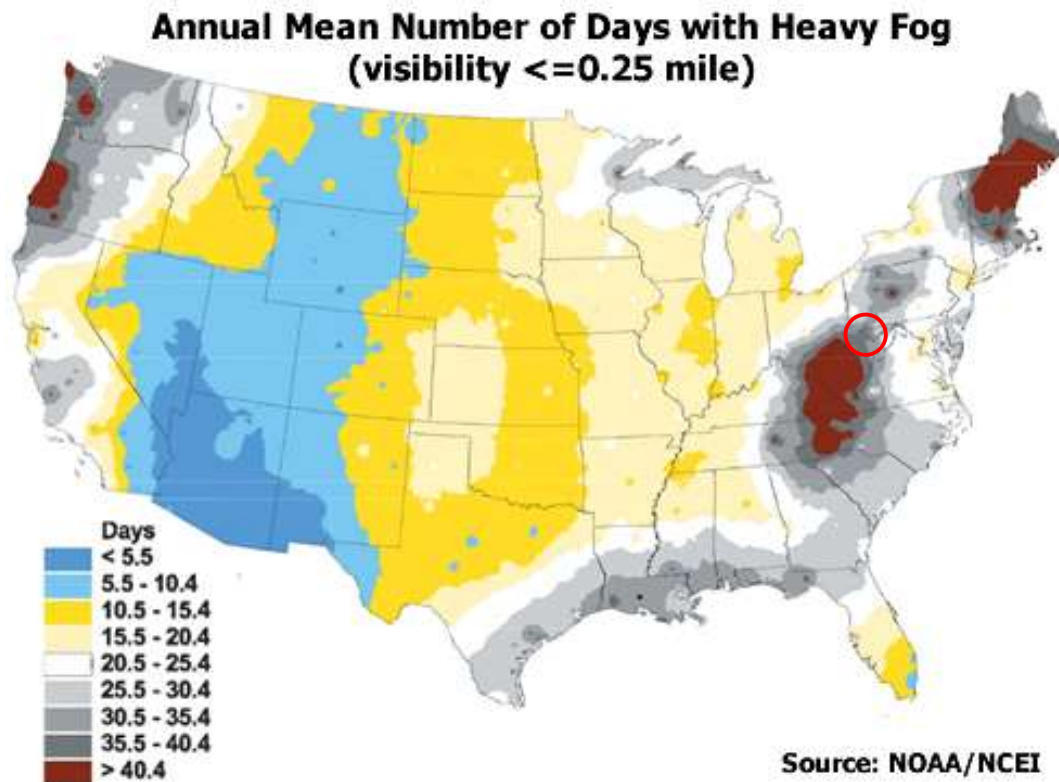
Fog is visible condensation in the air, at or near the ground. Fog is considered dense when the visibility is lowered to a quarter of a mile or less.				
	RISK	Period of Occurrence:	Following temperature inversions, typically after a rain or snow event	Garrett County Risk Ranking: Medium
		Warning Time:	Less than 6 hours	State Risk Ranking: Not Ranked
		Probability:	Excessive (will occur in a year)	Impact: Limited (10-25% of land are affected)
		Type of Hazard:	Natural	Disaster Declarations: None

Hazard Overview

Fog is a form of stratus cloud lying close to the earth's surface. The two principal types are radiation and advection fog. Radiation fog commonly occurs at night during a temperature inversion when the air temperature at the base level falls below the dew point. Advection fog results from the movement of warm, moist air over a cold or snow-covered surface. While losing heat to the ground the lower layers of air undergo a drop in temperature below the dew point and condensation sets in, tiny drops of water in the air form a thick cloud often times making it difficult to see. Some of the most dense fog conditions in Garrett County occur in the valleys along rivers and streams.

Location and Extent

Garrett County lies in the area of the eastern United States having the greatest number of dense fog days per year. According to the Department of Agriculture's "Climate and Man", most of the Appalachian Plateau has 30 or more dense fog days annually, but the Plateau area from Central West Virginia to southern Pennsylvania has more than 50 dense fog days annually. The county must deal with dense fog conditions during many precipitation events when low hanging clouds hamper visibility. These events occur on average between 35 and 40 times annually within Garrett County (see image below).



Garrett County is prone to dense fog conditions during every season, but particularly so during winter and spring months when temperature inversions are common. Foggy conditions are more pronounced when the ground is snow covered and warm air flows into the county from the west and south. Fog is variable across a local forecast area, some locations can have dense fog while others have only a light fog. Fog tends to be densest in wet vegetated areas, lower elevations near streams that are cooler and wetter which leads to a higher density of cloud droplet formation.

This phenomenon produces poor visibility, particularly along segments of Interstate 68 and State Route 135, which are the major east-west highways traversing the county; as well as Routes 219 and 495, the primary north-south highways. Like winter storms, there is little difference in the way fog affects the municipalities of Garrett County. Fortunately, vehicles are normally traveling slower inside corporate boundaries and existing landmarks do provide some perspective for motorists, especially along roadways where lighting is provided.

In 2005, the State Highway Administration installed four “Reduced Visibility Possible” signs in two identified fog-prone areas, two signs were placed near Big Savage Mountain and the other two near Keyzers Ridge to warn drivers to slow down during extremely foggy conditions. The warning signs were positioned along I-68 prior to areas known to be impacted by fog. The warning system has been well-received by area drivers, and there have been no other major fog-related crashes in Western Maryland since 2003.



Impacts and Vulnerability

Fog is often an underrated weather hazard. Temperature inversions, which are common in winter, cause foggy conditions, particularly when warmer air contacts accumulated snow. Occasionally these fog events will last many hours, can lower visibility to zero, and hamper transportation to a greater degree than snow or ice storms. If dense fog occurs on a weekend, or at other times when a large volume of drivers not familiar with this type of driving condition are traveling through the county, deteriorating visibility becomes deadly. Unlike most winter storms or heavy rainfall events there is little to no warning before visibility becomes severely limited. If dense fog is predicted or observed over a large enough area, the National Weather Service (NWS) will issue a Dense Fog Advisory.

The Coordinated Highways Action Response Team (CHART) is a joint effort of the Maryland Department of Transportation, Maryland Transportation Authority and the Maryland State Police, in cooperation with other federal, state, and local agencies. CHART's mission is to improve "real-time" operations of Maryland's highway system through a series of cameras placed along major highways throughout the state of Maryland. This comprehensive, advanced traffic management system is enhanced by a newly constructed state-of-the-art command and control center called the Statewide Operations Center (SOC). The SOC is the "hub" of the CHART system, functioning 24 hours-a-day, seven days a week with satellite Traffic Operations Centers (TOCs) spread across the state to handle peak-period traffic. The CHART system is used by State Highway Administration (SHA) to inform the public about local traffic information, winter storm information, visibility, and precipitation for a particular area. This system is used to help inform motorists about poor visibility and other weather-related problems that may be occurring on major road systems.



I-68 Fog Detection System

Ten such weather/camera systems are located in Garrett County, all of which are positioned along Interstate 68.

- I-68 at the West Virginia state line (611004)
- Road Weather Information System (RWIS) I-68 at West Virginia state line
- I-68 Exit 4 at State Route 42, Friendsville Road
- I-68 West at Old Morgantown Road East
- I-68 at U.S. Route 219 (Keyser's Ridge Tower)
- Road Weather Information System (RWIS) I-68 at U.S. Route 219
- I-68 at U.S. Route 219 (Grantsville Tower)
- I-68 West prior to Lower New Germany Road
- I-68 at Savage Mountain
- Road Weather Information System (RWIS) I-68 at Savage Mountain

Social Vulnerability Considerations

One of the greatest impacts of dense fog is reduced visibility for motorists leading to an increased risk of vehicle accidents. According to the National Institutes of Health, older drivers may be at greater risk for a collision under dense fog conditions. A number of factors likely contribute to the increased risk for older drivers. These factors include age-related changes in sensory processing, perceptual processing, attention, and cognitive ability.

There are a few ailments which might get aggravated by dense fog, chief among them are asthma and rheumatism. Breathing in fog exposes the lungs to cold, watery air. Breathing in vapor laden air results in less oxygen in every breath, for individuals with low immunity, this could lead to bronchitis or other respiratory issues.

Previous Occurrences

There are multiple roadways that are impacted by dense fog conditions several times a year in Garrett County, most notably Interstate 68. These dense fog conditions have resulted in numerous vehicle accidents over the years, some of which have resulted in fatalities.

The National Centers for Environmental Information (NCEI) Storm Event Database records instances of dense fog from 2003 to present. The following table presents the NCEI dense fog events that have affected Garrett County.

HISTORICAL DENSE FOG OCCURRENCES – GARRETT COUNTY					
Location	Date	Injuries	Deaths	Property Damage	Crop Damage
Garrett (Zone)	5/23/2003	100	2	\$0 Reported	\$0 Reported
Garrett (Zone)	12/18/2020	0	0	\$0 Reported	\$0 Reported
Garrett (Zone)	3/24/2021	0	0	\$0 Reported	\$0 Reported

Big Savage Mountain Interstate 68 Dense Fog – May 23, 2003

While several dense fog events have resulted in vehicle accidents in Garrett County, the most recent well known event occurred on a Friday before the Memorial Day weekend of 2003. A very dense fog set in on Big Savage Mountain between the communities of Frostburg and Finzel along Interstate 68 during the mid-afternoon hours. Before officials could provide a warning, or get that segment of the interstate closed, two multiple chain reaction accidents occurred, involving approximately 90 vehicles and resulting in two fatalities and 100 injuries.



Chain reaction accident I-68

The accident scene was approximately 200 yards long and the interstate was closed until 11:00 a.m. the next morning. Motorists reported that visibility was near zero.

Paul Street, Loch Lynn Heights / I-68 Friendsville Dense Fog – April, 2017

In April of 2017, the driver of a logging truck was reportedly uninjured when the trailer overturned in Loch Lynn Heights spilling cargo into the yard of a nearby house. The truck, owned by North Branch, LLC of Gorman, West Virginia, crashed on Paul Street around 11:15am. It was the second accident involving a tractor-trailer in Garrett County that morning. A tractor-trailer hauling lumber traveled out of control and overturned onto the westbound shoulder of Interstate 68 near Friendsville just before daylight. Both accidents were the result of poor visibility due to extremely foggy conditions.



Source: Cumberland Times, News

Interstate 68 Westbound Dense Fog – December 1, 2019

“According to an official with the Maryland State Police McHenry Barracks, 58 vehicles were involved in 29 separate collisions due to heavy fog on the westbound lanes of Interstate 68 in Garrett County, Maryland. Ten people suffered non-life-threatening injuries and were transported to Western Maryland Health System in Cumberland, Maryland” (WJLA, 2019).

Loss and Damages

The largest impacts of dense fog in Garrett County are related to transportation, specifically highway travel and vehicular accidents. Weather-related crashes, of which fog is one cause, cost an average of \$42 billion annually in the United States from personal injury, loss of life, and property damage.

Future Occurrences

Garrett County’s location and topography increases its susceptibility to both radiation and advection fog. There are two ingredients that add to the formation of fog in areas of variable terrain. First, overnight, the ground cools as the heat that was gathered from the sun during the day is released back into the air near ground level. The denser, cooler air on mountain-tops sinks and collects in valleys. Second, over the course of the night, the valley’s begins to fill from the bottom with cold layers of air. This phenomenon is known as “cold air drainage”. This cooler air

lowers the surrounding air temperatures closer to the dew point and subsequently saturation. If there is sufficient moisture in the air, fog will begin to form in these valleys as the night progresses. This type of fog is densest around sunrise when surface temperatures are often lowest.

The county lies in an area that experiences the greatest number of dense fog days per year, averaging between 35 and 40 dense fog days per year. The county will continue to experience dense fog conditions multiple times per year.

Future Climate Considerations

Garrett County is particularly prone to dense fog conditions during winter and spring months when temperature inversions are common. Foggy conditions are more pronounced when the ground is snow covered and warm air flows into the county from the west and south.

According to the USEPA, annual precipitation in most of Maryland has increased since the first half of the 20th century, “and precipitation from extremely heavy rain storms in the eastern United States increased by more than 25 percent since 1958” (USEPA, 2016). The USEPA anticipates continued increases in average annual precipitation as well as in the frequency of heavy downpours. Interestingly, the US EPA expects precipitation to increase in the winter and spring rather than the summer and fall, which as mentioned above is when Garrett County is most prone to dense fog conditions.

Risk Assessment

This section summarizes the vulnerability of Garrett County to dense fog. Garrett County conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding dense fog impacting transportation.

PUBLIC SENTIMENT, DENSE FOG-TRANSPORTATION – GARRETT COUNTY					
Hazard	Level of Concern				Total Responses
	Not at All	Somewhat	Concerned	Very	
DENSE FOG TRANSPORTATION	11 (15.94%)	24 (34.78%)	23 (33.33%)	11 (15.94%)	69
Please indicate which hazard event you feel may affect your community?				27 (40.91%)	66

The Location and Extent as well as the Impacts and Vulnerability sections above describe the consequences and effects of dense fog on the participants of this plan. The assets most vulnerable to impacts resulting from the effects of dense fog include motorists primarily on the segment of Interstate 68 near the Friendsville area, and those traveling on roadways within Kitzmiller. A slight vulnerability also exists for assets located within close proximity of those roadway segments.


The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above.

DENSE FOG-TRANSPORTATION RISK RANKING			
Category	Points	Description	Notes
Frequency	5	Excessive (will occur during a year)	According to information obtained from NOAA/NCEI Garrett County averages between 35 and 40 dense fog days annually.
Response	2	One day	The most typical response to incidents involving dense fog involve vehicular accidents, large-scale chain-reaction accidents would likely take one day.
Onset	4	Less than 6 hours	Dense fog can set in with little to no warning, is difficult to forecast, and is variable across a forecast area.
Magnitude	2	Limited (10-25% of land area affected)	Fog tends to collect in valleys near streams.
Business	1	Less than 24 hours	Dense fog conditions could delay employees attempting to get to work, impact customers traveling to businesses, delay the shipment of goods to and from businesses for several hours.
Human	3	Medium (multiple severe injuries)	Two of the previous occurrences discussed above resulted in 110 injuries and two fatalities.
Property	1	Less than 10% property affected	Property damage is mostly confined to vehicles and property located near roadways.
Totals	18	MEDIUM	

FEMA's *Local Mitigation Planning Handbook* (2023c) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks or vulnerabilities are more or less prevalent as compared to the other participating jurisdictions. The following table quickly synthesizes the data to capture the jurisdiction-specific aspects of risks and vulnerabilities for each town.

MULTI-JURISDICTIONAL CONSIDERATIONS, DENSE FOG-TRANSPORTATION		
<i>Jurisdiction</i>	<i>Comparison</i>	<i>Notes</i>
Garrett County	More	Despite dense fog conditions being experienced throughout the county, many of the historical occurrences have impacted the unincorporated areas. Though there is little difference in the way fog affects the municipalities, vehicular traffic is normally traveling at slower speed inside corporate boundaries.
Accident	Same	The Town of Accident Is located at higher elevations (i.e., 2,385 feet) with limited valleys, and is more exposed to wind which helps to dissipate fog. Motorists do periodically encounter foggy conditions on portions of U.S. Route 219.
Deer Park	Same	Fog tends to be densest in lower elevations in valleys along rivers and streams. Deer Park is located along portions of the Youghiogheny River valley; however, has the highest general elevation of all municipalities in the county at 2,510 feet. Motorists do encounter foggy conditions on portions of State Route 135. Fog coming from Deep Creek Lake sometimes impacts the town.
Friendsville	More	Fog tends to be densest in lower elevations in valleys along rivers and streams. Friendsville is located along portions of the Youghiogheny River valley and has the lowest general elevation of all municipalities in the county at 1,499 feet. The town is also located near the site of the largest chain-reaction accidents resulting from dense fog on I-68.
Grantsville	Same	The Town of Grantsville Is located at higher elevations with limited valleys, and is more exposed to wind which helps to dissipate fog. The town is positioned near roadways that are often impacted by fog (i.e., U.S. Route 219 and Interstate 68.
Kitzmiller	More	Fog tends to be densest in lower elevations in valleys along rivers and streams. The Town of Kitzmiller is located along the Potomac River valley.
Loch Lynn Heights	Same	The town has experienced vehicle accidents due to dense fog in the past. The town is located within proximity of the Youghiogheny River.
Mountain Lake Park	Same	U.S. Route 219 is utilized to access the town and is often impacted by fog.
Oakland	Same	Fog tends to be densest in lower elevations in valleys along rivers and streams. The town is situated in a small valley a few miles from the source of the Potomac River. U.S. Route 219 is utilized to access the town and is often impacted by fog.

2.2.4 Drought

A drought is a period of abnormally dry weather that persists long enough to produce a serious hydrological imbalance, and a temporary shortage of water for humans, animals, and plants.				
 <p>RISK</p> <p>HIGHEST</p> <p>HIGH</p> <p>MEDIUM</p> <p>LOW</p> <p>LOWEST</p>	Period of Occurrence:	Typically after a period of prolonged absence of precipitation	Garrett County Risk Ranking:	Low
	Warning Time:	Over 24 hours	State Risk Ranking:	Medium-Low
	Probability:	Low (unlikely to occur in a year)	Impact:	Critical (25-50% of land area affected)
	Type of Hazard:	Natural	Disaster Declarations:	USDA (1999)

Hazard Overview

“Drought” is a period of abnormally dry weather, which persists long enough to produce a serious hydrological imbalance. Drought is a term used in relation to who or what is affected by the lack of moisture. Drought can be a result of multiple causes, including global weather patterns that produce persistent, upper-level high-pressure systems with warm, dry air, resulting in less precipitation. According to the National Centers for Environmental Information (NCEI), a drought is a complex event that is difficult to either monitor or clearly define. Droughts develop slowly; typically, they are already underway when officially identified. There are several types of drought (Sears, 2017, p. 138).

- **Meteorological Drought:** Differences from the normal precipitation amounts. Because not every area receives the same amount of rainfall, a drought in one place might not be considered a drought in another.
- **Agricultural Drought:** Moisture deficiency seriously injurious to crops, livestock, or other agricultural commodities. Parched crops may wither and die. Pastures may become insufficient to support livestock. The effects of agricultural droughts are difficult to measure because there are many other variables that may impact production during the same growing season.
- **Hydrological Drought:** Reduction in stream flow, lake and reservoir levels, depletion of soil moisture, and a lowering of the groundwater table. Consequently, there is a decrease in groundwater discharge to streams and lakes. Prolonged hydrological drought will affect the water supply.

- **Socioeconomic Drought:** A lack of water that begins to affect people's daily lives. "A socioeconomic drought occurs when the demand for an economic good exceeds supply as a result of a weather-related shortfall in water supply" (NDMC, 2016).

Precipitation falls in uneven patterns across the county; the amount of precipitation at a particular location varies from year to year, but over the years, the average amount is reasonable constant. The amount of rain and snow also varies with the seasons. Even if the total amount of rainfall for a year is about average, rainfall shortages can occur during a period when moisture is critically necessary for plant growth, such as in early summer. When little to no rain falls, soils can dry out, and plants can die. When rainfall is less than normal for several weeks, months, or years the water in wells decreases. "If dry weather persists and water-supply problems develop, the dry period can become a drought" (USGS, n.d.).

Location and Extent

Droughts occur throughout North America, and in any given year at least one region will experience drought conditions. Droughts are countywide phenomena, as such, the effects of drought would be nearly equal throughout the entirety of the county. Garrett County is most rural, an agricultural drought could have a significant impact on the county. The severity of drought can vary throughout a year; what begins as a mild drought can become severe or extreme, then subside to a mild incident. This process can take weeks or months, and the effects can be felt after drought conditions end.

Maryland's average annual precipitation ranges from as much as 48 inches at places located in the Allegheny Plateau (i.e., Garrett County), and southern Eastern Shore area, at extreme ends of the state, to as little as 37 inches in the Cumberland area located in the "rain shadow" to the east of the Allegheny Plateau. Precipitation in the form of rain or snow is increased in storms or air masses that ascend the mountains from the Ohio Valley. At times ascent of air masses up the slopes of the mountain barrier is the "trigger action" required to induce precipitation that falls on the Allegheny Plateau. Descending air on the leeward slopes is warmed with the effect of dissipating the clouds and forming a "rain shadow" to the east of the mountains.

The Palmer Drought Severity Index (PDSI) is a measure of drought that is widely used to track moisture conditions. The PDSI is “an interval of time, generally in months or years in duration, during which the actual moisture supply at a given place rather consistently falls short of the climatically appropriate moisture supply.” The range of PDSI is from -4.0 (extremely dry) to +4.0 (excessively wet), with the central half (-0.5 to +0.5) representing normal or near-normal conditions. In the United States, the USDA, National Drought Mitigation Center at the University of Nebraska-Lincoln, U.S. Department of Commerce, and the National Oceanic and Atmospheric Administration (NOAA) developed another measurement of droughts named the U.S. Drought Monitor (USDM). The table above shows the two scales and how they compare.

USDM AND PDSI COMPARISON			
U.S. Drought Monitor		Palmer Drought Severity Index	
N/A		> 4.0	Extreme moist spell
		3.0 to 3.99	Very moist spell
		2.0 to 2.99	Unusual moist spell
		1.0 to 1.99	Moist spell
		0.50 to 0.99	Incipient moist spell
		-0.49 to 0.49	Near normal
		-0.5 to -0.99	Incipient dry spell
D0	Abnormally dry	-1.0 to -1.99	Mild drought
D1	Moderate drought	-2.0 to -2.99	Moderate drought
D2	Severe drought	-3.0 to -3.99	Severe drought
D3	Extreme drought	< -4.0	Extreme drought
D4	Exceptional drought	N/A	

As illustrated in the table above D0, described as **Abnormally Dry**, corresponds with the PDSI of -1.0 to -1.9. Possible impacts include “short-term dryness, slowing of crop and pasture growth” (NDMC, 2016). **Moderate Drought**, level D1, corresponds to a PDSI of -2.0 to -2.9. “These conditions can result in damage to crops and pastures and can cause the development of some water shortages” (NDMC, 2016). The D2 level, known as a **Severe Drought**, is a condition where “crop or pasture losses are likely and water shortages will be common” (NDMC, 2016). This correlates with a PDSI of -3.0 to -3.9. The D3 (PDSI of -4.0 to -4.9), or **Extreme Drought** level includes impacts such as “major crop and pasture losses as well as widespread water shortages and restrictions” (NDMC, 2016). The most critical drought category (D4, **Exceptional Drought**), with a PDSI of -5.0 or less, will create exceptional and widespread loss and will lead to water emergencies as reservoirs, streams, and wells are short of water (NDMC, 2016).

In addition to the PDSI, the Crop Moisture Index (CMI) calculates the change in moisture available from week to week, which gives a short-term status of agricultural moisture (National Weather Service, 2005). The table at right describes the Crop Moisture Index.

A growing populations with individual and commercial demands upon water supplies, coupled with industrial and agricultural uses, can combine to affect water use during both normal and drought conditions. Most municipalities in Garrett County rely on surface water for their water supply, primarily from the Potomac River. Both the Jennings Randolph Lake Dam and Savage River Dam regulate the river's flow; therefore, this water supply should remain adequate during drought conditions for the next several decades. The communities using wells and springs, which have access to limestone or sandstone aquifers, typically have a good supply of water through periods of drought. A small percentage of the county is supported by private water wells. Some of these private wells have the possibility of becoming dry or contaminated during a drought prior to the public systems, depending on use, size, and depth of the wells.

CROP MOISTURE INDEX	
Crop Moisture Index Value	Drought Condition
3.0 and up	Excessively Wet
2.0 to 2.9	Wet
1.0 to 1.9	Moist
-0.9 to 0.9	Slightly Dry/ Favorable Moist
-1.0 to -1.9	Abnormally Dry
-2.0 to -2.9	Excessively Dry
-3.0 or less	Severely Dry

Source: National Weather Service

GARRETT COUNTY & MUNICIPAL WATER RESOURCES				
Jurisdiction / System(s)	Water Source	Operated By	Design Production Capacity (gpd)	Ave. Water Demand (gpd)
Accident 2 WTPs	Two groundwater wells in Hampshire formation	Town of Accident	110,000	30,000
Bloomington 1 WTP	Savage River	Garrett County	38,000	28,000
Crellin 1 WTP	Two groundwater wells in Allegheny/Pottsville formations	Garrett County	28,000	15,000
Deer Park 1 WTP	Two groundwater wells in Greenbrier formation	Garrett County	96,000	35,000
Friendsville 1 WTP	Youghiogheny River	Garrett County	120,000	65,000
Gorman 1 WTP	Two groundwater wells in Greenbrier and Mauch Chunk formations	Garrett County	58,000	35,000
Grantsville 2 WTP	Two wells & four springs in Savage River State Forest, two additional groundwater wells	Town of Grantsville	111,000	60,000
Kitzmilller / Shallmar 1 WTP	Groundwater well in Allegheny & Pottsville formations	Garrett County	104,000	25,500

GARRETT COUNTY & MUNICIPAL WATER RESOURCES				
<i>Jurisdiction / System(s)</i>	<i>Water Source</i>	<i>Operated By</i>	<i>Design Production Capacity (gpd)</i>	<i>Ave. Water Demand (gpd)</i>
Loch Lynn Heights & Mountain Lake Park Combined Water System 1 WTP	Four production wells in the Hampshire, Rockwell, and Mauch Chunk formations & two springs	Garrett County	238,000	201,000
McHenry 3 WTP	Five groundwater wells	Garrett County	640,000	231,000
Oakland 2 WTP	Broadford Lake & Youghiogheny River	Town of Oakland	590,000	377,000
Thayerville 1 WTP	Groundwater wells	Garrett County	432,000	100,000

Source: Garrett County Comprehensive Plan, 2022

Impacts and Vulnerability

Droughts can impact drinking water both in terms of availability and demand. According to the U.S. Environmental Protection Agency (US EPA), as temperatures rise, people and animals need more water to maintain health. Additionally, a large number of economic activities require abundant water sources such as energy production and growing food crops. As droughts reduce available water sources, local officials will need to monitor water usage closely to maintain enough for critical uses. An extreme drought would have a negative effect on the large agricultural or open urban area sectors of Garrett County. According to the United States Department of Agriculture's (USDA) 2017 Census of Agriculture, there are 707 farms in Garrett County, with an average size of 128 acres per farm. In total, Garrett County produced over \$6 million worth of agricultural products (based on market prices at the time).

Water supplies in Garrett County are a mix of public and private systems. Public systems include; Bloomington, Carmel Cove, Crellin, Town of Deer Park, Town of Friendsville, Gorman, Keyser's Ridge, Town of Kitzmiller, McHenry, Towns of Loch Lynn Heights and Mountain Lake Park, Pee Wee Hill, Shallmar, and Willows. A small percentage of Garrett County relies on private water wells. Many of these private wells can become dry during a drought before the public systems show significant loss depending on the use, size, and depth of the wells.

Prolonged droughts can affect municipality's ability to provide adequate water supplies, as water storage supplies would begin to become critically low throughout the region, this could also potentially increase the risk of wildfires. Mandatory water conservation measures, and water use priorities may be enacted and enforced. Local health departments may have to conduct water quality sampling of numerous private water wells throughout the region as a buildup of

contaminants in these wells is common during extreme drought conditions. Local clinics and hospitals may begin to see a significant increase of respiratory infections (i.e., asthma, bronchitis, and pneumonia) resulting from the extremely dry and windy conditions affecting air quality.

The significant lowering of the ground-water table and a decrease in ground-water discharge to streams and lakes may have an effect on tourism and the abundant recreational attractions at parks, trout streams, and lakes. Local and state agencies may be required to post no boating and no swimming signs at various lakes and streams where water quality standards are not being met due to stagnant and contaminated water. Stagnant water from reduced levels can provide a breeding ground for disease-carrying mosquitoes.

The effects of drought would negatively impact the following business types throughout Garrett County; farmers, local water utilities, restaurants, the tourism industry (i.e., parks, lakes, golfing, boating, fishing, etc.), laundry mats, community swimming pools, and car washes. The following table (MDEM, 2021) describes the effects of drought on demographics, infrastructure and buildings, the environment, delivery of services, the economy, and public confidence in governance.

DROUGHT CONSEQUENCE ANALYSIS	
<i>Impact Type</i>	<i>Impact Description</i>
Public/Responder Health & Safety	Impacts on the public during a drought take the form of crop damage, water rationing and other water source impacts, and wildfires. First responders would be most concerned with the secondary effects of drought, such as wildfires. As such, first responders would be called to incident areas to evacuate people from the fire area, close roads, create fire breaks, and attend to injuries.
Continuity of Operations (Delivery of Services)	The impacts on continuity of operations due to drought are typically minimal. Generally, buildings and infrastructure, which are essential to the continuity of operations and delivery of services, are not impacted by drought.
Property, Facilities & Infrastructure	Property and infrastructure are typically not vulnerable to drought; however, the water supply infrastructure may be impacted by long-term drought.
Economic Condition	A significant drought would draw upon state, county, and local resources. Some of the costs could be recouped through federal grant reimbursements, but local governments would feel the fiscal impact.
Environment	Impacts on the environment would result from wildfires, overloading water and wastewater treatment plants, creating dust storms, and disturbing wildlife and natural areas.

The National Drought Mitigation Center has developed the U.S. Drought Monitor. The Drought Monitor is a map that is updated weekly using data from the previous week to show areas of the U.S. that are in a drought. The following table lists the U.S. Drought Monitor classifications of drought, along with potential impacts.

U.S. DROUGHT MONITOR CLASSIFICATION			
Category	Description	Possible Impacts	Palmer Drought Severity Index
D0	Abnormally Dry	Going into drought: <ul style="list-style-type: none"> • Short-term dryness slowing planting, growth of crops or pastures Coming out of drought <ul style="list-style-type: none"> • Some lingering water deficits • Pastures or crops not fully recovered 	-1.0 to -1.9
D1	Moderate Drought	<ul style="list-style-type: none"> • Some damage to crops, pastures • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested 	-2.0 to -2.9
D2	Severe Drought	<ul style="list-style-type: none"> • Crop or pasture losses likely • Water shortages common • Water restrictions imposed 	-3.0 to -3.9
D3	Extreme Drought	<ul style="list-style-type: none"> • Major crop/pasture losses • Widespread shortages or restrictions 	-4.0 to -4.9
D4	Exceptional Drought	<ul style="list-style-type: none"> • Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies 	-5.0 or less

Source: National Drought Mitigation Center

Severe drought conditions can negatively affect human health (CDC, 2020). Some effects are experienced short-term and can be directly observed and measured, while others are indirect and are not easy to anticipate or monitor. The possible health implications of drought include:

- Compromised quantity and quality of drinking water,
- Increased recreational risks,
- Effects on air quality,
- Diminished living conditions related to energy, air quality, and sanitation and hygiene,
- Compromised food and nutrition, and
- Increased incidence of illness and disease.

Social Vulnerability Considerations

Social vulnerability is especially important, as certain community characteristics can make populations more susceptible to adverse impacts from environmental hazards such as drought. “Drought vulnerability has generally been linked to poverty, specific drought-related health outcomes associated with air quality, airborne illnesses and food insecurity have also been associated with poverty. The reliance on small or poorly maintained water systems puts populations at increased risk of morbidity due to exposure to contaminated drinking water or issues resulting from reduced use of water resources for hygiene and food washing.

Children and the elderly are both vulnerable to various drought-related health outcomes, such as air and waterborne diseases (Fard, Puvvula, & Bell, 2022)”. The following images show (a) Census tracts where more than 25% of the tract’s population is below 150% of the poverty level, and (b) Census tracts showing the highest percentages of vulnerable populations (i.e., those under 18 and 65+) as a function of the total population.



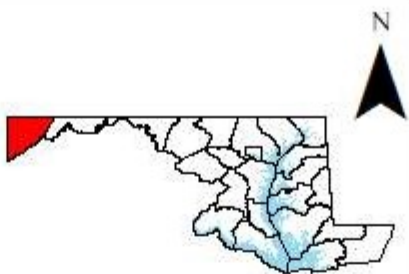
Persons Below Poverty Estimate (>20%)



Hay/Pasture



Cultivated Crops



0 1 2 4 6 8 Miles

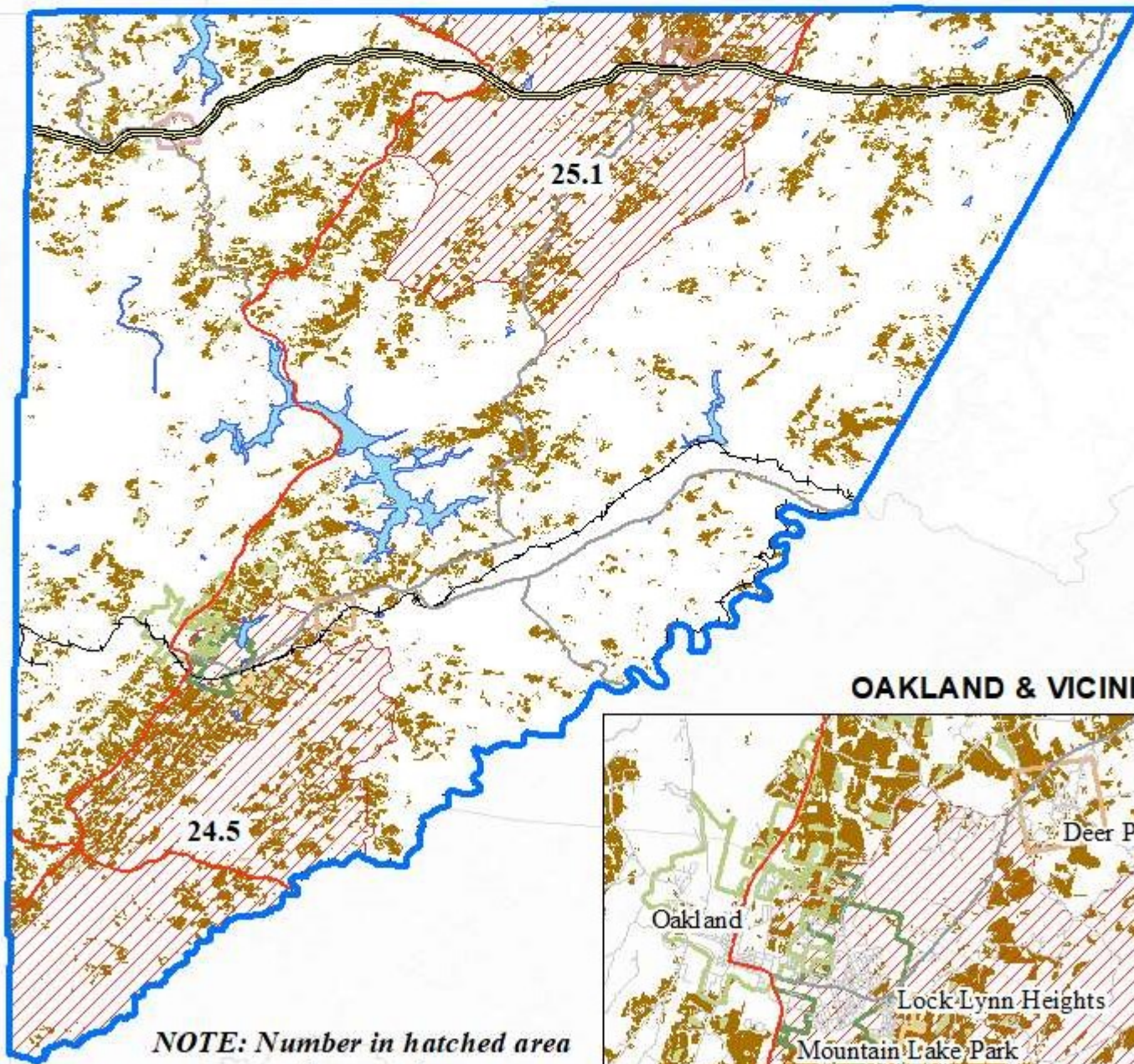
GARRETT COUNTY HAZARD MITIGATION PLAN

Drought: SVI Considerations

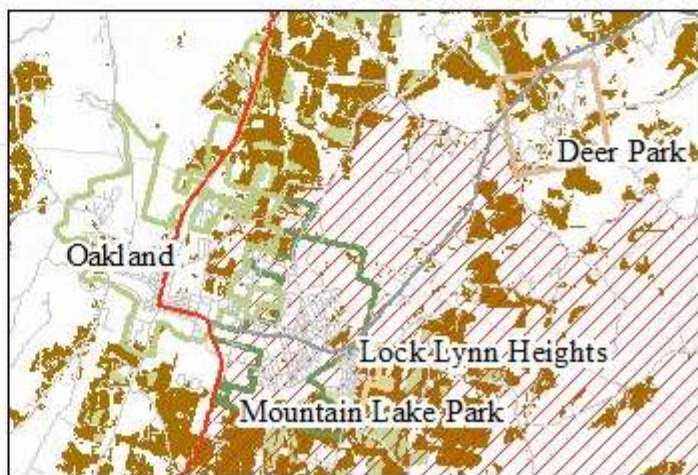
Data Source(s):
CDC ATSDR, USGS
NLCD



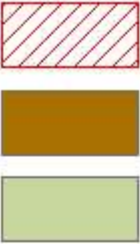
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



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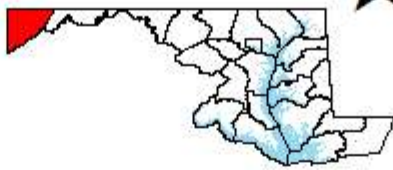
**NOTE: Number in hatched area
represents the actual percentage**



Population, Under 18 (>20%)

Hay/Pasture

Cultivated Crops




0 1 2 4 6 8 Miles


GARRETT COUNTY HAZARD MITIGATION PLAN

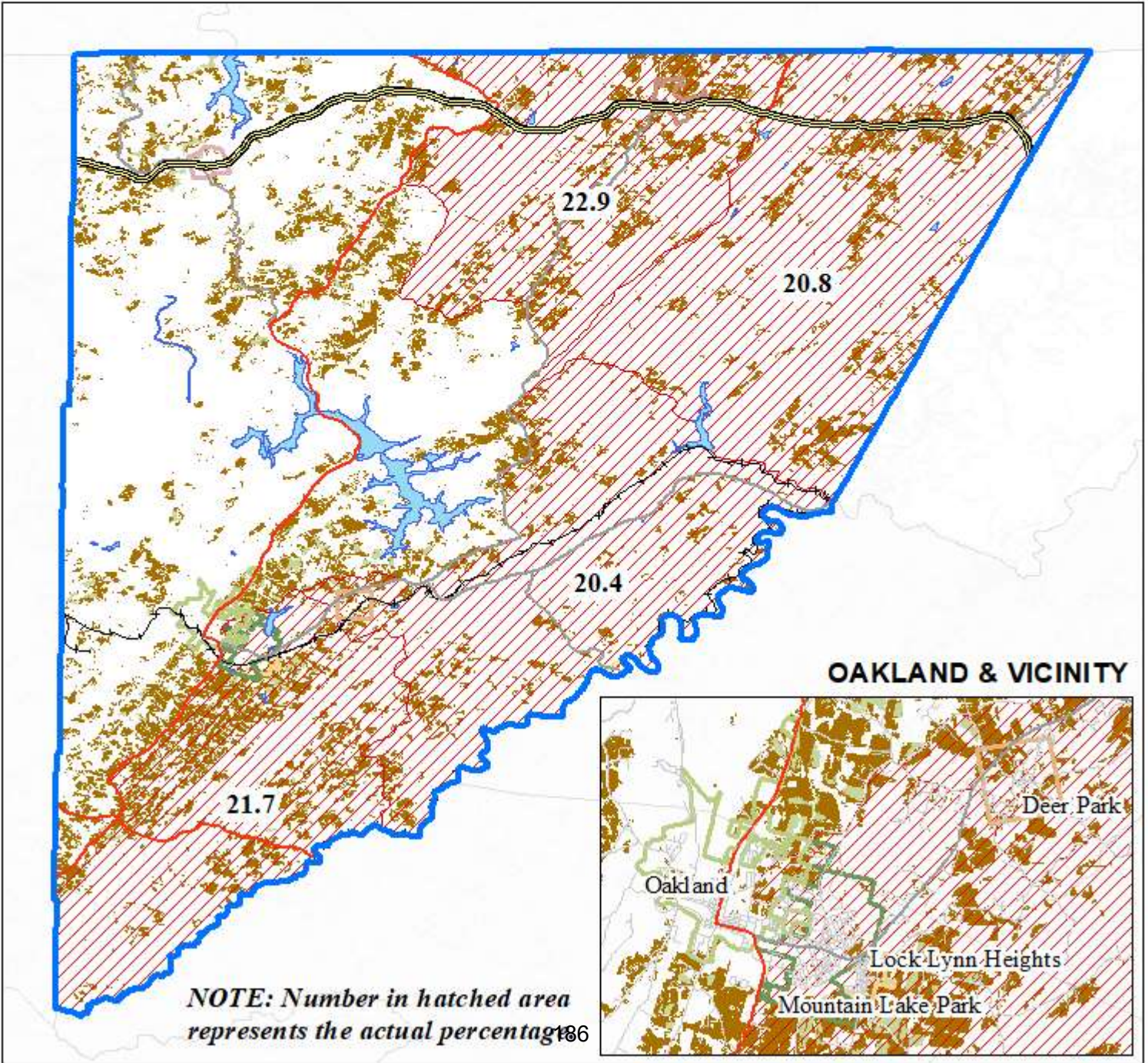
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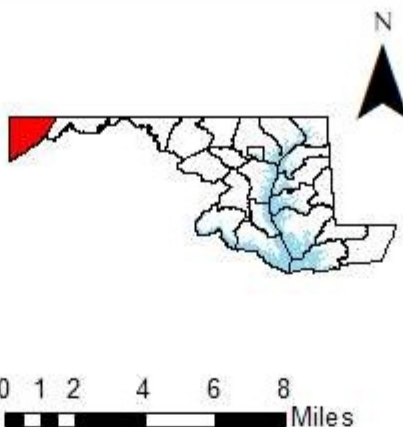
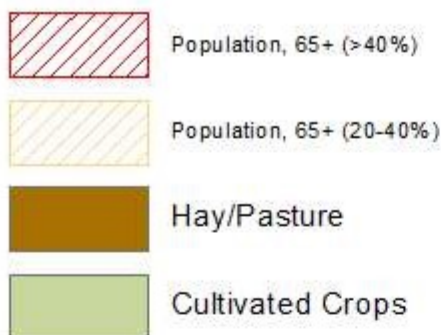
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CDC ATSDR, USGS
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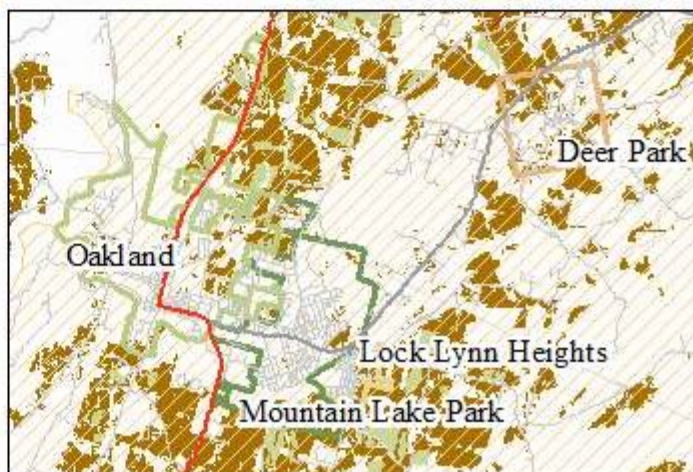
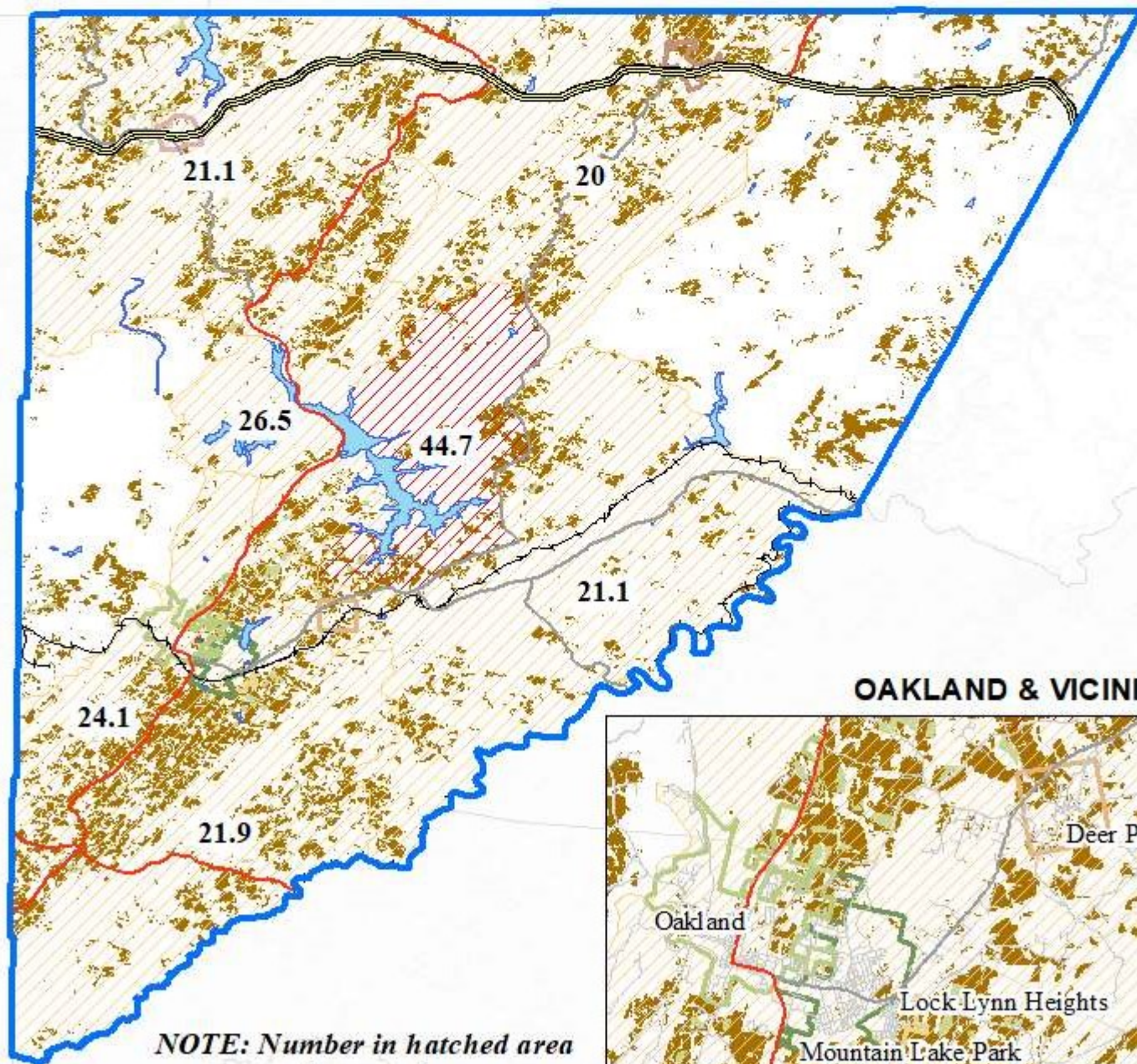
GARRETT COUNTY HAZARD MITIGATION PLAN

Drought: SVI Considerations

Data Source(s):
CDC ATSDR, USGS
NLCD



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



NOTE: Number in hatched area represents the actual percentage

Previous Occurrences

The National Centers for Environmental Information (NCEI) Storm Event Database records instances of drought from 1999 to present. The following table presents the NCEI droughts that have affected Garrett County.

HISTORICAL DROUGHT OCCURRENCES – GARRETT COUNTY					
Location	Date	Injuries	Deaths	Property Damage	Crop Damage
Garrett (Zone)	8/01/1999	0	0	\$0 Reported	\$0 Reported
Garrett (Zone)	9/01/1999	0	0	\$0 Reported	\$0 Reported

Source: NCEI Storm Events Database

Countywide Drought – August through September, 1999

The dry conditions that actually began in July 1999 continued through the month of August across Garrett County. A few areas in the county saw a deterioration of stream flow and soil moisture, several small streams and farm ponds began to go dry. The month started with the county under a state-declared Drought Emergency, and on August 2 the U.S. Department of Agriculture declared the county an agricultural disaster area, enabling farmers to apply for federal aid. Although rains across the area during the last few weeks of the month started to ease the drought situation, a statewide rainfall deficit of over nine inches still existed.

Rainfall averaged around 0.40 inches above normal for September, easing drought conditions a bit. The main contributor to the rainfall total was the remnants of Hurricane Floyd, which passed to the east of the area. As a result of the rainfall, the governor downgraded the drought emergency to a drought warning for Garrett County, as well as the entire state of Maryland. However, the 365-day rainfall still remained around five to seven inches below the 30-year normal and the Palmer Drought Severity Index still showed Garrett County continuing under an extreme drought through September.

Loss and Damages

Loss estimates with regards to drought are difficult to quantify, though droughts generally affect crops rather than structures. There is no need for a loss estimate for structural damage. The varying severity levels of drought makes estimating crop loss difficult, especially considering the numerous possible mitigating factors such as time of year, heartiness of crops, etc.

The worst case scenario would involve the entire agricultural sector being affected from a prolonged and serious drought. Based on 2017 numbers, the most recent Census of Agriculture published by the USDA, market value of crops sold in Garrett County was \$2,034,000. Drought conditions also have an effect on livestock production. Low rainfall causes a drop in available drinking water precluding the effective grazing of pastures. During drought years livestock suffer a lower conception rate due to an incomplete return to peak bodyweight and a higher rate of miscarriage due to high stress levels as the dry season proceeds. Therefore, drought in one year will lead to lower calving rates in the following year. As access to grazing pastures is reduced there will be a decrease in livestock bodyweight reducing the value of livestock sold at market. Female's milk output will also decrease as fodder access is reduced. Once food intake is below a certain level, lactation will cease, reducing product for market and affecting calf's nutrition (Toumlin, 1985)

Although there is no direct correlation between the presence of farms and drought risk, the market value of agricultural products sold provides evidence of total economic activity exposed to losses from drought. On average, \$6.04 million of agricultural products in Garrett County are vulnerable to drought conditions in any given year.

GARRETT COUNTY – CENSUS OF AGRICULTURE (USDA, 2017)	
Number of Farms	594
Land in Farms	94,627 ac
Average Size of Farm	159 ac
Market Value of Products Sold	\$6,039,000
Crop Sales	\$2,034,000
Crop Sales %	34%
Livestock Sales	\$4,005,000
Livestock Sales %	66%
Average Sales Per Farm	\$10,167

Source: USDA, Census of Agriculture, County Summary Highlights, 2017

For planning purposes, utilizing research on average crop yield losses provides the basis for a mathematical loss calculation. Kuwayama (2019), focused on corn and soybeans and found that a week of drought in non-irrigating counties results in average crop yield reductions ranging from 0.1% to 1.2%. The average market value of agricultural products sold annually (i.e., across 52 weeks) in Garrett County suggest an average weekly value of approximately \$116,135 (for a potential exposure ranging from \$116 to \$1,394).

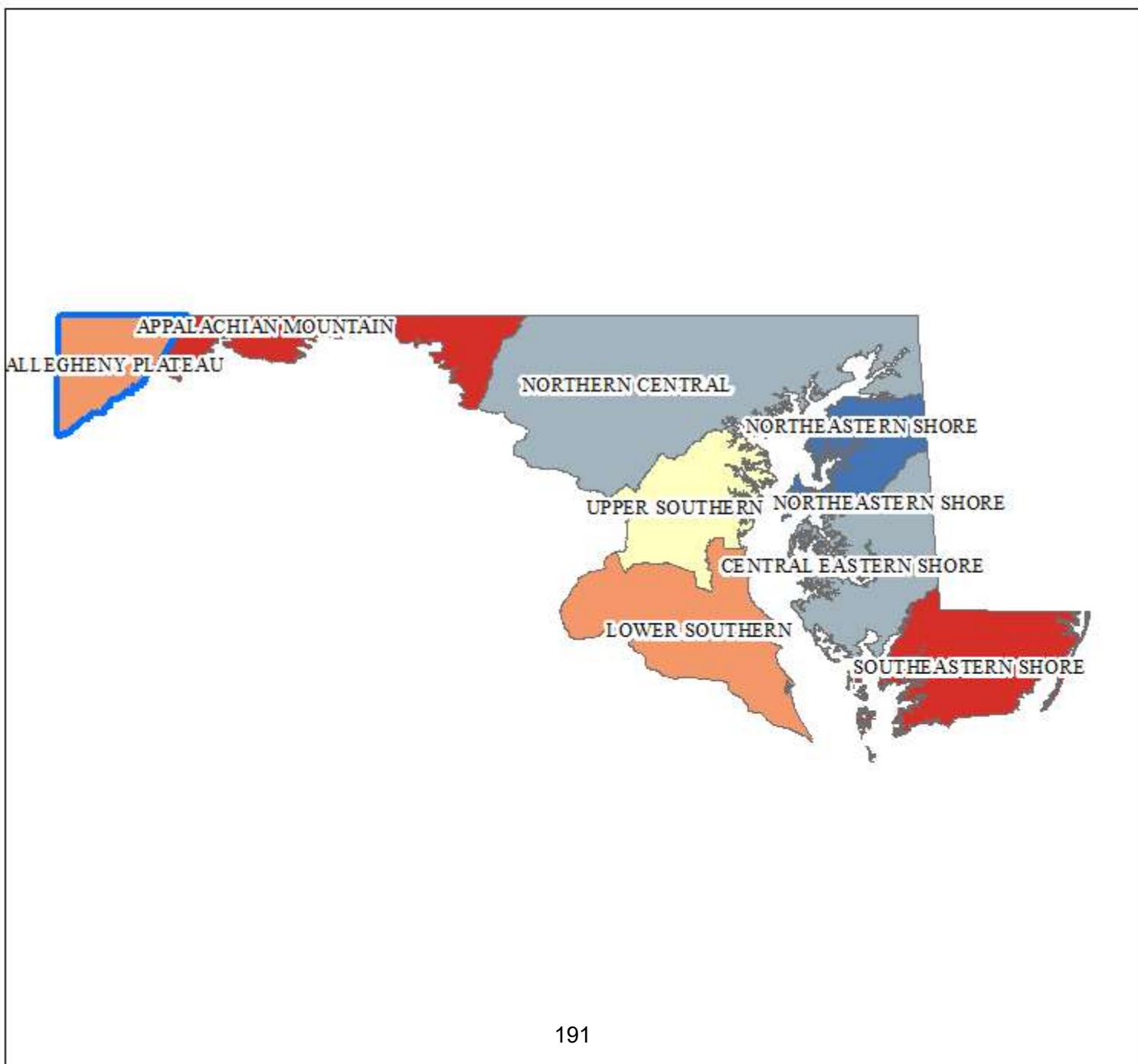
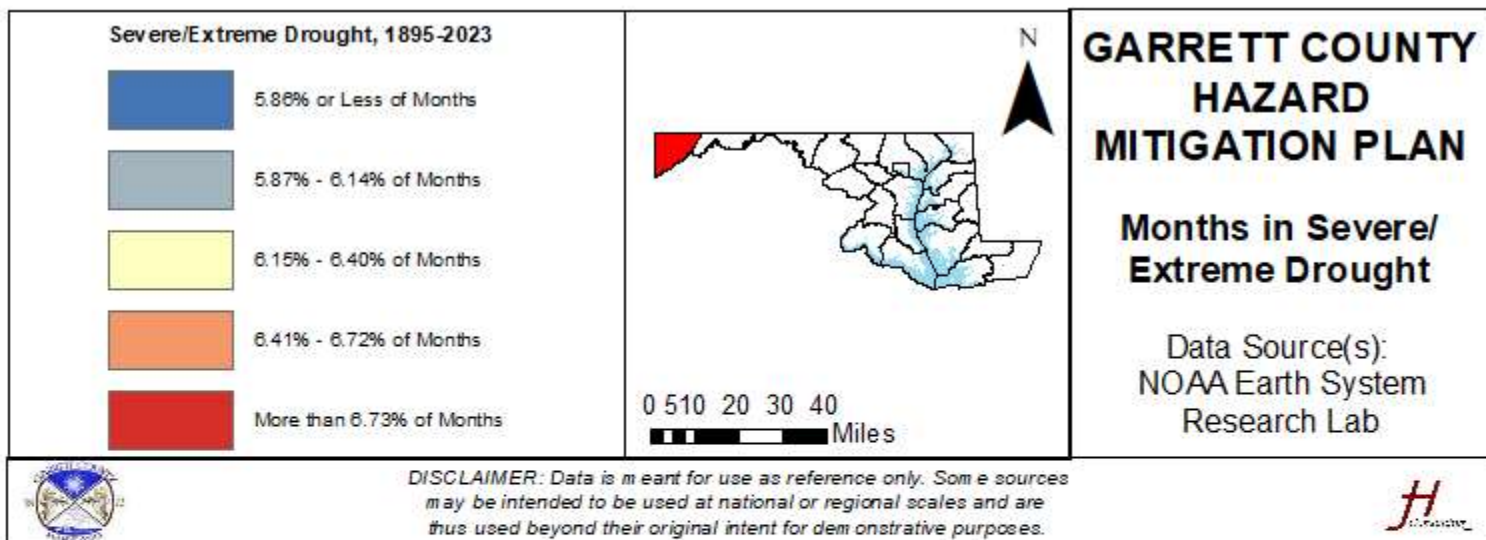
The declared incident cited above indicates the length of the 1999 drought was from July through September (three months). The average length of historical droughts (receiving a secretarial designation) in Garrett County is thus three months (or 12 weeks). Combining these calculations suggest a range of exposure of \$1,394 to \$16,723 per drought.

Future Occurrences

Though it is difficult to anticipate precisely where drought conditions will occur in the future, Garrett County can estimate the chances of experiencing drought conditions generally. The National Oceanic and Atmospheric Administration's (NOAAs) Earth System Research Laboratory (ESRL) has divided the U.S. into "climate divisions." ESRL further maintains data for each of these areas, including the historical Palmer Drought Severity Index (PDSI) values for all months between 1895 and 2023. Garrett County's climate division – Allegheny Plateau, experienced severe or extreme drought conditions during 103 of the 1,536 months comprising the 1895-2023 period. The map below displays ESRL Climate Divisions' months spent in severe or extreme drought in Garrett County (NOAA NCEI, 2023).

Future Climate Considerations

Rising air and water temperatures and changes in precipitation are intensifying droughts in certain areas. The quality and quantity of water available for use by people and ecosystems across the country are being affected by climate change, increasing risks and costs to agriculture, energy production, industry, recreation, and the environment. Droughts are projected to increase in frequency due to shifts in seasonal precipitation patterns, including dryer summers and less precipitation falling as snow in early spring and late fall. Droughts are also projected to have a longer duration due to a changing climate.

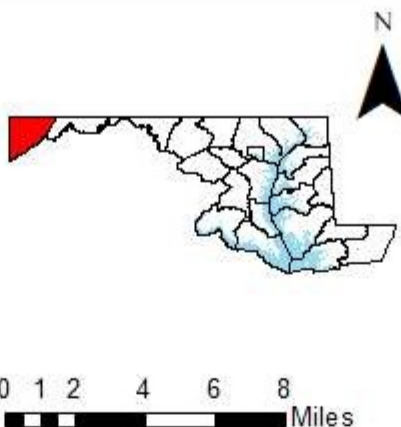


Risk Assessment

The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above.

DROUGHT RISK RANKING			
Category	Points	Description	Notes
Frequency	2	Low (unlikely to occur in a year)	There has only been one recorded drought event in 24 years in Garrett County, which yields an estimate of 0.04 incidents per annum.
Response	4	One month	Though the agricultural response may be extensive and much longer, it is a response that is not as acute as many other emergency responses.
Onset	1	Over 24 hours	Drought conditions occur following an extended period of specific hydrological circumstances.
Magnitude	3	Critical (25-50% of land area affected)	Historically drought conditions have impacted the entire county simultaneously.
Business	2	One week	Drought is not likely to necessitate wide-spread business closures for extended periods.
Human	1	Minimum (Few minor illnesses)	Drought is not likely to result in injuries; however, can result in a slight increase in respiratory infections such as bronchitis and pneumonia.
Property	2	10-25% of property affected	Though a significant amount of the land area could be impacted, drought conditions do not affect personal property as severely.
Totals	15	LOW	

FEMA's *Local Mitigation Planning Handbook* (2023b) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks are more or less prevalent as compared to the rest of the planning area. The following map graphically depicts potential risk areas in Garrett County, (i.e., cultivated crops & hay/pasture).



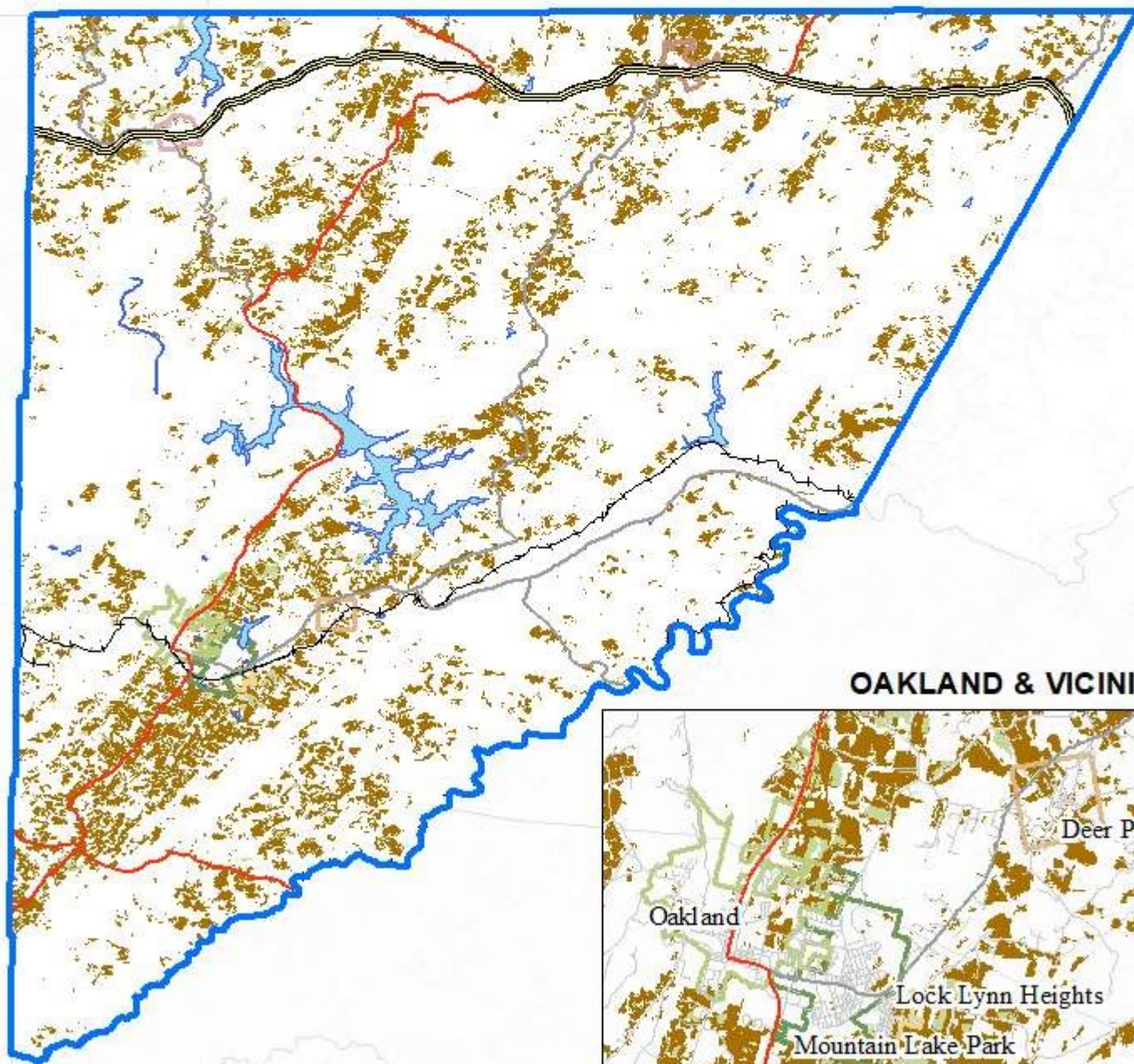
GARRETT COUNTY HAZARD MITIGATION PLAN

Agricultural Land Uses

Data Source(s):
USGS NLCD (2020)

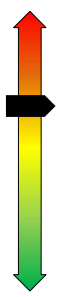


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2.2.5 Flooding

A flood is a general or temporary condition of partial or complete inundation of normally dry land areas or the rapid accumulation of runoff surface water from any source. A flash flood is a sudden local flood, typically due to heavy rainfall				
	RISK	Period of Occurrence:	At any time, typically after prolonged periods of precipitation	Garrett County Risk Ranking: Medium
	HIGH	Warning Time:	6-12 hours	State Risk Ranking: Medium-High
	MEDIUM	Probability:	Excessive (will occur in a year)	Impact: Limited (10-25% of land area affected)
	LOW	Type of Hazard:	Natural	Disaster Declarations: DR-1094-MD (1996) DR-1139-MD (1996) DR-1492-MD (2003) PA-00097/ S4465 (2018)
	LOWEST			

Hazard Overview

Flooding is the inundation of a normally dry area caused by an increased water level in an established watercourse or ponding of water that poses a threat to life or property. According to FEMA, inundation may stem from:

- The overflow of inland tidal waters;
- The unusual and rapid accumulation of runoff of surface waters from any source; or
- Mudslides are proximately caused by flooding and are akin to a river of liquid and flowing mud on the surfaces of normally dry areas, as when the earth is carried by a current of water and deposited along the path of that current.

Floods are the most prevalent hazard in the United States. Each year, floods cause more property damage in the U.S. than any other type of natural disaster, killing an average of 150 people a year. Almost 90% of Presidential declarations involve flooding. According to NOAA, some of the possible causes for flooding include the following.

- **Excessive Rainfall:** This is the most common cause of flooding. Water accumulates quicker than the soil can absorb, resulting in flooding.
- **Snowmelt:** It occurs when the primary source of water involved is melting snow. Unlike rainfall that can reach the soil almost immediately, the snowpack can store the water for an extended amount of time until temperatures rise above freezing, and the snow melts.

- **Ice or Debris Jams:** Common during the winter and spring along rivers, streams, and creeks. As ice or debris moves downstream, it may get caught on obstructions to the water flow. When this occurs, water can be held back, causing upstream flooding. When the jam finally breaks, flash flooding can occur downstream.
- **Dam Breaks or Levee Failure:** Dams can overtop, have excessive seepage, or have a structural failure. For more information, see Section 2.2.2 Dam and Levee Failure.

The history of flooding within Garrett County indicates that it can occur at any time of the year. Nearly all significant floods, though, are from winter and spring rains falling on saturated, snow-covered, or frozen soil.

According to the National Flood Insurance Program (NFIP), flash floods are the most common severe weather emergency in the United States. Some storms drop large amounts of rain within brief periods. Flash floods occur with little or no warning and can reach a full peak in just a few minutes. Flash floods develop more quickly than river flooding, and they are harder to predict. Unlike river flooding, flash floods can occur in many places that river flooding does not. These areas are less prepared for flooding, leading to greater danger and potential for property damage.

Flash flooding is usually a widespread event, as small creeks and streams overflow banks and flood large areas of agricultural fields and rural roads. Flash flooding in or near urban areas often stems from failing storm sewers and poor drainage systems. Excessive amounts of paved areas or other impervious surfaces upstream can increase the water runoff rate. Development affects the runoff of storm water and snowmelt. When rain falls in an undeveloped area, as much as 90 percent of it will infiltrate the ground; in a highly developed area, as much as 90 percent (90%) will run off.

National Flood Insurance Program (NFIP)

The NFIP is a FEMA-managed program designed to provide flood insurance to property owners, renters, and businesses. The intent of the program is to help those property owners recover more quickly following a flood event. The NFIP, though, is not *just* an insurance program. Program representatives work with communities to adopt and enforce floodplain management regulations to lessen the exposure to damages in flood-prone areas.

All of the jurisdictions in the county participate in the NFIP (see Section 1.3: Capabilities for additional information). The following table outlines NFIP policies in force¹ throughout Garrett County.

NFIP POLICIES IN FORCE – GARRETT COUNTY			
Community Name (Number)	Policies in Force	Total Coverage	Total Written Premium + FPF
Garrett County (240034)	55	\$12,482,000	\$43,376
Accident, Town of (240093)	2	\$401,000	\$799
Deer Park, Town of (240102)	0	\$0	\$0
Friendsville, Town of (240035)	10	\$1,316,000	\$12,593
Grantsville, Town of (240165)	1	\$280,000	\$360
Kitzmiller, Town of (240036)	2	\$681,000	\$1,435
Loch Lynn Heights, Town of (240037)	0	\$0	\$0
Mountain Lake Park, Town of (240038)	0	\$0	\$0
Oakland, Town of (240039)	4	\$362,000	\$2,307

Location and Extent

Floods occur in every state in the U.S., and, according to NOAA’s National Severe Storms Laboratory, kill more people each year than tornados, hurricanes, or lightning (NSSL, n.d.). The local topography and the ground’s capacity to hold water are variables that impact flooding in localized areas. Dense population centers and other heavily developed areas are at risk for flash flooding due to impervious surfaces (i.e., pavement, concrete, etc.). Roadways, parking lots, and other paved areas prevent the ground from absorbing rainfall, thereby increasing runoff and the possibility of flooding events.

Garrett County is not only susceptible to widespread flooding along major streams and rivers in special flood hazard areas but is also subject to flash flooding along its smaller tributaries in the headwaters of steeply sloped drainage basins. The steep slopes along the mountain ridges of Garrett County ensure rapid runoff from rainfall and snowmelt, while the broad limestone valleys in the center of the Plateau contain sizeable wetland areas which create marshy conditions that prevail throughout the year. Flash flooding is a serious problem, particularly down-slope from the major ridge-tops in the Potomac and Youghiogheny River valleys.

Garrett County has nearly 16,000 acres within the 100-year floodplain. Of the eight municipalities in Garrett County, three are located within the floodplains of major streams, and five are located along the headwaters of streams but have floodplain areas within the corporate

¹ This table is a recreation of the spreadsheet available from the NFIP. Some policies are flagged for a county, but the community name is unknown. In those cases, this table will report “Unknown.”



limits. Kitzmiller, located on the Potomac River upstream of the Bloomington Dam, has suffered flooding during many of the flood events in Garrett County that have affected the Potomac Basin. Friendsville, located on the Youghiogheny River upstream of the Youghiogheny Reservoir, has also suffered flooding during major events in that basin. Oakland, Mountain Lake Park, Loch Lynn Heights, and Deer Park have sustained limited damage from flooding in the Little Youghiogheny watershed. These four communities are also susceptible to storm water damage from intense localized storms that produce rapid runoff. New urban development upslope of existing urban areas which have inadequate storm water facilities can cause runoff problems as these communities expand. The Town of Grantsville is situated on higher ground and has no mapped floodplains, the Town of Accident is somewhat susceptible to localized flooding from intense storms and storm water runoff.

The Potomac River is a major river in the Mid-Atlantic Region of the U.S. that flows from the Potomac Highlands in West Virginia to the Chesapeake Bay in Maryland. The river is 405 miles long, with a drainage area of 14,700 square miles and is the fourth-largest river along the

East Coast of the United States, more than five million people live within its watershed. The river has two sources, the North Branch and the South Branch. From the Fairfax Stone the North Branch of the Potomac River flows 27 miles to the man-made Jennings Randolph Lake, below the lake the river cuts a path through the eastern Allegheny Mountains, it flows northeast by the communities of Bloomington, Luke, and Westernport in Maryland. The upper branch of



North Branch Potomac River

the Potomac River forms the southern boundary of Garrett County and the Town of Kitzmiller. The river separates Kitzmiller from Blain, West Virginia.

The Youghiogheny River is a 134-mile-long tributary of the Monongahela River. It drains an area on the west side of the Allegheny Mountains northward into Pennsylvania, providing a small watershed in extreme western Maryland into the tributaries of the Mississippi River. The river rises in northern West Virginia near Backbone Mountain. The headwaters are approximately 10 miles north of the headwaters of the North Branch of the Potomac River near Crellin, and pass through Silver Lake before flowing north-northeast into Garrett County.



Youghiogheny River, Swallow Falls State Park, near Oakland, MD

The river flows to the west of Oakland and through Friendsville, paralleling the West Virginia border then enters southwestern Pennsylvania, then joins the Monongahela River southeast of Pittsburgh. Approximately six miles upstream from the confluence with the Monongahela River the river is impounded by a 184-foot-high dam that forms the Youghiogheny River Lake, a reservoir that stretches upstream into northern Maryland. The Youghiogheny is designated a Maryland State Scenic and Wild River. The portion of the river south of Friendsville and all land that can be viewed from the river are protected.

The Little Youghiogheny River flows along a portion of the B&O Railroad from the east side to the center of Deer Park, and heads south along the southeast boundary of Mountain Lake Park and the northwest boundary of Loch Lynn Heights. The river then runs along the southern and western boundaries of Oakland before meeting up with the Youghiogheny.

The Casselman River originates in a field north of Grantsville Park. The North and South Branches of the Casselman River originate about eight to ten miles southwest of Grantsville, passing on the east of the town.

Efforts were made by the steering committee in coordination with the Department of Public Works – Road Division and the general public to identify roadways within the county that are frequently impacted by flooding. Each municipality was asked the following question, “Are there any areas of concern within your municipality that repetitively flood, such as roadways?” The information received is provided in the table below.

FREQUENTLY FLOODED ROADWAYS – GARRETT COUNTY			
Roadway	Maintained By	Municipality	Ranking
Maple Street Route 742 (Youghiogheny River)	Municipality	Friendsville	High
Shallmar Road (N. Branch Potomac River)	County	Garrett County	High
Underwood Road (Youghiogheny River)	County	Garrett County	High
Water Street (Youghiogheny River)	Municipality	Friendsville	High
West Liberty Street (Bradley Run)	Municipality	Oakland	High
Allegheny Drive (near Oak Street)	Municipality	Mountain Lake Park	Medium
Althouse Hill Road (N. Branch Potomac River)	County	Garrett County	Medium
Bethlehem Road (Laurel Creek)	County	Garrett County	Medium
Blue Ribbon Road (Clark Creek)	County	Garrett County	Medium
Cranesville Road	County	Garrett County	Medium
Fish Hatchery Road (Bear Creek)	County	Garrett County	Medium
Deer Park Ave. (Between Dennett Rd & Alexander)	Municipality	Mountain Lake Park	Medium
Industrial Park Dive (East of Fratz Street)	Municipality	Accident	Medium
Jasper Riley Road (Trout Run Creek)	County	Garrett County	Medium
Lynndale Road (Trout Run Creek)	County	Garrett County	Medium
Maple Street @ Walnut Street (Bear Creek)	Municipality	Friendsville	Medium
North Hill Road (Wolfden Run Creek)	County	Garrett County	Medium
North Street (North of Baltimore Street)	Municipality	Mountain Lake Park	Medium
Pleasant Valley Road (Trout Run Creek)	County	Garrett County	Medium
Sang Run Road	County	Garrett County	Medium
Silver Knob Road (Youghiogheny River)	County	Garrett County	Medium
Smouse Road (End of Roanoke Rd)	County	Garrett County	Medium
Willow Lane (Between Fairway & Woodland Drive)	Municipality	Oakland	Medium
Aiken Miller Road	County	Garrett County	Low
Buffalo Run Road	County	Garrett County	Low
Dung Hill Road	County	Garrett County	Low
Eighth @ Arch Street	Municipality	Oakland	Low
Glade Road	County	Garrett County	Low
King Wildersen Road (Glade Run Creek)	County	Garrett County	Low
Second & Green Street	Municipality	Oakland	Low
Wilson Corona Road (Shields Run Creek)	County	Garrett County	Low

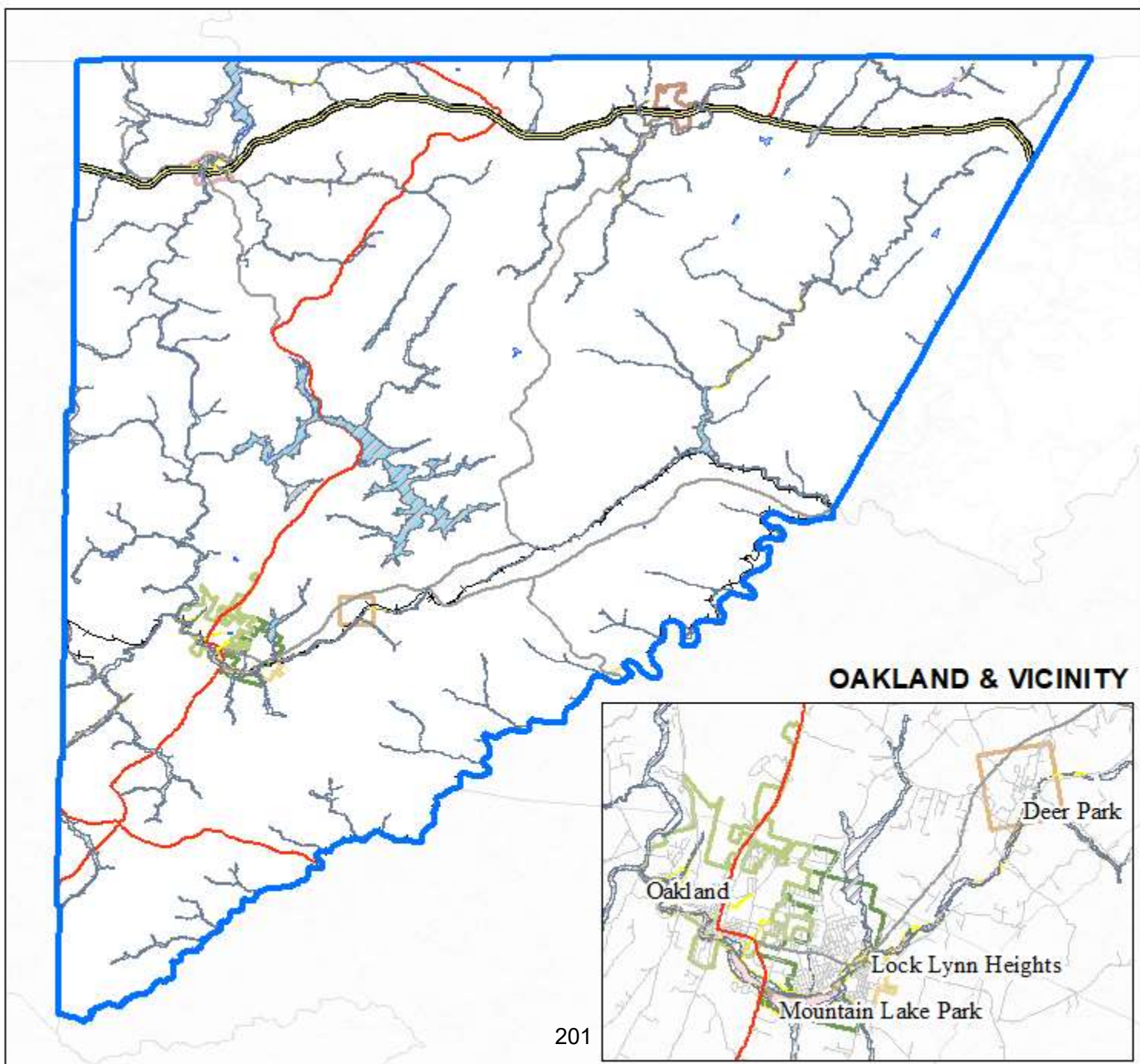
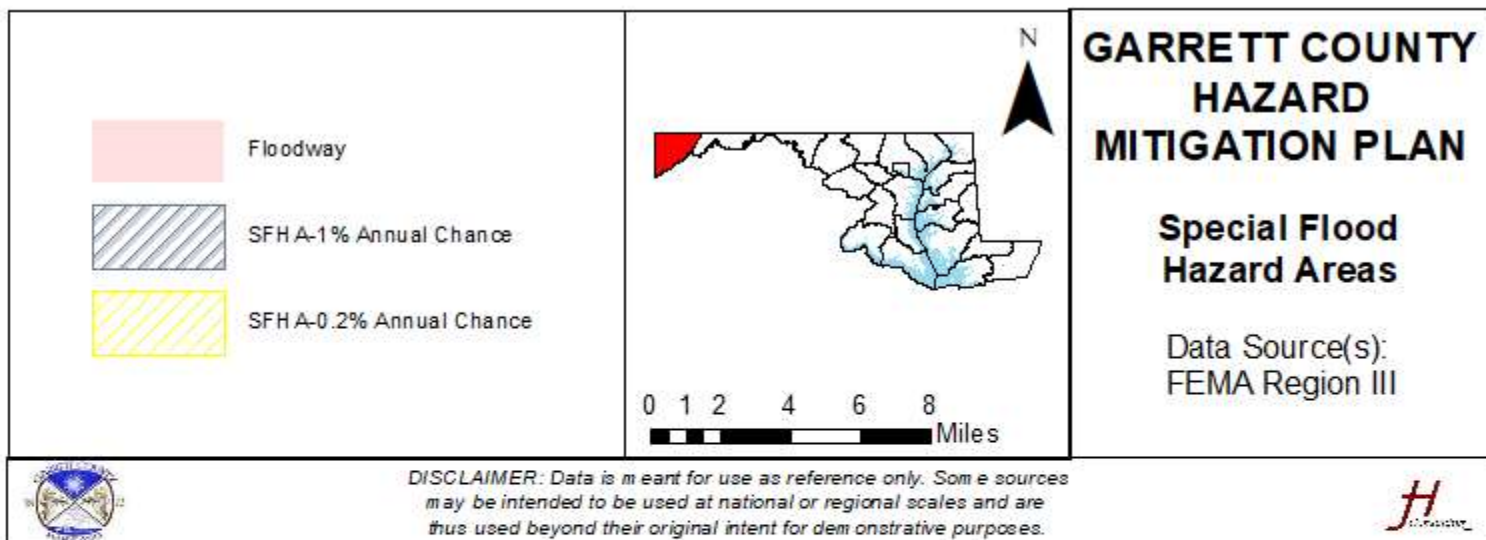
Source: Department of Public Works – Road Division

Historically, floods were referred to as a function of time (i.e., a "100-year" flood). A more accurate description would be that a "100-year" flood has a 1% chance of occurring in a year, a 50-year flood has a 2% chance of occurrence in a year, and a 500-year flood has a 0.2% chance of happening in any year. Any development within floodplains can impact the direction, flow, and level of a watercourse during periods of high water. If fill material or building construction is in a floodplain, it can alter the boundaries of that floodplain downstream. Not only does development in the floodplain increase dangers downstream, but developments within the floodplain are also at higher risk of damage due to flooding. This damage includes fill material and debris from destroyed structures upstream colliding with structures in the floodplain

downstream of an affected area. Many bridges are washed out in floods because river-borne debris obstructs their free-flow area.

Flood zones are the geographic areas that FEMA has defined according to their varying levels of flood risk. The following map shows the floodway, Zones A and AE (i.e., the 1% annual chance), and 0.2% annual chance Special Flood Hazard Areas (SFHAs) at a county level. These flood zone categories refer to the following (FEMA, 2020).

- **Floodway:** The “regulatory floodway” refers to the channel of a river or stream and the adjacent areas that should be reserved in order to discharge a base flood without cumulatively increasing the water surface elevation more than a designated height.
- **1% Annual Chance:** These areas are those that would be inundated by a flood event having a one percent chance of being equaled or exceeded in any given year. This 1% annual chance area is typically referred to as “the base flood.” They appear as Zone A and Zone AE on flood insurance rate maps (FIRM) for Garrett County.
- **0.2% Annual Chance:** These areas are “moderate flood hazard areas” that often appear as Zone B or Zone X on FIRM maps. These areas are between the limits of the base flood and the 0.2 percent annual chance flood.
- Municipal flood risk maps are presented in Appendix 5.



The *Maryland Critical Facilities Database* has recently been expanded to include FEMA flood zones. Each critical facility has been assessed to determine if the facility is located within a flood zone, and, if so, the flood zone was identified within the database. Moderate flood hazard areas and minimal flood hazard areas are also shown on the FIRM and were identified in relation to critical facilities within the database. The table below lists the number of critical facilities within Garrett County that are located in a FEMA flood zone.

CRITICAL FACILITIES WITHIN FEMA FLOOD ZONES – GARRETT COUNTY						
Critical Facility Totals	SFHA-High Risk			Moderate Risk	Minimum Risk	Historical Total Built prior to 1965
	A	AE	VE	0.2%		
19	0	0	0	1	18	8

When structures experience more than one flooding event, they can become “repetitive loss” or “severe repetitive loss” properties. The Flood Mitigation Assistance (FMA) grant and the NFIP define repetitive loss and severe repetitive loss slightly differently. The table below outlines both definitions.

REPETITIVE LOSS AND SEVERE REPETITIVE LOSS DEFINITIONS		
Program	Repetitive Loss	Severe Repetitive Loss
Flood Mitigation Assistance (FMA) Grant	A repetitive loss (RL) property is a structure covered by a contract for flood insurance made available under the NFIP that: Has incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25% of the market value of the time of each such flood event; At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.	(a) Is covered under a contract for flood insurance made available under the NFIP; and (b) Has incurred flood-related damage i. For which <u>4 or more separate claims payments</u> (includes building and contents) have been made under flood insurance coverage with the amount of each such claim exceeding \$5,000, and with the cumulative amount of such claim's payments exceeding \$20,000, or ii. For which <u>at least 2 separate claims payments</u> (includes only building) have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.
National Flood Insurance Program (NFIP)	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.	A single-family property (consisting of one to four residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which four 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 two separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

There are 17 repetitive loss properties in Garrett County, 16 are in the unincorporated areas of the county and one is in the Town of Friendsville. The occupancy type of single family accounts for 70% of the repetitive loss properties. The table below shows the repetitive loss by unincorporated area and municipality.

GARRETT COUNTY REPETITIVE LOSS RECORD					
<i>Jurisdiction</i>	<i>Community Number</i>	<i>Sum of Total Losses</i>	<i>Sum of Cumulative Building Payments</i>	<i>Sum of Cumulative Contents Payments</i>	<i>Sum of Total Paid</i>
Garrett County*	240034	43	\$421,744.63	\$205,593.62	\$627,338.25
Other-Nonresidential	240034	9	\$101,918.14	\$112,319.92	\$214,238.06
2-4 Family	240034	5	\$52,351.31	\$25,146.56	\$77,497.87
Single Family	240034	29	\$267,475.18	\$68,127.14	\$335,602.32
Friendsville	240035	3	\$8,068.50	\$2,485.00	\$10,553.50
Single Family	240035	3	\$8,068.50	\$2,485.00	\$10,553.50
Grand Total		46	\$429,813.13	\$208,078.62	\$637,891.75

Impacts and Vulnerability

Impacts from flooding can be primary or secondary. Primary effects are those that occur due to contact with water. Secondary effects occur because of flooding, such as disruption of services and changes in the position of river channels. Flooding is one of the costliest disasters in the United States. Just one inch of water in a home can cause up to \$25,000 in damages. There are a variety of other hazards associated with flooding. Those hazards can be primary, secondary, or tertiary. The following table presents the effects of flood hazards.

EFFECTS OF FLOODING	
Type	Description
Primary Impacts	<ul style="list-style-type: none"> With higher velocities, streams are able to transport larger particles as suspended load. Such large particles include not only rocks and sediment, but, during a flood, could include such large objects as automobiles, houses, and bridges. Massive amounts of erosion can be accomplished by floodwaters. Such erosion can undermine bridge structures, levees, and buildings causing their collapse. Water entering human-built structures cause water damage. Even with minor flooding of homes, furniture is ruined, floors and walls are damaged, and anything that comes in contact with the water is likely to be damaged or lost. Flooding of automobiles usually results in damage that cannot easily be repaired. The high velocity of floodwaters allows the water to carry more sediment as suspended load. When the floodwaters retreat, velocity is generally much lower and sediment is deposited. After retreat of the floodwaters, everything is usually covered with a thick layer of stream deposited mud, including the interior of buildings. Flooding of farmland usually results in crop loss. Livestock, pets, and other animals are often carried away and drown. Humans that get caught in the high-velocity floodwaters are often drowned by the water. Floodwaters can concentrate garbage, debris, and toxic pollutants that can cause the secondary effects of health hazards.
Secondary Impacts	<p>Disruption of services -</p> <ul style="list-style-type: none"> Drinking water supplies may become polluted, especially if sewerage treatment plants are flooded. This may result in disease and other health effects, especially in underdeveloped countries. Gas and electrical service may be disrupted. Transportation systems may be disrupted, resulting in shortages of food and clean-up supplies. In underdeveloped countries, food shortages often lead to starvation.
Long-Term (Tertiary) Impacts	<ul style="list-style-type: none"> Location of river channels may change as the result of flooding, new channels develop, leaving the old channels dry. Sediment deposited by flooding may destroy farmland (although silt deposited by floodwaters could also help to increase agricultural productivity). Jobs may be lost due to the disruption of services, destruction of business, etc. (although jobs may be gained in the construction industry to help rebuild or repair flood damage). Insurance rates may increase. Corruption may result from misuse of relief funds. Destruction of wildlife habitat.

In addition to property and structure damage, flood waters pose a risk to human health. Floodwaters can contain downed power lines, human and livestock waste, household, medical, and industrial waste and debris, wild or stray animals, and other contaminants that can cause illnesses (CDC, 2022b).

Flash floods are often the most dangerous floods. Flash flood waters are fast-moving and can destroy buildings and bridges and scour new channels. Occasionally, debris floating in flash floodwaters accumulates at natural or human-made obstructions and restricts the flow of water. This obstruction causes upstream flooding and subsequent downstream flooding if the obstacle suddenly releases.

Flooding impacts include injuries and potential fatalities, damage to property, lost revenue and other economic damages, and increased demand for public safety and infrastructure-related services. Response activities include unplanned overtime for Emergency Operations Center (EOC) activations, evacuations and sheltering of displaced individuals, rerouting traffic destined for impassible roads, bridge and road repairs, and rescue or medical missions related to motorists and isolated individuals. Private property damages to homes and vehicles, as well as land erosion, river channel changes, agricultural damages, and livestock losses resulting in significant rural economic impacts to residents.

Social Vulnerability Considerations

Flooding can impact numerous social vulnerability categories, in both direct and subtle ways. Direct impacts include the following. Flood insurance can be costly, and those living in poverty may not be able to afford coverage. As a result, they forego coverage and feel disproportionate impacts if their home floods. Renters may not be aware that they can purchase flood insurance, and as such, they may face similar impacts when floods occur. The following map shows the Census tracts with the highest concentrations of persons living in poverty overlaid by flood hazard data.



Persons Below Poverty Estimate
(>20%)



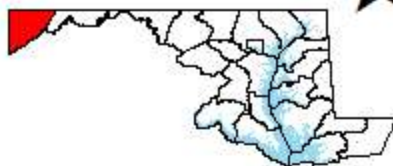
Floodway



SFHA-1% Annual Chance



SFHA-0.2% Annual Chance



0 1 2 4 6 8
Miles

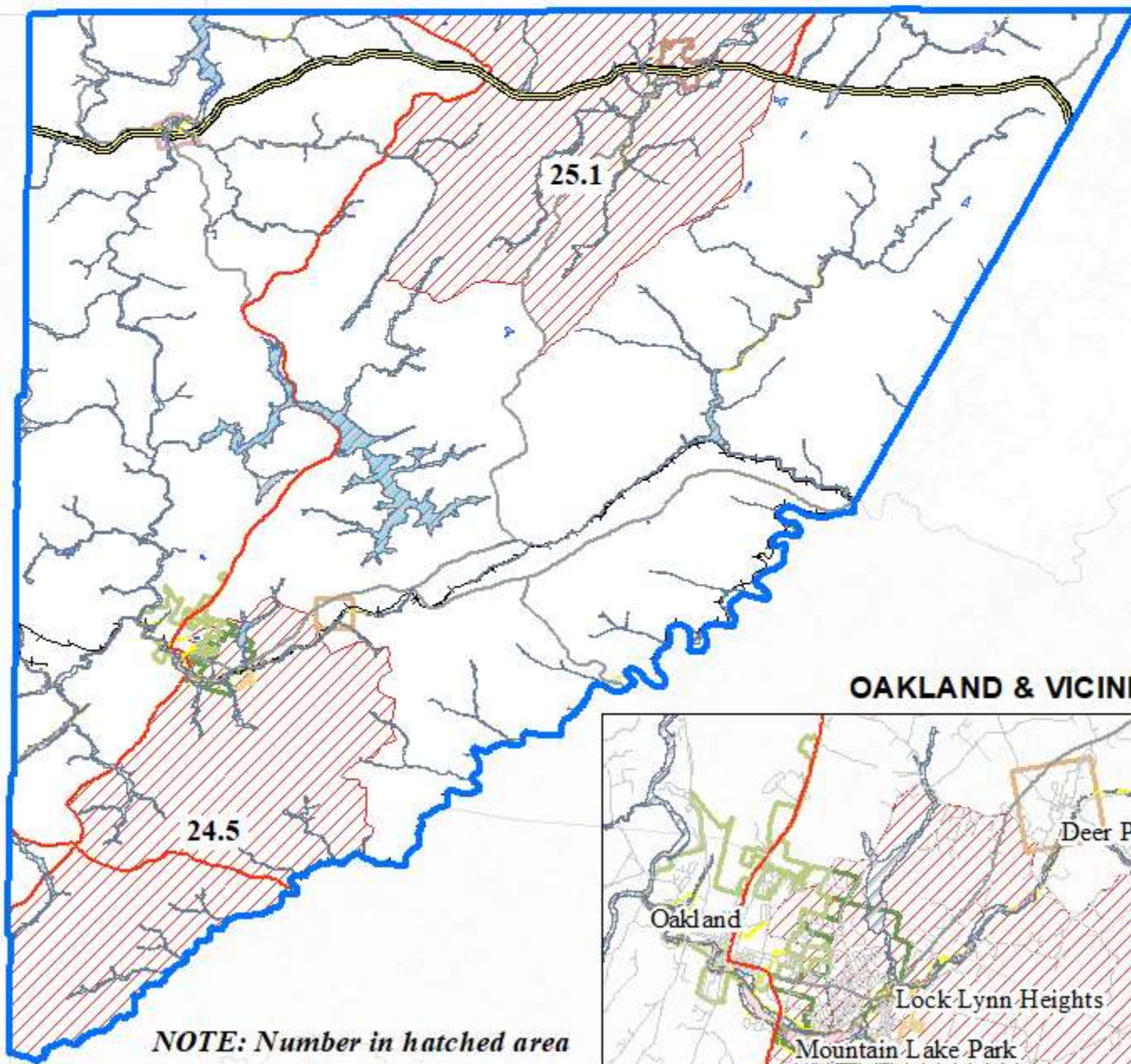
GARRETT COUNTY HAZARD MITIGATION PLAN

Flooding: SVI Considerations

Data Source(s):
CDC ATSDR,
FEMA Region III



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



**NOTE: Number in hatched area
represents the actual percentage**

Other direct impacts are related to response capabilities. Populations with a low English proficiency may not understand public awareness messages and forecasts, and when/if an evacuation is warranted, they may not understand the directive (thus delaying or prohibiting their evacuation). Similarly, households with no vehicle can experience difficulty evacuating. The following maps show the relationship between special flood hazard areas and the Census tracts with high concentrations of (a) persons speaking English “less than well,” and (b) households with no vehicle.



Speak English "Less than Well" Est.
(0.5%)



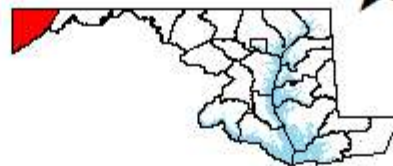
Floodway



SFHA-1% Annual Chance



SFHA-0.2% Annual Chance



0 1 2 4 6 8
Miles

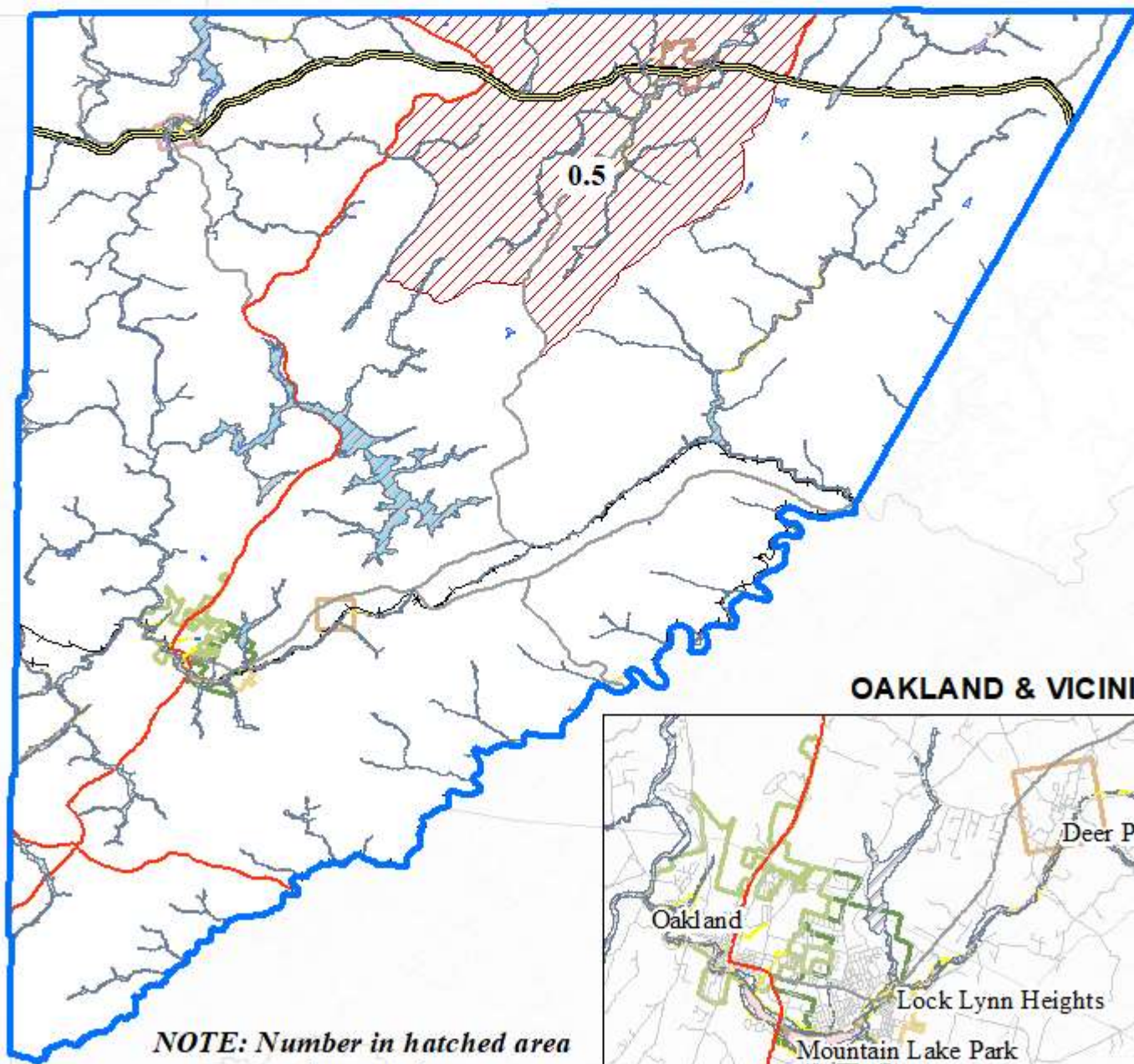
GARRETT COUNTY HAZARD MITIGATION PLAN

Flooding: SVI Considerations

Data Source(s):
CDC ATSDR,
FEMA Region III



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**NOTE: Number in hatched area
represents the actual percentage**



Households w/ No Vehicle (>7%)



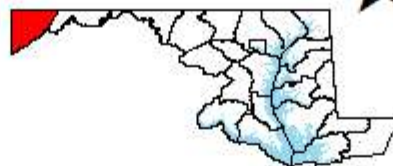
Floodway



SFHA-1% Annual Chance



SFHA-0.2% Annual Chance



0 1 2 4 6 8 Miles



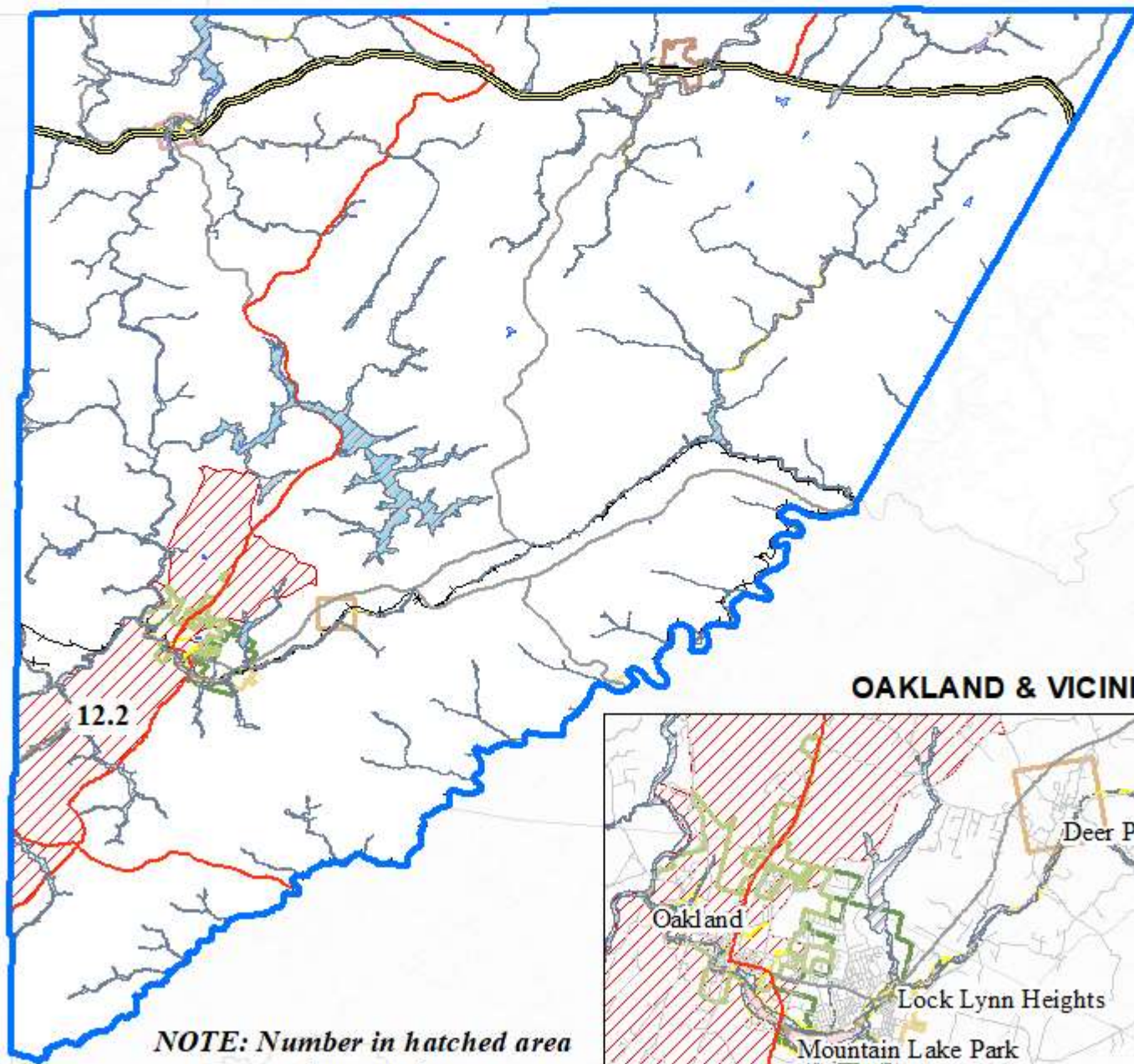
GARRETT COUNTY HAZARD MITIGATION PLAN

Flooding: SVI Considerations

Data Source(s):
CDC ATSDR,
FEMA Region III



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**NOTE: Number in hatched area
represents the actual percentage**

Other effects can be more subtle. Frequent flooding (or the potential for frequent flooding) can depress property values in hazard areas, which can (over time) steer lower income residents into those areas as a matter of what they can afford. These individuals not only have difficulty affording flood insurance premiums (as noted above), but also homeowner's insurance more generally. The lack of insurance hampers their ability to recover when floods occur.

In the aftermath of disasters such as Hurricane Katrina in New Orleans and Hurricane Harvey in Houston, Texas, more affluent (often white) impactees chose to purchase or rebuild in less hazard-prone areas, further concentrating lower-income, often racially-segregated populations in hazard-prone areas (Craemer, 2010; Olin, 2021). Though participants in the 2024 update were not aware of any instances like these occurring, the map graphics in Section 1.2 above identify the Census tracts with higher concentrations of racial minorities. The following map shows those tracts and their relationship to special flood hazard areas.



Minority Persons (>5%)



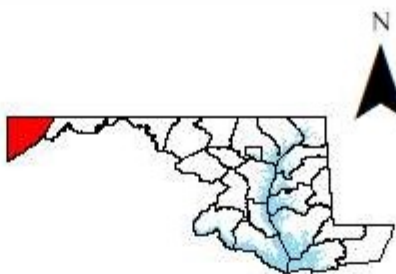
Floodway



SFHA-1% Annual Chance



SFHA-0.2% Annual Chance



0 1 2 4 6 8
Miles

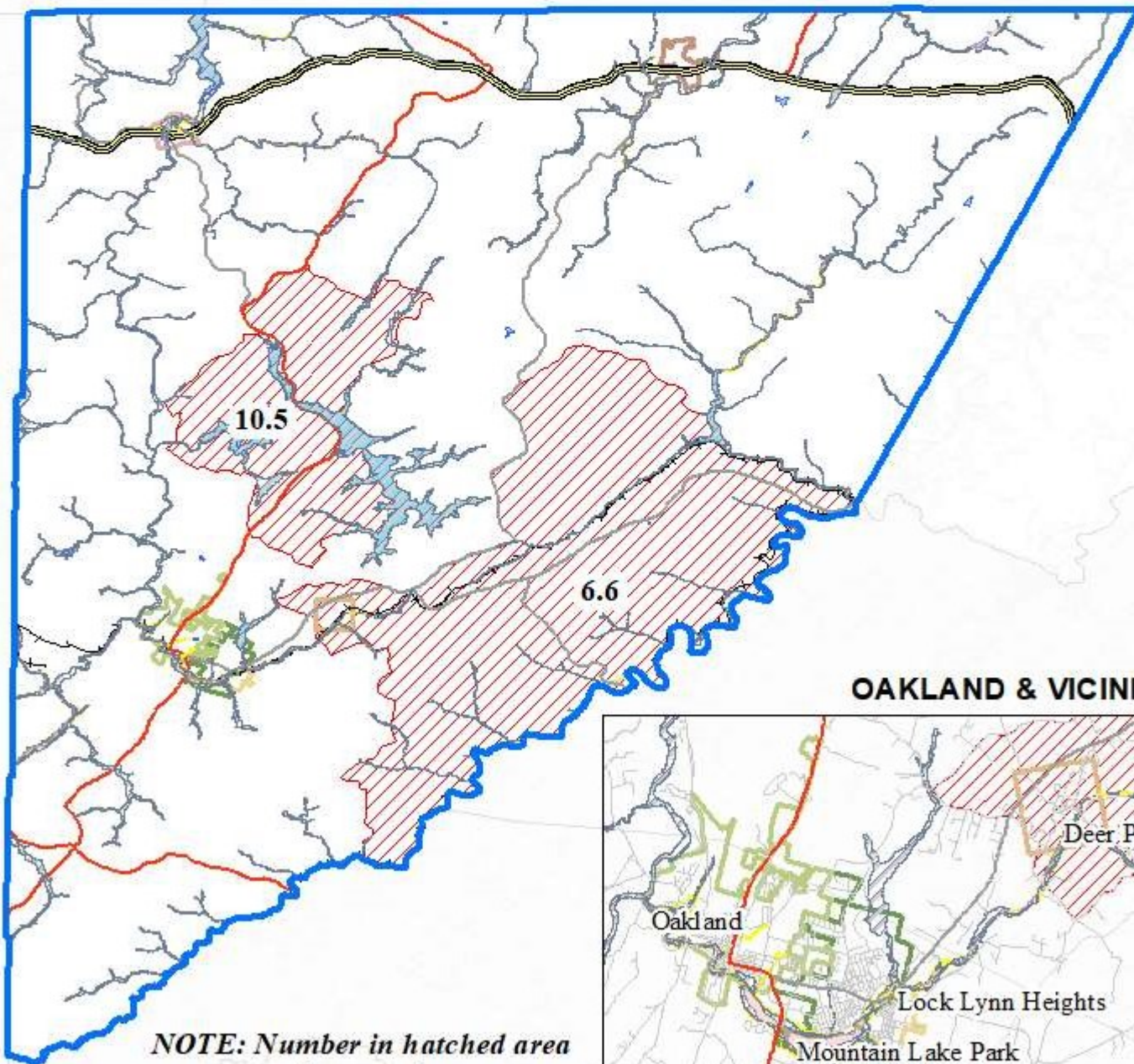
GARRETT COUNTY HAZARD MITIGATION PLAN

Flooding: SVI Considerations

Data Source(s):
CDC ATSDR,
FEMA Region III

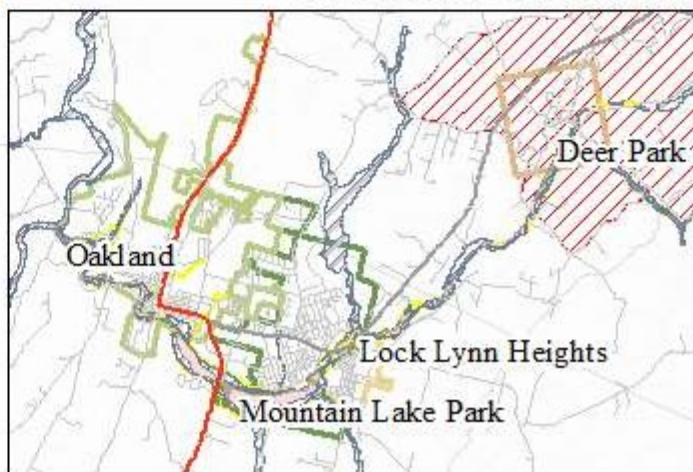


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**NOTE: Number in hatched area
represents the actual percentage**

OAKLAND & VICINITY



Previous Occurrences

Garrett County has a long history of flooding and has been affected by several high-water events with several events surpassing the 100-year base flood recurrence interval in selected watersheds (i.e., Potomac and Youghiogheny, and along the Casselman and Savage Rivers). Further, Garrett County has received four declarations involving flood or flash flooding disasters in the past 27 years.

Historically, the greatest flood events to occur in the State of Maryland remain the 1936 floods on the Potomac River and the 1972 flood resulting from Hurricane Agnes. Flooding events appear in the NOAA National Centers for Environmental Information's Storm Event Database, which provides access to records since 2003. The following table presents the 17 flood events reported in Garrett County, along with reported deaths, injuries, and property and crop damages (NOAA NCEI, 2023c).

HISTORICAL FLOODING OCCURRENCES – GARRETT COUNTY						
<i>Location</i>	<i>Date</i>	<i>Event Type</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
Countywide	9/19/2003	Flood	0	0	\$0	\$0
Countywide	2/6/2004	Flood	0	0	\$0	\$0
Countywide	3/6/2004	Flood	0	0	\$0	\$0
Countywide	9/8/2004	Flood	0	0	\$0	\$0
Countywide	9/17/2004	Flood	0	0	\$0	\$0
McHenry	12/13/2007	Flood	0	0	\$10,000	\$0
Grantsville	5/31/2008	Flood	0	0	\$25,000	\$0
Sand Spring	8/2/2008	Flood	0	0	\$25,000	\$0
Blooming Rose	5/4/2009	Flood	0	0	\$25,000	\$0
Friendsville	6/17/2009	Flood	0	0	\$25,000	\$0
Friendsville	4/19/2011	Flood	0	0	\$25,000	\$0
Deer Park Mtn. Lake Park	2/29/2012	Flood	0	0	\$50,000 \$10,000	\$0 \$0
Elden Mtn. Lake Park Sang Run	8/28/2013	Flood	0	0	\$0 \$0 \$0	\$0 \$0 \$0
Bittering Weber	9/9/2018	Flood	0	0	\$1,000 \$5,000	\$0 \$0
Accident Friendsville Hoyes Run Sang Run	9/27/2018	Flood	0	0	\$0 \$1,000 \$0 \$500	\$0 \$0 \$0 \$0
Countywide	3/1/2021	Flood	0	0	\$5,000	\$0
Sang Run Thayerville	9/1/2021	Flood	0	0	\$0 \$0	\$0 \$0
Totals		17	0	0	\$202,500	\$0



The NCEI database also lists flash flooding (2023c). Since 1996, there have been 43 flash flood events, for an average of 1.59 events per year. These flash floods have resulted in approximately \$3.3 million in property damage and \$1,000 in crop damages. The following table describes these events.

HISTORICAL FLASH FLOODING OCCURRENCES – GARRETT COUNTY						
<i>Location</i>	<i>Date</i>	<i>Event Type</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
Oakland	1/19/1996	Flash Flood	0	0	\$3,000,000	\$0
Oakland	1/24/1996	Flash Flood	0	0	\$0	\$0
Oakland	2/2/1996	Flash Flood	0	0	\$0	\$0
Oakland	5/29/1996	Flash Flood	0	0	\$0	\$0
Oakland	6/8/1996	Flash Flood	0	0	\$6,000	\$0
Bloomington	6/11/1996	Flash Flood	0	0	\$0	\$0
Hoyes	6/14/1996	Flash Flood	0	0	\$1,000	\$0
Oakland	7/19/1996	Flash Flood	0	0	\$0	\$0
Oakland	7/30/1996	Flash Flood	0	0	\$0	\$0
Mtn. Lake Park	8/8/1996	Flash Flood	0	0	\$0	\$0
Oakland	9/6/1996	Flash Flood	0	0	\$0	\$0
Countywide	4/19/1998	Flash Flood	0	0	\$0	\$0
Finzel	5/4/1998	Flash Flood	0	0	\$0	\$0
Countywide	2/18/2000	Flash Flood	0	0	\$20,000	\$0
Countywide	7/30/2000	Flash Flood	0	0	\$25,000	\$0
Countywide	8/6/2000	Flash Flood	0	0	\$55,000	\$0
Oakland	7/26/2001	Flash Flood	0	0	\$0,000	\$0
Gorman	7/29/2001	Flash Flood	0	0	\$50,000	\$0
New Germany	8/3/2001	Flash Flood	0	0	\$0	\$0
Countywide	4/28/2002	Flash Flood	0	0	\$5,000	\$0
Oakland	5/2/2002	Flash Flood	0	0	\$0	\$0
Countywide	5/10/2003	Flash Flood	0	0	\$0	\$0
McHenry	7/6/2003	Flash Flood	0	0	\$0	\$0
Oakland	7/9/2003	Flash Flood	0	0	\$0	\$0
Oakland	7/28/2003	Flash Flood	0	0	\$0	\$0
Crellin	8/9/2003	Flash Flood	0	0	\$10,000	\$0
Redhouse	8/12/2003	Flash Flood	0	0	\$0	\$0
Friendsville	8/27/2003	Flash Flood	0	0	\$0	\$0
Gorman	9/1/2003	Flash Flood	0	0	\$0	\$0
Oakland	9/19/2003	Flash Flood	0	0	\$0	\$0
Grantsville	11/12/2003	Flash Flood	0	0	\$0	\$0
Grantsville	11/19/2003	Flash Flood	0	0	\$0	\$0
Grantsville	8/30/2004	Flash Flood	0	0	\$5,000	\$0
Redhouse	7/13/2005	Flash Flood	0	0	\$20,000	\$0

HISTORICAL FLASH FLOODING OCCURRENCES – GARRETT COUNTY						
Location	Date	Event Type	Deaths	Injuries	Property Damage	Crop Damage
McHenry	4/22/2006	Flash Flood	0	0	\$10,000	\$0
Grantsville	6/26/2006	Flash Flood	0	0	\$0	\$0
Bond	5/27/2012	Flash Flood	0	0	\$50,000	\$0
High Point	7/2/2018	Flash Flood	0	0	\$1,000	\$500
Avilton	7/5/2018	Flash Flood	0	0	\$500	\$500
Friendsville	6/29/2019	Flash Flood	0	0	\$0	\$0
Redhouse Weber	6/30/2019	Flash Flood	0	0	\$0 \$0	\$0 \$0
Friendsville	7/4/2019	Flash Flood	0	0	\$0	\$0
Friendsville Grantsville	7/11/2019	Flash Flood	0	0	\$5,000 \$0	\$0 \$0
Totals		43	0	0	\$3,263,500	\$1,000

Countywide Flood – February 29, 2012

Beginning during the evening hours of Wednesday, February 29, 2012, showers and thunderstorms with heavy rain developed in a warm sector along the Mason-Dixon Line. These showers continued to train over parts of Garrett County in Maryland. Two to three inches of rain were reported within only a few hours, in addition to the rain from earlier in the day with the passage of the warm front. Roads were made impassable by fast moving floodwaters and mudslides. Photos submitted by the public via media web page showed water flowing over Sand Flat Road. The Emergency Manager reported numerous roads and streets being flooded. This flood event resulted in approximately \$60,000 in property damage in the Mountain Lake Park and Deer Park areas.

Countywide Flash Flood – January 19, 1996 (DR-1094-MD)

Moderate rains and a melting snow cover (15-25 inches in the Maryland mountains) on saturated soil released an estimated 3.50 to 4.50 inches of runoff into area streams. The runoff also caused major flooding on the Casselman River in Garrett County. The Casselman River flows into the Youghiogheny River, and subsequently caused near record flooding downstream on the Youghiogheny River. Damages in Garrett County totaled around \$3 million. Seventy-five to 100 homes were damaged, as well as, bridges, roads, and water treatment plants.



1996 Flood: The Fruit Bowl

Loss and Damages

The 60 flooding events in Garrett County caused a reported \$3,467,000 in property and crop damages, for an average of \$57,783 per flood event.

FEMA estimates losses from flooding through the HAZUS-MH program (FEMA, 2022b). The program calculates the expected losses to buildings during a 1% annual chance flood event. The following tables outline damages during the event to buildings by occupancy, buildings by construction type, and building economic losses.

EXPECTED BUILDING DAMAGE BY OCCUPANCY – GARRETT COUNTY												
Occupancy	1-10		11-20		21-30		31-40		41-50		>50	
	Ct.	%	Ct.	%	Ct.	%	Ct.	%	Ct.	%	Ct.	%
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	11	69	4	25	1	6	0	0	0	0
Education	1	100	0	0	0	0	0	0	0	0	0	0
Government	0	0	1	100	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	1	100	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	3	3	23	24	16	17	15	16	15	16	24	25
Total	4		35		20		16		16		24	

EXPECTED BUILDING DAMAGE BY BUILDING TYPE – GARRETT COUNTY												
Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Ct.	%	Ct.	%	Ct.	%	Ct.	%	Ct.	%	Ct.	%
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
Manufactured Housing	0	0	0	0	0	0	0	0	0	0	5	100
Masonry	1	4	10	40	4	16	4	16	3	12	3	12
Steel	0	0	7	78	1	11	0	0	1	11	0	0
Wood	2	3	18	25	14	19	11	15	12	16	16	22

BUILDING-RELATED ECONOMIC LOSS ESTIMATES (MILLIONS OF DOLLARS) – GARRETT COUNTY						
Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss	Building	33.71	17.32	3.74	1.92	56.69
	Content	17.51	47.69	8.80	10.58	84.57
	Inventory	0.00	5.91	1.23	0.00	7.14
	Subtotal	51.22	70.92	13.77	12.50	148.40
Business Interruption	Income	0.47	30.02	0.14	2.30	32.94
	Relocation	8.78	9.67	0.29	2.00	20.75
	Rental Income	3.83	7.18	0.04	0.28	11.33
	Wage	1.12	38.39	0.25	83.87	123.62
	Subtotal	14.19	85.26	0.73	88.46	188.64
Totals		65.41	156.18	14.50	100.96	337.04

Future Occurrences

Based on the frequency of previous occurrences, the future probability of flooding in Garrett County is highly likely. According to the *Fifth National Climate Assessment*, climate change may impact flooding. Continued increases in the frequency and intensity of localized heavy precipitation in many regions of the United States, including the Northeast (which includes Maryland), may contribute to increased flooding (USGCRP, 2018). The increase in frequency and intensity of precipitation could also place additional stress on existing large impoundments within the county which could result in a dam failure causing large-scale flooding.

Regarding changes in land use and development, new urban development upslope of inadequate existing stormwater facilities in older urban areas also exacerbates stormwater runoff issues as these communities expand. In Garrett County, the local governments utilize a designated "growth area" concept. Through this effort, many areas of the county remain naturalized. Though not explicitly for hazard mitigation, this approach provides areas for increased water runoff to absorb back into the ground. Impacts could be substantial in developed areas, but the county's development supports a general regulation of the runoff. In the developed areas, local officials should consider upgrades to stormwater management systems, the integration of urban-area green infrastructure solutions etc.

Floods can occur at any time, but are most likely to occur between March and September. While this trend is expected to continue, intense severe storms at various times in the year may result in floods at uncommon times. The Intergovernmental Panel on Climate Change (IPCC) notes that the most likely impacts from climate change on Maryland will be an increase in extreme precipitation (IPCC, n.d.). Interestingly, a secondary impact of that precipitation is a quick-rising flood.

Garrett County has undertaken several projects to mitigation the impacts of flooding. The county has purchased a number of homes in the floodplain areas of both the Potomac River and the Youghiogheny River in the communities of Shallmar, Crellin, and Oakland. In addition, the county has worked with the Natural Resources Conservation Service to construct six flood control dams in the upper Youghiogheny basin near Oakland and Mountain Lake Park. Several homes in Crellin been elevated and a flood wall has been constructed around the Friendsville water treatment plant. Stream dredging was conducted on a segment of the Potomac River in Kitzmiller, and stream level sensors have been installed at Crellin, Kitzmiller and Bloomington. These sensors are part of the county's hazard warning system that was installed as part of a dam safety initiative.

Future Climate Considerations

Many climate researchers anticipate periods of heavy rain becoming more common as the future climate changes. The *Fifth National Climate Assessment* suggests that rainfall in the most severe of rain events increased across the United States between 1958 and 2016 (USBCRP, 2018). Hersher (2022) reports that floods have become larger in rivers and streams throughout the Northeast and Midwest, while frequencies have decreased in other parts of the country. FEMA further reports that, generally, floodplain inundation is expected to increase by approximately 45% by the end of the 21st century (AECOM, n.d.).

Researchers have also documented that a warmer atmosphere holds more water, and as such, it can release that water (USBCRP, 2018). Climate assessments often point out potential changes in seasonal patterns, which can influence the number rain-on-snow events (USBCRP, 2018) that occur.

Fluctuations in precipitation, to include more precipitation and increased instances of locally-contained heavy downpours may contribute to the runoff flooding noted above.

Risk Assessment

This section summarizes the vulnerability of the county to flooding. The steering committee conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding flooding.

PUBLIC SENTIMENT, FLOODING – GARRETT COUNTY					
Hazard	Level of Concern				Total Responses
	Not at All	Somewhat	Concerned	Very	
FLOODING	28 (40.00%)	22 (31.43%)	13 (18.57%)	7 (10.00%)	70
Which hazard event have you experienced property damage from?				7 (14.29%)	49
Please indicate which hazard event you feel may affect your community?				14 (21.21%)	66
If you own your home or commercial property, do you have flood insurance?				Yes	64
				No	
				12	47

For site-specific hazards like flooding, planners can identify specific facilities sitting within risk areas. The following table lists the assets (taken from the asset inventory listed in Section 1.2 above) located in flood risk areas.

ASSETS LOCATED IN SPECIAL FLOOD HAZARD AREAS							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
FLOODWAY ASSETS							
X				Water Infrastructure	Friendsville Water Treatment Plant	849 First Avenue	Friendsville
X				Waste Water Infrastructure	Waste Water Treatment Plant	849 First Avenue	Friendsville
100 YEAR FLOOD ASSETS							
X				Water Infrastructure	Oak Park Sub-Station	West Liberty Street	Oakland
X				Water Infrastructure	Water Pump Station	Water Street	Friendsville
X				Water Infrastructure	Water Pump Station	West Liberty Street	Oakland
500 YEAR FLOOD ASSETS							
X				Water Infrastructure	Crellin Water Treatment Plant	Crellin Street	Oakland
	X			Emergency Response	Friendsville Vol. Fire Dept. #110	122 Walnut Street	Friendsville
X				Water Infrastructure	Kitzmiller Water Treatment Plant	200 East Main Street	Kitzmiller
X				Waste Water Infrastructure	Kitzmiller WWTP	202 East Main Street	Kitzmiller

The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above.


FLOODING RISK RANKING			
Category	Points	Description	Notes
Frequency	5	Excessive (will occur during a year)	Per NCEI records, Garrett County experiences approximately 0.85 floods and 1.59 flash floods per year.
Response	3	One week	Not all floods require a major response, but larger flood require, at minimum, a multi-day response.
Onset	3	6-12 hours	Though storm systems are forecasted, the accuracy of estimates necessary to determine actionable flood data is much closer to the onset of the event.
Magnitude	1	Localized (less than 10% of land area affected)	Flooding typically occurs in SFHAs near creeks and streams. Flash flood, though not bound geographically like riverine flooding, typically occurs quickly in localized areas. Though destructive, neither event impacts more than 10% of the county's land area on a per incident basis.
Business	2	One week	Some floods have resulted in the closure of businesses; however, community-wide business closure would be rare. Planners selected one week as a mid-point between the experiences of non-impacted and impacted businesses.
Human	3	Medium (multiple severe injuries)	Per NCEI records, no deaths or injury have resulted from flash flooding or flooding. However, flooding is destructive in nature and can cause significant injuries and loss of life.
Property	2	10-25% of property affected	Flood/flash flood events may not impact 10-25% of the building stock on a per incident basis, but property damage is typically substantial due to infrastructure impacts.
Totals	19	MEDIUM	

FEMA's *Local Mitigation Planning Handbook* (2023c) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks or vulnerabilities are more or less prevalent as compared to the other participating jurisdictions. The following table quickly synthesizes the data to capture the jurisdiction-specific aspects of risks and vulnerabilities for each town with regards to flooding.

MULTI-JURISDICTIONAL CONSIDERATIONS, FLOODING		
Jurisdiction	Comparison	Notes
Garrett County	More	Despite flood hazard areas being located throughout the county, many of the historical occurrences have impacted unincorporated areas. All but one of the repetitive loss properties are located in the unincorporated areas of the county. The county also has the highest number of NFIP policies in force with 55. Riskfactor.com (n.d.) lists the county's flood risk as "Major," with 12% of the properties in the county have greater than a 26% chance of being severely affected by flooding over the next 30 years.
Accident	Same	The Town of Accident is located in the Bear Creek Watershed. Riskfactor.com (n.d.) lists the town's flood risk as "Moderate," with 16 properties (12% of its properties) having a 26% chance of being severely impacted by floods in the next 30 years. The majority of these properties are listed as residential.
Deer Park	Same	Flooding in the Youghiogheny River watershed has resulted in limited damages. Riskfactor.com (n.d.) ranks the town's flood risk as "Major," with 11% of all properties having greater than a 26% chance of being severely impacted by flooding in the next 30 years. The majority of these properties are listed as residential.
Friendsville	More	The Youghiogheny River flows through a portion of the town. Friendsville has the largest number of NFIP policies in force (10) among all municipalities in the county. Friendsville contains one repetitive loss property. Riskfactor.com (n.d.) classifies the town's flooding risk as "Extreme," citing 65% of all properties as having a greater than 26% chance of being severely impacted by floods in the next 30 years. Approximately 15 of the 18 commercial properties in the town is considered to be at extreme risk. Friendsville was the most listed municipality with regards to flooding events in the NCEI database. Three flooding events have impacted the town since 2009.
Grantsville	Less	The Town of Grantsville is situated on higher ground and has no mapped floodplains. The list of historical occurrences in the town is low. Riskfactor.com (n.d.) notes that 17% of all properties in the town have greater than a 26% risk of being severely impacted by flooding over the next 30 years, which results in a "Major" risk categorization by the site.
Kitzmiller	More	The Town of Kitzmiller is located along the Potomac River and has suffered from flooding several times. Riskfactor.com (n.d.) estimates 62% of all town properties as having a greater than 26% chance of being severely affected by flooding in the next 30 years (which yields an "Extreme" ranking). Six of nine commercial properties are listed as being at an extreme risk of flooding.
Loch Lynn Heights	Less	The town has experienced limited damage in the past due to flooding in the Youghiogheny River watershed. The list of historical occurrences in the town is low, and there are no repetitive loss properties in the town. Riskfactor.com (n.d.) lists the town's risk as "Minor," citing 1% of its properties as having a greater than 26% chance of being severely affected by flooding in the next 30 years.

MULTI-JURISDICTIONAL CONSIDERATIONS, FLOODING		
<i>Jurisdiction</i>	<i>Comparison</i>	<i>Notes</i>
Mountain Lake Park	Same	The town has experienced limited damage in the past due to flooding in the Youghiogheny River watershed. Riskfactor.com (n.d.) notes that 8% of all properties in the town have greater than a 26% risk of being severely impact by flooding over the next 30 years, for a “Moderate” rating. The site indicates that five out of 30 miles of roadways are at moderate risk of flooding.
Oakland	More	The town has experienced damage due to flooding within the Youghiogheny River watershed. Riskfactor.com (n.d.) classifies the town’s flood risk as “Major,” noting that 18% of its properties have greater than a 26% chance of being severely impacted by flooding in the next 30 years. The site indicates that 61 commercial properties are located in a severe risk area. Oakland is susceptible to flash flooding due to rapid runoff. The town was the most listed municipality with regards to flash flooding in the NCEI database with a total of 13 flashfloods since 1996.

2.2.6 Hazardous Materials Release

Hazardous material releases can contaminate air, water, and soils and have the potential to cause injury or death. Dispersion can take place rapidly when transported by water and wind. While often accidental, releases can occur as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary events.				
	RISK	Period of Occurrence:	At any time	Garrett County Risk Ranking: Medium
	HIGH	Warning Time:	No warning	State Risk Ranking: Not Ranked
	LOW	Probability:	Medium (may or may not occur in a year)	Impact: Localized (less than 10% land area affected)
	LOWEST	Type of Hazard:	Technological	Disaster Declarations: None

Hazard Overview

According to the National Fire Protection Association (NFPA), a hazardous material is matter or energy that, when released, is capable of creating harm to people, the environment, or property, including weapons of mass destruction, as well as any other criminal use of hazardous materials, such as illicit labs, environmental crimes, or industrial sabotage. Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. They are in nearly every home and most hospitals and factories.

Incidents involving chemical releases are common and on the rise. Before World War II, these events primarily affected employees of specific occupations, but the expansion of the chemical industry and increased industrialization has led to danger to people outside work environments. The manufacture, storage, transportation, and utilization of large amounts of varying types of chemicals and growing population densities in areas near chemical manufacturing have contributed to an increase in the exposed population.







Hazardous material incidents can occur because of an industrial accident during production, while in storage, in transportation, during use or disposal, or as part of an intentional attack. They can also occur due to (or in tandem with) natural hazard events, such as earthquakes, floods, windstorms, or winter storms (Planning for Hazards, n.d.). The large-scale release of hazardous materials in combination with natural hazard events can increase the spread of contamination to large geographic areas and amplify the potential for long-term impacts on human and ecological health.

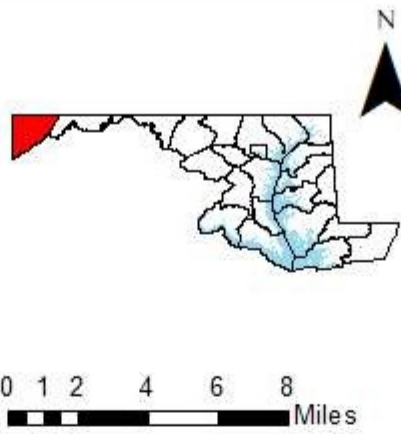
Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, in 1980 to provide broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA established prohibitions and requirements concerning closed and abandoned hazardous waste sites, provided for the liability of persons responsible for releasing hazardous wastes at these sites, and established a trust to provide for cleanup when no responsible party could be identified.

The U.S. Environmental Protection Agency's (USEPA) Toxic Release Inventory (TRI) program tracks the management of certain toxic chemicals that pose a threat to human health and the environment. U.S. facilities report the amounts of chemicals released into the environment or managed through recycling, energy recovery, and treatment. Since its inception in 1986, the TRI program has provided citizens access to information about potentially hazardous chemicals in their communities.

Location and Extent

Hazardous material releases can be localized events, such as minor releases at a fixed site, or regional events, such as radiological incidents. Several factors determine a community's risk of hazardous material releases, including the size of the community, the location and number of sites containing hazardous materials, and the community's proximity to mobile hazardous material risk areas, such as roads and railways (see the Transportation-Based Hazmat Risk Areas Map below).

-  Highway Buffer, 1000'
-  Railway Buffer, 1000'
-  Interstates
-  U.S. Routes
-  State Routes
-  Railroads



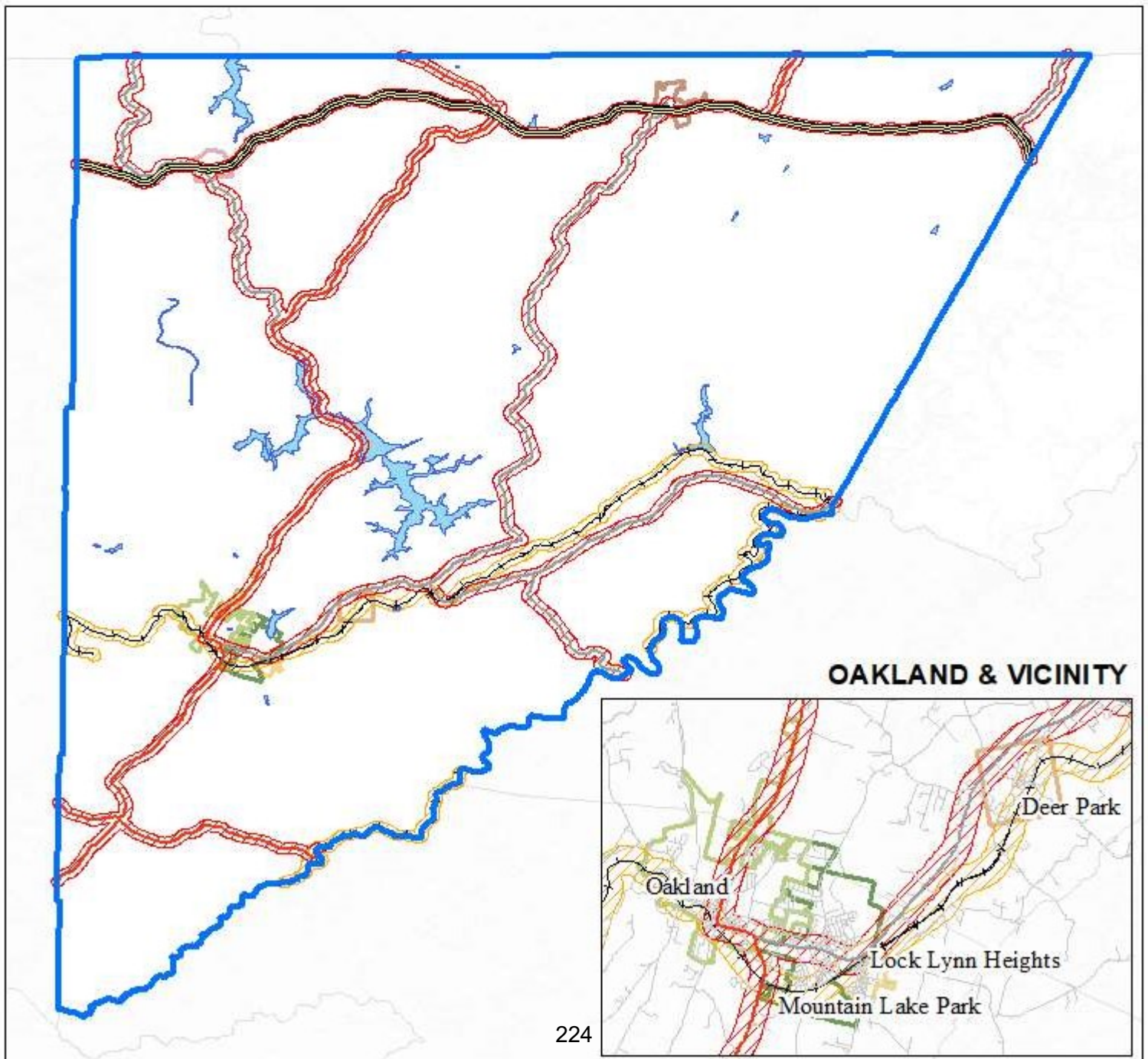
GARRETT COUNTY HAZARD MITIGATION PLAN

Transportation-based Hazmat Risk Areas

Data Source(s):
US Census (Tiger Data)



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



Regulators classify hazardous materials in several ways. The U.S. Department of Transportation (USDOT) organizes substances into nine classes, as shown in the table below. Other agencies further categorize hazardous materials, but the nine USDOT classifications are consistent across all reporting agencies.

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION SYSTEM	
<i>Hazard Classification</i>	<i>Category</i>
Class 1	Explosives
Class 2	Gases
Class 3	Flammable (and combustible) liquids
Class 4	Flammable solids
Class 5	Oxidizing substances and organic peroxides
Class 6	Toxic substances
Class 7	Radioactive materials
Class 8	Corrosive substances
Class 9	Miscellaneous dangerous goods, hazardous materials, and articles

Historically, most hazardous materials moving through Garrett County has been on the CSX rail system and its predecessors, the Baltimore and Ohio Railroad, and the Western Maryland Railroad. Today; however, the bulk of hazardous materials pass through the county by truck, particularly on Interstate 68, which crosses the northern portion of the county from west to east. A large portion of hazmat traffic is diverted from the Pennsylvania Turnpike, which limits hazmat traffic through its tunnels. Westbound hazmat trucks typically appear to be coming from the Baltimore/Washington area by way of Interstate 70 and 270 with a few from Interstate 81. Most of the local hazmat traffic is comprised of gasoline, propane, and ammonia deliveries to businesses in Oakland and the surrounding areas.

The municipalities most susceptible to transportation related hazardous materials incidents include Friendsville and Grantsville, which are located adjacent to Interstate 68. The Towns of Oakland, Mountain Lake Park, Loch Lynn Heights, and Deer Park are the most susceptible municipalities with regards to a railway hazardous materials incidents as these towns are located near the CSX rail line that crosses the southern part of the county.

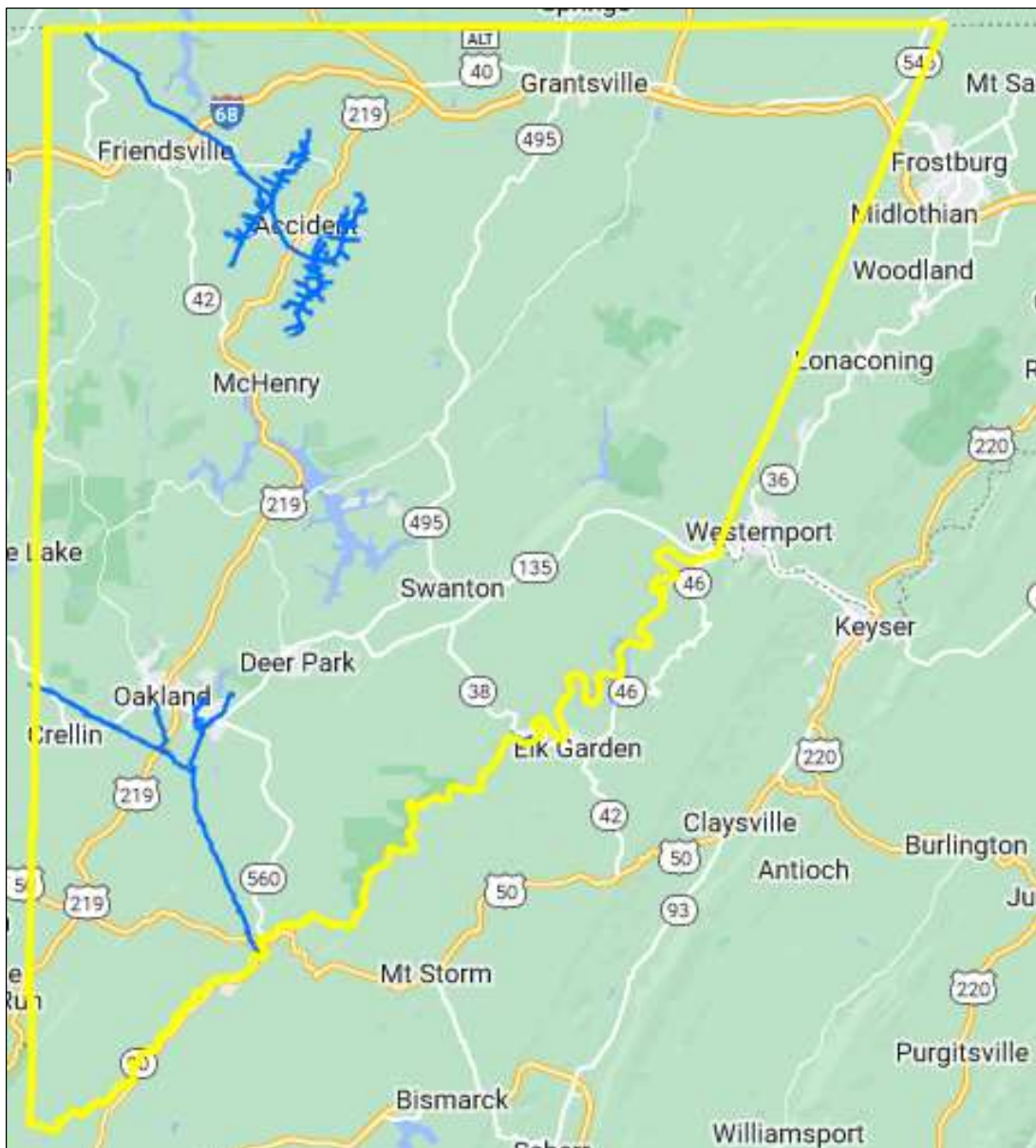
A site of concern regarding hazardous materials releases is the Verso Corp. Paper Mill located in the nearby Town of Luke, Maryland just across the county line in Allegany County. A release at this site could affect the community of Bloomington in Garrett County due to its proximity to the mill and the fact that it is located in a narrow deep valley.

The potential for a hazardous materials release also exists along the Texas Eastern Pipeline which transports natural gas in twin 36 inch pipes. Texas Eastern also maintains a

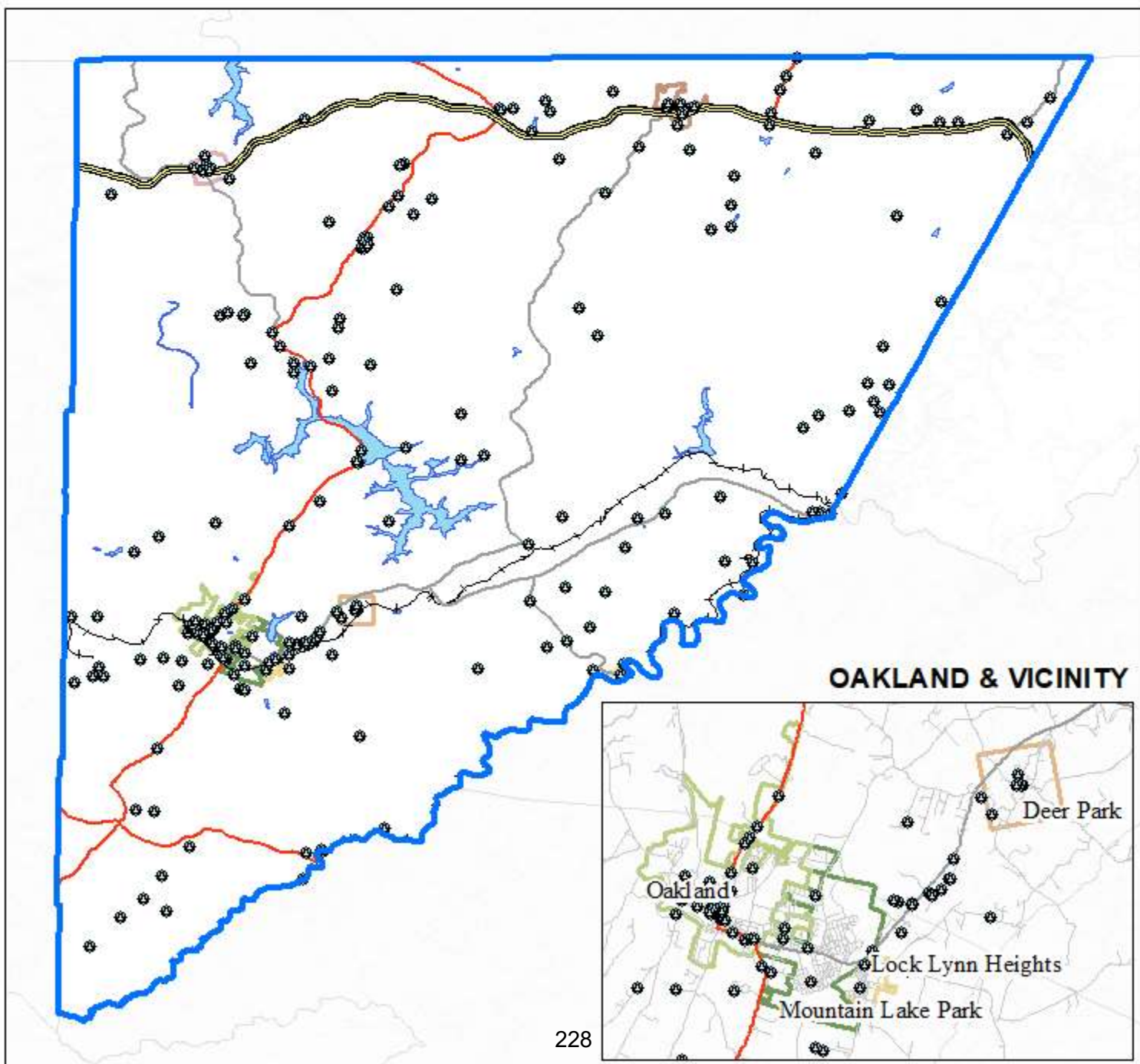
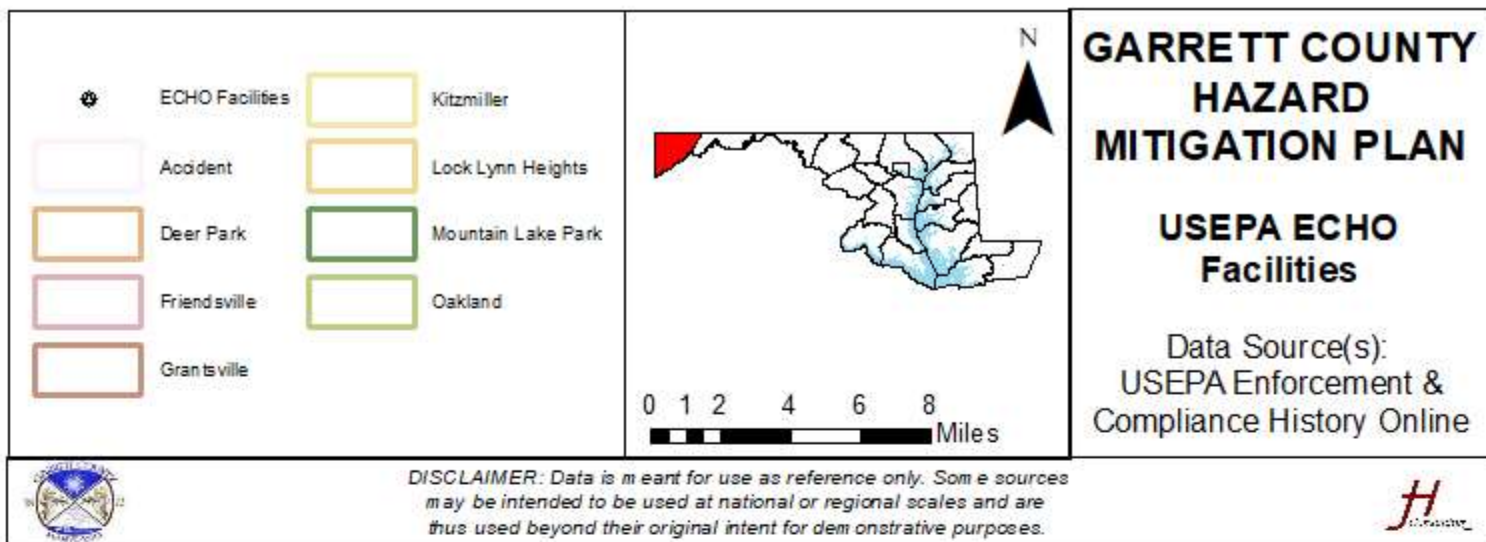


compressor station near the Town of Accident, there is a natural gas storage facilities located near the Town of Friendsville.

According to the USDOT's National Pipeline Mapping System (NPMS), there are two natural gas transmission pipelines that traverse Garrett County. The image below was taken from the NPMS Public Viewer (PHMSA, 2023). The blue lines represent transmission lines. Significantly, the NPMS does not identify distribution and feeder gas lines. As can be seen there is a Texas Eastern gas transmission pipeline in the northwest corner of the county passing near the Towns of Friendsville and Accident, and a Columbia Gas transmission pipeline in the southwest corner passing near the Towns of Loch Lynn Heights, Mountain Lake Park and Oakland.



The USEPA also monitors and regulates sites that use or produce hazardous materials. The USEPA's Enforcement and Compliance History Online (ECHO) database lists regulated sites. The list is far more extensive than the list of facilities that annually report the counties' Local Emergency Planning Committee (LEPC). The ECHO database identified facilities with permitted discharges, those against whom the USEPA has taken enforcement actions, etc. (ECHO, 2023). There are 335 facilities in Garrett County that are (or have been) regulated by the USEPA, as shown in the map below.



Impacts and Vulnerability

The effects of a hazardous material release on the environment can be devastating. On land or in bodies of water, animals, and plants in affected areas can die or experience reproductive complications (USEPA, 2022c). Certain hazardous materials have the potential to explode or cause a fire, threatening all organisms close to the incident.

Hazardous materials vary significantly in the health risks they pose to humans. According to the USEPA, hazardous substances may irritate the skin or eyes, make breathing difficult, cause headaches or nausea, or cause other illnesses (USEPA, 2022c). Additional health risks include thermal harm, radiological harm, asphyxiation, chemical harm, biological harm, or mechanical harm.

- **Thermal Harm:** Thermal harm results from exposure to temperature extremes. Thermal injuries can be external (from contact or proximity to a fire or heat source) or internal (from inhaling fumes or heated air). Thermal injuries can also include frostbite from contact with low-temperature hazardous materials.
- **Radiological Harm:** Radiological harm results from exposure to radioactive materials. Different types of radiation have different energy levels, and not all are dangerous. The radiation that threatens humans is ionizing radiation, which can damage living cells and DNA. Examples of sources of ionizing radiation are medical isotopes used for diagnostic and therapeutic purposes, X-rays, and some survey equipment.
- **Asphyxiation:** Asphyxiation results from exposure to materials that reduce oxygen levels that may cause suffocation. Asphyxiation can occur in confined spaces or with highly concentrated chemical asphyxiants, such as carbon dioxide and methane. Asphyxiants are generally odorless and tasteless and displace so much oxygen from the atmosphere that the lungs cannot deliver enough oxygen to tissues, and the victim slowly suffocates.
- **Chemical Harm:** Chemical harm results from chemical exposure, including poisons and corrosives. Injuries and illnesses vary by material.
- **Biological Harm:** Biological harm results from exposure to biological materials, including bacteria, viruses, and toxins. Symptoms of biological harm are often delayed because the pathogens require time to multiply sufficiently and cause illness in the person carrying the pathogen.
- **Mechanical Harm:** Mechanical harm results from exposure to, or contact with, fragmentation or debris scattered because of a pressure release, explosion, or boiling liquid expanding vapor explosion (BLEVE) event. Predictable reactions occur during and

immediately following an explosion, which routinely injures or kills anyone nearby. The degree of harm closely relates to the size of the blast and proximity to the device. Sources of injury include fragmentation and flying debris, blast overpressure, and secondary blast injuries.

Children, pregnant women, the elderly, hospital patients, and those with low socioeconomic status should be considered to have a greater inherent risk of suffering adverse health effects from a hazmat incident. These groups may have lower exposure thresholds, reduced mobility hindering evacuation, and/or the inability to protect themselves (WHO, 2009).

First responders are especially vulnerable to hazardous material releases. Police, fire, and EMS personnel, often will not know that there is a chemical present, spilled, leaked, or released, at the scene of a motor vehicle accident, structure fire, or medical call until the first units arrive on scene.

Social Vulnerability Considerations

Social vulnerability concerns with respect to hazardous materials are nuanced. As noted in other profiles, persons with a lower proficiency in English may not understand regular public outreach from facilities, warnings, or evacuation/shelter-in-place instructions. Households without a vehicle may experience difficulty evacuating.

Understanding other issues, though, requires a longer historical consideration. Numerous studies have shown linkages between higher occupancy of zip codes and communities near landfills, hazardous waste sites, and high numbers of chemical and manufacturing facilities by low-income and minority populations (Abel, 2008; Allen, 2001; Benjamin & Lee, 1987; Chakraborty & Armstrong, 1997; Daniels & Friedman, 1999; Goldman & Fitton, 1994; Kershaw, Gower, Rinner, & Campbell, 2013; Pastor, Morello-Frosch, & Sadd, 2005). Some of these authors posit that a de-gentrification occurs, whereby families of means leave those areas over time. Garrett County is home to large commercial facilities and some light manufacturing along the I-68 corridor, and generally along the fringes of the Oakland area.

Previous Occurrences

A number of truck related hazardous materials releases have occurred on Interstate 68 in the northern portion of the county, particularly in Allegany County just to the east of and downgrade from Garrett County. The Pipeline and Hazardous Materials Safety Administration (PHMSA) maintains data on the frequency of hazardous materials incidents during rail, air, and highway transport. PHMSA reports three incidents in Garrett County between 2013 and 2023 (PHMSA, 2023). These incidents appear in the table below.

HAZARDOUS MATERIAL INCIDENTS – GARRETT COUNTY 2013-2023					
Carrier Reporter Name	Community	Date	Commodity Name	Total Damages	Mode Of Transportation
Estes Express Lines, Inc.	Friendsville	4/17/2013	Corrosive Liquid, Acidic	\$21,800	Highway
UPS Freight	Grantsville	9/17/2013	Paint / Lacquer / Stain	\$2,500	Highway
Trimac Trans	Grantsville	11/5/2015	Corrosive Liquid, Acidic	\$4,500	Highway
Total				\$28,800	

In addition to the incidents reported through the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration's, Office of Hazardous Materials Safety, several other hazmat incidents have occurred in Garrett County, they are described below:

- February 11, 2015 – Due to valves being left open during a fuel delivery there was discharge of approximately 60-80 gallons of kerosene to the ground from two 275-gallon tanks. This incident occurred on 708 Teets Road.
- January 5, 2016 – An overturned crane at Interstate 68 and Route 495 in Grantsville spilled approximately 50-gallons of fuel.
- January 7, 2016 – A tractor trailer hauling steel drums containing Molly Oxide (dry powder similar to concrete) lost approximately 73 drums, each weighing approximately 500 pounds, 200 yards in between the 11 and 12 mile markers on the east bound side of Interstate 68.

Loss and Damages

By law, the parties responsible for the use, transportation, storage, and disposal of hazardous substances are liable for costs of containment, cleanup, and damages resulting from a release to their activities (USEPA, 2022d). When a responsible party cannot be identified or refuses to cooperate with the response effort, the EPA and participants in the National Response System ensure the emergency is dealt with in an appropriate and timely manner. According to PHMSA incident data, the three transportation-based incidents that occurred in



Garrett County over the past 30 years caused \$28,800 in damages, for an average of \$9,600 per incident.

Data is also available nationally regarding loading/unloading incidents at fixed facilities. According to a report prepared for the Federal Motor Carrier Safety Administration, the average non-explosion loading/unloading incident results in losses of \$5,000 (Battelle, 2001). Though it is difficult to extrapolate that figure to an annualized loss estimate, it provides a site-specific point of reference for future planning.

Future Occurrences¹

Hazardous material incidents are difficult to predict. While it is safe to assume that incidents will occur in Garrett County, it is impossible to predict when or where they may happen. The property damage, loss of life, or environmental damage of future occurrences depends on the location, the material, and the quantity released.

As noted above, a large number of transportation-based hazardous material incidents occur on roadways, which makes the primary thoroughfares (i.e., I-68) and surrounding areas the most likely to experience a future hazardous material incident. Nationally, Class 3 flammable liquids comprise, by far, the most hazmat shipments (USDOT BTS, 2017, p. 75) and are involved in most incidents (USDOT PHMSA, 2023).

With the added capability of a hazardous materials response team and a strong mutual aid relationship with Allegany County, Garrett County is more prepared to deal with hazmat incidents than in previous years. In addition, the county can call on assistance from a team in Somerset County, Pennsylvania, as well as state hazmat response capabilities through the Maryland Department of the Environment, the Department of Transportation, and the Department of Health and Mental Hygiene.

¹ Future climate considerations are not included because hazardous materials incidents represent a technological hazard.

Risk Assessment

This section summarizes the vulnerability of the county to hazardous materials incidents. The steering committee conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding hazardous materials incidents.

PUBLIC SENTIMENT, HAZARDOUS MATERIALS RELEASE – GARRETT COUNTY					
Hazard	Level of Concern				Total Responses
	Not at All	Somewhat	Concerned	Very	
HAZMAT RELEASE	19 (27.14%)	21 (30.00%)	21 (30.00%)	9 (12.86%)	70
Please indicate which hazard event you feel may affect your community?				15 (22.73%)	66

The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above.

HAZARDOUS MATERIALS RELEASE RISK RANKING			
Category	Points	Description	Notes
Frequency	3	Medium (may or may not occur in a year)	There have been three recorded transportation related hazmat releases in Garrett County over the past 10 years, for an average of 0.3 incidents per year.
Response	3	One week	Most hazardous material incidents are contained, and cleaned-up with a day; however, site restoration and remediation can take a few days to complete.
Onset	5	No warning	There is usually no warning before a hazardous material incident.
Magnitude	1	Localized (less than 10% of land area affected)	Hazardous material incidents are usually localized and only effect the immediate surrounding area.
Business	1	Less than 24 hours	Most hazardous material incidents that occur will have a short-duration minimal affect the economy of Garrett County.
Human	3	Medium (multiple severe injuries)	Hazardous material incidents have the ability to result in multiple severe injuries.
Property	1	Less than 10% of property affected	Hazardous material incidents are localized events.
Totals	17	MEDIUM	

For site-specific hazards like hazardous materials, planners can identify specific facilities sitting within risk areas. The following table lists the assets (taken from the asset inventory listed in Section 1.2 above) that are located in hazardous material risk areas (i.e., those assets located within a 1,000 foot buffer from the centerline of major highways and railways)². There are 109 county assets located in highway hazardous materials prone areas and 21 assets located in railway hazardous materials prone areas.

ASSETS LOCATED IN TRANSPORTATION-BASED HAZMAT HAZARD AREAS							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
HIGHWAY HAZMAT ASSETS							
			X	Public Facility	Accident Library	106 S. North Street	Accident
	X			Public Facility	Accident Post Office	103 S. South Street	Accident
	X			Transportation	Accident Road Garage	80 Accident Garage Road.	Accident
	X			Government Facility	Accident Town Hall	104 S. North Street	Accident
			X	Public Park	Accident Town Park East	150 South Street	Accident
			X	Public Park	Accident Town Park West	113 Wood Street	Accident
	X			Emergency Response	Accident VFD #50	109 S. South Street	Accident
X				Water Infrastructure	Accident WWTP	101 Wastewater Ln.	Accident
	X			Emergency Response	Bittinger VFD #90	176 Brenneman Rd.	Accident
	X			Education	Bittinger Mennonite School	10707 Bittinger Road	Accident
	X			Public Facility	Bittinger Post Office	11357 Bittinger Road	Accident
			X	Police/Corrections	Boys Forestry Camp	234 Recovery Road	Accident
	X			Education	Northern Garrett High School	86 Pride Parkway	Accident
			X	Public Park	Pleasant Valley 4-H Park	243 4H Camp Road	Swanton
X				Waste Water Infrastructure	Sewage Pump Station	Industrial Park Drive	Accident
X				Communications	Spectra Comm. Tower	400 Stockyard Road	Accident
X				Communications	USCOC Tower	400 Stockyard Road	Accident
			X	Police/Corrections	Boys Forestry Camp	124 Camp Four Road	Deer Park
	X			Emergency Response	Deer Park VFD #20	5353 Maryland Hwy	Deer Park
	X			Economic	South Garrett Industrial Park	65 Enterprise Drive	Oakland

² These assets are located in estimated risk areas from *transportation-based* hazardous material incidents.



ASSETS LOCATED IN TRANSPORTATION-BASED HAZMAT HAZARD AREAS							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
			X	Public Facility	Swanton Community Center	3335 Swanton Road	Deer Park
	X			Waste Collection	Swanton Dump Site	12091 Maryland Hwy	Deer Park
	X			Public Facility	Swanton Post Office	3320 Swanton Road	Deer Park
	X			Economic	Agriculture Trade Ctr.	24086 Garrett Hwy	McHenry
X				Communications	Comm. Tower	83 Brant Road	McHenry
	X			Emergency Response	Deep Creek VFD #30	1906 Deep Creek Dr.	McHenry
X				Waste Water Infrastructure	Deep Creek WWTP	90 Towne Ctr. Way	McHenry
			X	Fairgrounds	Garrett County Fairgrounds	24086 Garrett Hwy	McHenry
X				Water Infrastructure	Garrett Sub-Station	25326 Garrett Hwy	McHenry
X				Water Infrastructure	Hoyes Sub-Station	605 Hoyes Road	McHenry
	X			Public Facility	McHenry Post Office	1914 Deep Creek Dr.	McHenry
	X			Water Storage	McHenry Water Tank	N/A	McHenry
	X			Emergency Response	Northern Garrett Rescue Squad #2	26017 Garrett Hwy	McHenry
X				Energy	Sithe Energy HP Plant	Sang Run Road	McHenry
	X			Safety & Security	State Police / MDNR Police	67 Friendsville Road	McHenry
X				Water Infrastructure	Thayerville Sub-Station	19889 Garrett Hwy	Thayerville
	X			Health & Medical	Urgent Care	24441 Garrett Hwy	McHenry
X				Communications	American Towers Inc.	20971 National Pike	McHenry
			X	Recreation	Eastern Garrett Recreation Area	State Route 546	Frostburg
	X			Emergency Response	Eastern Garrett VFD #80	401 Finzel Road	Frostburg
X				Communications	WFRB Radio Tower	242 Finzel Road	Frostburg
X				Communications	Communication Tower	3200 Bloomingrose Road	Friendsville
			X	Public Facility	Friendsville Library	315 Chestnut Street	Friendsville
	X			Government Facility	Friendsville Town Hall	313 Chestnut Street	Friendsville
	X			Health & Medical	Garrett Medical Center-Friendsville	250 Maple Street	Friendsville
	X			Emergency Response	Northern Garrett Rescue Squad #3	320 Chestnut Street	Friendsville
X				Water Infrastructure	Friendsville Pump Station	Water Street	Friendsville
X				Communications	Communication Tower	I-68 West Keyzers	Grantsville

ASSETS LOCATED IN TRANSPORTATION-BASED HAZMAT HAZARD AREAS							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
						Ridge	
	X			Transportation	County Roads Garage	13266 National Pike	Grantsville
			X	Public Park	Grantsville Community Park	153 Miller Street	Grantsville
	X			Waste Collection	Grantsville Dump Site	13168 National Pike	Grantsville
	X			Education	Grantsville Elementary School	130 Grant Street	Grantsville
			X	Public Facility	Grantsville Library	153 Main Street	Grantsville
	X			Public Facility	Grantsville Post Office	159 Main Street	Grantsville
	X			Government Facility	Grantsville Town Hall	171 Hill Street	Grantsville
X				Water Infrastructure	Jennings Sub-Station	167 Baker Road	Grantsville
X				Waste Water Infrastructure	Jennings WWTP	Route 495	Grantsville
	X			Economic	Northern Garrett Industrial Park	193-1 Corporate Drive	Grantsville
	X			Health & Medical	Northern Outreach Center	12601 National Pike	Grantsville
	X			Transportation	SHA-Keyesers Ridge	3876 National Pike	Grantsville
			X	Historical	Company Store / Visitors Center	236 West Main Street	Kitzmiller
X				Water Infrastructure	Gorman Sub-Station	Route 50 / Gorman Road	Kitzmiller
	X			Emergency Response	Gorman VFD #120	270 Gorman Road	Kitzmiller
	X			Public Facility	Kitzmiller Community Building	104 Centre Street	Kitzmiller
			X	Public Facility	Kitzmiller Public Library	288 West Main Street	Kitzmiller
	X			Public Facility	Kitzmiller Post Office	103 Centre Street	Kitzmiller
	X			Emergency Response	Kitzmiller VFD #70	249 East Main Street	Kitzmiller
X				Water Infrastructure	Mittiki Sub-Station	Table Rock Road	Kitzmiller
	X			Transportation	Moran Air Strip	2091 Westernport Rd.	Kitzmiller
X				Communications	Tri-State Cell Tower	Route 50 / Table Rock	Kitzmiller
X				Communications	US Cellular Tower	Westernport Road	Kitzmiller
	X			Water Storage	Water Tank	319 North American Road	Kitzmiller
	X			Waste Collection	Westernport Landfill	Westernport Road	Kitzmiller
	X			Public Facility	White Church Community Building	3420 White Church Sreyer Road	Kitzmiller
X				Water Infrastructure	Broadford Sub-Station	Route 135	Mountain Lake Park

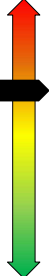
ASSETS LOCATED IN TRANSPORTATION-BASED HAZMAT HAZARD AREAS							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
			X	Historical	C&W Plaza	2008 Maryland Hwy	Mountain Lake Park
	X			Public Facility	Mt. Lake Park Post Office	1325 Maryland Hwy	Mountain Lake Park
	X			Government Facility	Mt. Lake Park Town Hall	1007 Alleghany Drive	Mountain Lake Park
	X			Emergency Response	Southern Garrett Rescue Squad #9	200 Baltimore Avenue	Mountain Lake Park
X				Communications	Communication Tower	17070 Garrett Hwy	Oakland
	X			Health & Medical	Community Action Agency	104 East Center Street	Oakland
			X	Public Park	Crellin Community Park	Crellin Underwood Rd.	Oakland
	X			Nursing Home	Cuppett / Weeks Nursing Home	706 East Alder Street	Oakland
	X			Safety & Security	Maryland DNR	1728 Kings Run Road	Oakland
	X			Government Facility	Dept. of Public Utilities	14689 Garrett Hwy	Oakland
	X			Government Facility	Dept. of Social Services	12594 Garrett Hwy	Oakland
	X			Education	Ferndale Christian School	15211 Garrett Hwy	Oakland
	X			Government Facility	Garrett County Courthouse	203 South Fourth St.	Oakland
	X			Emergency Response	Garrett County EOC	32 Outfitter Way	McHenry
	X			Transportation	Garrett County Roads Dept.	12778 Garrett Hwy	Oakland
	X			Safety & Security	Garrett County Sheriff's Dept.	311 East Alder	Oakland
	X			Health & Medical	Garrett Regional Medical Center	251 North Fourth St.	Oakland
	X			Waste Collection	Kings Run Dump Site	1631 Kings Run Road	Oakland
	X			Economic	Maryland Employment Office	216 South Third Street	Oakland
	X			Government Facility	Motor Vehicle Administration	400 Weber Road	Oakland
	X			Education	Mt. Top Seventh Dam Advent School	16335 Garrett Hwy	Oakland
	X			Government Facility	NRCS & SCD	1916 Maryland Hwy	Oakland
	X			Waste Collection	Oakland Dump Site	10810 Garrett Hwy	Oakland
	X			Safety & Security	Oakland Police Dept.	15 South Third Street	Oakland
	X			Public Facility	Oakland Post Office	22 South Second St.	Oakland
	X			Water Infrastructure	Oakland Sub-Station	Route 135	Oakland

ASSETS LOCATED IN TRANSPORTATION-BASED HAZMAT HAZARD AREAS							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
	X			Government Facility	Oakland Town Hall	15 South Third Street	Oakland
	X			Emergency Response	Oakland VFD #40	23 South Third Street	Oakland
X				Water Infrastructure	Oakland WTP	15 South Third Street	Oakland
	X			Education	Pleasant View Baptist Church Homeschool	8931 Garrett Hwy	Oakland
			X	Historical	Ruth Enlow Library	315 Chestnut Street	Oakland
	X			Transportation	SHA-Oakland	95 SHA Drive	Oakland
	X			Education	Swan Meadow Elementary School	6709 Garrett Hwy	Oakland
	X			Education	Yough Glades Elementary School	70 Wolf Acres Drive	Oakland
RAILWAY HAZMAT ASSETS							
	X			Police/Corrections	Boys Forestry Camp	124 Camp Four Road	Deer Park
	X			Government Facility	Deer Park Town Hall	100 Church Street	Deer Park
			X	Historical	C&W Plaza	2008 Maryland Hwy	Mountain Lake Park
	X			Public Facility	Mt. Lake Park Post Office	1325 Maryland Hwy	Mountain Lake Park
	X			Government Facility	Mt. Lake Park Town Hall	1007 Alleghany Drive	Mountain Lake Park
X				Waste Water	Mt. Lake Park WWTP	Powells Drive	Mountain Lake Park
X				Communications	Communication Tower	17 East Oak Street	Oakland
	X			Health & Medical	Community Action Agency	104 East Center Street	Oakland
	X			Safety & Security	Garrett County Sheriff's Dept.	311 East Alder	Oakland
	X			Economic	Maryland Employment Office	216 South Third Street	Oakland
	X			Government Facility	NRCS & SCD	1916 Maryland Hwy	Oakland
	X			Safety & Security	Oakland Police Dept.	15 South Third Street	Oakland
	X			Public Facility	Oakland Post Office	22 South Second St.	Oakland
	X			Government Facility	Oakland Town Hall	15 South Third Street	Oakland
	X			Emergency Response	Oakland VFD #40	23 South Third Street	Oakland
X				Waste Water	Oakland WWTP	27 Oakland-Rosedale	Oakland
X				Water Infrastructure	Oakland WTP	15 South Third Street	Oakland
X				Water Infrastructure	Oak Park Sub Station	West Liberty Street	Oakland
			X	Historical	Ruth Enlow Library	315 Chestnut Street	Oakland
	X			Transportation	SHA-Oakland	95 SHA Drive	Oakland
	X			Water Storage	Water Tanks 1 & 3	Pennington Street	Oakland

FEMA's *Local Mitigation Planning Handbook* (2023b) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks are more or less prevalent as compared to the rest of the planning area. The following table quickly synthesizes the data to capture the specific aspects of risks and vulnerabilities for each participating jurisdiction.

MULTI-JURISDICTIONAL CONSIDERATIONS, HAZARDOUS MATERIALS		
<i>Jurisdiction</i>	<i>Comparison</i>	<i>Notes</i>
Garrett County	More	Significant portions of Interstate 68, as well as U.S. 219 and 40 pass through unincorporated areas of the county, as do several miles of CSX rail line and natural gas transmission line. Further, county response resources would support hazardous material responses throughout Garrett County.
Accident	More	A portion of U.S. Route 219 passes through the town, a natural gas transmission line passes near the town, and Texas Eastern also maintains a natural gas compressor station near the town.
Deer Park	Same	The town of Deer Park is susceptible to a railway hazardous materials incident as a CSX freight railway passes along the southern portion of the town.
Friendsville	More	Friendsville's northern limits run adjacent to I-68, and it is within close proximity to a few commercial facilities (that receive shipments from truck traffic). There is a Texas Eastern natural gas transmission line that passes near the town, and Texas Eastern also has natural gas storage facilities located near the town.
Grantsville	More	The town of Grantsville is positioned adjacent to a segment of I-68, and near the junction of I-68 and U.S. Route 219.
Kitzmiller	Same	The town of Kitzmiller county be impacted by a railway hazardous materials release as a CSX rail line passes just to the south of the town.
Loch Lynn Heights	Same	There is a CSX fright rail line that passes just to the south of the town. A Columbia Gas transmission pipeline in the southwest corner of the county passes near the town.
Mountain Lake Park	Same	There is a CSX fright rail line that passes just to the south of the town. U.S. Route 219 passes through the town, and a Columbia Gas transmission line in the southwest corner of the county passes near the town.
Oakland	More	A portion of U.S. Route 219 passes through the Town of Oakland, and a CSX fright rail line passes just to the south of the town. A Columbia Gas transmission line in the southwest corner of the county passes near the town.

2.2.7 Landslide

Landslides occur when areas of relatively dry rock, soil, or debris move uncontrollably down a slope. These events can strike with little to no warning				
	RISK	Period of Occurrence:	At any time. Increased following heavy rain, or construction activity	Garrett County Risk Ranking: Medium
		Warning Time:	Ranges from no warning to months	State Risk Ranking: Medium
		Probability:	High (likely to occur during a year)	Impact: Localized (less than 10% of land area affected)
		Type of Hazard:	Natural	Disaster Declarations: None

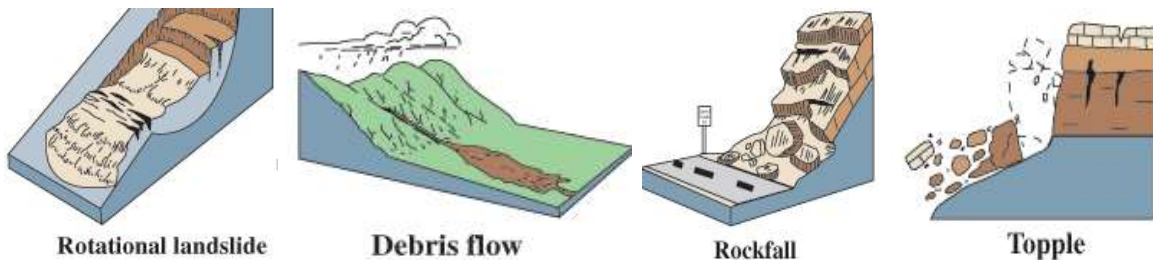
Hazard Overview

Landslides involve the movement of debris sliding uncontrollably down a slope. Landslides may be localized, or massive in size, and can move at high rates of speed. Landslides can be triggered by natural or man-made circumstances such as heavy rains, earthquakes, rapid snow melt, erosion, or construction activity. In Garrett County, landslides are most common after a heavy rainfall event or snow melt, and when heavy equipment is being operated at the top edge of a steep slope. Landslides can involve debris flows, rockfalls, and toppling effects (reference next page). The telltale signs of areas susceptible to landslides include leaning and bent trees or utility poles, seeps and sag ponds (i.e., water-filled depressions), and old or recent landslides where horizontal and vertical movement has occurred.

Conditions in Garrett County that contribute to the frequency of landslides include the mountainous terrain and the high average annual precipitation. Winter precipitation seeps into cracks and fissures in rock slopes and expands upon freezing, which frequently results in sliding and toppling failures. The two most common types of landslides that affect Garrett County are earth/mudslides and rockslides.

Every landslide is different and unpredictable. Some landslides move slowly over time, while others move quickly. Certain geological areas are more prone to landslides, such as the bases of steep slopes or hillsides, which cover a large portion of Garrett County.

- **Rotational Landslides:** Occur when areas of relatively dry rock, soil, or debris move uncontrollable down a slope.
- **Debris Flows:** Are water saturated rivers of earth, rock, and debris. Mudflows develop when water rapidly accumulates in the material, such as during heavy rainfall or rapid snowmelt. Mudflows can develop and move quickly, giving little to no warning.
- **Rock Falls/Topple:** Occur when rocks or other materials detach from a slope or cliff and descend in a freefall, rolling, or bouncing manner. Rock falls can occur naturally, through faults and seismic activity, or as a product of human activity, such as blasting.



Location and Extent

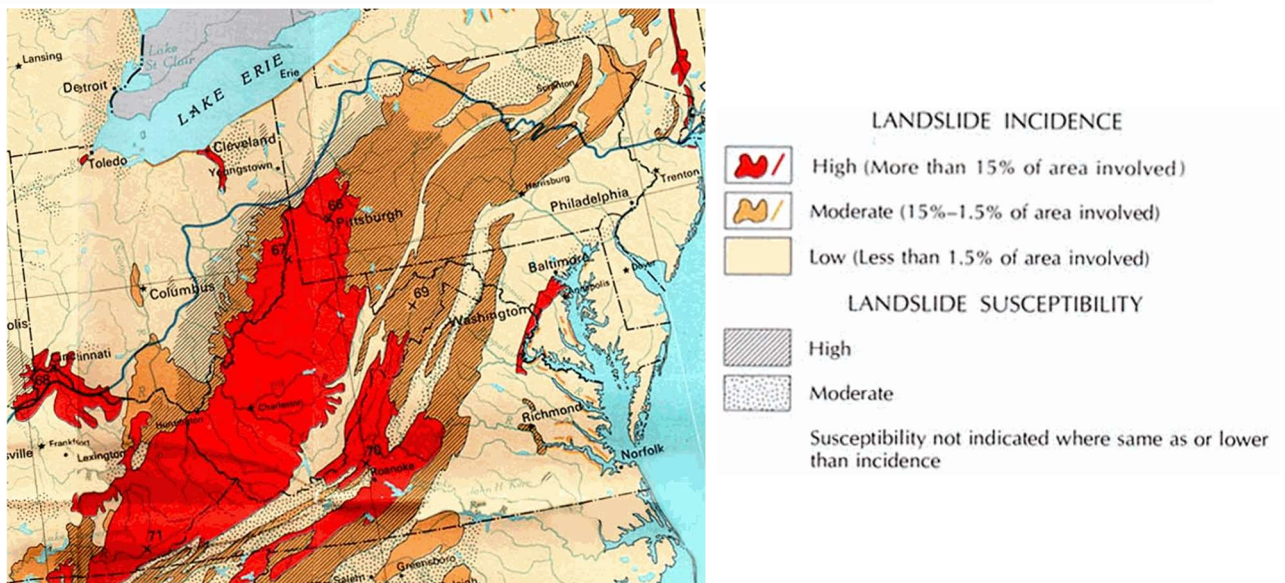
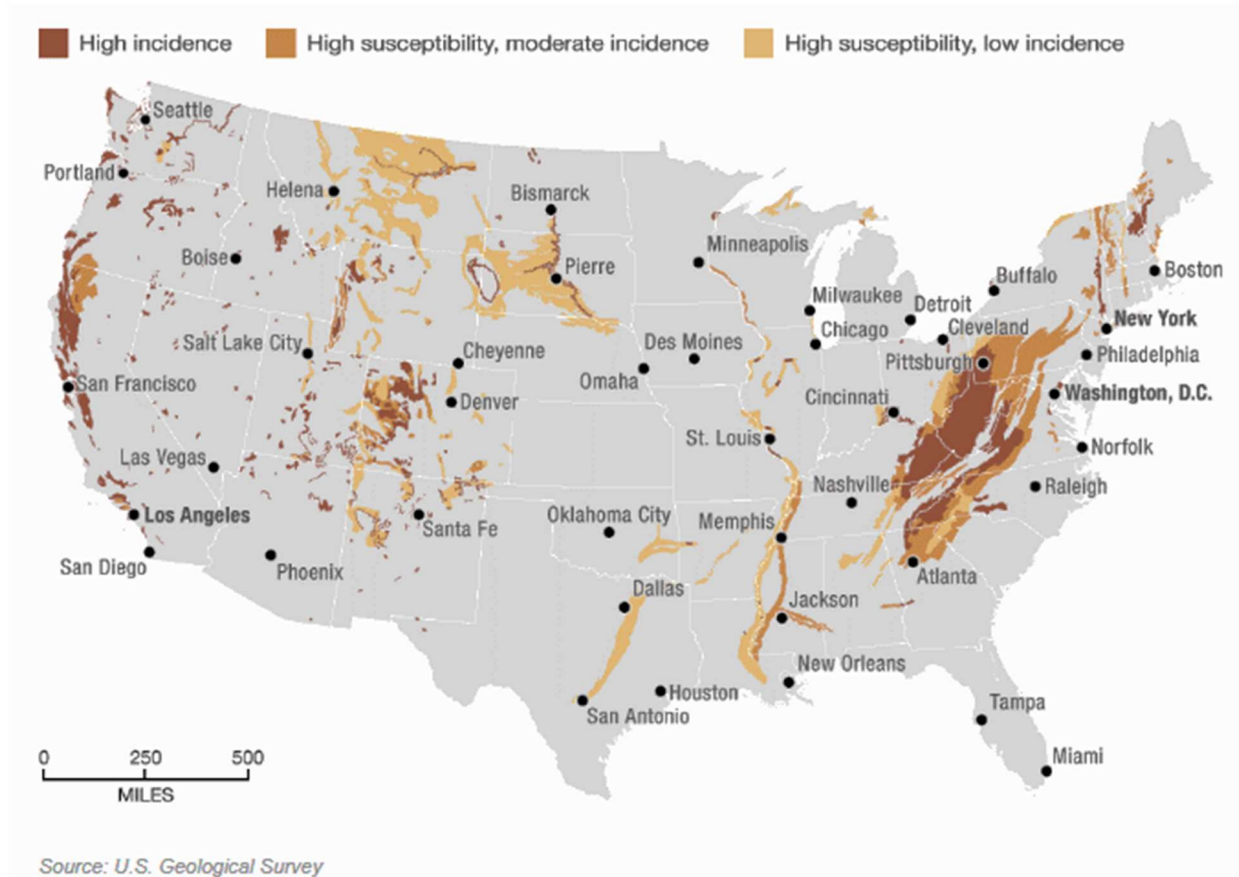
Although landslides are rare in Maryland, they can and do happen in the mountainous areas in the western portion of the state, specifically in Garrett County. Based on the geologic makeup of Garrett County, the Appalachian Plateaus are more likely to experience naturally occurring landslides. Suburban and urban areas, where man-made soil movement has taken place to facilitate development, are also prone to landslide activity.

According to the Garrett County Soil Survey, most of the soil associations in Garrett County are related to the rock type of the parent material and the slope of the land. The rock units that make up the county's undulating surface contain large deposits of limestone, sandstone and shale. The sandstones also contain bituminous coal, peat and clay that have been mined since the mid-1800's. The broad up-warped valleys also contain natural gas deposits that have been exploited in the past. Normally, the sandstone units form the ridge-tops while the valleys are underlain by softer shale or limestone. Slope failure, particularly in cut or fill areas where shale is overlain by sandstone, is not uncommon.

Approximately 150,000 acres of land are classified as steep in the county soil survey. Another 42,500 acres of land contain soils on colluvial materials at the toe of slopes. These soils have essentially formed on steep slopes and moved downslope over time. When disturbed by

road construction, surface mining or other land development activities, soils on steep slopes, colluvial soils, and alluvial soils are more prone to movement than other more stable soil types.

According to information obtained from United States Geological Survey (USGS) the vast majority of Garrett County is located within a high susceptibility, moderate landslide incidence area, see figure below (i.e., more than 15% of an area involved), (USGS, PP 1183).



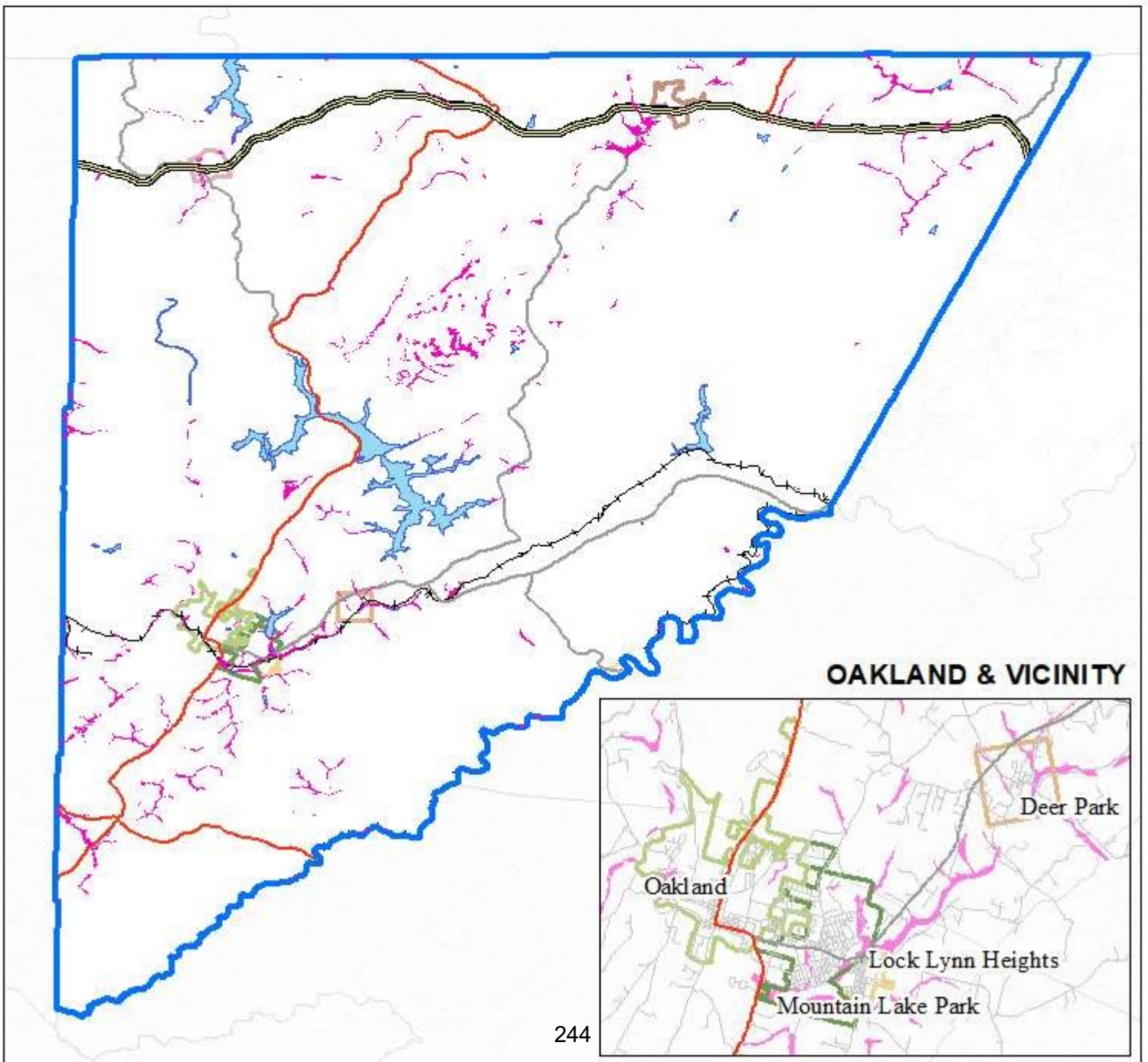
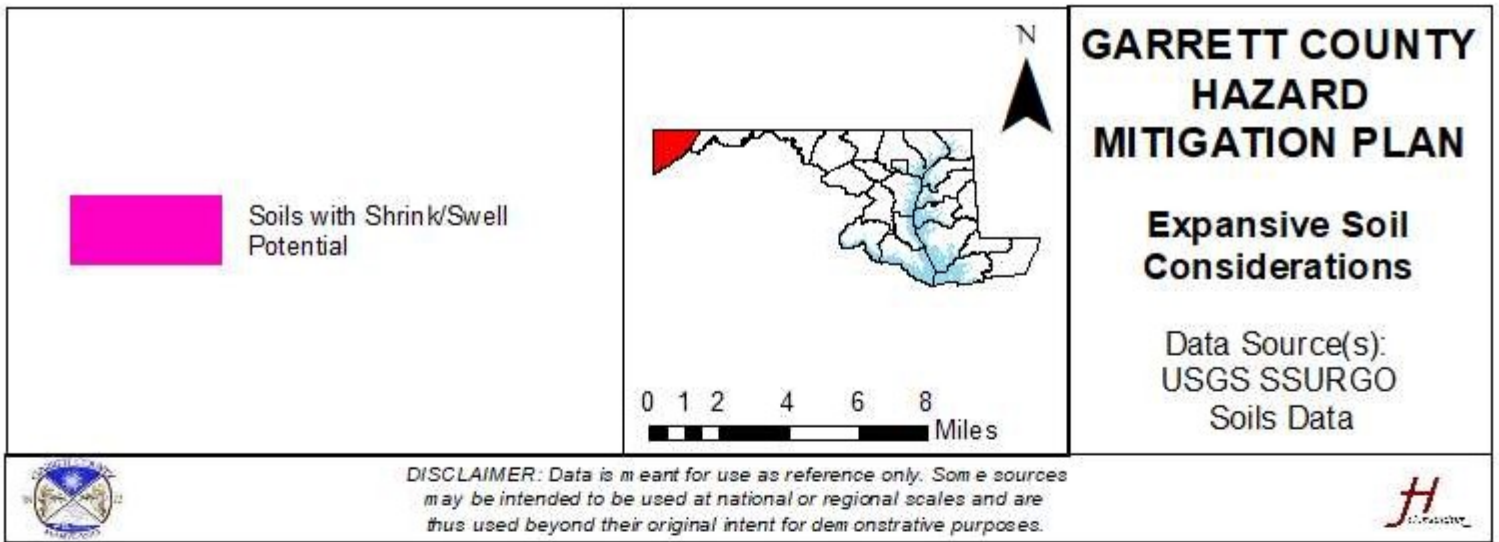
As mentioned above Garrett County is underlain by layered sedimentary rocks that have been folded moderately. When exposed on steep slopes, normally the sandstone forms the cap rock at the top of the slope with shale or limestone lying underneath. When these weaker rocks are disturbed, the sandstone eventually fails and moves downslope. The slump type of soil movement is most common, particularly in road cuts and in strip mining operations. While these movements are not normally on a large scale, they do result in road blockages from time to time, particularly where narrow valley floors are shared by a stream and a road or railroad. Savage River Road and other county roads leading up from the Savage River are prone to this type of slope failure (see Previous Occurrences Section below).

The same geologic conditions that affect the county are also prevalent in the municipalities. Fortunately, most municipalities are located on slopes of 10% grade or less and do not currently have heavy development pressure for new roads or streets in steep slope areas. Small sections of Oakland and Deer Park have slopes up to 15% in grade for short distances, mainly rolling topography rather than steeply sloping topography. However, Kitzmiller and Friendsville are located at the foot of extremely steep slopes and are susceptible to storm water run-off from these slopes. The county's Sensitive Area Regulations protect steep slopes and floodplains from intense development.

Garrett County is traversed by the northeast – southwest ridges of the Appalachian Mountains, interspersed with numerous rivers and streams. Along the sides of these ridges and waterways there are steep slopes greater than 30%. Although found throughout the county, steep slopes are most extensive in the following areas:

- In and around Savage River State Forest,
- Along the North Branch Potomac River and its tributaries,
- Along the Youghiogheny River and the Youghiogheny River Reservoir,
- Along Backbone Mountain, and
- Along Bear Creek and its north and south branches.

Homes built on expansive soils have the possibility of being structurally damaged due to the shrink-swell properties of this soil type. Best Management Practices (BMPs) for building on expansive soils include: monitoring for extreme changes in soil moisture content and planting trees 15 to 30 feet away from foundations. The maps below illustrates the expansive soils located in Garrett County as well as areas with greater than 20% slope. The Town of Accident is the only municipality that has no expansive soils located within its boundaries.

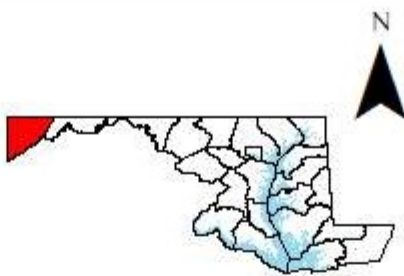




Soils w/ >20% Slopes



Soils with Shrink/Swell Potential



0 1 2 4 6 8
Miles

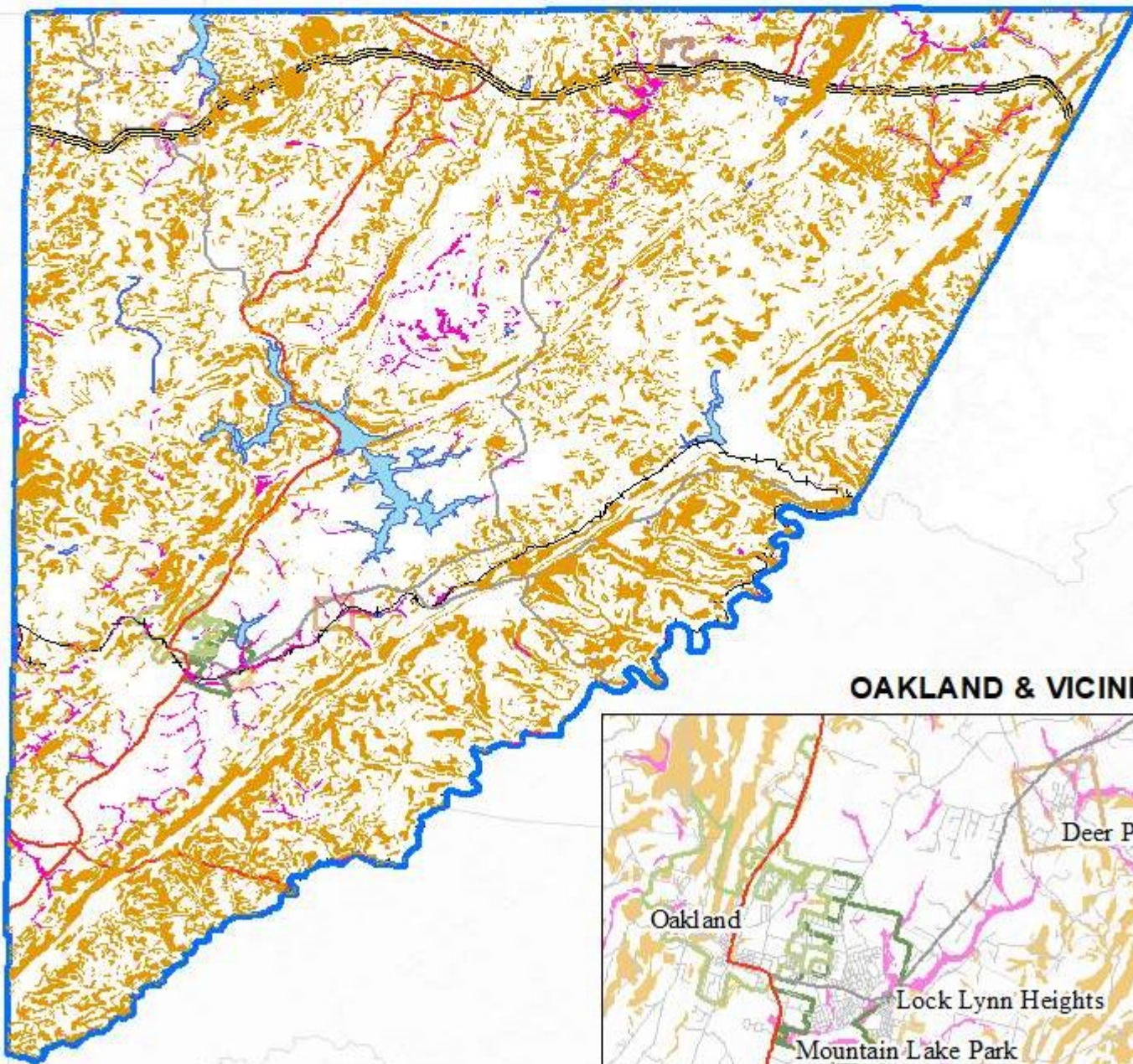
GARRETT COUNTY HAZARD MITIGATION PLAN

Slope & Shrink/ Swell Comparison

Data Source(s):
USGS SSURGO
Soils Data



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



Impacts and Vulnerability

Landslides has the capability of damaging and destroying homes, businesses, utilities, and highways, resulting in annual costs of millions of dollars. Landslide events typically affect residential areas and roadways. Following landslide events the clean-up and restoration project is typically prepared by the county engineering department and contracted out for completion. These projects can range in cost from \$10,000 to \$6,000,000.

Landslides can disrupt underground utilities, and be a potential risk to human life. Landslides are not random, and are not a totally unpredictable phenomena. Large-scale or catastrophic landslide events can result in fatalities, numerous injuries, and trauma stemming from suffocation and entrapment. Depending on the location of the event, landslides can damage or destroy critical infrastructure and facilities, and block whole communities off.

Landslides can result from both natural and man-made causes. Man-made slope failures are generally caused by overloading the head (i.e., top) of an old slide with fill, excavating the tow (i.e., bottom) of an old slide, recharging the zones of ground-water movement beyond their capacities in a slide-prone area, or a combination of these. Slow creep movement gradually opens cracks in house walls, floors, and pavements, and causes support posts and pillars to lean. Rapid slide or flow movement usually happens without warning, breaking apart house walls, tilting floors, and pulling apart buried water, gas, and sewer lines. Houses are often pushed off their foundations, and are occasionally even buried by debris.

Social Vulnerability Considerations

Authors such as Nam, Choi, Copeland, and Kim (2023) have noted a lack of research specifically on how the negative effects of geo-hazards like (sinkholes, land subsidence, landslides, etc.) impact social vulnerable populations, underserved, or marginalized communities. In Garrett County, there are no apparent trends suggesting that population and housing distribution avoids areas prone to subsidence. Other hazard considerations note how those with a lower proficiency in English may not readily understand preparedness messages and warnings, and the same may be true regarding descriptors of the risks associated with subsidence. Low-income populations may not be able to afford structural alterations and retrofits if subsidence impacts their homes.

Previous Occurrences

As reported by local officials and news media outlets, landslides, mud and rock slides do occur often, especially following heavy rainfall events. Isolated landslide occurrences in Garrett County often-times block roadways with mud and debris; however, rarely result in damage to structures or roadways.

Land subsidence issues have been known to occur in Maryland since the 1850; however, the damage caused by land subsidence has become increasingly expensive as urban development encroaches more and more on the area's hillsides.

Potomac River Basin Landslide – 1995

Perhaps the most striking example of a large-scale landslide event in Garrett County occurred during the flood of 1995 in the Potomac River Basin when a CSX freight train derailed due to a slope failure above the Savage River. This event involved heavy rains and subsequent runoff weakening and undermining the slope below the railroad fill. This incident resulted in a fatality.

Savage River Road Landslide – March 18, 2017

Savage River Road and other county roads leading up from the Savage River are prone to slump type slope failures. On March 18, 2017, rocks larger than automobiles fell from cliffs above Savage River Road blocking traffic in both directions for several hours. A large amount of smaller stones, dirt and a tree also covered the road from the slide.

Fortunately, much of the extreme steep slope land in Garrett County is located within State Forests and Parks, particularly in the Savage River Basin, the Upper Potomac Basin, and the Youghiogheny Basin.



Source: Cumberland Times, News

Accident – Friendsville Road Landslide – 2017

A landslide occurred on the Accident – Friendsville road. This portion of roadway is known for limestone deposits and has had landslide issues in the past. As a result, the road was closed from the 4500 block of the Accident – Friendsville Road to Deere Road. In July of 2017, the County Commissioners approved a permanent road closure 5,715 feet from Deere Road to 4501 Accident – Friendsville Road. In addition, this section of roadway will no longer be a part of the county road system.



Kitzmiller Landslide – April, 2018

The most recent landslide to occur in Garrett County took place on the road bank at Shallmar near the Town of Kitzmiller, specifically at the area known as the cliffs. Warning signs were placed in the area of the bank slide, and the public was advised to exercise caution and watch for falling debris.



Loss and Damages

Landslides and subsidence can result in significant damage to highways, buildings, homes, and other structures that support a wide range of economic activities. The expansion of urban development contributes to a greater risk of damages from landslides and subsidence. The USGS recognizes six major impacts caused by landslides.

- Damage in all 50 states, Puerto Rico, and the U.S. Virgin Islands.
- Costs of \$3.5 billion per year (2005 dollars), in damage repair.
- Between 25 and 50 fatalities in the U.S. annually.
- Reduction in real estate values and tourism revenue.
- Losses in industrial, agricultural, and forest productivity.
- Damages sustained to the natural environment.

Future Occurrences

Decades of groundwater withdrawals from unconsolidated, confined aquifers throughout the region have resulted in a drawdown of groundwater levels. Withdrawal increases to supply a growing population will result in additional drawdown. Withdrawing water from a confined aquifer reduces the hydrostatic pressure in adjacent confining layers (clay and silt). A reduction of hydrostatic pressure may increase the load on the sediment, which may lead to compaction and land subsidence incidents.

Perhaps the most important mitigation measure taken by the county is the enforcement of sediment control and stormwater management measures and the sensitive area regulations. These measures are mandated by state law and have provisions for development on steep slopes as well as limitations for the amount of water that can be stored and released on conjunction with new development. Highway construction and surface mining are also subject to these measures.

Future Climate Considerations

Long-term climate change may result in an increase in precipitation, precipitation intensity, ground saturation, and a rise in groundwater level, reducing the shear strength and increasing the weight of soils. An increase in erosion may remove the toe and lateral support of certain areas, triggering potential landslides.

According to NOAA's Climate Change Web Portal climate change is expected to result in an increased frequency of severe storm events. A potential effect of climate change is more intense downpours often leading to flash flooding as soils become saturated. Landslide risk is increased following periods of heavy rain. There is a high probability that future landslides in Garrett County will occur.

Risk Assessment

This section summarizes the vulnerability of the county to landslides. Garrett County conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding landslides.

PUBLIC SENTIMENT, LANDSLIDE – GARRETT COUNTY					
Hazard	Level of Concern				Total Responses
	Not at All	Somewhat	Concerned	Very	
LANDSLIDE	33 (47.14%)	24 (34.29%)	10 (14.29%)	3 (4.29%)	70
Which hazard event have you experienced property damage from?				4 (8.16%)	49
Please indicate which hazard event you feel may affect your community?				9 (13.64%)	66

For site-specific hazards like landslides, planners can identify specific facilities located within risk areas. The following table lists the assets (taken from the asset inventory list in Section 1.2 above) located in areas with greater than 20% slopes, or having shrink-swell properties.

ASSETS LOCATED IN SPECIAL LANDSLIDE PRONE AREAS							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
GREATER THAN 20% SLOPE ASSETS							
X				Water Infrastructure	Deer Park WTP	520 Decost Road	Deer Park
	X			Safety & Security	Potomac/Garrett MDNR	1523 Potomac Camp Road	Deer Park
X				Communications	Communication Tower	83 Brant Road	McHenry
	X			Water Infrastructure	Water Pump Station	2909 Piney Run Road	McHenry
X				Communications	WFRB Radio Tower	242 Finzel Road	Frostburg
	X			Waste Collection	Friendsville Dump Site	8397 Friendsville Rd	Friendsville
X				Water Infrastructure	Jennings Sub-Station	167 Baker Road	Grantsville
X				Waste Water Infrastructure	Jennings WWTP	Route 495	Grantsville
X				Water Infrastructure	Gorman Sub-Station	Rt. 50 / Gorman Road	Kitzmiller
	X			Emergency Response	Gorman VFD #120	270 Gorman Road	Kitzmiller
X				Water Infrastructure	Mettiki Sub-Station	Table Rock Road	Kitzmiller
	X			Transportation	Moran Air Strip	2091 Westernport Rd	Kitzmiller
X				Communications	Tri-State Cell Tower	Rt. 50 / Table Rock Rd.	Kitzmiller
X				Communications	U.S. Cellular Tower	Westernport Road	Kitzmiller
	X			Water Storage	Water Tank	319 N. American Rd.	Kitzmiller
	X			Waste Collection	Westernport Landfill	Westernport Road	Kitzmiller
	X			Public Facility	White Church Community Building	3420 White Church / Sreyer Road	Kitzmiller
X				Waste Water Infrastructure	Crellin WWTP	2219 Hutton Road	Oakland
X				Water Storage	Crellin Water Tank	2219 Hutton Road	Oakland
	X			Economic	Dept. of Agriculture	152 Oakland Sang Run Road	Oakland
	X			Government Facility	Garrett County Animal Shelter	152 Oakland Sang Run Road	Oakland
SHRINK-SWELL ASSETS							
X				Waste Water Infrastructure	Oakland WWTP	27 Oakland-Rosedale Road	Oakland
X				Water Infrastructure	Oak Park Sub-Station	West Liberty Street	Oakland
X				Water Infrastructure	Water Pump Station	West Liberty Street	Oakland




The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above.

LANDSLIDES RISK RANKING			
Category	Points	Description	Notes
Frequency	4	High (likely to occur annually)	According to information obtained from the USGS the vast majority of Garrett County is located within a high susceptibility, moderate landslide incidence area.
Response	4	One month	Large-scale landslides can take a month to clean-up and repair.
Onset	5	No warning	Some instances of landslides can occur with no warning at all.
Magnitude	1	Localized (less than 10% of land area affected)	All landslide events are site specific in nature, and do not affect vast areas.
Business	3	At least two weeks	Businesses located in the affected area of a large-scale landslide event could be impacted for up to two week.
Human	2	Low (some minor injuries)	Historically landslides have mostly resulted in property damage, one incident involving a train derailment did result in a fatality. The greatest chance of personal injury would be to motorists.
Property	1	Less than 10% of property affected	All landslide events are site specific in nature, and do not affect vast areas.
Totals	20	MEDIUM	

EMA's *Local Mitigation Planning Handbook* (2023b) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks are more or less prevalent as compared to the rest of the planning area. The following table quickly synthesizes the data to capture the jurisdiction-specific aspects of risk and vulnerabilities to each participating jurisdictions.

MULTI-JURISDICTIONAL CONSIDERATIONS, LANDSLIDE		
<i>Jurisdiction</i>	<i>Comparison</i>	<i>Notes</i>
Garrett County	More	Based on the geologic makeup of Garrett County, the Appalachian Plateaus are more likely to experience naturally occurring landslides. Certain geological areas are more prone to landslides, such as the bases of steep slopes or hillsides, which cover a large portion of Garrett County. Approximately 150,000 acres of land are classified as steep in the county soil survey. According to information obtained from United States Geological Survey (USGS) the vast majority of Garrett County is located within a high susceptibility, moderate landslide incidence area
Accident	Less	Small areas in the northwestern portion of the town contains slopes up to 25-30%; however, the majority of the slopes within town are 10% or less. The town does have a documented past occurrence.
Deer Park	Less	A few small areas in the southcentral portion of the town does contain slopes up to 25-30%. The majority of the slopes within the town are 15% or less.
Friendsville	Same	The Town of Friendsville is located at the foot of steep slopes, several areas contain slopes up to 25%.
Grantsville	Less	There is a small area within the town's limits with slopes greater than 15%. This area extends southeast from the intersection of Dorsey Hotel Road and Main Street across the town boundary to the banks of the Casselman River. The majority of the slopes in town are 10% or less.
Kitzmiller	More	The Town of Kitzmiller is located at the foot of steep slopes, several areas contain slopes up to 25%. There are several areas in the northern and western portion of the town with slopes in excess of 30%. The town does have a documented past occurrence.
Loch Lynn Heights	Less	The land in Loch Lynn Heights slopes gradually upward from an elevation of 2,400 feet in the westernmost part of the town along the Little Youghiogheny River to 2,520 feet on the hilltop on the northeast part of town. There is only one small area in the northeast corner of the town with a slope greater than 15%, the remainder of the town's area has slopes less than 8%.
Mountain Lake Park	Less	Due to the town's location on a mountain top, there are very few steep slopes within the town. The majority of the town contains slopes of 10% or less.
Oakland	Less	Small sections of Oakland contain slopes up to 15% for short distances, the majority of the slopes within the town of less than 10%. Steep grades of over 30% occur along Hoop Pole Ridge south of the Little Youghiogheny River and North of Oakland between Bradley Run and U.S. Route 219.

2.2.8 Public Health Emergency

A public health emergency is any adverse event (natural or man-made) that compromises the health of the population and has the potential to cause widespread illness.				
 RISK HIGHEST HIGH MEDIUM LOW LOWEST	Period of Occurrence:	At any time	Garrett County Risk Ranking:	Medium
	Warning Time:	Over 24 hours	State Risk Ranking:	Medium-High
	Probability:	Medium (may or may not occur on annual basis)	Impact:	Low (some moderate illness)
	Type of Hazard:	Natural	Disaster Declarations:	EM-3430-MD (2020) DR-4491-MD (2020)

Hazard Overview

A public health emergency exists when the occurrence or imminent threat of an illness or health condition, caused by bio-terrorism, an epidemic or pandemic disease outbreak, or an infectious agent or biological toxin, poses a substantial risk to humans by either causing a significant number of human fatalities, or permanent or long-term disability. Public health emergencies are defined as much by their health consequences as by their causes and precipitating events. A situation becomes emergent when its health consequences have the potential to overwhelm routine community capabilities to address them. Potential causes of public health emergencies that lead to widespread illnesses include:

- Naturally occurring illness such as seasonal flu, or man-made such as the intentional release of anthrax.
- Illnesses amongst the public that may cause a larger number of deaths and/or serious disabilities.
- Illnesses resulting from highly infectious agents that are hard to control.
- Illnesses resulting from a chemical attack on the public.
- Illnesses resulting from the release of nuclear materials.
- Other illnesses that can severely impact public health, whether resulting from natural hazards (i.e., drought, floods, invasive species, etc.) or emerging infectious diseases.
- **NOTE:** This profile does not address the following public health emergencies; bio-terrorism, chemical attacks, release of nuclear materials, heart disease, or diabetes.

“Since September 11, 2001, and the anthrax attacks that followed, a substantial federal investment has been made to increase our nation’s ability to prepare for, and respond to, public health emergencies. Despite anecdotal reports which suggest that progress has been made, it is unclear whether the nation is better prepared to respond to a bioterrorist attack, pandemic influenza, or any other large-scale public health emergency.” (American Journal of Public Health, 2007)

Location and Extent

As the recent Corona Virus Disease of 2019 (COVID-19) pandemic has demonstrated, a public health emergency could occur at any time and simultaneously impact all of Garrett County, the state of Maryland, and the entire world. Although the probability of a public health emergency striking Garrett County is relatively low, the associated risk is very high.

The most probable causes that could result in a public health emergency within Garrett County would be a naturally occurring illness such as seasonal flu, an illness resulting from an emerging highly infectious disease, or illnesses stemming from the occurrence of a natural disaster (i.e., severe drought, significant flooding, etc.).

Epidemic outbreaks are more probable to occur in densely populated areas, such as the incorporated communities of Mountain Lake Park and Oakland, especially at facilities containing large numbers of occupants such as multi-unit residential developments, commercial and industrial sites at which a large work force is employed, nursing homes, hospitals, schools, and large correctional institutions.

A declaration of a public health emergency can be made by the Secretary of the Department of Health and Human Services (HHS) under Section 319 of the Public Health Service (PHS) Act, if it has been determined that a disease or disorder presents a public health emergency, or a public health emergency, including significant outbreaks of infectious disease or bio-terrorist attacks, otherwise exists. The declaration lasts for the duration of the emergency or 90 days, but may be extended by the Secretary.

According to the Center for Disease Control and Prevention (CDC), there are three widely accepted “levels” of disease presence.

- **Endemic** refers to the baseline level of a particular disease in a population or area. This level is not necessarily the desired level, but the observed level.
- **Epidemic** refers to an increase in the number of cases of a disease above the usual level in that population or area. Epidemics may result from an increase of the disease’s virulence, presence of a disease in a new outbreak, enhanced disease transmission, increased susceptibility among exposed persons, or increased exposure to the disease-causing agent. Note that, while the term “epidemic” originally only included infectious diseases, some non-infectious health conditions (such as obesity and opioid misuse) have reached epidemic status in the United States.
- **Pandemic** refers to an epidemic that has spread over several countries or continents, typically affecting a large number of people.

Impacts and Vulnerability

Public health emergencies take on many forms, such as pandemics, natural disasters, or other mass-casualty events. In these cases, communication among providers, public health officials, and the public is vital. “Responsibility for the preparedness of a community lies not only with governmental agencies but also with active, engaged, and mobilized community residents, businesses, and nongovernmental organizations.” (American Journal of Public Health, 2007)

Major concerns during a public health emergency include the ability of local healthcare providers to give medical attention to everyone who becomes ill, and the ability to identify the source of illness in the population. Cascading effects of public health emergencies can include:

- Illness or death,
- Civil disturbance,
- Distrust of government,
- Supply chain issues,
- Poor water quality, and
- Temporary loss of income.

An epidemic is a contagious disease that attacks a large number of people at the same time. Epidemics can develop with minimal warning and quickly erode the capacity of local medical care providers. The potential impacts of an epidemic include severe illnesses or fatalities, disruption or closing of schools, and the forced closure of businesses and industrial operations.

The extent of illness caused by a communicable or infectious disease depends on both the individual infected and the pathogen infecting them. For example, the influenza virus usually circulates from November to March and affects up to 20% of Americans. Unlike seasonal influenza, pandemic strains of the flu virus are easily circulated and affect healthy individuals (see the table below).


SEASONAL FLU	FLU PANDEMIC
Outbreaks occur every year, usually in winter.	This occurs only rarely (only four times since 1918).
Caused by influenza viruses that are similar to those already affecting people.	Caused by a new influenza virus that people have not been exposed to before.
Health adults usually not at risk for serious complications.	Healthy adults may be at increased risk for serious complications.
Hospitals and healthcare providers can usually meet public needs.	Hospitals and healthcare providers may be overwhelmed and difficult to access.
The vaccine is available at beginning of flu season.	A vaccine would probably not be available in the early stages of a pandemic.
It causes an average of 36,000 deaths each year in the United States.	The number of deaths could be significantly higher. In the 1918 pandemic, approximately 675,000 people died in the United States.
Generally does not have a severe impact on daily life.	May have a severe impact on daily life, including widespread restrictions on travel, closings of schools and businesses, and cancellation of public events.

Public health emergencies are further exacerbated by the fact that healthcare resources can become scarce during an event. An increased number of cases and a reduced number of caregivers can overload jurisdictions or healthcare systems ability to provide medical attention to everyone who becomes ill. Furthermore, preventative measures, such as vaccinations or prophylactic medication, may be in short supply or unavailable in a novel strain of a virus.


Social Vulnerability Considerations

The most probable public health emergency within Garrett County (i.e., naturally occurring illness such as seasonal flu, an emerging highly infectious disease) would affect all areas of Garrett County, but certain sub-sections of the population would be more affected than others. While there is a general correlation public health emergencies and population, there is credible research indicating that certain incidents may affect areas of the county differently. Both urban and rural areas face different challenges regarding public health emergencies. Long-standing systemic health and social inequities have put some rural residents at increased risk of becoming infected with disease or having severe illness. In general, rural Americans tend to have higher rates of cigarette smoking, high blood pressure, and obesity as well as less access to healthcare, which can negatively affect health outcomes. They are also less likely to have health insurance.

Suburban and urban residents face a different set of concerns, as studies have shown that densely populated environments increase community spread. Those most vulnerable to public health emergencies include children, the elderly, and individuals with pre-existing medical conditions and chronic illnesses. The following maps illustrate the Census block groups with the highest concentrations of those aged 18 and under and those over 65.



Population, Under 18 (>20%)




0 1 2 4 6 8 Miles


**GARRETT COUNTY
HAZARD
MITIGATION PLAN**

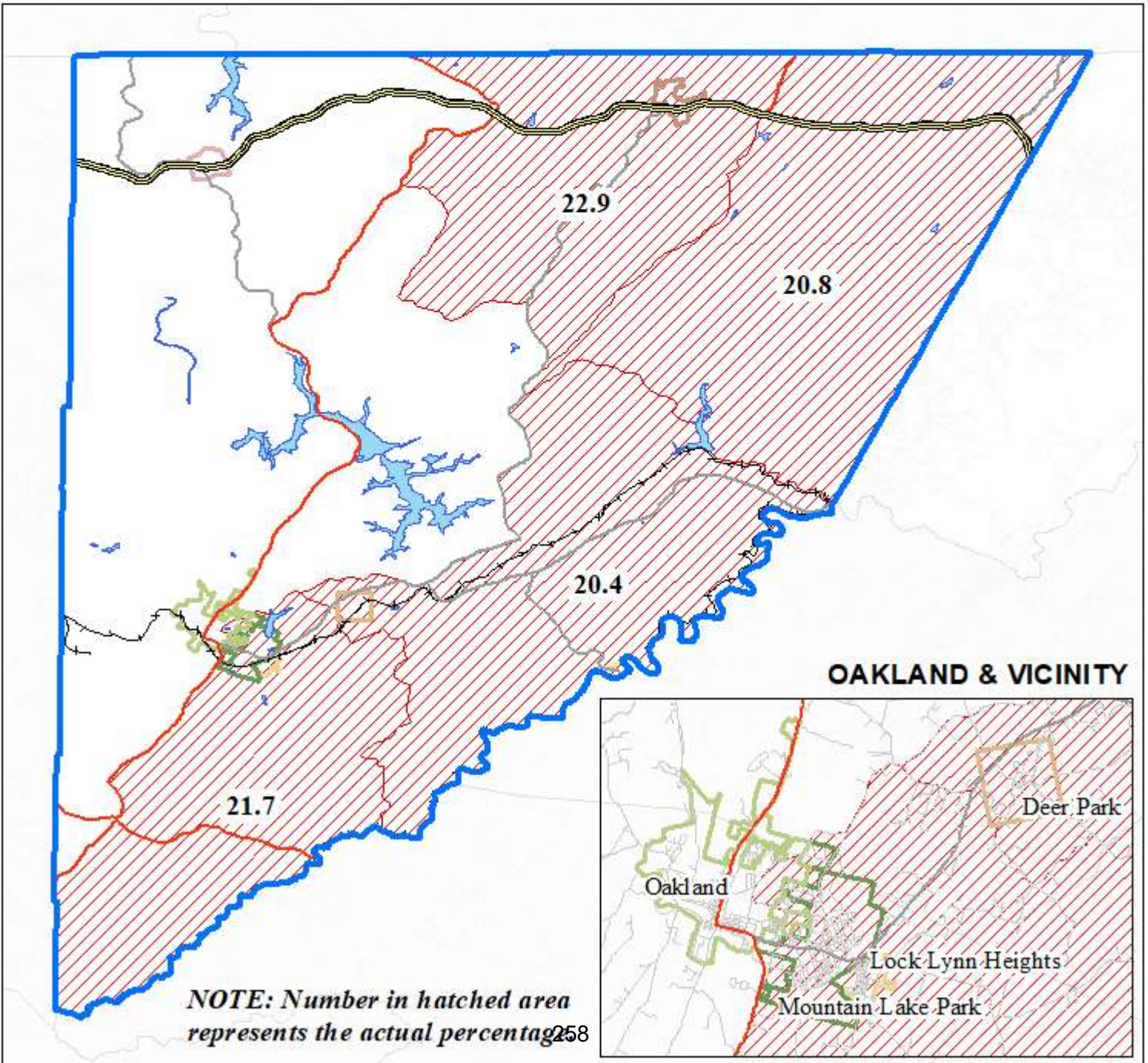
**Public Health:
SVI Considerations**

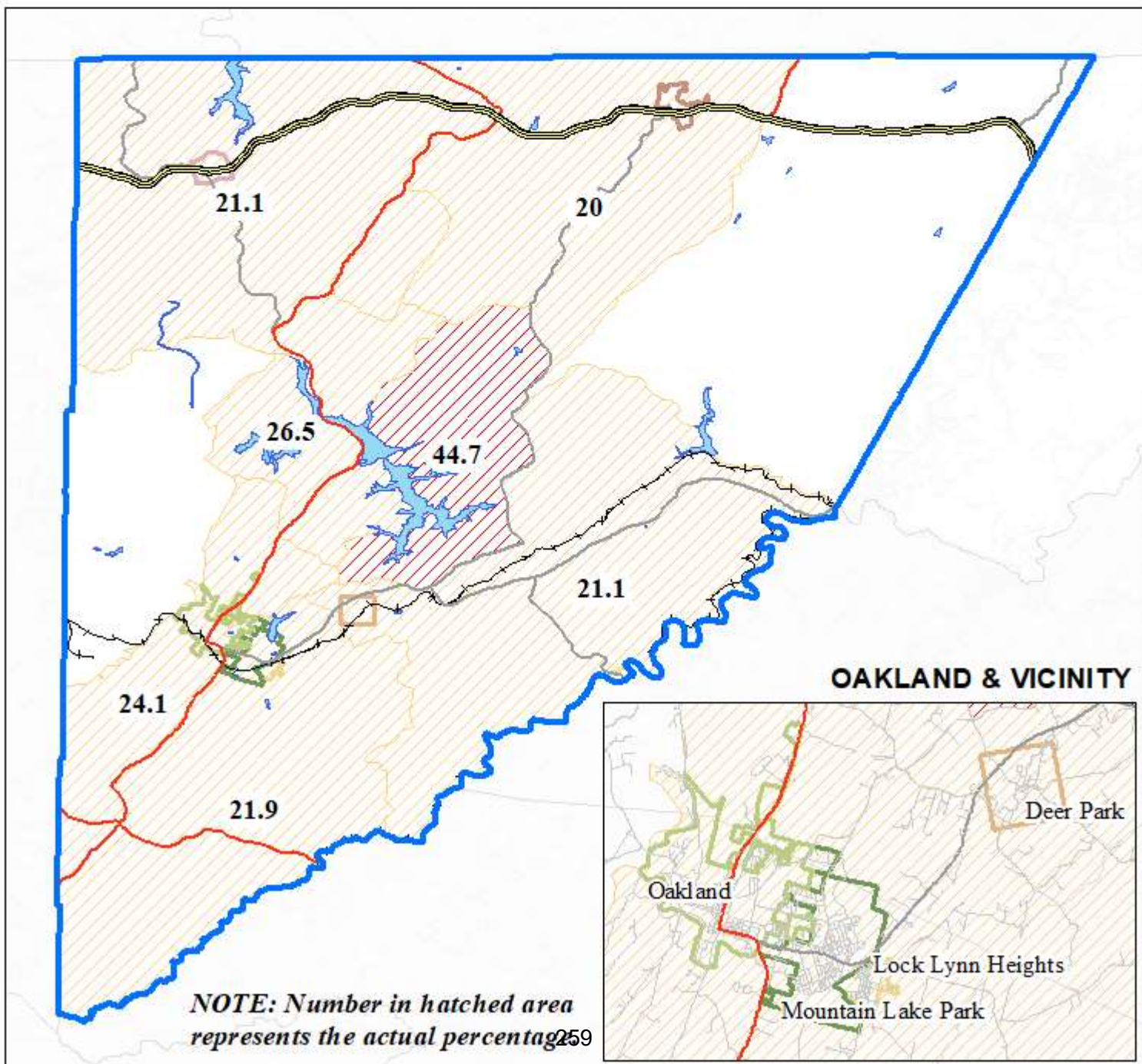
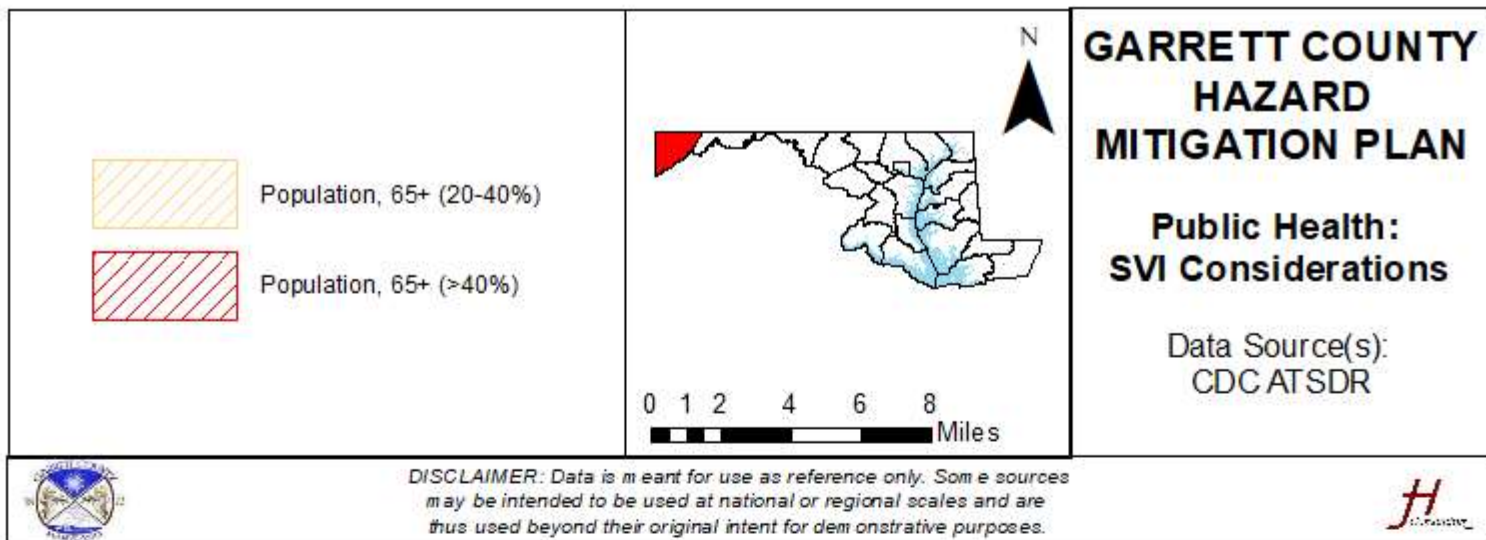
Data Source(s):
CDC ATSDR



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.







Public health emergencies can last several days, extend into several weeks, and in some extreme cases, they can last for several months to over a year. The Garrett County Health Department has taken many steps to ensure a base level of preparedness for epidemic and pandemic conditions. Initiatives surrounding general preparedness for Avian flu, and H1N1 (swine flu), and most recently the Corona Virus Disease of 2019 (COVID-19) pandemic have led some local governments to develop and adopt business Continuity of Operations Plans (COOP). Since various residents within Garrett County travel and because groups/individuals from outside the county frequently travel to various destinations within the county, the possibility does exist for novel strains to be introduced to the local populations, thus validating epidemic/pandemic planning efforts.

Previous Occurrences

According to epidemiologist in the region, there are outbreaks of infectious disease every year. Garrett County has experienced several outbreaks of influenza and gastroenteritis in long-term care facilities, pertussis associated with schools and daycares, influenza at schools and regional correctional facility. There have also been foodborne outbreaks involving food service establishments.

The Maryland Department of Health (MDH) maintains counts for 86 diseases, conditions, outbreaks, and unusual manifestations as reported by health care providers and 43 diseases notifiable by laboratories in Maryland. The surveillance and reporting of these diseases is the responsibility of local health departments, which investigates and completes reporting both electronically and manually as per MDH regulations. Examples of notifiable diseases include Hepatitis B, Salmonellosis, giardiasis, Lyme disease and rabies. The following table presents the different types of infectious diseases that have been reported in Garrett County between 2018 and 2022. As can be seen there have been eves and flows in the total number of reported disease over the five year period; however, the total number has increase by 155 from 2018 to 2022.

REPORTED INFECTIOUS DISEASE CASES BY TYPE – GARRETT COUNTY (2018-2022)					
Disease	2018	2019	2020	2021	2022
Animal Bites (Rabies)	42	61	63	61	83
Campylobacteriosis	9	3	9	6	20
Chlamydia	38	57	54	N/A	33
Cryptosporidiosis	1	0	3	4	5
Giardiasis	2	0	2	0	9
Gonorrhea	6	2	6	N/A	4
Haemophilus Influenza	0	1	0	1	1
Hepatitis B Acute	0	0	0	0	0
Hepatitis C Acute	1	1	0	0	0
Hepatitis C Perinatal	0	0	0	1	0
Legionellosis	0	1	0	0	1
Lyme Disease	14	26	16	38	91
Mycobacteriosis	1	3	1	3	1
Pertussis	2	1	1	0	0
Rabies-Animal	3	3	4	1	2
Salmonellosis	1	9	2	5	5
Shiga Toxin	0	1	2	4	5
Shigellosis	0	0	1	0	2
Strep A & B	4	9	5	7	5
Strep Pneumoniae	2	3	2	0	13
Syphilis	0	1	0	N/A	0
Tuberculosis	0	0	0	0	0
Typhoid Fever	0	0	0	0	0
West Nile Virus	0	0	0	0	0
Yersiniosis	1	0	0	1	2
Zika Virus Disease	0	0	0	0	0
Totals	127	182	171	132	282

Source: Maryland Department of Health

Note: Only conditions reported in Garrett County are listed in the table. For a complete list of reported conditions, please refer to the Maryland Department of Health website at: <https://health.maryland.gov/pages/index.aspx>.

Five pandemic influenza events have occurred in the last century. The 1918 Spanish Influenza outbreak remains the worst-case pandemic on record, with the number of deaths dramatically decreasing with each event, with the exception of the recent Corona Virus, 2019 (COVID-19) pandemic, see the table below.

PREVIOUS WORLDWIDE PANDEMIC EVENTS		
<i>Date</i>	<i>Pandemic Name/Subtype</i>	<i>Worldwide Deaths</i>
1918 – 1920	Spanish Flu / H1N1	50 million
1957 – 1958	Asian Flu / H2N2	1 – 3 million
1968 – 1969	Hong Kong Flu / H3N2	1 million
2009 – 2010	Swine Flu / A/H1N1	25,174
2019 – 2023	Corona Virus 2019 (COVID-19) (SARS)	6.8 million (on-going)

Source: [health.com/condition/infectious-diseases/worst-pandemics-in-history](https://www.health.com/condition/infectious-diseases/worst-pandemics-in-history)

H1N1 Epidemic of 2009

A recent pandemic influenza event was the H1N1 (swine flu) epidemic which was discovered in 2009. The CDC monitored the spread of the disease on a near-daily basis. The H1N1 flu was relatively mild for most people, but the virus spread with unprecedented speed; more than 700 schools in the United States closed, and many hospitals quarantined infected individuals. H1N1 was almost entirely responsible for total anomalies resolved as health events for 2009.

There were 46 reported deaths in Maryland associated with the 2009 H1N1 influenza epidemic. In May of 2009, the Governor declared a public health emergency as the number of “probable” cases reached 11. In late July of 2009, 800 cases of H1N1 were confirmed in Maryland.

West Nile Virus of 2016

The West Nile Virus (WNV) is an arthropod-borne virus spread by the bite of infected mosquitoes. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes can then spread the virus to humans and other animals. The virus causes inflammation of the brain, most individuals who contract the virus never exhibit symptoms, while some have mild symptoms such as fever, headache, and body aches, these individuals typically recover without any treatment. Few individuals experience more severe illness with fever, fatigue, confusion, headache, weakness, nausea, vomiting, muscle aches, stiff neck, abdominal pain and other symptoms that require hospitalization. Among people that develop a severe illness, three to 15% may die from the infection; however, less than one percent of individuals that become infected with West Nile Virus develop a severe illness. Individuals over the age of 50 are most at risk, as well as those that spend a great deal of time outdoors during the summer months and do not take precautions against mosquitoes.

“Many counties in Maryland have had birds test positive for West Nile Virus. Mosquitoes positive for the virus have also been found in a few counties within the state. The virus first

appeared in 1999 in a crow in Baltimore City, the first human cases were reported in 2001.” (Maryland Department of Health, n.d.)

Corona Virus Disease of 2019 (COVID-19 / SARS-CoV-2) (DR-4491-MD)

The most recent pandemic to impact the United States was the Coronavirus, which is a Severe Acute Respiratory Syndrome. The virus is believed to have started spreading as early as 2018, originating from the Wuhan Institute of Virology laboratory in Wuhan, Hubei Province, China which experiments with corona viruses. The first reported cases of COVID-19 in the State of Maryland occurred on March 3, 2020, when three individuals tested positive for the virus. To date there have been nearly 675 million confirmed cases of the virus, resulting in over 6.8 million deaths worldwide. The virus spread to every country and continent of the world.

According to the Maryland Department of Health as of March 31, 2023, there have been approximately 1.4 million confirmed cases and over 16,000 deaths in the State of Maryland and nearly 8,000 confirmed cases and 126 deaths in Garrett County as a result of the pandemic.

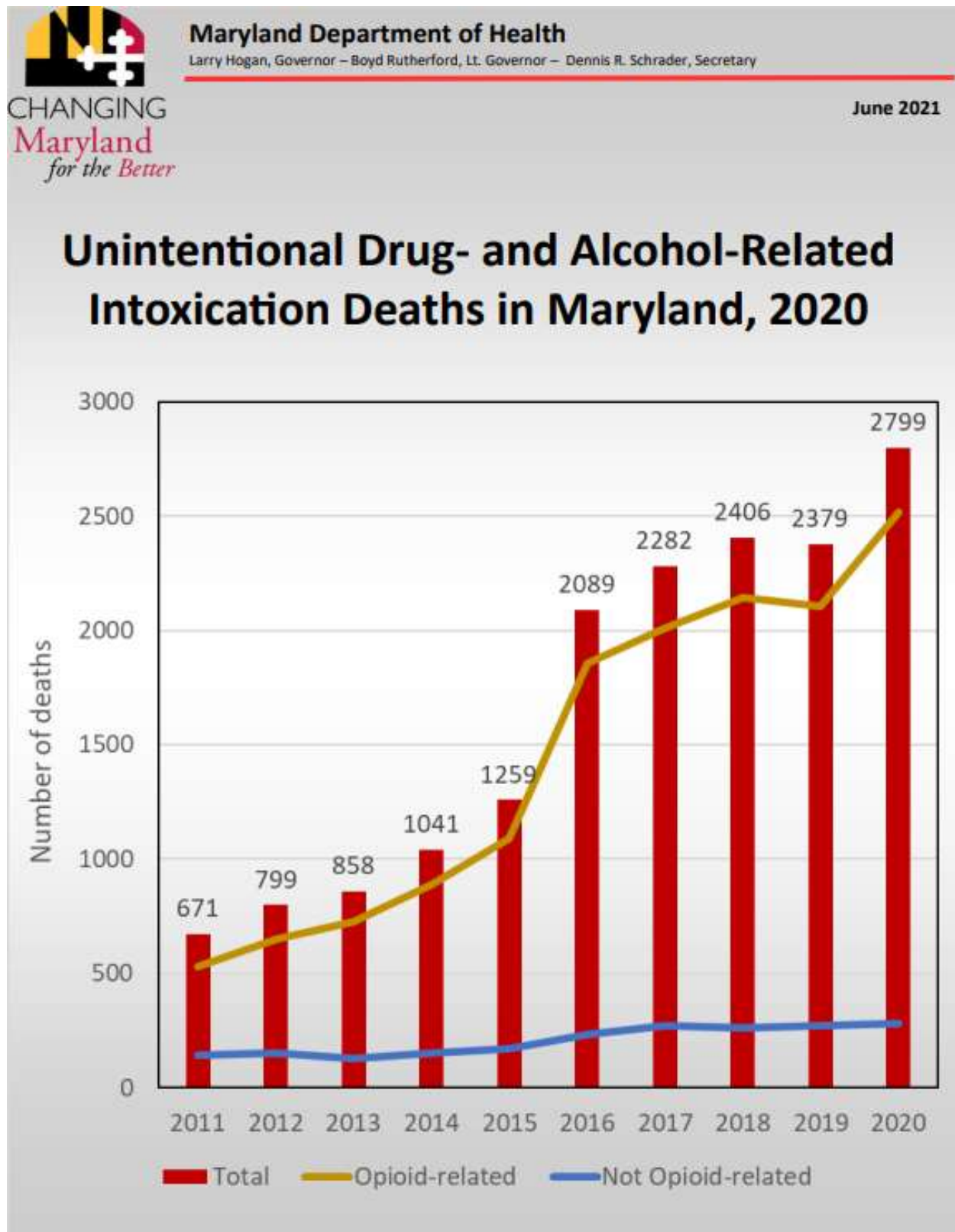
“Maryland reported its first confirmed cases relating to the COVID-19 pandemic in Montgomery County on March 5, 2020, all three patients were on the same river cruise on the Nile River in Egypt. Thirteen days later the state reported its first COVID-19 death.” (CBS News Baltimore, 2020)

The pandemic completely shut-down the entire United States for several months due to stay-at-home and social distancing order, isolation and quarantine mandates, global air travel was restricted for several months. The pandemic had a negative effect on the countries supply-chain for nearly two years. The overall cost of the pandemic on the U.S. economic is in the trillions.

Opioid Crisis of 2017 – On-going

Opioid deaths have impacted every county throughout the State of Maryland. Annual data trends indicate a startling increase in fatalities since 2011, and the impacts of the concurrent public health crisis-COVID-19 have further exacerbated the crisis. The executive director of the Opioid Operational Command Center indicated in the 2020 Second Quarter Report, that Maryland saw increases in fatalities related to almost every class of substance. The number of unintentional drug and alcohol-related intoxication deaths occurring in Maryland reached an all-time high of

2,799 deaths in 2020, an eight percent increase over the number of deaths (2,379) in 2019, and an increase of over 2,000 deaths since 2011.



Nearly 90% of all intoxication deaths that occurred in Maryland in 2020 were opioid-related, opioid-related deaths include those involving heroin, prescription opioids, and non-pharmaceutical fentanyl. The substance leading to the majority of these deaths since 2015 has been Fentanyl. The vast majority of this fentanyl is being brought into the U.S. by crossing the country's southern border with Mexico (DEA Intelligence Report, 2020). According to the Maryland Department of Health's Unintentional Drug-and Alcohol-Related Intoxication Deaths Report dated June, 2021, there were eight intoxication deaths in Garrett County in 2020, five of those were the result of fentanyl. The age group, race/ethnicity and gender that comprise the majority of these deaths involve white males over the age of 55.

TOTAL NUMBER OF DRUG & ALCOHOL-RELATED INTOXICATION DEATHS – GARRETT COUNTY					
2015	2016	2017	2018	2019	2020
5	1	8	3	9	8
TOTAL NUMBER OF OPIOID-RELATED INTOXICATION DEATHS – GARRETT COUNTY					
2015	2016	2017	2018	2019	2020
4	0	4	3	6	5

Most recently, the State of Maryland was one of only four nationwide to receive a \$4.6 million award from the U.S. Department of Labor to implement the “Support to Communities; Fostering Opioid Recovery through Workforce Development” pilot program.

Loss and Damages

Losses based on historical public health emergencies are difficult to estimate. According to a study published in the medical journal “Vaccine” (2018), seasonal influenza results in a substantial economic impact, estimated, in part, at \$16.3 billion in lost earnings each year. By population, Garrett County represents 0.0086% of the United States. Since seasonal influenza primarily impacts the human population, using Garrett County's composition in the U.S. as a multiplier (i.e., 0.000086) and applying it to the potential economic impact, lost earnings in Garrett County could reach \$1,398,000 each year. Though that number appears high, it equates to approximately \$84.04 per year for each person listed by the U.S. Census Bureau as “in civilian labor force” for the county. Public health emergencies rarely affect structures; however, they often times do impact the operations at critical facilities, businesses, and other community assets. Public health emergencies can stress inpatient bed availability secondary to seasonal illnesses.

Future Occurrences

According to regional Epidemiologist, the types of illness or disease that the Garrett County health department is most concerned about are influenza, rabies, Lyme disease, strep pneumoniae, and sexually-transmitted disease.

Seasonal influenza activity peaks every winter, generally from December to February (CDC, 2018). These spikes may reach outbreak status, particularly in congregate settings such as nursing homes, detention facilities, and schools. Other bacterial and viral sicknesses, such as the common cold, RSV, hand-foot-mouth disease, etc. may also yield localized (i.e., site-specific) outbreaks. It is likely that new variants will continue to influence the trajectory of COVID-19. It is almost impossible; however, to predict the characteristics of a new variant prior to its arrival, making forecasting a complex and challenging task.

The Maryland Department of Health has many efforts underway to enhance preparedness and response to health threats and disasters. The Garrett County Health Department website (<https://www.garrettthealth.org>) has a public health preparedness section containing information and links on bioterrorism, fact sheets, articles, documents, and education and training including self-learning modules. This site not only consists of epidemic information, but all health-related topics including how to prevent and prepare for different types of disasters.



Future Climate Considerations

Although a direct link between climate change and an increase in public health emergencies has not been established, scientists are increasingly studying potential relationships.

Risk Assessment

This section summarizes the vulnerability of Garrett County to public health emergencies. The steering committee conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding public health emergencies.

PUBLIC SENTIMENT, PUBLIC HEALTH EMERGENCY – GARRETT COUNTY					
Hazard	Level of Concern				Total Responses
	Not at All	Somewhat	Concerned	Very	
PUBLIC HEALTH EMERGENCY	19 (26.76%)	19 (26.76%)	18 (25.35%)	15 (21.13%)	71
Please indicate which hazard event you feel may affect your community?				25 (37.88%)	66

The Location and Extent as well as the Impacts and Vulnerability sections above describe the consequences and effects of public health emergencies on the participants of this plan. The only asset type that is directly impacted by public health emergencies are people. A potential cascading impacts of a large-scale epidemic or pandemic could be disruptions or closing of schools, and the forced closure of businesses and industrial operations.

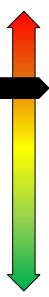
The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above.

PUBLIC HEALTH EMERGENCY RISK RANKING			
Category	Points	Description	Notes
Frequency	3	Medium (may or may not occur annually)	Garrett County can expect seasonal outbreak of infectious diseases annually. Even when considering the 2020 COVID-19 pandemic, large-scale situations would likely occur 0.05 times per year.
Response	5	More than one month	Responses to public health emergencies, like the H1N1 response and the COVID-19 response, far exceed one month in duration.
Onset	1	Over 24 hours	While one person can become ill in less than a day, the onset of most public health emergencies are slow.
Magnitude	1	Less than 10% of land area affected	A public health emergency would affect less than 10% of the land area in Garrett County, as the impacts from this hazard are limited to human health.
Business	4	More than 30 days	For this category, planners averaged potential impacts. A “normal” outbreak would not likely impact business operations. However, a pandemic response would disrupt business operations for at least over a month.
Human	2	Low (some moderate illness)	Though many people may become ill, most recover from communicable diseases.
Property	1	Less than 10% of property affected	Public health emergencies primarily affect human health, not property.
Totals	17	MEDIUM	

FEMA's *Local Mitigation Planning Handbook* (2023b) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks are more or less prevalent as compared to the rest of the planning area. The following table quickly synthesizes the data to capture the jurisdiction-specific aspects or risks and vulnerabilities for each town with regards to public health emergencies.

MULTI-JURISDICTIONAL CONSIDERATIONS, PUBLIC HEALTH EMERGENCY		
<i>Jurisdiction</i>	<i>Comparison</i>	<i>Notes</i>
Garrett County	Less	Populations located in the unincorporated areas of the county are spread out, as the county has a significantly low population density of only 43.6 persons per square mile.
Accident	Less	The Town of Accident is sparsely populated with 338 people and a population density of 690 persons per square mile. The median age for the town is 32.6 which is the youngest municipality in the county, only 2.3% of the population do not have health insurance, which is the lowest percentage in the county.
Deer Park	Less	The Town of Deer Park has a population density of 303 persons per square mile making it the least densely populated municipality in the county.
Friendsville	Same	The Town of Friendsville has a low population density of 438 persons per square mile. The median age of the town is 52.9, making it the oldest amongst all municipalities in the county.
Grantsville	Same	The Town of Grantsville has a low population density of 931 persons per square mile. Only 30.4% of the town's population is over the age of 65.
Kitzmilller	Same	Kitzmilller is the least population municipality in the county with a total population of 300; however, they do have a relatively high population density at 1,200 persons per square mile.
Loch Lynn Heights	More	Epidemic outbreaks are more probable to occur in densely populated areas, Loch Lynn Heights has the highest population density in Garrett County at 1,541 persons per square mile. Approximately 6.9% of the town's population does not have health insurance, this is the highest percentage in the county.
Mountain Lake Park	More	Epidemic outbreaks are more probable to occur in densely populated areas, Mountain Lake Park is the most populated municipality in Garrett County with an overall population of 2,147, and a population density of 1,068 persons per square mile.
Oakland	More	Epidemic outbreaks are more probable to occur in densely populated areas, Oakland is the second most populated municipality in the county (i.e., population 1,851). Oakland also contains the majority of the county's multi-unit residential developments, commercial and industrial sites, nursing homes, as well as the only hospital in the county.

2.2.9 Severe Summer Weather

A severe thunderstorm is one that produces a tornado, winds in excess of 58 miles per hour, or hail of one inch in diameter or larger. These storms are accompanied by lightning. Straight-line winds (Derechos), downbursts, macrobursts, microbursts, and gust fronts are all part of severe wind events.				
 <p>RISK</p> <p>HIGHEST</p> <p>HIGH</p> <p>MEDIUM</p> <p>LOW</p> <p>LOWEST</p>	Period of Occurrence:	Thunderstorms, typically occur during late spring and summer	Garrett County Risk Ranking:	High
	Warning Time:	6-12 hours	State Risk Ranking:	Medium
	Probability:	Excessive (will occur on an annual basis)	Impact:	Catastrophic (more than 50% of land area affected)
	Type of Hazard:	Natural	Disaster Declarations:	DR-1094-MD (1996) DR-1139-MD (1996) DR-1492-ND (2003)

Hazard Overview

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. Thunderstorms can be 10-15 miles in diameter and normally last 20 to 30 minutes. Thunderstorms are local storms accompanied by lightning and thunder that are capable of producing strong winds, tornadoes, hail, and flash flooding. A thunderstorm is “severe” when it produces a tornado, winds of at least 58 mph, or hail at least one inch in diameter. According to the National Weather Service only 10% of thunderstorms across the country meet these criteria annually. Hazards associated with severe thunderstorms include lightning, hail, damaging wind, heavy rain, flash flooding, and tornadoes, which often result in power failures and disruptions to communications infrastructure.

Modern technology allows for the forecasting and tracking of thunderstorms via Doppler radar and the issuance of proactive “watches” and “warnings” to communities; however, severe thunderstorms can still pose a significant risk. Thunderstorms are a seasonal hazard and can be expected to occur every year. According to the NWS the most active thunderstorm season in Maryland is late spring and early summer often during the afternoon hours. There are five types of thunderstorms, each described in detail in the table below.

TYPES OF THUNDERSTORMS				
Type	Description	Duration	Wind Speeds	Hazards
Single Cell	Uncommon	20-30 minutes	N/A	<ul style="list-style-type: none"> • Non-damaging hail • Microbursts • Weak tornadoes
Multi-Cell	Common, organized cluster of two or more single cells	Approx. 20 minutes per cell	Downbursts up to 80 mph	<ul style="list-style-type: none"> • Heavy rainfall • Downbursts • Hail • Weak tornadoes
Mesoscale Convective System	A well-organized system of thunderstorms	Up to 12 hours or more	55 mph or more	<ul style="list-style-type: none"> • Torrential rainfall • Derechos • Tornadoes
Squall Line	May extend over 250-500 miles, 10-20 miles wide	30-60 minutes each individual cell	N/A	<ul style="list-style-type: none"> • Significant rainfall • Derechos
Super Cell	Most dangerous, visible with Doppler radars	1-6 hours	Updrafts & downdrafts greater than 100 mph	<ul style="list-style-type: none"> • Tornadoes • Hail

Source: National Weather Service

A hailstorm is defined as an atmospheric disturbance manifested in strong winds and accompanied by precipitation. The precipitation is made of hailstones, or hard pellets of snow and ice. Hail is a form of precipitation that occurs when updrafts from a thunderstorm carry raindrops into colder temperatures. The drops of water freeze together in the cold upper regions of the thunderstorm clouds. Hailstones grow by colliding with super-cooled water droplets, the stronger the updraft of the storm the longer the drops of water can freeze together, thus the larger the hailstone. When a hailstone becomes too heavy for the updraft to support it, or the updraft weakens, the hailstone falls to the ground.

Hailstones less than one inch in diameter typically fall to the ground at nine to 25 mph. Hailstones typically associated with severe thunderstorms (i.e., 1" to 1 3/4" in diameter) can fall to the ground at 40 mph. The TORRO Hailstorm Intensity Scale (Voss Law Firm, n.d.) measures hail, H0 – H10, based on diameter. The TORRO scale and reference objects appear in the table below.

TORRO HAILSTORM INTENSITY SCALE			
<i>TORRO Intensity</i>	<i>Intensity Category</i>	<i>Diameter (mm)</i>	<i>Reference Objects</i>
H0	Hard Hail	5	Pea
H1	Potentially Damaging	5-15	Mothball
H2	Significant	10-20	Marble, Grape
H3	Severe	20-30	Walnut
H4	Severe	25-40	Pigeon's egg > Squash ball
H5	Destructive	30-50	Golf ball > Pullet's egg
H6	Destructive	40-60	Hen's egg
H7	Destructive	50-75	Tennis ball > Cricket ball
H8	Destructive	60-90	Large orange > Softball
H9	Super Hailstorm	75-100	Grapefruit
H10	Super Hailstorm	> 100	Melon

Lightning is a naturally-occurring giant spark of electricity in the air between clouds, the air, or the ground. Air acts as an insulator between the cloud and the ground, but when the charge difference becomes great enough this insulating capacity breaks down, allowing the rapid discharge of electricity. This electrical discharge is known as lightning. Lightning can reach a significant distance from a storm, up to 25 miles according to the National Severe Storms Library (NSSL). While lightning is a common occurrence and can be seen in most thunderstorms, only about 20% of the lightning observed in a storm will strike the ground. Lightning strikes occur with no warning and kill between 75 to 100 Americans each year (Haddow, Bullock, & Coppola, 2014). 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.

Severe wind includes non-tornadic winds from thunderstorms. There are six types of severe wind: straight-line wind, downbursts, macrobursts, microbursts, gust fronts, and Derechos.

- **Straight-line Wind:** Straight-line wind is a term used to define any thunderstorm wind not associated with rotation, used mainly to differentiate from tornadic winds.
- **Downburst:** Downburst is the general term for all localized strong wind events caused by a strong downdraft within a thunderstorm.
- **Macroburst:** An outward burst of strong winds at or near the surface with a diameter larger than 2.5 miles that occurs when a strong downdraft reaches the surface.
- **Microburst:** A small, concentrated downburst that produces an outward burst of strong winds near the surfaced. Microburst are small and short-lived, with a diameter less than 2.5 miles and lasting only 5-10 minutes.

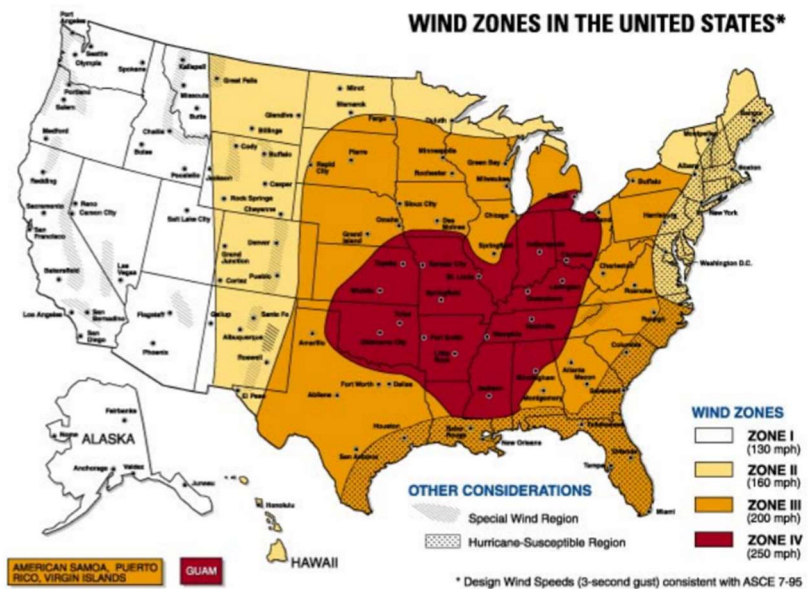
- **Gust Front:** The leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. It is characterized by a wind shift, temperature drop, and gusty winds ahead of a thunderstorm.
- **Derecho:** A widespread, long-lived wind storm associated with a band of rapidly moving showers or thunderstorms. A typical derecho consists of numerous microbursts and downbursts. An event with wind speeds of at least 58mph and a diameter of 240 miles is a derecho.

Location and Extent

Severe thunderstorms and associated hail and lightning can affect all areas of Garrett County. These events can last a few seconds (i.e., lightning), minutes (tornadoes), hours (thunderstorms and hailstorms), or days (high winds).

Garrett County is affected by thunderstorm activity both by the interaction of warm and cool air masses and by the lifting of warm air as it passes over the Appalachian Plateau. Thunderstorms are more common in the spring when frontal zones are passing over the county from west to east and during the summer months when warm, moist air is lifted over the Plateau from the south and west. Intense thunderstorms over the steep terrain in Garrett County result in rapid runoff, particularly in the headwaters of small stream basins. The Potomac, Savage, and Youghiogheny basins are particularly steep and have high runoff rates.

The wind is a commonplace phenomenon across the globe. Wind events can impact several jurisdictions at the same time, with varying duration and severity. All of Garrett County is at an equal risk of experiencing severe wind. FEMA's wind zone map classifies wind zones in the United States. As shown below, all of Garrett County is located in Zone III. Buildings located in a Zone III area should be constructed to withstand three-second wind gusts of up to 200 mph.



Garrett County is situated in the lower part of the westerly wind belt. Prevailing winds in Garrett County are from the southwest during the summer months and the northwest in the winter. There are several days during winter that winds are very strong and approach gale force on the Beaufort Wind Scale. The Beaufort Wind Scale measures wind. This scale characterizes wind using a 0-12 metric based on observation rather than exact measurements. The table below outlines the scale in detail.

BEAUFORT WIND SCALE					
Force	Wind Speed		Description	Appearance of Wind Effects	
	Knots	MPH		On Water	On Land
0	>1	>1	Calm	Sea surface smooth and mirror like	Calm, smoke rises vertically
1	1-3	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	4-7	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	8-12	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	13-18	Moderate Breeze	Small waves 1-4ft becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	19-24	Fresh Breeze	Moderate waves 4-8ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	25-31	Strong Breeze	Larger waves 8-13ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	32-38	Near Gale	Sea heaps up, waves 13-19ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	39-46	Gale	Moderately high 18-25ft waves or greater length, edges of crests begin to break into spindrift, foam blown in streaks	Twigs breaking off trees, generally impedes progress
9	41-47	47-54	Strong Gale	High waves 23-32ft, sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	55-63	Storm	Very high waves 29-41ft with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	64-72	Violent Storm	Exceptionally high waves 37-52ft, foam patches cover sea, visibility more reduced	N/A
12	64+	72+	Hurricane	Air filled with foam, waves over 45ft, sea completely white with driving spray, visibility greatly reduced	N/A

Garrett County was effected by a derecho in 2012. According to the National Weather Service (NWS) a derecho is “a complex line of thunderstorms that travels a minimum of 240 miles and produces a nearly continuous and widespread swath of damaging winds over that distance, with concentrated areas of wind speeds over 58 mph.” As illustrated in the graphic below, Garrett County is in an area that can expect to see a derecho once every two years.



Garrett County has experienced 170 severe summer storm events since 1956 according to data obtained from the National Centers for Environmental Information (NCEI) Storm Event Database. The table below illustrates the number of severe summer storm events reported for Garrett County. Of the 170 reported events, 59% were classified as thunderstorms. Approximately 78% of the total reported property damage across all summer storm events were the result of thunderstorms.

GARRETT COUNTY SEVERE SUMMER WEATHER EVENTS				
	<i>Hail</i>	<i>Lightning</i>	<i>Thunderstorms</i>	<i>High Winds</i>
Total Events	34	2	101	33
Events with Property Damage	0	2	83	22

Source: NCEI Storm Event Database

The municipalities of Garrett County face the same threat from thunderstorms as the county. In some cases, in older developed areas, inadequate storm water management contributes to damage from flash flooding in low lying residential areas or in older residential areas downslope from new construction.

Impacts and Vulnerability

Thunderstorms occur regularly and have the potential to impact large areas and damages can range from minor to severe. The impacts of thunderstorms can include widespread property damage, injuries, and even fatalities. Hailstones can be the most damaging part of a severe thunderstorm, inflicting injuries and destroying crops like a giant pummeling machine. Hailstone damage is often confined to automobiles and crops; however, structural damage is a possibility in the form of broken windows, damaged gutters, HVAC systems, and siding. The table below outlines the typical impacts of a hailstorm.

TORRO HAILSTORM DAMAGE IMPACTS	
TORRO Intensity	Typical Damage Impacts
H0	No damage
H1	Slight damage to plants, crops
H2	Significant damage to fruit, crops, vegetation
H3	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Widespread glass damage, vehicle bodywork damage
H5	The wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Bodywork of grounded aircraft dented, brick walls pitted
H7	Severe roof damage, risk of serious injuries
H8	Severe damage to aircraft bodywork
H9	Extensive structural damage. Risk of severe or fatal injuries to persons caught in the open
H10	Extensive structural damage. Risk of severe or fatal injuries to persons caught in the open

In some cases, lightning has caused fires in structures and open land or forests. A bolt of lightning reaches a temperature of 50,000 degrees Fahrenheit in a split second. Maryland averages less than one death (i.e., 0.47) per year as a result of lightning (NWS, 2023). Individual lightning strikes occur with no warning and kill between 75 and 100 Americans every year (Haddow, Bullock, & Coppola, 2014, pg.51.) Heavy rains can damage vegetation and infrastructure and cause flash flooding. Recently, some of the most damaging impacts of severe thunderstorms have been the cascading effects of long-duration power outages.

Severe wind events can cause a variety of secondary and tertiary hazard events. In addition to damaging roofs and other home finishing's, wind can cause damage to trees that may interrupt power service or block roadways. Such damages could be widespread and severe, potentially overwhelming the capacity of local responders to address the situation.

Garrett County recently completed the purchase and deployment of three hazard warning weather stations funded under DR-03-MD-4261-005, these stations have been positioned at the Kitzmiller Head Start, the Garrett County-Grantsville Roads Garage, and the Bittinger Volunteer Fire Department. Garrett County's building code contains provisions for wind loading for new structures and the tying down of mobile homes.

Social Vulnerability Considerations

This section summarizes the vulnerability of Garrett County to severe summer storms. Severe summer weather does not discriminate amongst the geographies that it impacts, nor does it select or spare certain populations. Risk, then, is fairly universal. The way the impacts of severe summer weather manifest is where communities will see variance with respect to social vulnerability variables. For instance, households below the poverty line are often un- or under-insured. Low-income areas may see a higher concentration of structures built before 1970, when code adoption and enforcement became more common, because those older structures are often more affordable. The map below illustrates the Census tracts in the county where more residents live at or below 150% of the poverty level.

Persons Below Poverty Estimate



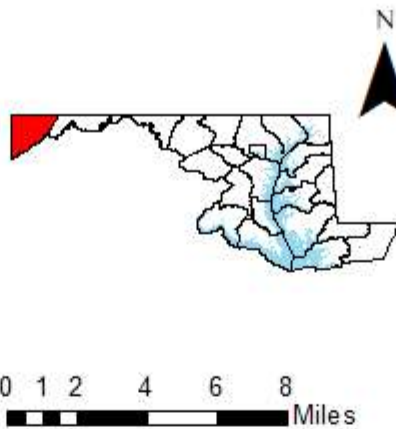
15.7-17.1% of Persons



17.2-19.3% of Persons



19.4-25.1% of Persons



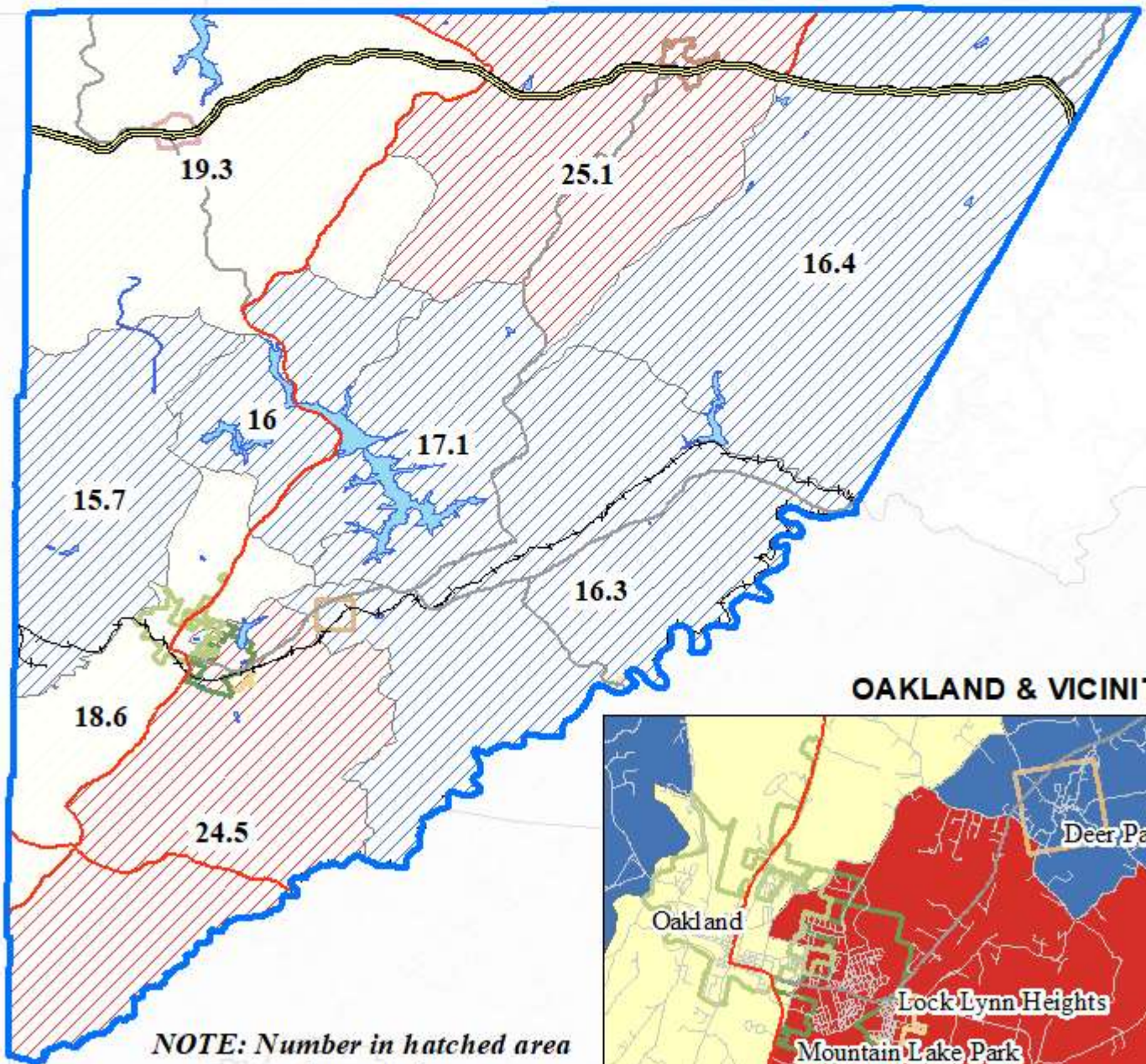
GARRETT COUNTY HAZARD MITIGATION PLAN

Summer Weather: SVI Considerations

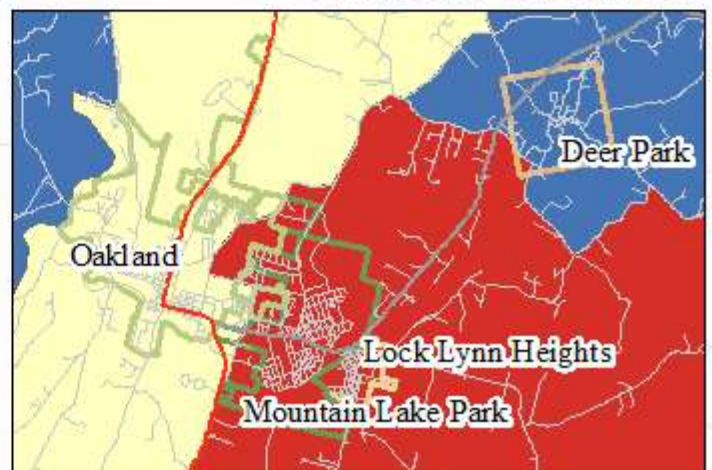
Data Source(s):
CDC ATSDR



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



OAKLAND & VICINITY



**NOTE: Number in hatched area
represents the actual percentage.**

Previous Occurrences

Garrett County has experienced 170 severe summer storm events since 1956. This rate is an average of 2.54 severe summer storm events per year. These events appear by category in the table below. Thunderstorms accounted for 59% of the total summer storm events throughout the county, and accounted for the most property damage at nearly \$1.24 million.

HISTORICAL SEVERE SUMMER WEATHER – GARRETT COUNTY									
THUNDERSTORM (1956 to 2023)									
Total Events	Areas Affected	Area w/ Most Events	Avg. Events / Year	Wind Speeds		Injuries	Fatalities	Damages	
				Avg.	Highest			Property	Crop
101	All	Friendsville Oakland	1.50	50 kts.	65 kts.	None reported	None reported	\$1.24M	\$0.00
Most thunderstorm events in one year = 11 in 2022				Number of events with property damage = 83					
HAIL (1986 to 2023)									
Total Events	Areas Affected	Area w/ Most Events	Avg. Events / Year	Hail Size		Injuries	Fatalities	Damages	
				Avg.	Largest			Property	Crop
34	All	Accident Oakland	0.92	1"	1.75"	None reported	None reported	\$0	\$0
Most hail events in one year = 3 in 1998, 2003, 2004, 2008, 2011, & 2012									
LIGHTNING (1996 to 2023)									
Total Events	Areas Affected	Area w/ Most Events	Avg. Events / Year			Injuries	Fatalities	Damages	
								Property	Crop
2	Kitzmillers Oakland	Kitzmillers Oakland	0.07			1	None reported	\$6,000	\$0
Most lightning events in one year = 2 in 1996				Number of events with property damage = 2					
HIGH WINDS (1996 to 2023)									
Total Events	Areas Affected	Area w/ Most Events	Avg. Events / Year			Injuries	Fatalities	Damages	
								Property	Crop
33	All	Countywide	1.22			None reported	None reported	\$421K	\$0
Most high wind events in one year = 3 in 2001 & 2003				Number of events with property damage = 22					
170	All	Oakland	2.54			1	0	\$1.67M	\$0

Source: NCEI Storm Event Database

Accident / Friendsville / Deep Creek Lake Park Thunderstorm – August 4, 2010

A mesoscale convective system moved along a boundary situated over east central Ohio, southern Pennsylvania and Northern West Virginia. Severe thunderstorms across eastern Ohio, southwest Pennsylvania, northern West Virginia, and Garrett County Maryland produced widespread wind damage with 50 thousand homes left without power. Numerous large trees blocked roadways, the Garrett County Department of Emergency Management (GCDEM) reported numerous trees, power poles, and lines being down in and around the Deep Creek Lake Park. This storm resulted in approximately \$100,000 in reported property damage.

Loch Lynn Heights Hailstorm – July 4, 2012

Clusters of severe thunderstorms developed across the upper Ohio valley from the afternoon of July 4th into the morning hours of July 5th. Severe weather was reported across eastern Ohio, western Pennsylvania, northern West Virginia, and Garrett County Maryland. Large hail was widespread, with reports of hail larger than golf balls in the Loch Lynn Heights area.

Kitzmiller / McHenry Lightning Strike – June 24, 1996

At approximately 3:00 p.m. on June 24th, frequent lightning was reported in Garrett County. Lightning struck a shed near Kitzmiller sparking a fire that destroyed the shed. A man was also struck by lightning and sustained severe injuries while at Deep Creek Lake.

Accident / Bittering / McHenry High Winds – August 7, 2023

Between 12:30 p.m. and 1:00 p.m. on Monday, August 7th a strong cold front, driven by an unusually strong upper-level trough and wind shear, interacted with a hot, humid, and unstable airmass over the Mid-Atlantic. This pattern resulted in the formation of lines of thunderstorms and several supercells. The most widespread and significant wind damage was noted over northern Maryland. Somewhat atypical for the Mid-Atlantic is late summer was the number of large hail reports, with multiple instances of giant hail noted. Several roadways were blocked due to downed trees including, State Route 42 Friendsville Road, Gravelly Run Road, Foster Road, Dung Hill Road, several roads in and around the Town of Accident, Savage River Road, and along State Route 135 between Swanton and Luke. This high wind event resulted in approximately \$190,000 in property damage.

Loss and Damages

Severe summer storms can impact all areas and jurisdictions of Garrett County and are typically widespread events. Severe summer storm events have resulted in approximately \$1.67 million in property damages throughout the county over the past 67 years, creating an annual average damage estimate of \$24,925. This likely underestimates damages caused to infrastructure and power lines.

Historical occurrences included property damage loss estimates for certain severe summer storms. By dividing the total losses of each by the number of reported historical occurrences, general property loss estimates for each which data is available are as follows:

- Thunderstorms: \$12,277, per event (based on 101 total events)
- Lightning: \$3,000, per event (based on 2 total events)
- High Winds: \$12,758, per event (based on 33 events)

Future Occurrences

Data on the impacts of climate change suggest that severe summer storms may increase in intensity in the coming years (USGCRP, 2018), rendering loss estimates based on previous occurrences obsolete.

Severe summer storms may impact infrastructure systems like the power grid and storm water management features. High winds can affect electricity distribution systems, and as those systems age, they may be more prone to the effects of said weather. Thus, future severe summer storms may be accompanied by more frequent (and longer-duration) power outages. Additionally, more intense precipitation compounded by the rapid gathering of increased runoff may strain the ability of aging dams to perform as designed.

Future Climate Considerations

Drought, flooding, and severe storms (i.e., “extreme precipitation” [IPCC, n.d.]) are likely to be the hazards most-impacted by climate change in Maryland. In fact, the impacts to both drought and flooding may stem from what Garrett County feels with respect to changes in future severe storms. According to the USEPA, annual precipitation in most of Maryland has increased since the first half of the 20th century, “and precipitation from extremely heavy rain storms in the eastern United States increased by more than 25 percent since 1958” (USEPA, 2016). The USEPA anticipates continued increases in average annual precipitation as well as in the frequency of heavy downpours. Interestingly, the US EPA expects precipitation to increase in the winter and spring rather than the summer and fall. Thanks to these changes, intense, hype-local rainfall events may exacerbate flooding in both areas that frequently experience it as well as those with little history of flooding.

According to the NCA4 published in 2018, “tornadoes, hail, and thunderstorms are exhibiting changes that may be linked to climate change, but scientific understanding is not yet detailed enough to confidently project the direction and magnitude of future change.” However, severe thunderstorm modeling studies suggest that climate change may increase severe thunderstorm frequency and intensity.

Garrett County includes communities that range from very rural to more urban. In the rural areas with fewer impervious surfaces, the natural features will manage increased precipitation differently than the more urbanized areas where increased runoff will be a concern.

Risk Assessment

This section summarizes the vulnerability of the county to severe summer weather. The steering committee conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding severe summer weather.

PUBLIC SENTIMENT, SEVERE SUMMER WEATHER – GARRETT COUNTY					
Hazard	Level of Concern				Total Responses
	Not at All	Somewhat	Concerned	Very	
SEVERE SUMMER WEATHER	25 (36.23%)	26 (37.68%)	13 (18.84%)	5 (7.25%)	69
Which hazard event have you experienced property damage from?				16 (32.65%)	49
Please indicate which hazard event you feel may affect your community?				29 (43.94%)	66

While discussing the summer weather hazard, the steering committee considered hurricanes, tropical storms, and nor'easters. Most of the impacts of these events are similar to those from the types of severe summer weather considered above. However, there has been instances where Garrett County has been impacted primarily from flooding as a result of the remnants of hurricanes (i.e., Tropical Storm Fran in 1996, Hurricane Isabel in 2003, and Hurricane Frances in 2004, Hurricane Sandy resulted in significant snowfall in Garrett County in 2013). Garrett County also received a federal declaration (EM-3251-MD) from supporting the Hurricane Katrina evacuation in 2005. As such, the following call-out box discusses the risk of hurricanes and tropical storms, and nor'easters.

Hurricanes, Tropical Storms, and Nor'easters¹

Hurricanes, tropical storms, and nor'easters are classified as cyclones and are any closed circulation developing around a low-pressure center in which the winds rotate counterclockwise (in the Northern Hemisphere), and whose diameter averages 10 to 30 miles across.

With its inland situation, Garrett County is not normally as affected by the high winds associated with the passage of a hurricane as a coastal community would be. Garrett County's eastern border sits approximately 150 and 180 miles inland from the Atlantic coast. Historically, this distance has been enough to shield the county from the effects of a hurricane or tropical depression moving up the coast as well as from a direct hit along Maryland, Delaware, and New Jersey's shorelines. However, hurricanes do still carry a lot of moisture over the mountainous terrain and the amount of runoff associated with the resulting precipitation can be deadly. Indeed, much of the eastern United States experienced near-tropical depression weather from Hurricane Ida's 2021 track through the mainland after striking the U.S. Gulf Coast near New Orleans, Louisiana. Hurricanes that track through the Gulf of Mexico or move inland from the Atlantic and then pass over the Appalachians have the greatest potential for excessive rainfall in the mountainous areas. As such, all of Garrett County (including all participating municipalities) represents the **location** of potential risks from hurricanes, tropical storms, and nor'easters. The Towns of Friendsville and Kitzmiller face more danger from flooding associated with the passage of a hurricane due to their floodplain locations, while the Towns of Accident and Grantsville are more susceptible to wind damage because of their exposed location on higher, more flat terrain. Historically, a hurricane and tropical storm's extent has been measured by sustained wind speed, with the Saffir-Simpson Hurricane Wind Scale being a common example. The Saffir-Simpson scale begins with a Category 1 designation, marking sustained wind speeds of 74-95 mph. Tropical storm wind speeds range from 39-73 mph, while tropical depression speeds are 38 mph or less. The **extent** of these events in Garrett County would likely be in the tropical depression/storm range, with some future events pushing far enough inland with Category 1 speeds being possible.

The **impacts and vulnerability** discussion surrounding these events would be very similar to what appears in this Severe Summer Weather Hazard Profile. After all, the potential for heavy rain, hail, high winds, and lightning is all present in each of those storm types. What might be an extension specific to hurricanes, tropical storms, and nor'easters would be the potential for *sustained* heavy downpours. Recent hurricanes (e.g., Florence, Harvey, and Michael) had lower wind speeds than many hurricanes that have hit the continental United States, but the amount of rain they poured on impact areas produced widespread overwhelming flooding. The discussion in Section 2.2.5: Flooding would be a relevant consideration.

Regarding **historical occurrences**, NOAA's National Centers for Environmental Information (NCEI) does not contain historical records of hurricanes, tropical storms, or tropical depressions for Garrett County (1950-2023); however, two flooding events were included in the database directly related to Hurricanes Fran and Frances. Subsequently, there is no data as to **loss and damages** directly attributable to the incidents prompting Presidential declarations. (It is possible that Garrett County was the recipient of a declaration as a result of cascading impacts or providing support.) Again, though, this consideration is based more on future probability versus historical occurrences. NOTE: The NCEI does not have a category for nor'easters.

The *Fifth National Climate Assessment* (nca2023, globalchange.gov) discusses ocean warming along the Northeast Continental Shelf extensively in its chapter on the impacts to the northeast (which includes all of Maryland). This warming impacts the strength of storms coming in from the Atlantic Ocean – hurricanes and nor'easters, in particular. The Environmental Defense Fund (2023) reports that evaporation increases as water temperatures rise, which boosts the transfer of heat from the oceans to the air. As storms travel across warm oceans, they pull in more water vapor and heat, which can yield stronger wind, heavier rainfall, and flooding when the storms make landfall. When

¹ The headings that separate the narrative of this hazard profile (e.g., "Location and Extent") will appear in bold type to ensure a comparable discussion of the called-out hazard.

combining the traditional hurricane (i.e., June through September) and nor'easter (September through April) seasons, the Northeast region of the U.S. may be impacted by severe storms nearly year-round (USGCRP, 2018). Though the probability of these storms remains similar, the severity of them (per the warming ocean) may increase, pushing their dangerous effects further inland, yielding **future occurrences** for communities in areas like Garrett County.

The Location and Extent as well as the Impacts and Vulnerability sections above describe the consequences and effects of severe summer weather on the participants of this plan. The following table identifies the assets (taken from the asset inventory list in Section 1.2 above) that are most vulnerable to severe summer weather.

VULNERABLE ASSETS – SEVERE SUMMER WEATHER							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
Town of Accident							
X				Waste Water Infrastructure	Accident WWTP	101 Wastewater Lane	Accident
	X			Police/Corrections	Boys Forestry Camp	234 Recovery Road	Bittering
X				Transportation	Garrett County Airport	771 Airport Road	Accident
			X	Public Park	Pleasant Valley 4-H Park	243 4-H Camp Road	Swanton
X				Waste Water Infrastructure	Sewage Pump Station	Industrial Park Drive	Accident
X				Communications	Spectra Comm. Tower	400 Stockyard Road	Accident
X				Communications	USCOC Tower	400 Stockyard Road	Accident
X				Water Infrastructure	Water Pump Station	Accident Bittering Rd	Accident
Town of Deer Park							
			X	Public Facility	Big Run State Park	Savage River Rd	Bloomington
X				Waste Water Infrastructure	Bloomington WWTP	1227 Bloomington Hill Road	Bloomington
X				Water Infrastructure	Bloomington WTP	North Street	Bloomington
	X			Police/Corrections	Boys Forestry Camp	124 Camp Four Road	Bloomington
X				Water Infrastructure	Deer Park WTP	520 Decost Road	Deer Park
X				Electrical Infrastructure	Mount Zion Sub-Station	Route 135 Backbone Mtn.	Deer Park
			X	Public Facility	Swanton Community Center	3335 Swanton Road	Deer Park
Deep Creek / McHenry							
	X			Economic	Agriculture Trade Ctr.	24086 Garrett Hwy	McHenry
X				Communications	Communication Tower	83 Brant Road	McHenry
			X	Public Facility	Deep Creek Lake State Park	73 Brant Road	Swanton

VULNERABLE ASSETS – SEVERE SUMMER WEATHER							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
X				Waste Water Infrastructure	Deep Creek WWTP	90 Towne Centre Way	McHenry
	X			Transportation	Garrett County Airport Hangers	827 Airport Road	Deep Creek
			X	Fairgrounds	Garrett County Fairgrounds	24086 Garrett Hwy	McHenry
X				Electrical Infrastructure	Garrett Sub-Station	25326 Garrett Hwy	McHenry
X				Electrical Infrastructure	Hoyes Sub-Station	605 Hoyes Road	McHenry
X				Waste Water Infrastructure	Sewage Pump Station (15)	Near Lake Perimeter	Deep Creek
X				Electrical Infrastructure	Thayerville Sub-Station	19889 Garrett Hwy	Thayerville
Eastern Garrett							
X				Communications	American Towers Inc.	20971 National Pike	McHenry
X				Communications	CMA Cablevision Tower	Big Savage Mountain	Eastern Garrett
X				Communications	Columbia Gas Tower	Big Savage Mountain	Eastern Garrett
X				Communications	Crown Castel International Tower	Big Savage Mountain	Eastern Garrett
X				Communications	Crown Comms. Tower	Big Savage Mountain	Eastern Garrett
X				Communications	FAA Facility Tower	Pea Ridge Road	Eastern Garrett
X				Communications	FCC Comms. Tower	Big Savage Mountain	Eastern Garrett
X				Communications	Finzel Fire Comms. Tower	Finzel Road	Eastern Garrett
X				Water Infrastructure	Frostburg Water Pump Station	Piney Run Road	Eastern Garrett
X				Communications	WFRB Radio Tower	242 Finzel Road	Frostburg
Town of Friendsville							
X				Communications	Communication Towers	I-68 East of Friendsville	Friendsville
X				Water Infrastructure	Friendsville WTP	849 First Avenue	Friendsville
X				Waste Water Infrastructure	Friendsville WWTP	First Avenue	Friendsville
X				Water Infrastructure	Water Pump Stations	Water Street	Friendsville
Town of Grantsville							
X				Communications	Communication Towers	I-68 West of Keyzers Ridge	Grantsville
X				Electrical Infrastructure	Grantsville Substation	Alt. Route 40	Grantsville

VULNERABLE ASSETS – SEVERE SUMMER WEATHER							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
X				Waste Water Infrastructure	Grantsville WWTP	Alt. Route 40 Casselman River	Grantsville
X				Electrical Infrastructure	Jennings Substation	167 Baker Road	Grantsville
X				Waste Water Infrastructure	Jennings WWTP	Route 495	Grantsville
X				Waste Water Infrastructure	New Germany WWTP	McAndrew Hill Road	Grantsville
Town of Kitzmiller							
X				Electrical Infrastructure	Gorman Substation	Route 50 & Gorman Road	Gorman
	X			Fire Tower	High Rock Fire Tower	Swamp Road	Westernport
X				Waste Water Infrastructure	Kitzmiller WWTP	East Main Street	Kitzmiller
X				Water Infrastructure	Kitzmiller WTP	200 East Main Street	Kitzmiller
X				Electrical Infrastructure	Mettiki Substation	Table Rock Road	Gorman
X				Communications	Tri-State Cell Tower	Route 50 & Table Rock Road	Gorman
X				Communications	U.S. Cellular Tower	Westernport Road	Kitzmiller
Town of Mountain Lake Park							
X				Electrical Infrastructure	Broadford Substation	Route 135	Mountain Lake Park
X				Infrastructure	Mt. Lake Park WWTP	Powells Drive	Mountain Lake Park
Town of Oakland							
X				Communications	Communications Tower	17070 Garrett Hwy	Oakland
X				Communications	Communications Tower	17 East Oak Street	Oakland
X				Waste Water Infrastructure	Crellin WWTP	Hutton Road	Oakland
X				Water Infrastructure	Crellin WTP	Crellin Road	Oakland
	X			Animal Shelter	Garrett County Animal Shelter	152 Oakland-Sang Run Road	Oakland
X				Electrical Infrastructure	Oakland Substation	Route 135	Oakland
X				Waste Water Infrastructure	Oakland WWTP	27 Oakland-Rosedale Road	Oakland
X				Water Infrastructure	Oakland WTP	15 South Third Street	Oakland
X				Electrical Infrastructure	Oak Park Substation	West Liberty Street	Oakland

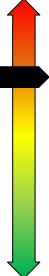
The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above.

SEVERE SUMMER WEATHER RISK RANKING			
Category	Points	Description	Notes
Frequency	5	Excessive (will occur annually)	There have been 170 severe summer storm events in Garrett County since 1956. Garrett County can expect an average of 2.54 severe summer storms per year.
Response	3	One week	The response to most severe summer storms typically occurs over the course of one day; however it can take several days to respond to significant wind and hail damage.
Onset	3	6-12 hours	All types of severe summer weather can be predicted up to 12 hours in advance.
Magnitude	4	Catastrophic (more than 50% of land area affected)	Severe summer storm events typically affect large portions of the county simultaneously.
Business	2	One week	Businesses would not typically close for a severe summer storm event. Damages from a significant storm may cause a short (one week) disruption of services.
Human	2	Low (some injuries)	The only injury reported in the NCEI Storm Event Database was the result of an individual being struck by lightning in 1996.
Property	2	10-25% of property affected	Though impacting large land areas, severe summer storm events often result in minimal property damage throughout the entire county.
Totals	21	HIGH	

FEMA's *Local Mitigation Planning Handbook* (2023b) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks are more or less prevalent as compared to the rest of the planning area. The following table identifies those multi-jurisdictional risks with respect to severe summer storms.

MULTI-JURISDICTIONAL CONSIDERATIONS, SEVERE SUMMER WEATHER		
<i>Jurisdiction</i>	<i>Comparison</i>	<i>Notes</i>
Garrett County	Same	Riskfactor.com (n.d.) lists the county's risk of wind (only) as "Minor," the lowest ranking on its scale. The website denotes severe storms as yielding the most wind-related risk.
Accident	(Slightly) More	Accident is more exposed to wind due to its location on high, nearly level land. Riskfactor.com (n.d.) notes Accident's wind (only) risk as "Minimal."
Deer Park	Same	Riskfactor.com (n.d.) notes Deer Park's wind (only) risk as "Minimal," which means there is a very low likelihood that severe storm winds will impact the area.
Friendsville	Same	Friendsville is more protected from high winds due to its valley setting. Riskfactor.com (n.d.) lists Friendsville's wind (only) risk as "Minimal," which means there is a very low likelihood that severe storm winds will impact the area.
Grantsville	(Slightly) More	Grantsville is more exposed to wind due to its location on high, nearly level land. Riskfactor.com (n.d.) lists Grantsville's wind (only) risk as "Minor," which means there is a very low likelihood that severe storm winds will impact the area.
Kitzmillier	Same	Kitzmillier is more protected from high winds due to its valley setting. Riskfactor.com (n.d.) lists Kitzmillier's wind (only) risk as "Minimal." Severe storms yield the most likely wind risk.
Loch Lynn Heights	Same	Riskfactor.com (n.d.) notes Loch Lynn Heights' wind (only) risk as "Minimal."
Mountain Park Lake	Same	Riskfactor.com (n.d.) notes Mountain Park Lake's wind (only) risk as "Minimal."
Oakland	(Slightly) More	Riskfactor.com (n.d.) notes Oakland's wind (only) risk as "Minimal." The town contains more residential and commercial structures that may be exposed, than any other municipality.

2.2.10 Severe Winter Weather

Winter storms include blizzards, heavy snow fall, blowing snow, ice storms, and dangerous wind chills that could threaten life or property.				
 <p>RISK</p> <p>HIGHEST</p> <p>HIGH</p> <p>MEDIUM</p> <p>LOW</p> <p>LOWEST</p>	Period of Occurrence:	Winter storms typically occur from November through March	Garrett County Risk Ranking:	High
	Warning Time:	12-24 hours	State Risk Ranking:	Medium-High
	Probability:	Excessive (will occur on an annual basis)	Impact:	Catastrophic (more than 50% of land area affected)
	Type of Hazard:	Natural	Disaster Declarations:	EM-3100-MD (1993) DR-1081-MD (1996) EM-3179-MD (2003) DR-1910-MD (2010) EM-3349-MD (2013) DR-4091-MD (2013) DR-4261-MD (2016)

Hazard Overview

Winter storms “occur when extremely cold atmospheric conditions coincide with high airborne moisture content, resulting in rapid and heavy precipitation of snow and/or ice.” (Haddow, Bullock, & Coppola, 2014). During winter, there are multiple instances of cold weather, snow, and storms. This profile includes only those winter weather events that are damaging enough to be considered “severe.” These include NOAA-labeled winter storms, heavy snow, blizzards, and ice storms.

- **Winter Storm:** Is an event that has more than one significant hazard (i.e., heavy snow and blowing snow, snow and ice, snow and sleet, sleet and ice; or snow, sleet and ice) and meets or exceeds regionally defined 12 and/or 24 hour warning criteria for at least one of the precipitation elements on a widespread or localized basis.
- **Heavy Snow:** Heavy snow refers to snowfall accumulating to four inches or more in 12 hours or less, or snowfall accumulating to six inches or more in 24 hours or less.
- **Blizzard:** A blizzard is a dangerous winter storm that is a combination of blowing snow and wind and results in very low visibility. Heavy snowfall and severe cold usually accompany blizzards, but not always. Sometimes strong winds can pick up fallen snow, creating a ground blizzard. A Blizzard is a winter storm which produces the following conditions for three hours or longer: (1) sustained winds or frequent gusts 30 knots (35

mph) or greater, and (2) falling and/or blowing snow reducing visibility frequently to less than ¼ mile, on a widespread or localized basis.

- **Ice Storm:** An ice storm is a storm that results in the accretion of at least 0.25" of ice on exposed surfaces. It can create hazardous driving and walking conditions, and tree branches and power lines can easily snap under the weight of the ice (see damage and impact descriptions in below).
- **Sleet or Freezing Rain:** Sleet accumulations meeting or exceeding locally/regionally defined warning criteria (typical value is a half inch or more)

SPERRY-PILTZ ICE ACCUMULATION INDEX	
Ice Damage Index	Damage and Impact Descriptions
0	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
2	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
3	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1-5 days.
4	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines and some high voltage transmission lines/structures. Outages lasting 5-10 days.
5	Catastrophic damage to entire exposed utility system, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.

Just like with other storms, the right combination of ingredients is necessary for a winter storm to develop. The three key components of a winter storm are cold air, lift, and moisture.

Location and Extent

Winter storms are an annual, common occurrence throughout Garrett County. They are often widespread and affect the municipalities in much the same way as they do the county in general. There are occasions when the northern towns, (i.e., Accident, Friendsville and Grantsville) are affected more. These events can take many forms either as independent events (i.e., snow, freezing rain, sleet, cold temperature events) or a combination. The most significant winter storms that affect Garrett County are known as “nor’easters” because they have strong northeast winds; these storms are also typically accompanied by heavy rain or snowfall.

According to information obtained from the Baltimore, MD / Washington, D.C. National Weather Service, snowfall varies widely across their area of responsibility due to varied terrain and elevation. The majority of Garrett County is comprised of a mixed landscape and is a transition zone between lowlands and mountainous areas. The entire county falls within the Appalachian Mountains where elevations generally range from 1,800 to greater than 3,000 feet above sea level. The highest elevation in the county is 3,360 feet above sea level at Hoyer-Crest, a summit along Backbone Mountain, this is also the highest point in the State of Maryland.

Snowfall across the county typically occurs between November and March; however, while less common, it is not unusual for snow to occur outside of the winter season beginning as early as October and ending as late as April or May especially in the upper elevations of the county. In very rare events, snow even earlier and/or later has been recorded. Most communities in Garrett County record an annual snowfall of 92 inches. Some communities at higher elevations, like Bittinger, at a general elevation of 2,700 feet, receives on average, more than 100 inches of snow per season.

Unlike the remainder of Maryland, Garrett County receives much of its snowfall from air masses generated over the Great Lakes that rise and cool as they cross the Allegheny Plateau. This can result in 10-12 inches of snow on the Plateau, while areas downslope to the east receive little or no snow. By contrast, Allegany County, just to the east, receives 55.6 inches of annual snowfall. Garrett County holds the highest snowfall record in the state, during the winter of 2009-2010 approximately 262.5 inches accumulated in a single season. Winter storms occur with much greater frequency and are usually more severe in Garrett County compared to the rest of the state.

Temperatures usually average 5-10 degrees cooler in Garrett County than in the rest of Maryland throughout the year. In fact, according to the National Weather Service, the coldest temperature recorded in the state was -40°F on January 13, 1912, in the Town of Oakland. Oakland, owing to its high elevation and valley location, is among the coldest and snowiest locales in the State of Maryland. Oakland averages of 106.1 inches of snow per year. The most snow in 24 hours was 40.0 inches on February 16, 1908.

Garrett County has received seven disaster declarations as a result of severe winter weather over the past 30 years, accounting for 50% of all disaster declaration issued for the county. Garrett County has experienced 178 winter weather events since 1996 according to data obtained from the National Centers for Environmental Information (NCEI) Storm Event Database.

The table below illustrates the number of winter weather events reported for the county. Of the 178 reported events, 49% were classified as heavy snow events.

GARRETT COUNTY WINTER STORM EVENTS				
	<i>Blizzards</i>	<i>Heavy Snow</i>	<i>Ice Storms</i>	<i>Winter Storms</i>
Total Events	4	87	32	55
Events with Property Damage	2	2	5	7

Source: NCEI Storm Event Database

A severe winter storm could affect all areas of the region simultaneously, virtually bringing all operations to a standstill. Winter storms create a difficult emergency response effort; adverse road conditions can impeded or prohibit all vehicular movement, including emergency response vehicles.



Snow bank along SR 495 near Obrien Road, February 2010.
Submitted by Surya Chronister



Residence in Oakland, MD, February 2010. Submitted
by Deanna Fryfoogle

There is no widely-used scale to classify snowstorms, but Paul Kocin and Louis Uccellini from the National Weather Service developed the Northeast Snowfall Impact Scale (NESIS). The NESIS characterizes and ranks high-impact Northeastern snowstorms from “notable” to “extreme.” Significantly, the NESIS does not predict the impacts of a forecasted storm; instead, it is a mechanism for rating impacts after a storm occurs (see table below).

NORTHEAST SNOWFALL IMPACT SCALE		
<i>Category</i>	<i>NESIS Value</i>	<i>Description</i>
1	1.0 – 2.499	Notable
2	2.5 – 3.99	Significant
3	4.0 – 5.99	Major
4	6.0 – 9.99	Crippling
5	10.0+	Extreme

Source: National Weather Service

Impacts and Vulnerability

Severe winter storms create treacherous driving conditions, according to a *FEMA Winter Storm Fact Sheet*, the leading cause of fatalities during winter storms is from automobile or other transportation accidents. According to the National Severe Storms Laboratory (NSSL), most deaths from winter storms are not from the storm itself. People die from traffic accidents on icy roads, heart attacks while shoveling snow, and hypothermia from prolonged exposure to cold. During severe storms, everyone is potentially at risk, particularly those stranded in their vehicle or outside during the storm. “Recent data shows that 70% of injuries related to ice and snow occur in automobiles, and 25% are people caught out in the storm. Most victims are males over 40 years old” (NWS, Winter Storms, n.d).

Heavy snow can result in property damage from roof collapses, and extreme cold temperatures can cause waterlines to freeze and bust. Ice accumulation can topple power lines, utility poles, and communication towers causing electrical power to be lost, which for several means a loss of a critical home heating source. The most vulnerable structures to roof collapse include those with large-span roofs, those that are poorly built, or are dilapidated. The resultant disruption in communication and utility services can last several days. Even minimal ice accumulation can pose a serious threat to motorists and pedestrians. Bridges and overpasses are particularly dangerous, as they freeze before other surfaces.

Health hazards generated from severe winter storms include frostbite and hypothermia. Frostbite is a severe reaction to cold exposure that can permanently damage its victims. A loss of feeling and a white or pale appearance in the victim’s fingers, toes, nose, and ear lobes are symptoms of frostbite. Hypothermia is a condition brought on when the body temperature drops to less than 55 degrees Fahrenheit. Symptoms of hypothermia include uncontrollable shivering, slow speech, memory lapses, frequent stumbling, drowsiness, and exhaustion.

Carbon monoxide poisoning is also a concern. Whether due to a power failure or a heating system being inadequate to warm a structure the need to use a generator and/or fireplace increases the risk of carbon monoxide poisoning and structure fires (CDC, 2015).

Garrett County is probably the best equipped county in the State of Maryland when it comes to dealing with winter storms. Both the State Highway Administration and the County Roads Department have dealt with winter storms for decades and are trained and equipped to do so. The county’s Department of Emergency Management as well as the local police, fire and rescue departments are trained to deal with winter storms and the types of situations that result from them.

Additionally, the County's Building Code contains snow loading and wind load requirements for new structures. These codes have been modified to reflect the climate of the area and include a modified requirement for footings and foundations due to the lower frost line in the county.

Social Vulnerability Considerations

Infants and the elderly are the most susceptible to the cold and wet conditions of a winter storm. Conditions that may be uncomfortable or inconvenient to the general population can easily become life-threatening to them (NOAA, 2017). The homeless have a much higher risk than the general population of developing exposure-related conditions (nationalhomeless.org, 2010). The inability to provide adequate, dry clothing, shelter and heat accompanied by malnutrition, decreased body fat, underlying infection, lack of fitness and fatigue make homeless individuals much more vulnerable to winter storms (O'Connell, 2004).

Low-income individuals are more vulnerable as they are more likely to live in poorly insulated homes and may be unable to afford sufficient heating. These individuals may need to make tradeoffs between proper nutrition, medication, and proper heating expenditures (USGCRP, 2016).

Dugan, Byles, and Mohagheghi (2023) studied social vulnerability with respect to power outages, using a case study for Colorado. This study identified increased health risks, varying (often less) power outage preparedness, and variance in the willingness and means to evacuate amongst an array of socially-vulnerable populations. The authors concluded that there is a need to identify these socially vulnerable groups for more targeted information, assistance, and resource delivery. These findings are particularly relevant to severe winter weather since power outages are common cascading effects from winter storms, and sustained harsh winter weather conditions can make the work that restores power dangerous and difficult.

Previous Occurrences

Garrett County has experienced 178 winter weather events since 1996. This rate is an average of 6.59 winter weather events per year. The Towns of Accident, Friendsville and Grantsville have experienced the most winter weather events within the county. These events are presented by category in the table below.

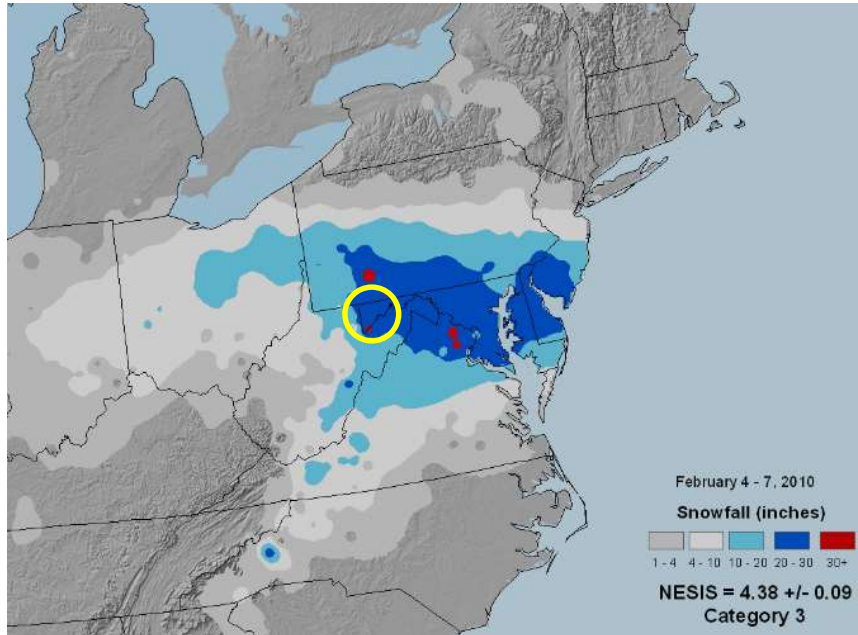
HISTORICAL SEVERE WINTER WEATHER – GARRETT COUNTY							
BLIZZARD (2010 to 2023)							
Total Events	Areas Affected	Area w/ Most Events	Avg. Events/Year	Injuries	Fatalities	Damages	
						Property	Crop
4	Countywide	Countywide	0.31	None reported	None reported	\$2.1M	\$0.00
Most blizzards in one year = 3 in 2010 (all during the month of February)							
ICE STORM (1996 to 2023)							
Total Events	Areas Affected	Area w/ Most Events	Avg. Events/Year	Injuries	Fatalities	Damages	
						Property	Crop
32	Countywide	Countywide	1.19	10	None reported	\$117,000	\$0.00
Largest ice accumulation = 1 inch in 1996							
HEAVY SNOW (1996 to 2023)							
Total Events	Areas Affected	Area w/ Most Events	Avg. Events/Year	Injuries	Fatalities	Damages	
						Property	Crop
87	Countywide	Accident, Friendsville, Grantsville	3.22	None reported	None reported	\$175,000	\$0.00
Most heavy snow events in one year = 10 in 2003							
WINTER STORM (1997 to 2023)							
Total Events	Areas Affected	Area w/ Most Events	Avg. Events/Year	Injuries	Fatalities	Damages	
						Property	Crop
55	Countywide	Countywide	2.12	None reported	None reported	\$67,000	\$0.00
Most winter storm events in one year = 7 in 2021							
178	Countywide	Accident, Friendsville, Grantsville	6.59	10	0	\$2.46M	\$0.00

Source: NCEI Storm Event Database



Countywide Blizzards – February, 2010 (5th – 6th) / (9th – 11th) / (25th – 27th)

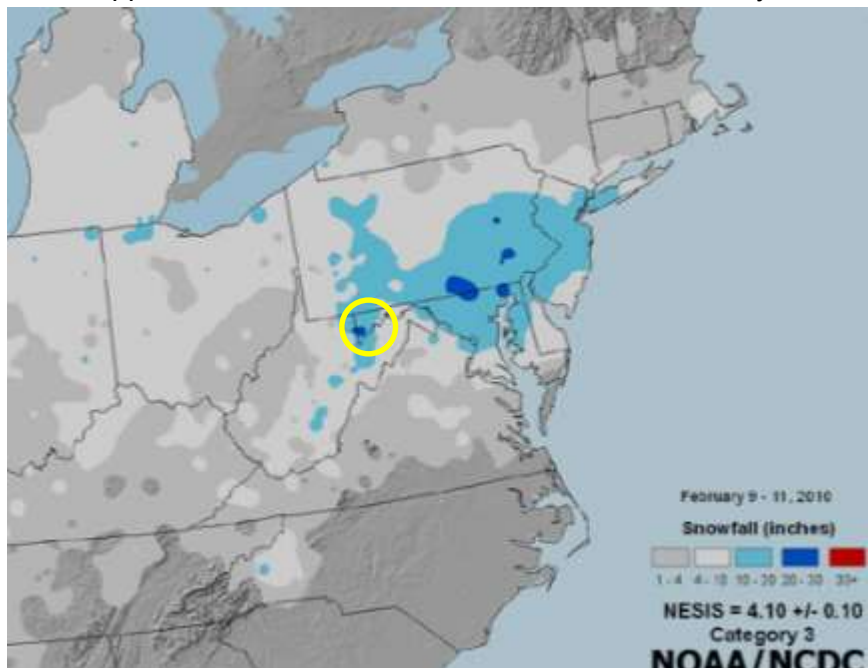
Garrett County experienced the worst series of sustained winter weather in its recorded history during the month of February in 2010. At the end of the month over 114 inches of snow had fallen in the county. The area experienced blizzard conditions on the 5th and 6th when a low pressure system originating in the Ohio Valley redeveloped over the Carolina Coast and brought very high snow totals to Garrett County as a result of very high snowfall rates and the slow speed of the storm system. The blizzard's reach was widespread and caused



the United States Government to shut down for several days due to significant snowfall in the D.C. area. Garrett County reported nearly 40 inches of snow from this event.

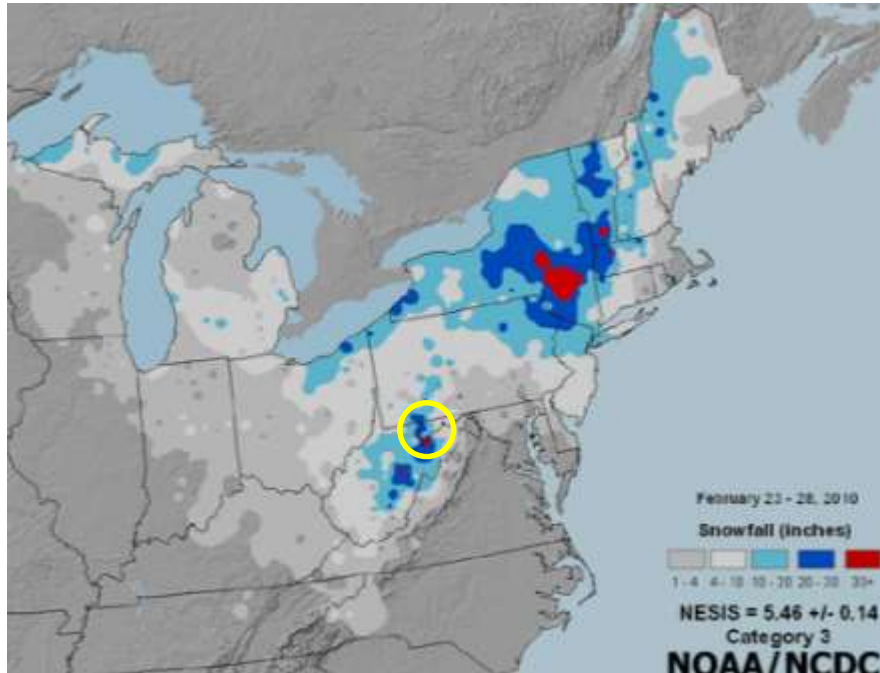
Blizzard conditions were also experienced in the county from the 9th through the 11th. This storm began as a powerful Alberta Clipper then intensified as it reached the New Jersey Coast.

As this point, is also formed an “eye” similar to a hurricane and was said to be of similar strength of a Category 1 hurricane. Garrett County experienced very strong winds with this system as well as another 30 inches of snow. Because it came only a few days after the previous blizzard, these two storms became nicknamed as



“snowmageddon” and “snowpocalypse” in the Mid-Atlantic region.

Blizzard conditions were experienced yet again from the 25th through the 27th of February, 2010. A complex combination of multiple systems, including an upper air low from the northern plains states, and a surface low from the gulf coast states. As the surface low tracked northeast from the Carolina Coast, the upper air low transferred its energy to it, eventually enabling the new storm to undergo rapid intensification near Long Island. A strong blocking regime of high pressure over the Canadian



Maritime provinces prevented the storm system from exiting to the east. This resulted in a cutoff low which took a highly unusual track, retrograding west into New York State before looping back out to sea. During the prolonged period of snow due to the cutoff low's flow over Lake Erie, Garrett County experienced nearly constant moderate to heavy snowfall during the three-day period, ending up with another 44 inches of snow.

Countywide Blizzard – October 29-31, 2012 (DR-4091-MD)

The remnants of Hurricane Sandy produced a blizzard event with snow amounts of more than 2.5 feet reported in Garrett County. Almost 95% of residents in Garrett County were without power during the peak of the storm, with outages lasting over a week in many locations. This storm resulted in several Public Assistance projects in Garrett County following a federal disaster declaration. The total cost of the FEMA Public Assistance for Garrett County was \$1,767,152.

Countywide Winter Storm Jonas – January 22-23, 2016 (DR-4261-MD)

The highest snow amounts from this storm were reported at Redhouse and Oakland in Garrett County, with 38 and 36 inches of snow respectively. This surpassed the previous two-day total for Oakland dating back to 1983. A State of Emergency was declared in Pennsylvania and Maryland. This storm resulted in a FEMA Disaster Declaration with a total cost of FEMA Public Assistance for Garrett County at \$295,053.

Loss and Damages

Winter storms often-times impact all areas and jurisdictions within Garrett County as they are typically widespread events. Loss estimates can be derived using historical data. Winter storms have resulted in nearly \$2.5 million in property damages throughout the county over the past 27 years, creating an annual average damage estimate of approximately \$91,000. This estimate likely underestimates damages to infrastructure and power lines.

Future Occurrences

The severity of winter storms may change in the future. For instances, heavy winter precipitation and blizzard conditions can impact power distribution utilities, and as those systems age, weather-related impacts may become more frequent in the form of power outages. The National Climate Assessment identifies a shortened snow season in the Northeast U.S., of which its report considers Maryland to be a part of. The report cites an increase in the amount of winter precipitation that falls as rain, resulting from a likely northward shift in the rain-snow transition zone. Despite these trends, the future probability of winter weather events remain highly likely in Garrett County due primarily to the county's general elevation.

Future Climate Considerations

According to information obtained from the *Fifth National Climate Assessment (NCA5)*, seasons are changing in length and timing in Garrett County, with earlier springs, delayed falls, and shorter winters. While a more extended frost-free period can benefit some crops or allow for double cropping, it can limit plant diversity, encourage invasive species, and threaten human and ecosystem health, for example milder winters help more ticks and mosquitos survive the winter.

Earlier springs may also cause trees and flowers to bloom earlier, leading to an extended allergy season. During a "false spring", warm weather in late winter or early spring can cause crops and plants to grow too early, exposing them to frost.

Reduced snow cover from warm winters and longer summers increases the risk of drought, and may impact tourism as stream flows may be significantly reduced in popular trout streams throughout the county, and ski resorts could be impacted as the length of ski season may be shortened.

Severe winter weather is another general label referring to weather phenomena, similar to the Intergovernmental Panel on Climate Change's (IPCCs) term "extreme precipitation." Winter precipitation events could thus become more extreme, though they would likely impact the same areas of the county. Recent polar vortex events have yielded discussion that winter weather will include more cold snaps versus precipitation.

Risk Assessment

This section summarizes the vulnerability of the county to winter storms. The steering committee conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding severe winter weather.

PUBLIC SENTIMENT, SEVERE WINTER WEATHER – GARRETT COUNTY					
Hazard	Level of Concern				Total Responses
	Not at All	Somewhat	Concerned	Very	
SEVERE WINTER WEATHER	8 (11.27%)	19 (26.76%)	23 (32.39%)	21 (29.58%)	71
Which hazard event have you experienced property damage from?				34 (69.39%)	49
Please indicate which hazard event you feel may affect your community?				61 (92.42%)	66

The Location and Extent as well as the Impacts and Vulnerability sections above describe the consequences and effects of severe winter weather on the participants of this plan. The following table identifies the assets (taken from the asset inventory list in Section 1.2 above) that are most vulnerable to severe winter weather.

VULNERABLE ASSETS – SEVERE WINTER WEATHER							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
Town of Accident							
X				Transportation	Accident-Bittering Road Bear Creek Bridge	N/A	Accident
X				Transportation	Accident-Bittering Road Cherry Creek Bridge	N/A	Accident
X				Transportation	Dung Hill Road Casselman River Bridge	N/A	Bittering
X				Transportation	Fish Hatchery Road Bear Creek Bridge	N/A	Accident
X				Transportation	Frank Brenneman Road Casselman River Bridge	N/A	Bittering
X				Transportation	Garrett County Airport	771 Airport Road	Accident
X				Transportation	Lageer Road Casselman River Bridge	N/A	Bittering
X				Transportation	Maynardier Road Casselman River Bridge	N/A	Bittering
X				Transportation	Rabbit Hollow Rd. Little Bear Creek Bridge	N/A	Accident
X				Transportation	Rock Lodge Rd Casselman River Bridge	N/A	Bittering
X				Transportation	Route 219 Bear Creek Bridge	N/A	Accident
X				Waste Water Infrastructure	Sewage Pump Station	Industrial Park Drive	Accident
X				Communications	Spectra Comm. Tower	400 Stockyard Road	Accident
X				Communications	USCOC Tower	400 Stockyard Road	Accident
X				Water Infrastructure	Water Pump Station	Accident Bittering Rd	Accident
Town of Deer Park							
			X	Public Facility	Big Run State Park	Savage River Rd	Bloomington
X				Transportation	Boiling Springs Rd. Bridge & Railroad crossing	Boiling Springs Rd @ Little Yough.	Deer Park
X				Transportation	Calderwood Road Bridge	N/A	Deer Park
X				Transportation	CSX RR Bridge	Mainline NBPR	Bloomington

VULNERABLE ASSETS – SEVERE WINTER WEATHER							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
X				Transportation	CSX RR Bridge	North Branch Potomac River	Bloomington
X				Transportation	Fricks Bridge & RR crossing	West of Deer Park	Deer Park
X				Transportation	Garrett Road Bridge (Black Run)	N/A	Deer Park
X				Transportation	CSX / Route 135 Bridge	Route 135	Bloomington
X				Transportation	Route 135 Savage River Bridge	Route 135	Bloomington
X				Transportation	Savage River Dam Bridge	Savage River Dam	Bloomington
X				Transportation	Savage River Rd. Bridge	N/A	Bloomington
X				Transportation	Savage River Rd. Big Run Bridge	N/A	Bloomington
X				Transportation	Savage River Rd. Dry Run Bridge	N/A	Bloomington
X				Transportation	Savage River Rd. Crabtree Creek Bridge	N/A	Bloomington
X				Transportation	Route 495 Bridge	Crabtree & Swanton	Deer Park
X				Transportation	Swanton Road Bridge	S. Fork Crabtree	Deer Park
Deep Creek / McHenry							
X				Communications	Communication Tower	83 Brant Road	McHenry
X				Electrical Infrastructure	Garrett Sub-Station	25326 Garrett Hwy	McHenry
X				Transportation	Glendale Rd. Deep Creek Bridge	Deep Creek Lake	McHenry
X				Transportation	Hoyes Run Bridge	Hoyes Run	Deep Creek
X				Electrical Infrastructure	Hoyes Sub-Station	605 Hoyes Road	McHenry
X				Transportation	Oakland Sang Run Bridge	Deep Creek Lake	McHenry
X				Transportation	Rock Lodge Rd. Bridge	Cherry Creek	Deep Creek
X				Transportation	Route 219 Deep Creek Lake Bridge	Deep Creek Lake	McHenry
X				Transportation	Sang Run Rd Bridge	Youghiogheny River	Deep Creek
X				Waste Water Infrastructure	Sewage Pump Station (15)	Near Lake Perimeter	Deep Creek
X				Electrical Infrastructure	Thayerville Sub-Station	19889 Garrett Hwy	Thayerville
Eastern Garrett							
X				Communications	American Towers Inc.	20971 National Pike	McHenry

VULNERABLE ASSETS – SEVERE WINTER WEATHER							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
X				Transportation	Avilton Lonaconing Rd Bridge	Savage River	Eastern Garrett
X				Transportation	Beall School Rd. Bridge	Savage River	Eastern Garrett
X				Communications	CMA Cablevision Tower	Big Savage Mountain	Eastern Garrett
X				Communications	Columbia Gas Tower	Big Savage Mountain	Eastern Garrett
X				Communications	Crown Castel International Tower	Big Savage Mountain	Eastern Garrett
X				Communications	Crown Comms. Tower	Big Savage Mountain	Eastern Garrett
X				Communications	FAA Facility Tower	Pea Ridge Road	Eastern Garrett
X				Communications	FCC Comms. Tower	Big Savage Mountain	Eastern Garrett
X				Communications	Finzel Fire Comms. Tower	Finzel Road	Eastern Garrett
X				Water Infrastructure	Frostburg Water Pump Station	Piney Run Road	Eastern Garrett
X				Transportation	I-68 Beal School Rd. Bridge	Near Finzel	Eastern Garrett
X				Transportation	I-68 Green Lantern Rd. Bridge	Near Avilton	Eastern Garrett
X				Transportation	I-68 Old Frostburg Rd. Bridge	Near Long Strech	Eastern Garrett
X				Transportation	Old Frostburg Rd. Bridge	Savage River	Eastern Garrett
X				Transportation	Piney Run Rd. Bridge	Piney Run	Eastern Garrett
X				Transportation	Rt 40 / Rt 946 Bridge	Near Finzel	Eastern Garrett
X				Transportation	Rt 40 / Beall School Rd. Bridge	Near Finzel	Eastern Garrett
X				Communications	WFRB Radio Tower	242 Finzel Road	Frostburg
Town of Friendsville							
X				Transportation	Accident-Friendsville Rd. Bridge (Bear Creek)	Bear Creek	Friendsville
X				Transportation	Bear Creek Rd. Bridge	Bear Creek	Friendsville
X				Transportation	Buffalo Run Rd. Bridge	Buffalo Run	Friendsville
X				Communications	Communication Towers	I-68 East of Friendsville	Friendsville
X				Transportation	Cranesville Rd. Bridge	Salt Block Run	Friendsville
X				Transportation	I-68 Youghiogheny River Bridge	Youghiogheny River	Friendsville
X				Transportation	Maple Street Bridge	N/A	Friendsville
X				Transportation	Route 42 Yough. River Bridge	Youghiogheny River	Friendsville
X				Water Infrastructure	Water Pump Stations	Water Street	Friendsville



VULNERABLE ASSETS – SEVERE WINTER WEATHER							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
X				Transportation	White Rock Rd. Bridge	Salt Block Run & White Rock Glade Run	Friendsville
Town of Grantsville							
X				Communications	Communication Towers	I-68 West of Keyzers Ridge	Grantsville
X				Transportation	Durst Rd. Bridge	N. Branch Casselman	Grantsville
X				Electrical Infrastructure	Grantsville Substation	Alt. Route 40	Grantsville
X				Transportation	Hare Hollow Rd. Bridge	S. Branch Casselman	Grantsville
X				Transportation	I-68 Casselman Bridge	Near Grantsville	Grantsville
X				Transportation	I-68 Lower New Germany Rd. Bridge	Near Grantsville	Grantsville
X				Transportation	I-68 New Germany Rd. Bridge	Near Grantsville	Grantsville
X				Transportation	I-68 Route 219 Bridge	Near Grantsville	Grantsville
X				Transportation	I-68 Route 495 Bridge	Near Grantsville	Grantsville
X				Transportation	Jennings Road Bridge	Route 495	Grantsville
X				Electrical Infrastructure	Jennings Substation	167 Baker Road	Grantsville
X				Transportation	Maple Grove Rd. Bridge	Casselman River	Grantsville
X				Transportation	River Road Bridge	Casselman River	Grantsville
X				Transportation	Rt 40 / Casselman River Bridge	Near Grantsville	Grantsville
X				Transportation	Rt 495 N. Branch Casselman River Bridge	Near Jennings	Grantsville
X				Transportation	Savage River Rd. Bridge	Poplar Lick Run & Bear Pen Run	Grantsville
X				Transportation	Westernport Road Bridge	Savage River	Grantsville
Town of Kitzmiller							
X				Transportation	CSX RR Bridge	North Branch Potomac River	Kitzmiller
X				Transportation	CSX RR Bridge	NBPR @ Alt House Hill Road	Gorman
X				Electrical Infrastructure	Gorman Substation	Route 50 & Gorman Road	Gorman
X				Transportation	Kempton Road Bridge	Laural Run	Gorman
X				Transportation	Laural Run Road Bridge	Laurel Run	Gorman
X				Electrical Infrastructure	Mettiki Substation	Table Rock Road	Gorman

VULNERABLE ASSETS – SEVERE WINTER WEATHER							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
X				Transportation	Route 38 Bridge	NBPR	Kitzmillier
X				Transportation	Route 50 Bridge	NBRP	Gorman
X				Communications	Tri-State Cell Tower	Route 50 & Table Rock Road	Gorman
X				Communications	U.S. Cellular Tower	Westernport Road	Kitzmillier
X				Transportation	Wilson Corona Rd. Bridge	Shields Run	Gorman
Town of Mountain Lake Park							
X				Electrical Infrastructure	Broadford Substation	Route 135	Mountain Lake Park
X				Transportation	CSX Rt 560 Crossing	Route 250	Mountain Lake Park
X				Transportation	Route 135 Bridge	Little Yough River	Mountain Lake Park
Town of Oakland							
X				Transportation	2 nd Street CSX RR Crossing	2 nd Street	Oakland
X				Transportation	Blue Ribbon Rd. Bridge	Clark Run Creek	Oakland
X				Communications	Communications Tower	17070 Garrett Hwy	Oakland
X				Communications	Communications Tower	17 East Oak Street	Oakland
X				Transportation	Crellin Mine Rd. Bridge	Snowy Creek	Oakland
X				Transportation	CSX RR Bridge	Youghiogheny River	Oakland
X				Transportation	Fingerboard Rd. / CSX RR Crossing	Fingerboard Road, Hutton	Oakland
X				Transportation	Herrington Manor Rd. Bridge	Herrington Run	Oakland
X				Transportation	Jasper Riley Rd. Bridge	Trout Run	Oakland
X				Transportation	Kings Run Rd. Bridge	Broadford Run	Oakland
X				Transportation	Liberty Street Bridge	Youghiogheny River	Oakland
X				Transportation	Mansfield Road Bridge	Redhouse Cherry Creek	Oakland
X				Transportation	Mason School Rd. Bridge	Cherry Creek	Oakland
X				Transportation	Oakland Rosedale / CSX RR Crossing	Rosedale Road	Oakland
X				Transportation	Oakland Rosedale Rd. Bridge	Little Yough River	Oakland
X				Transportation	Oakland Sang Run Rd. Bridge	Miller Run	Oakland
X				Electrical Infrastructure	Oakland Substation	Route 135	Oakland

VULNERABLE ASSETS – SEVERE WINTER WEATHER							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
X				Electrical Infrastructure	Oak Park Substation	West Liberty Street	Oakland
X				Transportation	Pleasant Valley Rd. Bridge	Trout Run	Oakland
X				Transportation	Rt. 39 / CSX RR Bridge	Oakland	Oakland
X				Transportation	Rt. 39 Bridge	Crellin	Oakland
X				Transportation	Rt. 219 South Bridge	Little Yough River	Oakland
X				Transportation	Silver Knob Road Bridge	Youghiogheny River	Oakland
X				Transportation	Swallow Falls Rd. Bridge	Youghiogheny River	Oakland
X				Transportation	Underwood Road Bridge	Cherry Creek	Oakland
X				Transportation	Underwood Rd. / CSX RR Bridge	Underwood Road	Oakland

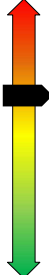
The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above.

SEVERE WINTER WEATHER RISK RANKING			
Category	Points	Description	Notes
Frequency	5	Frequent (Will occur annually)	Garrett County has experienced 178 winter weather events over the past 27 years. The county can expect an average of 6.59 winter weather events per year. Garrett County has received seven disaster declarations regarding winter weather.
Response	3	One week	The response to most severe winter weather events typically occurs over the course of one day; however, few do require a minimum of one week.
Onset	2	12-24 hours	All types of winter weather can be predicted up to 12 hours in advance.
Magnitude	4	More than 50% of land area affected	Winter weather typically impacts the entire county at varying degrees simultaneously.
Business	2	One week	Businesses may be required to close for up to one week due to poor road conditions and prolonged power outages.
Human	3	Medium (Multiple severe injuries)	Several people could be injured or killed in vehicle accidents, suffer heart attacks while shoveling snow, suffer from frostbite and hypothermia, succumb to carbon monoxide poisoning from improper venting of fuel-powered generators.
Property	2	10-25% of property affected	Winter weather events impact large areas; however, often result in minimal property damage.
Totals	21	HIGH	

FEMA's *Local Mitigation Planning Handbook* (2023c) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks or vulnerabilities are more or less prevalent as compared to the other participating jurisdictions. Geographically, all participating jurisdictions are at equal risk of severe winter weather. Most historical occurrences have been county-wide, and future occurrences are likely to be as well.

Garrett County is the western-most county in Maryland, and is considered the state's mountain county. The general elevations differences of the municipalities of Garrett County are so minimal that they do not influence the types of winter weather impacts they experience in measurably different ways. Therefore, the discussion above applies equally to the eight jurisdictions participating in this plan.

2.2.11 Tornado

A tornado is a violently rotating column of air that extends from the base of a thunderstorm to the ground.				
	RISK	Period of Occurrence:	They can occur at any time but are most likely to occur during thunderstorms from March to September	Garrett County Risk Ranking: Medium
		Warning Time:	Less than 6 hours	State Risk Ranking: Medium-High
		Probability:	Low (unlikely to occur in a year)	Impact: Localized (less than 10% of land area affected)
		Type of Hazard:	Natural	Disaster Declarations: None

Hazard Overview

Tornadoes form when warm, humid air collides with cold, dry air. Tornadoes can also occur along a "dryline," which separates very warm, moist air to the east from hot, dry air to the west. Another way that tornadoes can be created is when warm moist air flows upslope. Under the right temperature and moisture conditions, intense thunderstorms can produce tornadoes in higher terrain, which Garrett County possesses. They are vertical funnels of rapidly spinning air that extend from a thunderstorm cloud to the ground. In order for a vortex to be classified as a tornado, it must be in contact with the ground and extend to or from the cloud base.

Tornadoes can have wind speeds up to, and exceeding 250 miles per hour and a width of approximately 660 yards. While the majority of tornadoes are clearly visible, some are rain-wrapped and obscured by rain and low-hanging clouds. They occur in the U.S. more than anywhere else in the world and can occur in every state, although the mid-west states have the greatest potential for tornadoes by far. Tornadoes originate from rotating thunderstorms called "supercells" or quasi-linear convective systems (QLCS).

Tornadoes are historically very difficult to predict. The storms that may produce a tornado can be forecasted, but not every storm with that potential will spawn a tornado and predicting where and when that will happen is incredibly difficult.

Location and Extent

Garrett County is vulnerable to the impacts of tornado events, as Maryland averages 10 tornadoes annually typically occurring between the months of April and November, with events affecting all regions of the state. Tornadoes are a site-specific hazard, but communities cannot readily identify specific geographic features that allow them to anticipate where tornadoes may occur. Historical trends show that some areas of the country, such as the Midwest and plain states commonly referred to as tornado alley, have a higher probability of tornado occurrences; however, they can and have struck in many other areas. The nature of tornadoes is that they strike at random. While it is known that some areas of the country experience tornadoes more than others, predicting exactly what parts of Garrett County have a greater chance of being struck by a tornado is difficult. The best predictor of future tornadoes is the occurrence of previous tornadoes. For planning purposes, it is less important to map the tornado risk than it is to identify it. This is because it is so difficult to predict the path of future tornadoes.

Historic data (see below) suggest that the areas in the northern portion of the county along the Interstate 68 corridor (i.e., Finzel, Friendsville, and Grantsville) have experienced more tornadoes than the southern portions of the county. Though the reasons are unknown, it could be due to differences in topography.

Officials utilize the Enhanced Fujita (EF) Scale to classify tornadoes. This scale uses a rating system based on wind speeds and related damages. The EF scale was adapted from the original Fujita Scale, designed by Dr. Theodore Fujita, to estimate wind and storm damage better. The table below describes the EF Scale.

ENHANCED FUJITA (EF) TORNADO SCALE		
EF Rating	3-Second Gust Speed (MPH)	Possible Damage
0	65-85	Light Damage. Some damage to chimneys; break branches off trees; push over shallow-rooted trees; damage to signboards.
1	86-110	Moderate Damage. Surface peeled off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off roads.
2	111-135	Considerable Damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
3	136-165	Severe Damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; cars lifted off the ground and thrown.
4	166-200	Devastating Damage. Well-constructed houses leveled; structures with weak foundations blow off some distance; cars thrown and large missiles generated.
5	201+	Incredible Damage. Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile sized missiles fly through the air more than 100-yards; trees debarked; incredible phenomena will occur.

The original Fujita Scale is provided below as the majority of documented tornadoes that have occurred in Garrett County were measured utilizing this scale.

FUJITA TORNADO SCALE		
Scale	Wind Estimate (MPH)	Typical Damage
F0	< 73	Light Damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73 – 112	Moderate Damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113 – 157	Considerable Damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-objects missiles generated; cars lifted off ground.
F3	158 – 206	Severe Damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown.
F4	207 – 260	Devastating Damage. Wall-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261 – 318	Incredible Damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 109 yards; trees debarked; incredible phenomena will occur.

Impacts and Vulnerability

While tornadoes are typically short-lived, they are intensely focused and destructive. Tornadoes are the most violent of all atmospheric storms. Damage from tornadoes comes from the strong winds they contain. Wind speed in tornadoes can reach 300 miles per hour; winds of that speed can destroy homes, uproot trees, cause automobiles to become airborne, and turn glass and debris into high-velocity projectiles. The damage paths of tornadoes may be up to one mile wide and 50 miles long. Secondary and tertiary impacts from tornadoes include damage to roofs and other home finishings. Additionally, fallen trees can interrupt power service or block transportation access. The following table outlines potential tornado impacts on Garrett County's assets. The impacts apply to all participating jurisdictions equally.

GENERAL ASSET IMPACTS, TORNADOES	
Asset Type	Impacts
People	<p>Because tornadoes are somewhat unpredictable (i.e., they occur with little to no warning), the human effects can include emotional distress such as overwhelming anxiety, trouble sleeping, and other depression-like symptoms. These impacts are similar to the notion of disaster writ large. Still, they can be heightened around "tornado" because of its occurrence with little to no warning (USHHS SAMHSA, 2022).</p> <p>See the "Social Vulnerability Considerations" discussion below.</p>
Structures	<p>Structural damage from significant tornadoes can be quite obvious. The size of most historical tornadoes in Garrett County (i.e., F1, F2) may cause moderate to considerable damage. The county has experienced two events at an F3 magnitude, and those event resulted in \$275,000 of structural damage (1967 and 1980 dollars).</p>
Community Lifelines & Other Critical Facilities	<p>Powerful tornadoes can destroy pipelines, chemical containers, tanks, etc. Though these occurrences could result in a hazardous material incident, in Garrett County, the probability of a tornado with the intensity to cause this damage is low. The most vulnerable lifelines and critical facilities locally are power and communications systems. Damage would be similar to that noted for high winds, though affected areas (and the resultant number of impacted assets) would be smaller. Health and medical and utility assets that rely on power could be negatively impacted during a prolonged outage. Communications impacts are also similar to those noted for high winds, though in more localized areas.</p>
Natural, Historic, & Cultural Resources	<p>Tornadoes can cut through large swaths of forest, destroying trees and wildlife habitats. According to a 2019 article in Science News, these impacts can allow invasive species to gain ground in an area. In Garrett County, forested areas (i.e., the non-agricultural natural asset most at risk) are in the steep and mountainous portions of the county that are least susceptible to tornadoes. Tornadoes may include dust and debris, which stays behind as pollution following the tornado (some of which may be contaminated).</p> <p>If a historic or cultural resource is in the path of a tornado, it could be heavily damaged if not destroyed. Historic/cultural natural sites may be somewhat less at risk.</p>
Economy & Other Valuable Activities	<p>If a tornado were to occur during an outdoor activity it could result in injury and loss of life or, at minimum, cancellation of the event. Though damage-related impacts could be significant, tornadoes would not likely disrupt long-term economic activity in the county or region.</p>

Most injuries and fatalities resulting from tornadoes occur due to the victim being struck by solid objects that become airborne, or from a structure collapse. The most common injuries include lacerations, fractures, blunt trauma and head injuries. Most fatalities occur at the scene and result from trauma such as head, spine, and crushing injuries (Wier, 2000). Many injuries can occur during cleanup efforts following the storm, inexperienced people using equipment such as chainsaws or electrical tools in standing water.

Populations residing in mobile home parks and campgrounds should take particular care to seek adequate shelter with approaching severe weather. There are several mobile home parks and campgrounds located throughout Garrett County. Those living in mobile homes are especially at risk for injury and death as even an anchored mobile home can be seriously damaged when wind gusts reach 80 mph (NOAA, 2017).

Individuals who lack shelter during a tornado or wind event are highly vulnerable. The homeless population and those who may be traveling by vehicle or on foot when an event occurs are at greater risk for injury or death. Those in vehicles are at risk of flying debris, other vehicles being pushed into lanes of traffic, falling trees and utility poles and vehicle such as SUV's, and vehicles pulling trailers are at a high risk of being pushed or flipped over by winds (defensivedriving.com, 2014).

The homeless population are at risk as notification methods used for other populations such as, radio, television, and service providers, may not be applicable. They also face a lack of transportation and the inability to evacuate an area without assistance (Edgington, 2009).

Social Vulnerability Considerations

Social vulnerability variables that must be considered with regards to tornadoes include the ability of individuals to comprehend warnings, and their ability to evacuate. A factor somewhat related to income and housing is the presence of mobile homes. Mobile homes are affordable options for many residents, not only for those with lower incomes, but also for the elderly. While the quality of mobile home construction has improved in recent decades, data from numerous disasters (e.g., hurricanes, tornadoes, wildfires, and high-winds generally) suggests that they do not hold up as well to the elements as traditional stick-built homes. The National Weather Service (NWS) suggests that mobile home residents are 15 to 20 times more likely to be killed by a tornado that strikes the home in comparison to those in stick-built structures. "On average, a total of 72 percent of all tornado-related fatalities are in homes and 54 percent of those fatalities are in mobile homes" (NWS, n.d.). EF-1 tornadoes (as well as high-end severe thunderstorm winds) can severely damage or destroy mobile homes. The map below depicts the distribution of mobile homes by Census tract.



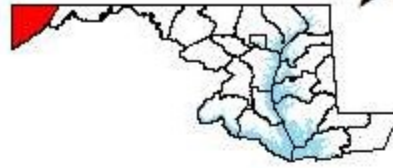
Mobile Homes (>10%)



Tornado (Touchdown Only)



Tornadoes (w/ Paths)



0 1 2 4 6 8
Miles

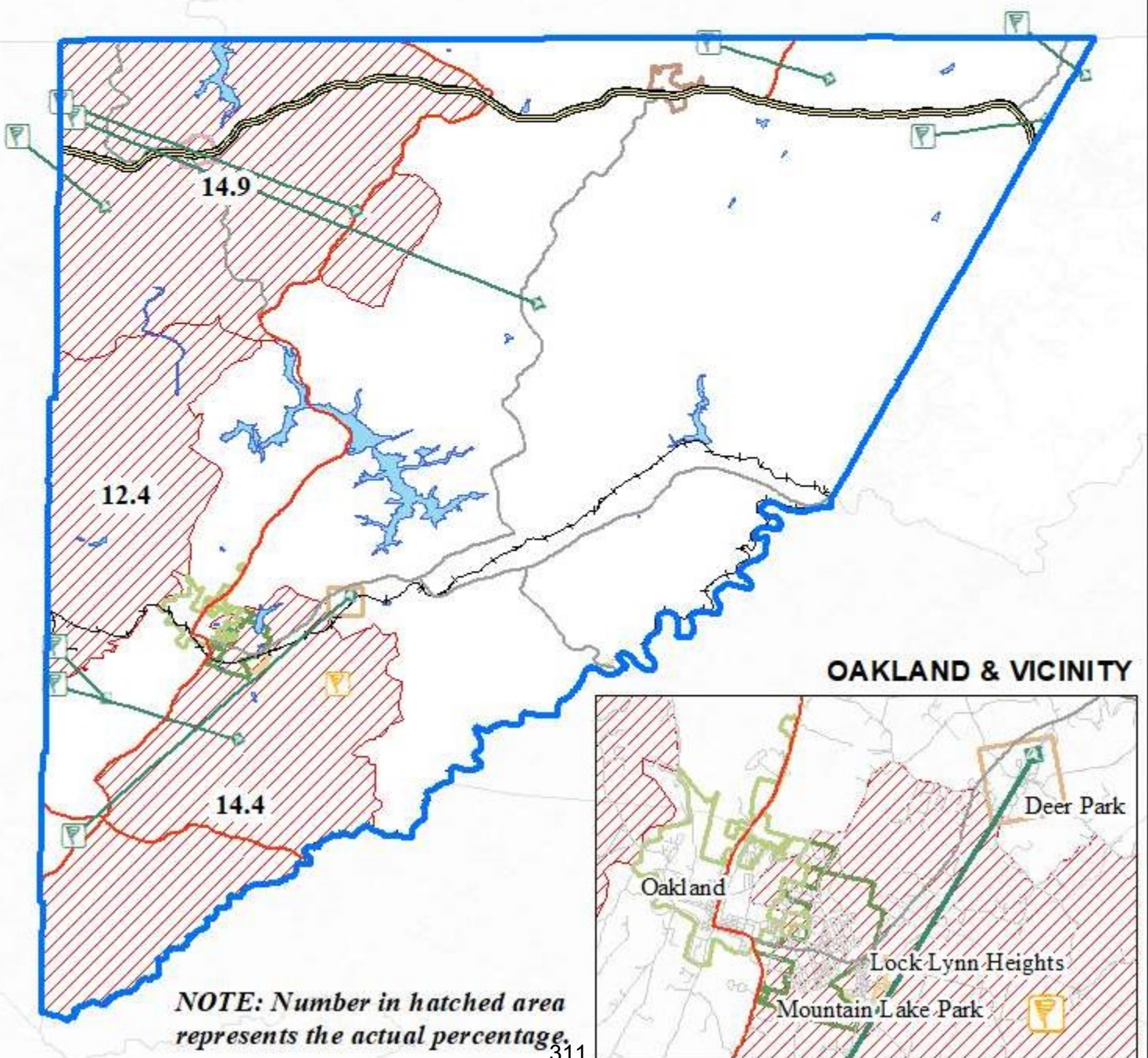
GARRETT COUNTY HAZARD MITIGATION PLAN

Tornado: SVI Considerations

Data Source(s):
CDC ATSDR,
NOAA NCEI



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



By examining those areas with high concentrations of mobile homes, local officials can strategically consider the placement of designated tornado shelters, the selection of facilities to serve as weather shelters, etc. Though there is a need for adequate sheltering options in all areas of the county, those areas with higher number of mobile homes may need those options more.

Previous Occurrences

The NOAA National Centers for Environmental Information (NCEI) Storm Events Database (2023c) lists 10 tornadoes touching down in Garrett County since 1954. These tornadoes have resulted in 12 injuries, one fatality, and approximately \$2.58 million in property damages. The highest magnitude tornado to touchdown in Garrett County is an F3, the widest tornado was 880 yards wide, and the longest track tornado was on the ground for approximately 15 miles. Nearly all tornado touchdowns in Garrett County has occurred during the afternoon hours of June and July.

HISTORICAL TORNADOES – GARRETT COUNTY							
Location	Date	Mag. EF Scale	Width (yards)	Length (Miles)	Injuries	Deaths	Property Damage
Garrett Co.	7/14/1954	F1	880	12	8	0	\$25,000
Garrett Co.	5/19/1967	F3	33	0.3	0	1	\$25,000
Garrett Co.	7/13/1971	F1	400	14.9	0	0	\$250,000
Garrett Co.	6/28/1973	F1	33	3.6	0	0	\$2,500
Garrett Co.	6/20/1977	F2	50	1.9	0	0	\$25,000
Garrett Co.	6/3/1980	F3	117	5.6	4	0	\$250,000
Finzel	6/2/1998	F2	700	2.5	0	0	\$500,000
Friendsville	6/2/1998	F2	300	3	0	0	\$1,000,000
Grantsville	7/10/2001	F0	40	4	0	0	\$5,000
Sand Spring	7/30/2008	EF0	150	4.21	0	0	\$500,000
Totals					12	1	\$2,582,500

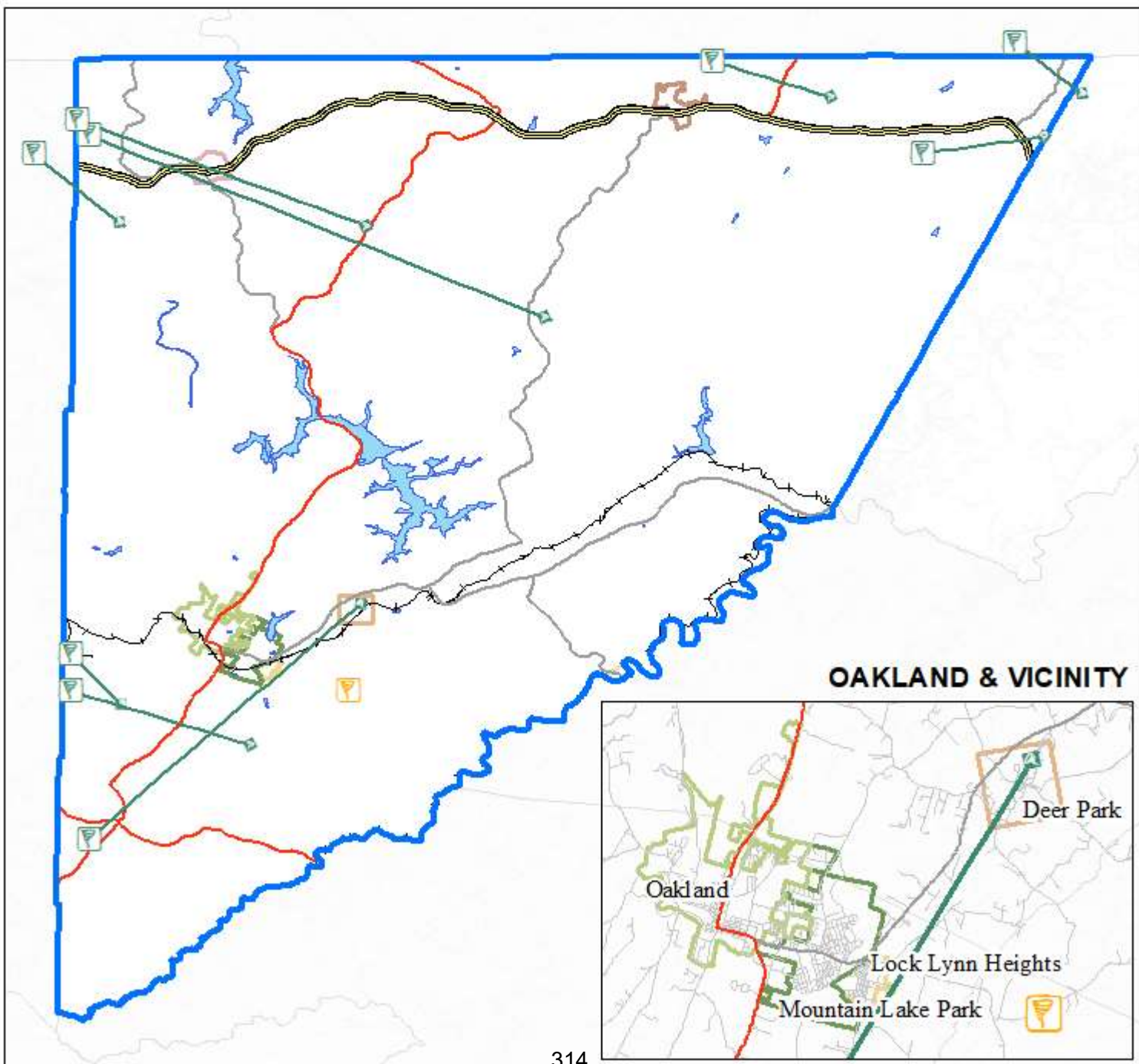
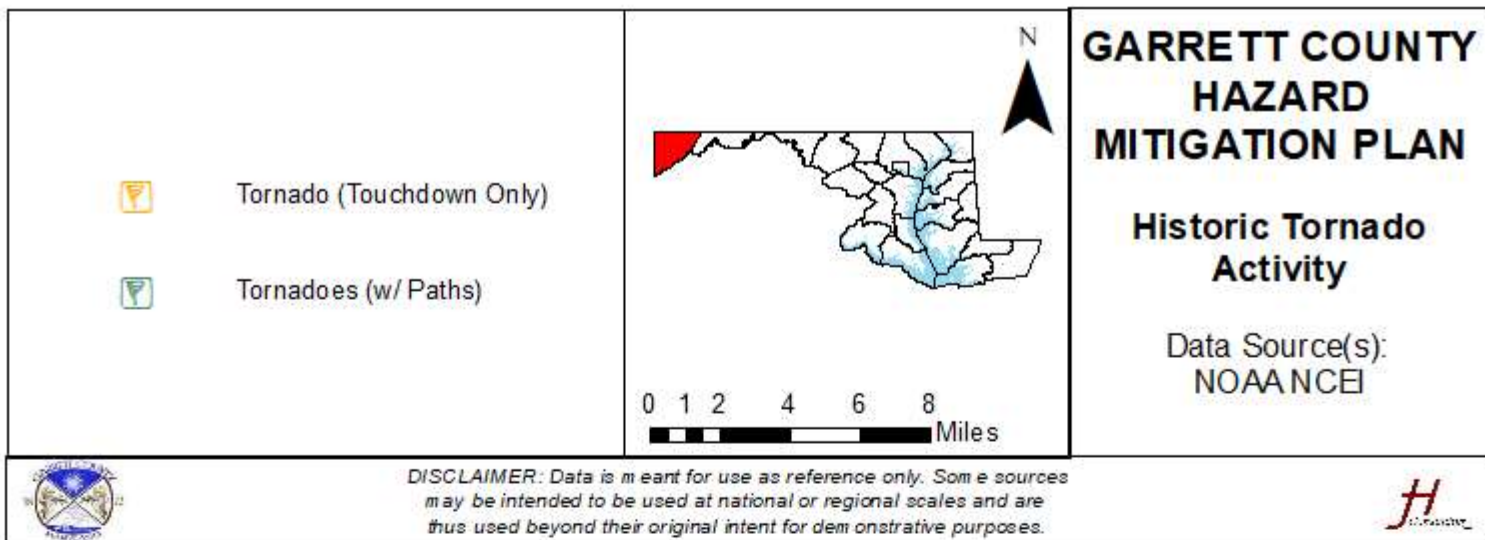
Finzel / Friendsville F2 Tornado – June 2, 1998

An F2 tornado passed southeast through southern Fayette County PA, the northeast tip of Preston County WV, and into northwest Garrett County MD. The total length of the tornado as it passed across these three counties was 12 miles. Damage included a completely destroyed dairy barn, two completely destroyed house trailers, and at least 21 other structures heavily damaged, many with roofs partially or completely peeled off. Several cows were killed, with one cow thrown through the air over 100 yards. A clearly visible 300-yard wide, 1-mile long swath of trees which were completely sheared/uprooted was present near the Pennsylvania/West Virginia

state border. Despite the damage, interviews with law enforcement officials, paramedics and local residents revealed no injuries occurred.

This tornado passed through the town of Finzel in extreme northeast Garrett County at approximately 8:40pm, it was approximately 700 yards wide and remained on the ground for 2.5 miles. Several buildings were destroyed, including a small house and cinder-block garage, damages in the community of Finzel were approximately \$500,000. Approximately 10 minutes later, at 8:50pm the tornado pasted through the Town of Friendsville, at this point to the tornado was 300 yards wide and remained on the ground for three miles, damages in the Town of Friendsville were estimated at \$1,000,000.

The following map illustrates the touchdown points and, if applicable, paths of the tornadoes that have impacted the county.

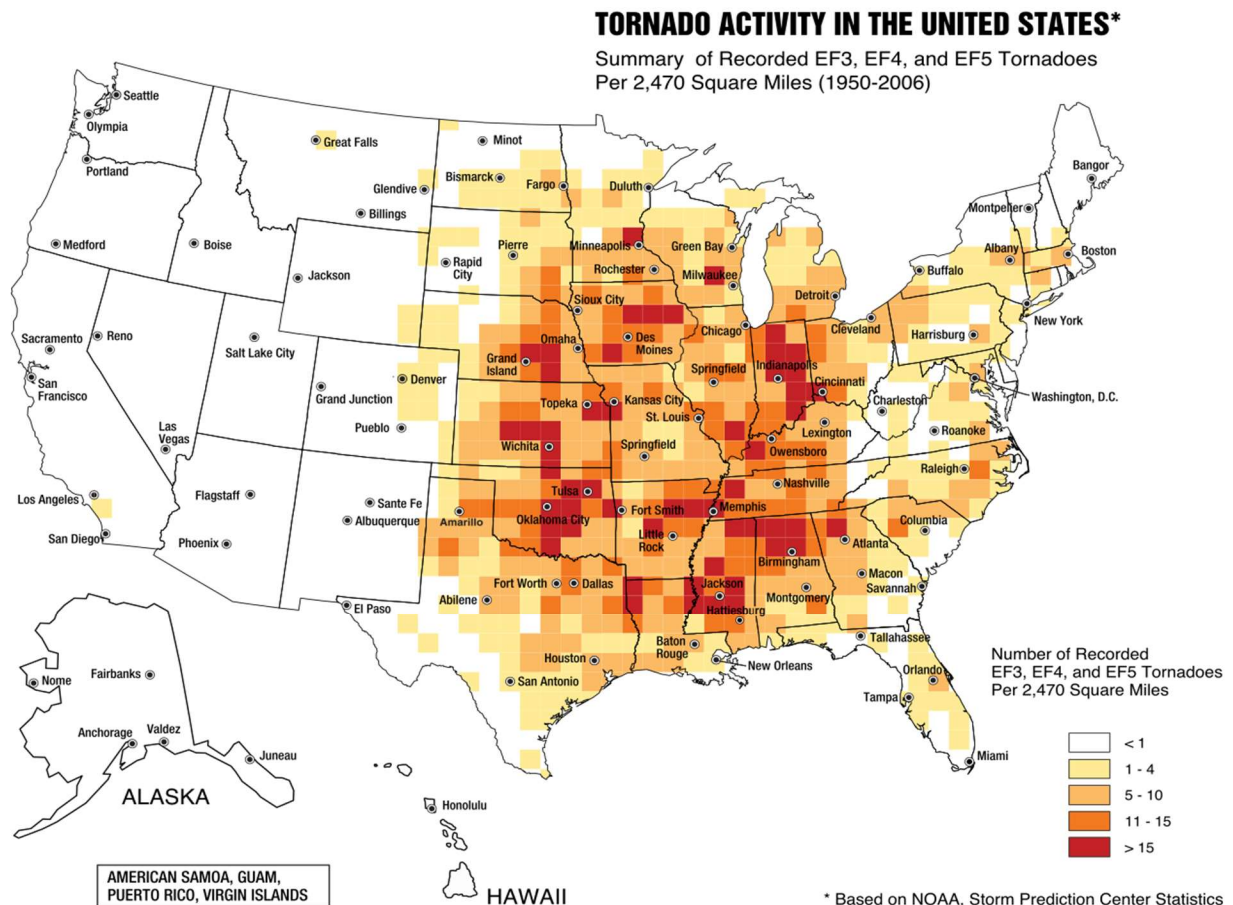


Loss and Damages

Planners generated loss estimates associated with tornadoes based on historical data. There has been an average of 0.14 incidents annually, accounting for an average of \$258,250 in property damage. The largest loss associated with a tornado was in 1998 (\$1,500,000 –property damage).

Future Occurrences

Traditionally, tornadoes impacted areas in the Midwest known as “Tornado Alley” in states like Iowa, Kansas, Missouri, Nebraska, Oklahoma, and northern Texas. While those areas still see frequent tornadoes, southern areas in Alabama, Arkansas, Georgia, Kentucky, and Mississippi are seeing them. (Reference the incredibly destructive tornadoes to strike Tuscaloosa, Alabama in 2011 as well as Mayfield, Kentucky in 2022). Tornadoes have been regular occurrences in Indiana and Ohio, but even events in those states appear to be gaining strength. Put simply, tornado alley appears to be shifting to the east (Gensini & Brooks, 2018). The following graphic shows the eastward movement of EF-3 through EF-5 events in the United States through 2006.



Further, in states like Pennsylvania, West Virginia, and western Maryland there was a common notion that mountainous terrain “broke up” tornadoes before they could do damage after touching down. Many damage assessments would label wind impacts as “straight line winds,” “downbursts,” or “macrobursts,” with seemingly little consideration of tornadic activity. Recently, though, those reports have been classifying events as tornadic in those states. Garrett County contains mountainous areas, but those that are most heavily-populated and comprise the majority of the designated growth areas in the county are in west-central portions, where the terrain is more gently sloping. As these areas develop, the natural topography of the area will not as easily break up tornadoes that touch down.

For Garrett County, local officials will need to monitor tornado occurrences carefully along with any shifts in design wind speed resources. If tornadoes increase measurably across longer time periods, it may be necessary to update building codes to account for the increased risk. Until that point, and after that point for existing structures, buildings not built to withstand tornadic activity may be at extra risk. Unfortunately, socio-economically disadvantaged populations are often not able to afford to finance and occupy new structures (including newer, more resilient apartments thanks to higher rents). These populations will continue to be more vulnerable to hazards like tornadoes.

Future Climate Considerations

Finding consensus on the level to which a changing climate is impacting tornadoes has been elusive. A hotter atmosphere can hold more moisture, which increases atmospheric instability (which is necessary for storm systems that form tornadoes). Other elements, like wind shear, appear to decrease as a result of said instability. This push-and-pull factor within the data makes it difficult to accurately assess climate changes with respect to tornadoes (National Geographic, n.d.). Further, tornadoes are too geographically small to be well-simulated by climate models (C2ES, n.d.B). Put very generally, evidence suggests there will be a more favorable environment overall to severe weather (i.e., there will be more severe weather, including tornadoes) (Berardelli, 2023).

Risk Assessment

This section summarizes the vulnerability of the county to tornadoes. The steering committee conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding tornadoes

PUBLIC SENTIMENT, TORNADO – GARRETT COUNTY					
Hazard	Level of Concern				Total Responses
	Not at All	Somewhat	Concerned	Very	
TORNADO	25 (35.71%)	25 (35.71%)	16 (22.86%)	4 (5.71%)	70
Which hazard event have you experienced property damage from?				3 (6.12%)	49
Please indicate which hazard event you feel may affect your community?				17 (25.76%)	66

The Location and Extent as well as the Impacts and Vulnerability sections above describe the consequences and effects of tornadoes on the participants of this plan. As mentioned above, predicting a geographical location within Garrett County that is more vulnerable to future tornado occurrences would be incredibly difficult. For this reason, planners have determined that all asset types within Garrett County (i.e., people, structures, systems, historical, cultural, etc.) are equally vulnerable to the risk of tornadoes.

The following table assigns point totals based on the methodology identified in Section 2.2: Profile Hazards above.


TORNADO RISK RANKING			
Category	Points	Description	Notes
Frequency	2	Low (unlikely to occur in a year)	The NCEI reports 10 tornadoes over a 69 year period, for an average of 0.14 events per annum.
Response	3	One week	Most events necessitate approximately one day of response activities, but more significant events may require much longer. As such, planners selected a week for estimation purposes.
Onset	4	Less than 6 hours	Though weather conditions may suggest the formation of a tornado is possible, the time between spotting a tornado and it touching down is often very short.
Magnitude	1	Localized (less than 10% of land area affected)	Tornadoes are very destructive, but in comparison to the total land area of the county, they affect a small area (as evidenced by the path map graphic above).
Business	3	At least two weeks	If an F3 tornado impacted a business, for example, that business might be closed for an undetermined period; however, community-wide business closures would be minimal.
Human	3	Medium (multiple severe injuries)	Though casualty numbers have been low, the potential for multiple casualties during tornadoes is high.
Property	3	25-50% of property affected	The historical tornadoes in the county have averaged six figures in property damage. If a tornado was to touch down in a densely-constructed area, that figure could be much higher.
Totals	19	MEDIUM	

FEMA's *Local Mitigation Planning Handbook* (2023c) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks or vulnerabilities are more or less prevalent as compared to the other participating jurisdictions. The following table quickly synthesizes the data to capture the jurisdiction-specific aspects of risks and vulnerabilities for each town.

MULTI-JURISDICTIONAL CONSIDERATIONS, TORNADO		
Jurisdiction	Comparison	Notes
Garrett County	(Slightly) More	There is historical precedent for tornadic activity in the planning area, though there is no reliable means of predicting where tornadoes will strike, nor is there any consensus on the spatial conditions that make tornadoes more likely. The county jurisdiction appears as "(Slightly) More" at risk because of the unincorporated Census tracts with higher numbers of mobile homes.

MULTI-JURISDICTIONAL CONSIDERATIONS, TORNADO		
<i>Jurisdiction</i>	<i>Comparison</i>	<i>Notes</i>
Accident	Same	There is historical precedent for tornadic activity in the planning area, though there is no reliable means of predicting where tornadoes will strike, nor is there any consensus on the spatial conditions that make tornadoes more likely. Thus, the town is just as much at risk of tornadoes as the other participating jurisdictions.
Deer Park	Same	There is historical precedent for tornadic activity in the planning area, though there is no reliable means of predicting where tornadoes will strike, nor is there any consensus on the spatial conditions that make tornadoes more likely. Thus, the town is just as much at risk of tornadoes as the other participating jurisdictions.
Friendsville	(Slightly) More	Historic data suggest that the areas in the northern portion of the county along the I-68 corridor have experienced more tornadoes than the southern portions of the county. Thus, the Town of Friendsville is slightly more at risk of tornadoes.
Grantsville	(Slightly) More	Historic data suggest that the areas in the northern portion of the county along the I-68 corridor have experienced more tornadoes than the southern portions of the county. Thus, the Town of Grantsville is slightly more at risk of tornadoes.
Kitzmilller	Same	There is historical precedent for tornadic activity in the planning area, though there is no reliable means of predicting where tornadoes will strike, nor is there any consensus on the spatial conditions that make tornadoes more likely. Thus, the town is just as much at risk of tornadoes as the other participating jurisdictions.
Loch Lynn Heights	Same	There is historical precedent for tornadic activity in the planning area, though there is no reliable means of predicting where tornadoes will strike, nor is there any consensus on the spatial conditions that make tornadoes more likely. Thus, the town is just as much at risk of tornadoes as the other participating jurisdictions.
Mountain Lake Park	Same	There is historical precedent for tornadic activity in the planning area, though there is no reliable means of predicting where tornadoes will strike, nor is there any consensus on the spatial conditions that make tornadoes more likely. Thus, the town is just as much at risk of tornadoes as the other participating jurisdictions.
Oakland	(Slightly) More	There is historical precedent for tornadic activity in the planning area, though there is no reliable means of predicting where tornadoes will strike, nor is there any consensus on the spatial conditions that make tornadoes more likely. Oakland is listed as "(Slightly) More" at risk because of its urban development pattern. If a tornado were to touch down in the town, it could result in far more structural damage than in other areas of the county.

2.2.12 Wildfire

Wildfires are uncontrolled fires that spread rapidly through vegetative fuels (i.e., forests, grasslands, and prairies), exposing and possibly consuming structures. These dangerous fires can devastate not only wildlife and natural areas, but also communities.				
	RISK	Period of Occurrence:	Most common in spring and fall	Garrett County Risk Ranking: Medium
	HIGH	Warning Time:	Less than 6 hours	State Risk Ranking: Medium-High
	MEDIUM	Probability:	High (brush fires likely to occur in a year)	Impact: Localized (less than 10% of land area affected)
	LOW	Type of Hazard:	Natural	Disaster Declarations: None
	LOWEST			

Hazard Overview

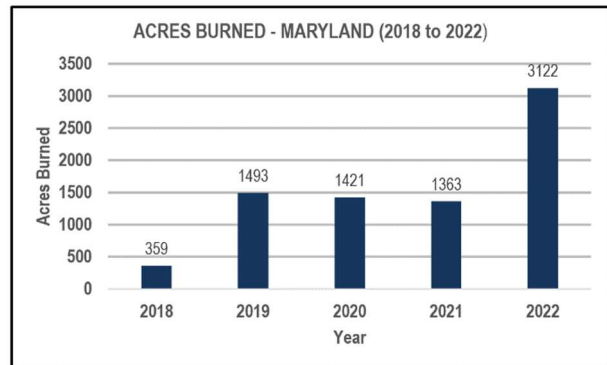
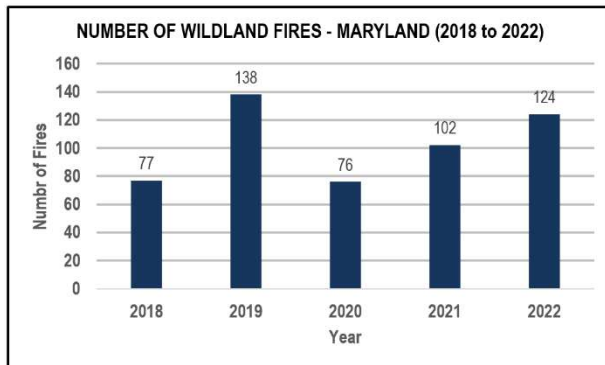
A wildfire is an unplanned, uncontrolled, fire that spreads rapidly through vegetative fuels (i.e., forests, grasslands, and prairies), exposing and possibly consuming structures. For the purposes of this analysis, the term “wildfire” includes brushfires as well as forest fires which are common occurrences in Garrett County. Wildfires often begin unnoticed and can spread quickly, creating dense smoke that is visible for miles.

Wildland fires can happen at any time of the year; however, they mainly occur during prolonged, dry, windy, hot spells with low humidity. Maryland’s wildland fire seasons are in the spring (i.e., March, April, and May) before vegetation has matured and greened, and in the fall (i.e., October and November) when leaf drop occurs. Any small fire in a wooded area, if not quickly detected and suppressed, can get out of control. Human carelessness, negligence, and ignorance cause most wildland fires (i.e., debris burning, arson, equipment fires, smoking, campfires, etc.). In some instances, lightning strikes can precipitate spontaneous combustion.

The National Park Service (NPS) lists causes of wildfires as either human-caused or nature-caused. Human-caused fires “result from campfires left unattended, the burning of debris, negligently discarded cigarettes and intentional acts of arson,” which account for up to 90% of fires. Lightning or lava causes the remaining 10% of fires (NPS, 2022).

The Maryland Department of Natural Resources (MDNR) maintains annual wildland fire reports, which illustrate the number of wildland fires and acres burned, as well as the cause of wildland fires. Per the table and graphics below, 517 wildland fires occurred between 2018 and 2022, burning approximately 7,760 acres, caused mainly by people burning debris. Debris burning was the cause of roughly 37% of all fires reported over the five-year period (MDNR, n.d.).

WILDLAND FIRES & ACRES BURNED BY CAUSES – MARYLAND (2018 to 2022)		
Cause	Number of Fires	Acres Burned
Arson	93	6,278
Campfire	22	32
Children	12	9
Debris Burning	193	352
Equipment Use	55	302
Lightning	21	268
Miscellaneous	89	251
Railroads	8	9
Smoking	24	258
Totals	517	7,759



The MDNR Forest Service enforces open-air burning regulations within the state. These regulations apply to activities within 200 feet of woodlands or those adjacent to flammable materials that could ignite and carry fire to woodland areas. The regulations state that adequate personnel and equipment must be present to prevent fires from escaping and that at least one responsible person remains at the location of a fire until the last spark is out. Burning must occur during the hours of 4 p.m. and 12 a.m.

“Wildland fire can be a friend and a foe. In the right place at the right time, wildland fire can create many environmental benefits, such as reducing grass, brush, and trees that can fuel large and severe wildfires and improving wildlife habitat. In the wrong place at the wrong time, wildfires can wreak havoc, threatening lives, homes, communities, and natural and cultural resources.” (U.S. Forest Service).

Location and Extent

According to the Maryland Department of Natural Resources, some wildfires in Maryland can burn hundreds or even thousands of acres; however, most are smaller in size, burning less than 10 acres. The topography in the western portion of Garrett County has more variety, with numerous ridges and hollows which contributes to more complex wildfire behavior as winds tend to circulate up hollows providing an easy path for wildfires. According to the Maryland Department of Natural Resources the first recorded fire tower in Maryland was constructed in Bittinger, Garrett County in 1915. Areas with higher vulnerability to wildfires would be agricultural and open urban areas with recreational opportunities and other attractions in designated areas throughout Garrett County, such as the 76,000 acres of parks (to include seven state parks), lakes, and 281,000 acres of publicly accessible forestland. Campfires, coupled with large numbers of visitors and a large proportion of trees, makes wildfires a potential hazard throughout Garrett County. The fact that more than 70% of Garrett County's land surface is forested makes wildfires a major concern.

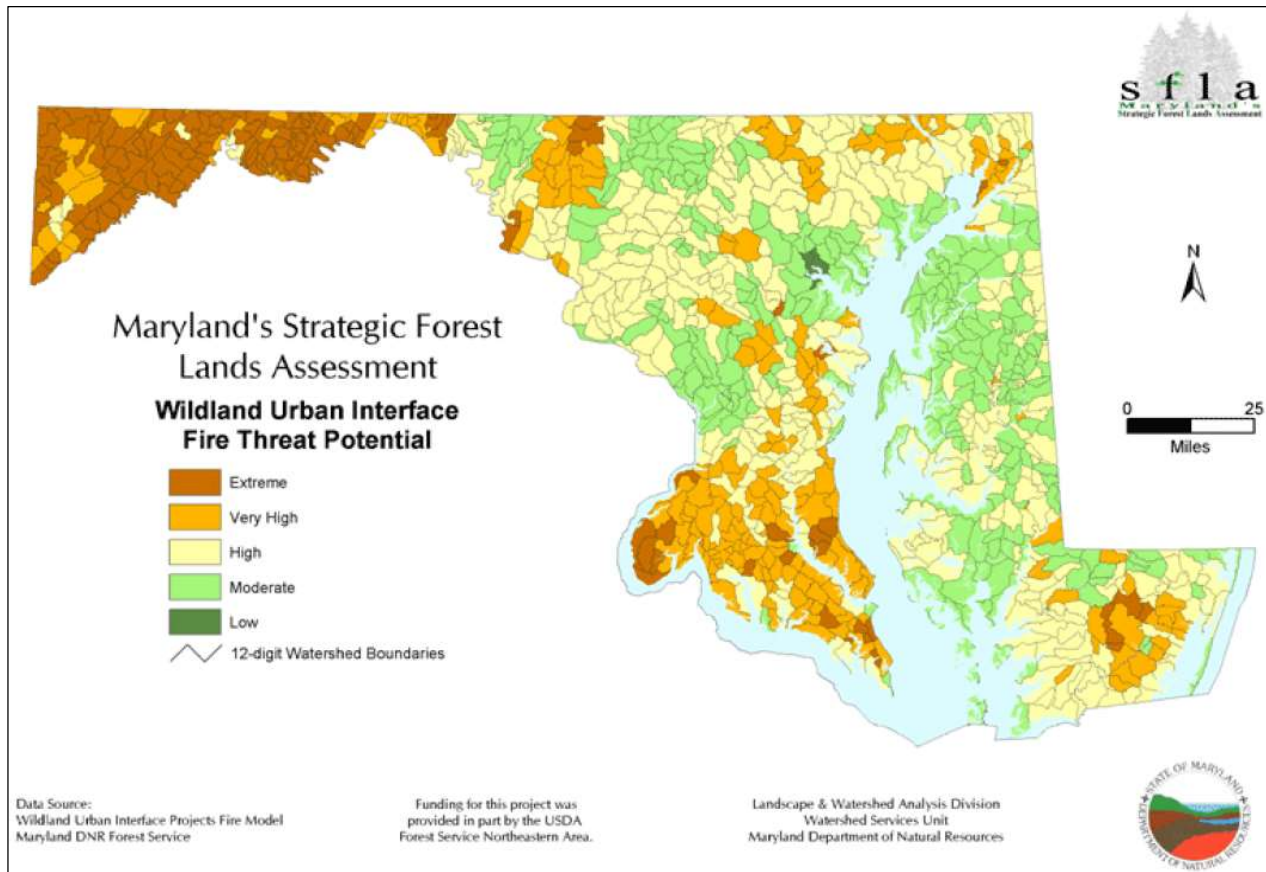
Scholars refer to an area called the "wildland-urban interface," or WUI when discussing wildfire risk. (See MDNR, n.d., for additional information.) Radeloff and colleagues (2005) defined the WUI as "...the area where houses meet or intermingle with undeveloped wildland vegetation" (citing the USDA and USDI, 2001, p. 800). Critically, the WUI does not recognize an area where wildfires are more or less prone to occur. Instead, it identifies areas that can expect higher wildfire-related damages should an incident occur. It is difficult to understand that the WUI, even in a single county, is not a place, per se, but conditions that exist. Thus, the WUI can be a rural subdivision in a wooded or vegetative area or three to four homes on an open range (wildlandfirersg.org, 2020).

Unfortunately, in recent years, more private property has been affected by wildfires as urban development encroaches on forestland. Wildfires present the greatest threat to communities located within the Wildland-Urban-Interface (WUI). This zone is characterized as the area where structures are built in or near natural areas, Garrett County does contain WUI areas. Because most wildfires are human caused, the mixture of human activity and structures near natural fuels in the WUI makes them highly vulnerable to wildfire events. The number of homes and development occurring in the WUI has increased in Garrett County over several years, exacerbating the overall wildfire risk.

Maryland's Strategic Forest Lands Assessment is conducted by the Maryland Department of Natural Resources with financial assistance provided by the United States Department of Agriculture Forest Service and is composed of many types of vulnerability studies applied to the forests of the state. The map below illustrates one of the studies conducted on wildland/urban

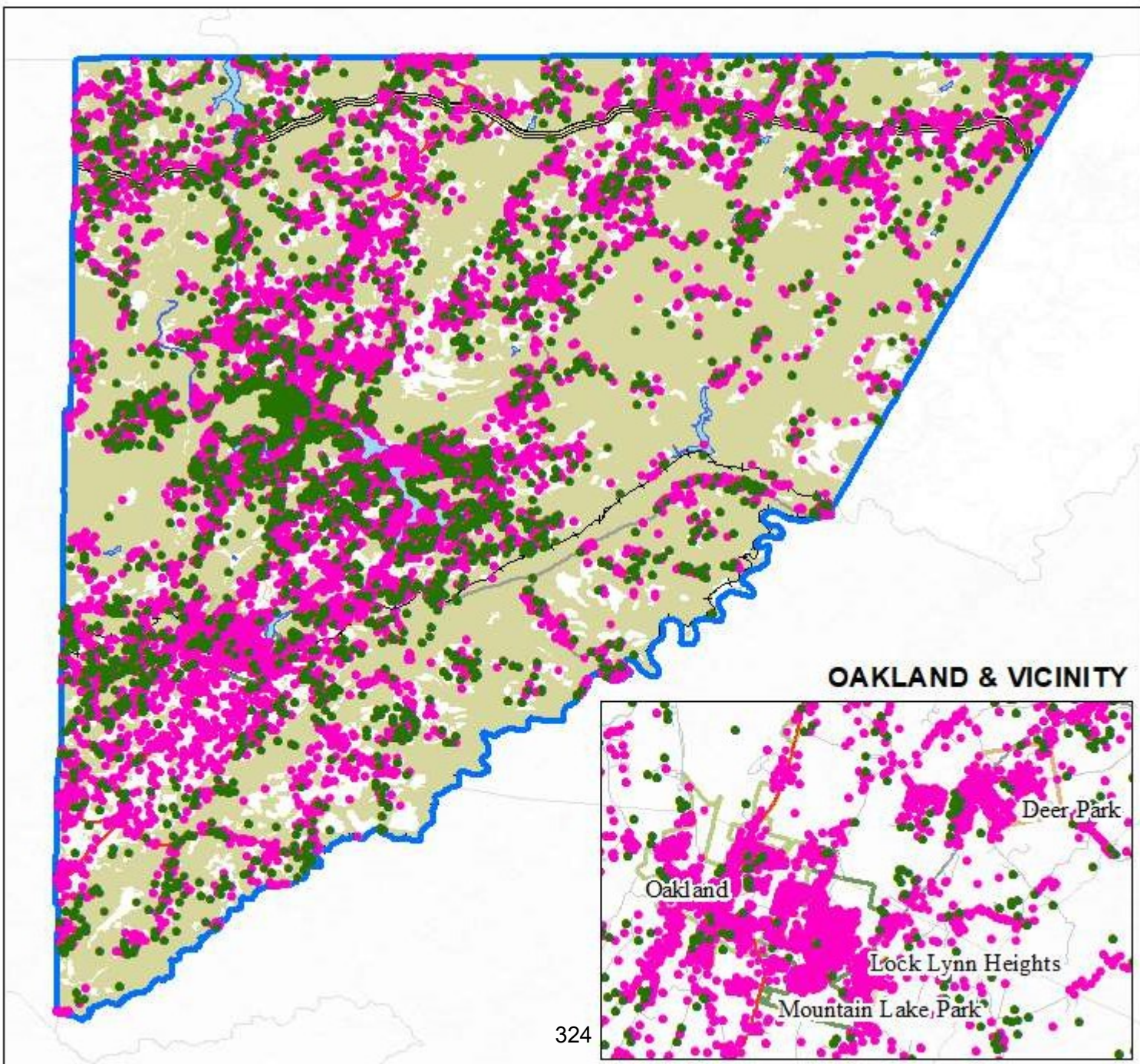
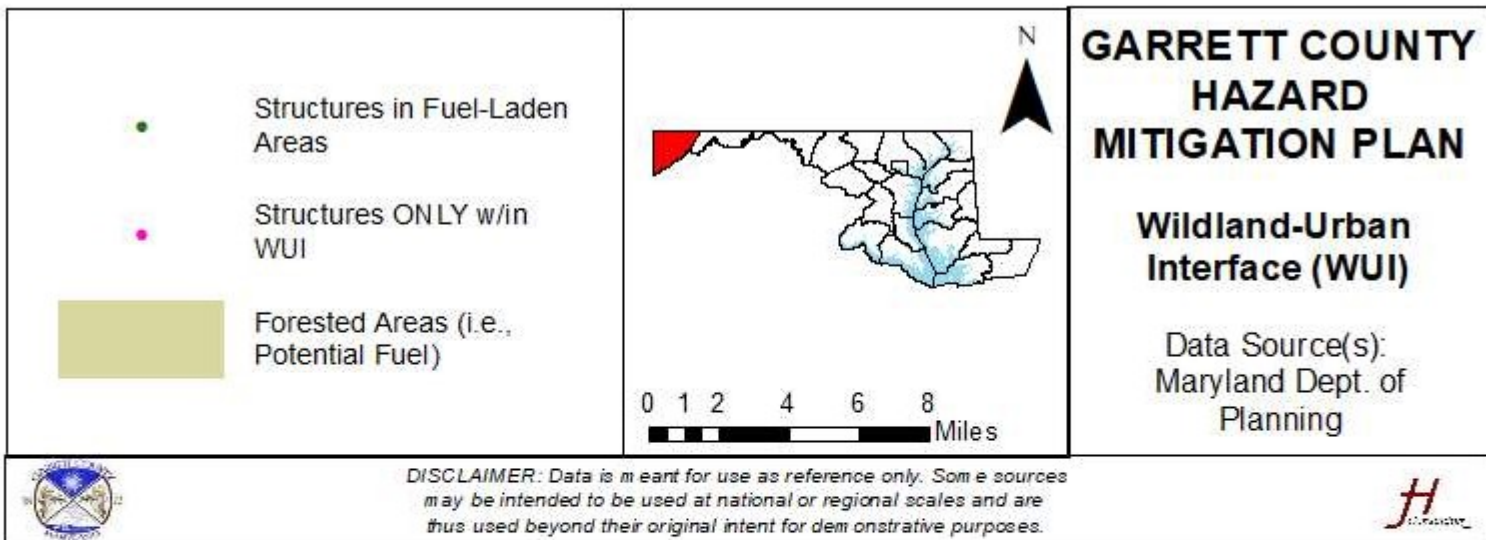


interface fire threat potential. As can be seen, the entirety of Garrett County is at a very high to extreme wildland urban interface fire threat.



Source: Maryland DNR Forest Service

The map below illustrates the areas within Garrett County that could be susceptible to wildfire conditions. The map displays structures located within fuel laden areas (i.e., deciduous forest, evergreen forest, mixed forest) as well as structures located within the Wildland Urban Interface (WUI) areas. Approximately 17% (12,663) of the total structures in the county are located in areas classified as fuel laden, and 83% (61,335) of the structures within the county are located within WUI areas.



Garrett County experiences several small fires each year, most of which are easily controlled by local fire departments and do not reach the threshold for inclusion as a “wildfire”. Like all other fires, wildfires require four conditions to start: an available fuel source (including dried leaves or grass), dry conditions (including low relative humidity), an ignition source, and a chemical reaction to sustain combustion. The first two conditions typically occur in Maryland in the spring and fall, when trees are bare, and sunlight can warm the ground and dry surface fuels.

The National Fire Danger Rating System (NFRDS) is a system that allows fire officials to estimate current fire danger for a given area based on available fuels, weather conditions, topography, and risk and translates them into one of the five categories identified below.

NFRDS CLASSIFICATION SYSTEM	
Fire Danger Level	Description
Low	When the fire danger is “low,” fuels do not ignite easily, and a more intense heat source is needed to start fires. Dry grasslands may burn quickly, but wood fires will spread slowly, and control of these fires is typically not difficult.
Moderate	When the fire danger is “moderate,” fires can start from accidental causes, but the number of fires that start is generally low. If a fire does start on open, dry grassland, it can spread quickly on windy days. Most wood fires spread slowly or moderately. The average fire intensity will be moderate, except in heavy concentrations of fuel. Fires are still not likely to become severe and are typically easy to control.
High	When the fire danger is “high,” fires can start easily from most fuel sources. Unattended campfires and brush fires are likely to escape and can spread quickly. Fires can become serious and difficult to control unless extinguished when they are still small.
Very High	When the fire danger is “very high” fires will start easily from most causes. Fires will spread rapidly and intensify quickly. Small fires can quickly become large fires and exhibit extreme fire intensity, such as long-distance spotting and fire whirls. These fires can be difficult to control and will often become much larger and longer-lasting fires.
Extreme	When the fire danger reaches “extreme,” fires of all types can start quickly and burn intensely. All fires are potentially dangerous and can spread rapidly with intense burning. Small fires become larger much faster than at the “very high” level. Long-distance fire spotting is likely. These fires are very difficult to fight, may become very dangerous, and often last for several days.

Impacts and Vulnerability

A major cause of forest fires in Maryland is debris burning. These fires typically start small but spread by wind to dead grass and dried leaves bordering woodlands. The number and severity of wildfires depend on external factors such as drought, human activity, wind activity, and the amount of available fuel. Wildfires can burn less than one acre up to thousands of acres of land in a short period of time. These fires can completely destroy recreational areas, community infrastructure, cultural and economic resources, timber, forage, wildlife habitats, scenic vistas, and watersheds. Secondary effects of wildfires include erosion, increased landslide potential, the introduction of invasive species, and changes in air and water quality.

The demographic effects of a wildfire can be high depending on the location of the fire. Several municipalities within Garrett County border larger forested areas and are susceptible to Wildland-Urban Interfaces (WUI). In addition, the large number of tourist attractions including parks, forests, and campgrounds, depending on the time of year, can increase the demographic effect as temporary population densities increase within the forest boundaries.

Aside from the obvious effects in humans such as burns and injuries, the smoke from fires is of great concern. “The smoke produced by wildfires can produce effects ranging from airway and eye irritation to death, especially among individuals with conditions that make them more susceptible to inhalation exposures” (Clements, 2009).

The fiscal effects can be largely due to the disruption of infrastructure (i.e., roads, rails, and bridges) or loss of commercial and industrial facilities. A wildfire could also have a devastating effect on the timber and forest product industries. “Cascading effects from forest fires include erosion and water quality from vegetation being removed from a watershed.” (Keller, 2015).

Forest fires in Garrett County normally do not approach the intensity of those in the western United States. Fires in Garrett County are mostly surface fires, burning forest litter and small trees and bushes while leaving larger trees standing. They “crown,” or reach the tops of mature trees, only during extremely severe fire weather. Such hot fires kill large trees outright. More often, forest fires occurring in Garrett County scorch the bark at the base of the tree, which may later fall off. Insects and diseases may then enter the tree, killing it or making it hollow and worthless for timber. Forest fires also kill wildlife; destroy habitat; and contribute to stream sedimentation, flooding and air pollution.

Social Vulnerability Considerations

Wigtil and colleagues (2016) studied the intersection of wildfire potential and social vulnerability in the coterminous United States. Their study identified a number of variables that could be relevant, such as owner-occupied vs. renter-occupied homes, poverty, unemployment, etc. Other social variables, such as land use trends, housing development, vegetative management practices, etc., factored into the overall discussion surrounding wildfires. Ultimately the variables they used to create a custom social vulnerability index included the following:

- Median gross rent
- Median house value
- Median age
- Per capita income
- People per unit
- Percentage of population under 5 / over 65
- Percentage of Various minority statuses
- Percentage civilian unemployment
- Percentage of population aged 25+ with less than 12th grade education
- Percentage with English as second language
- Percentage employment in extraction industries
- Percentage female
- Percentage female in labor force
- Percentage female head of household
- Percentage mobile homes
- Percentage of housing units w/ no cars
- Percentage of congregate populations
- Percentage poverty
- Percentage renters
- Percentage households earning \$200k
- Percentage employment in service industry
- Percentage of households receiving social security
- Percentage unoccupied housing units.

Their analysis led to the creation of the following graphics. The first graphic illustrates a social vulnerability score (p. 901). Garrett County received a score of -1.0 to 1.0.

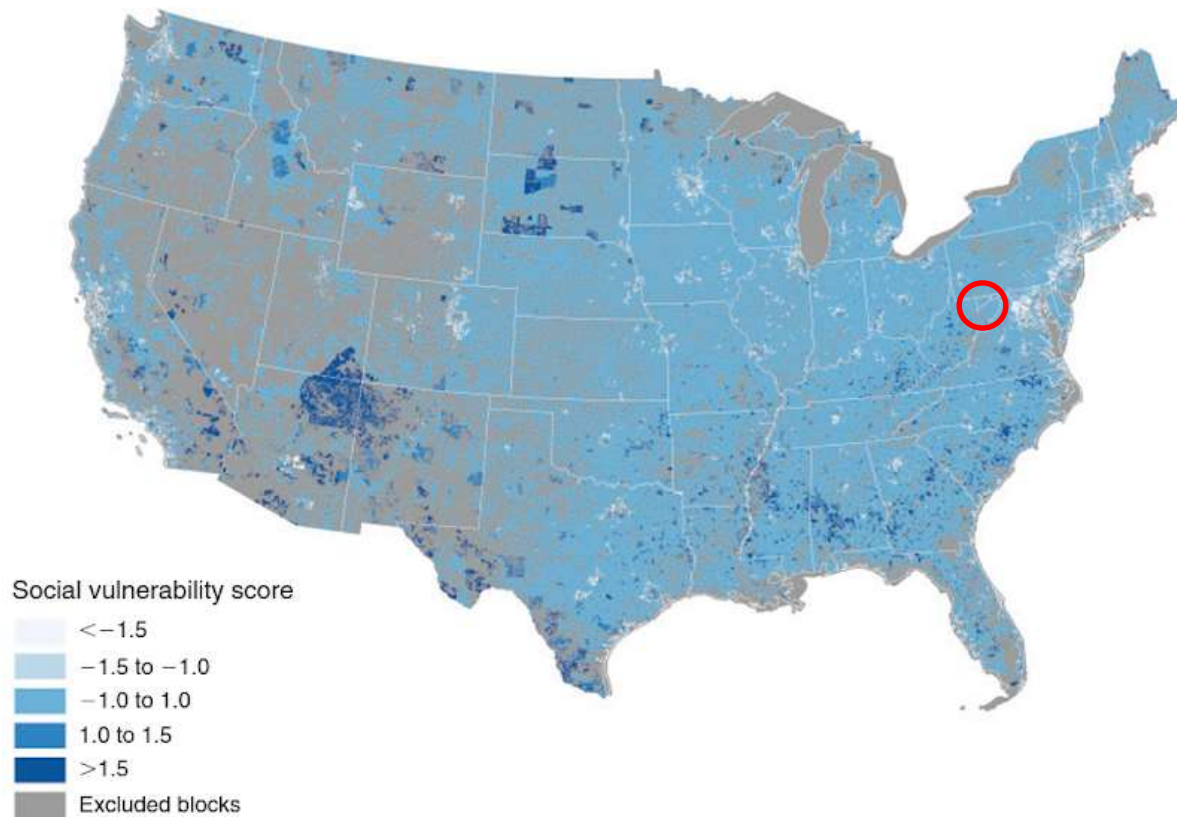


Fig. 1. Social vulnerability scores for the coterminous US.

The second graphic integrated the social vulnerability and wildfire potential data (p. 903). Though it is difficult to see, when zooming into the image, there are portions of the map near Garrett County's location with a slightly brighter pink color, indicating "Moderate" in both wildfire potential and social vulnerability.

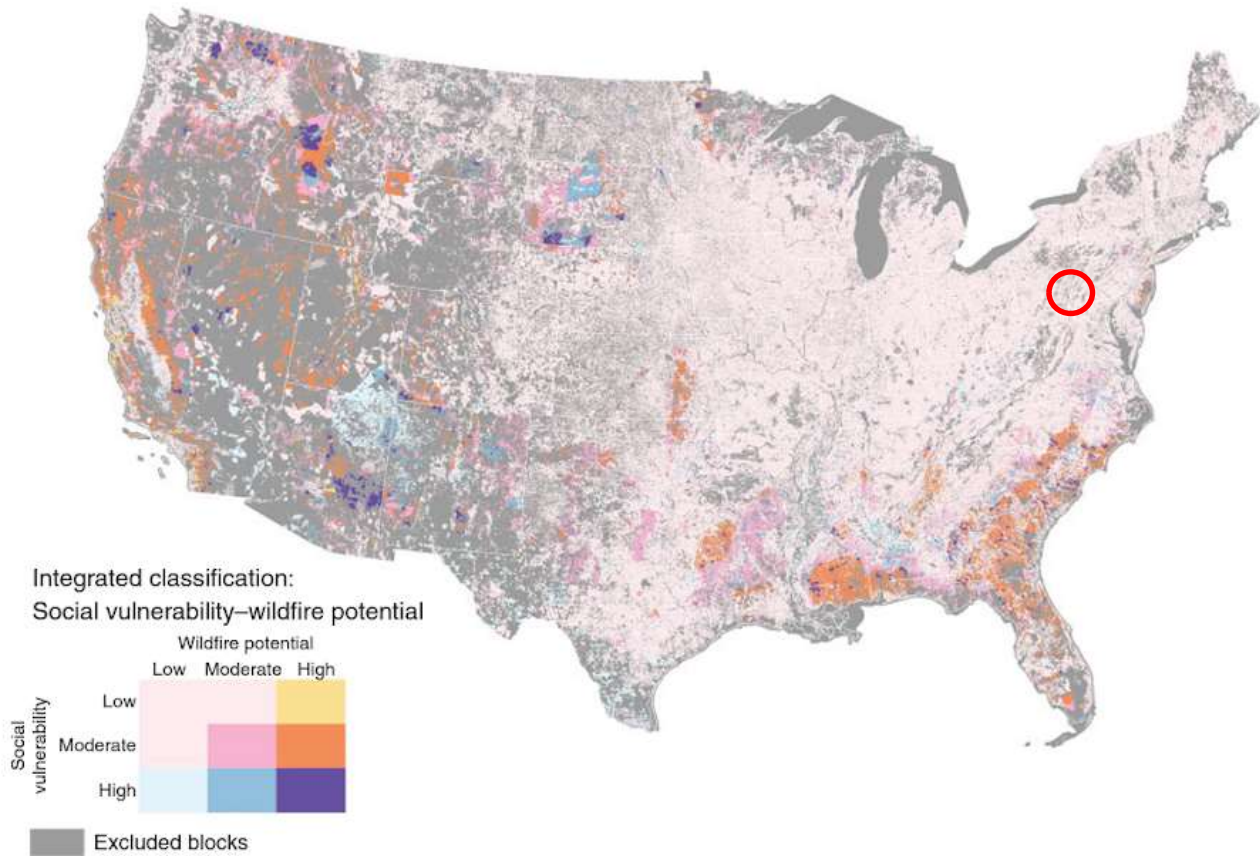


Fig. 4. Intersection of social vulnerability and wildfire potential.

Analyzing data from the study conducted above which considered the intersection of wildfire potential and social vulnerability in the coterminous United States, the following conclusions can be made. Garrett County falls within a "moderate" area where social vulnerability and wildfire potential intersect. Thus, individuals under the age of five and over the age of 65, those living below the poverty line, those without a high school diploma, non-English speaking, those without a vehicle, and those living in mobile homes are most susceptible to an overall moderate wildfire risk.

Previous Occurrences

Weather is the primary factor that determines the severity of fall and spring wildfire seasons in Maryland. Drought conditions, combined with windy days create red flag, or extremely high fire danger. According to the Maryland Department of Natural Resources, in 1990, one fire burned 1,360 acres, and in 1947 more than 5,000 acres burned in Anne Arundel and Baltimore Counties.

An example of a forest fire threatening residential properties occurred in Allegany County which borders Garrett County to the east, in the late 1990's a forest fire on Wills Mountain threatened homes built on the ridgetop within the City of Cumberland.

As noted, the MDNR maintains annual wildland fire reports for the state. The most current reports are between the years of 2018 and 2022. These reports present data by region; Garrett County is part of the state's western region. Generally, wildfires in the western region occur during March and April, often caused by burning debris. Calendar Year 2018 was the year that most acres burned. From 2018 to 2022, 82 wildfires in the western region burned a reported 174 acres (MDNR, n.d.).

WILDLAND FIRES – WESTERN REGION						
Year	Must Active Months			Total Fires Western Region	Total Acres Burned Western Region	Main Fire Cause across the State
	Month	# Fires	Acres			
2018	April	44	296	20	56.2	Debris Burning
	May	12	13			
2019	Sept.	30	89	18	41.5	Debris Burning
	October	33	148			
2020	March	19	58	16	36.5	Debris Burning
	April	17	41			
2021	March	25	89	16	22	Debris Burning
	Dec	17	211			
2022	March	34	65	12	18	Debris Burning
	April	26	96			
Totals				82	174.2	

Large Brush Fire Savage River Road – November 29th, 2016

According to information obtained from a local media outlet, emergency crews from around the region spent several hours battling a brush fire in Garrett County. The fire began just before 3:00 p.m. along Savage River Road and Big Run. More than 10 fire crews from the area were called to the scene. Forestry crews from the Maryland Department of Natural Resources were also called to the scene to investigate.

Brush Fire Sang Run Road – November 16th, 2016

According to information obtained from a local media outlet, emergency crews in Garrett County spent several hours on the scene of a brush fire during the afternoon hours. The fire broke out around 1:30 p.m. along Sang Run Road in McHenry. The fire burned approximately two acres, and no injuries were reported.

Brush Fire Savage River State Forest – May 14th, 2015

Approximately 29 Department of Natural Resources personnel formed fire lines around a 100-acre perimeter of a brush fire that started during the evening hours in the Coleman Hollow Wildlands of Savage River State Forest. The fire was located in a very remote area near the Savage Mountain Hiking Trail and downstream from the Savage River Dam. The fire was believed to be caused by lightning. Two dozers were utilized to form a perimeter around the fire.

Loss and Damages

Estimating monetary losses to wildland fire is difficult as the vast majority of wildland fires in Maryland occur in open land or fields. However, regarding exposure (i.e., potential losses), the greater the number of people and property in an area and the more variables for wildland fire severity of that area, the greater the potential loss. Of the many commercial products that the forests of Garrett County can generate, the most valuable is hardwood veneer and saw-timber.

The data that is consistently available are the number of acres burned per event. For this estimate, planners divided the total number of acres burned from 2018 to 2022 for the western region of Maryland by the number of events. An average of 2.1 acres were burned per event in western Maryland between 2018 and 2022 (MDNR, n.d.). According to information obtained from the U.S. Department of the Interior and the U.S. Forest Service (Hurst, 2023), since 1985, the entities have spent \$1.1 billion per year on fighting wildfires for a total of \$41 billion. These figures amount to approximately \$15,500 for every fire.

Future Occurrences

As mentioned above, wildfires can occur year-round (peaking in the spring) and are largely caused by human activity. Therefore, the probability of a wildfire event each year is likely. As outdoor recreation opportunities increase, human behaviors may ignite more fires that have the potential to escalate into larger wildfires. Additionally, the discussion of the Wildland Urban Interface (WUI) is relative for future considerations. If subdivisions continue to be built on the

fringe of more urbanized areas, they may be more susceptible to wildland fires, and as more former agriculture land reverts to brush, this problem will become more prevalent.

Future Climate Considerations

According to the *Fifth National Climate Assessment, NCA5*, “increased wildfire driven by climate change is projected to increase costs associated with health effects, loss of homes and other property. Seasons are changing in length and timing in Garrett County, with earlier springs, delayed falls, and shorter winters”. This seasonal shift could lengthen the fire season. Warmer temperatures mean higher evaporation rates, and thus, things dry out more quickly. Drier vegetation is more likely to burn if something sparks a flame. In many cases, the spark is accidental, but stronger storm events (often attributed to a changing climate) may include more lightning. As such, a changing climate may impact two variables of the fire risk (i.e., drier fuel and potential spark) rather than directly causing fires.

Weather conditions, including extreme heat and drought, can increase the likelihood of fires escalating to the level of “wildfire.” Any fire left unattended or mismanaged has the potential to become a wildfire; however, the likelihood of a fire attaining a significant size and intensity is unpredictable and varies based on environmental conditions.

Risk Assessment

This section summarizes the vulnerability of the county to wildfire. The steering committee conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding wildfire.

PUBLIC SENTIMENT, WILDFIRE – GARRETT COUNTY					
Hazard	Level of Concern				Total Responses
	Not at All	Somewhat	Concerned	Very	
WILDFIRE	14 (20.00%)	34 (48.57%)	16 (22.86%)	6 (8.57%)	70
Which hazard event have you experienced property damage from?				0 (0.0%)	49
Please indicate which hazard event you feel may affect your community?				24 (36.36%)	66

For site-specific hazards like wildfire, planners can identify specific facilities located within risk areas. The following table lists the assets (taken from the asset inventory list in Section 1.2 above) located within fuel laden areas (i.e., deciduous forest, evergreen forest, mixed forest) as obtained from a land use mapping layer provided by the Maryland Department of Planning.

ASSETS LOCATED IN WILDFIRE PRONE AREAS							
Infrastructure	Critical Facility	High Potential Loss	Cultural / Historical	Asset Type	Name	Address	City
			X	Public Park	Pleasant Valley 4-H Park	243 4H Camp Road	Swanton
	X			Emergency Response	Deer Park VFD Co. #20	5353 Maryland Hwy	Deer Park
X				Water Infrastructure	Deer Park WTP	520 Decost Road	Deer Park
	X			Safety & Security	Potomac/Garrett Headquarters	1523 Potomac Camp Road	Deer Park
			X	Public Facility	Swanton Community Center	3335 Swanton Road	Deer Park
	X			Waste Collection	Swanton Dump Site	12091 Maryland Hwy	Deer Park
	X			Public Facility	Swanton Post Office	3320 Swanton Road	Deer Park
X				Communications	American Towners Inc.	20971 National Pike	McHenry
X				Communications	CMA Cablevision Tower	20972 National Pike	Eastern Garrett
X				Communications	Columbia Gas Tower	20973 National Pike	Eastern Garrett
X				Communications	Crown Castel International Tower	20974 National Pike	Eastern Garrett
X				Communications	Crown Comms. Tower	20975 National Pike	Eastern Garrett
			X	Recreation	Eastern Garrett Recreation Area	State Route 546	Frostburg
X				Communications	FCC Comms. Tower	20975 National Pike	Eastern Garrett
X				Communications	Finzel Fire Comms. Tower	20975 National Pike	Eastern Garrett
X				Communications	Communications Tower	3200 Bloomingrose Road	Friendsville
X				Waste Water Infrastructure	Grantsville WWTP	10223 National Pike	Grantsville
X				Waste Water Infrastructure	Jennings WWTP	Route 495	Grantsville
			X	Public Park	New Germany State Park	349 Headquarters Lane	Grantsville
	X			Education	The Salem School	605 Salem Drive	Grantsville
X				Water Infrastructure	Water Tanks	Alt. Rt. 40 near Amish Road	Grantsville
X				Communications	Communications Tower	17070 Garrett Hwy	Oakland

ASSETS LOCATED IN WILDFIRE PRONE AREAS							
<i>Infrastructure</i>	<i>Critical Facility</i>	<i>High Potential Loss</i>	<i>Cultural / Historical</i>	<i>Asset Type</i>	<i>Name</i>	<i>Address</i>	<i>City</i>
X				Communications	Communications Tower	17 East Oak Street	Oakland
	X			Safety & Security	Dept. of Natural Resources	1728 Kings Run Rd.	Oakland
	X			Education	Ferndale Christian School	15211 Garrett Hwy	Oakland
	X			Public Health	Herrington Manor	222 Herrington Lane	Oakland
	X			Waste Collection	Kings Run Dump Site	1631 Kings Run Rd.	Oakland
X				Water Infrastructure	Oakland Substation	Route 135	Oakland
X				Electrical Infrastructure	Oak Park Substation	West Liberty Street	Oakland
			X	Public Park	Swallow Falls State Park	2470 Maple Glad Rd.	Oakland
X				Water Infrastructure	Water Pump Station	West Liberty Street	Oakland

The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above.

WILDFIRE RISK RANKING			
Category	Points	Description	Notes
Frequency	4	High (brush fires likely to occur in a year)	Several small to moderate sized brush fires occur each year in Garrett County. The western region of Maryland, which includes Garrett County has experienced 82 fires which burned approximately 174 acres over a five year period (i.e., 2018 to 2022).
Response	3	One week	Large-scale brushfires that occur in Garrett County are typically small and easily contained; however, may still require a small-scale response for up to a week.
Onset	5	No warning	Officials can easily predict wildfire conditions, but fires themselves occur with no advanced noticed.
Magnitude	1	Localized (less than 10% of land area affected)	The average wildfire in Maryland burns 15 acres, which is substantially less than 10% of the total land area of Garrett County.
Business	2	One week	Most wildfires in Garrett County are small; however, there is the possibility of some businesses being impacted for up to one week.
Human	2	Low (Some injuries)	Generally, the risk of injury or death due to wildfire is low. First responders to the event may experience injuries and adverse health effects.
Property	1	Less than 10% of property affected	The average wildfire in Garrett County would burn less than 10% of the county's land area.
Totals	18	MEDIUM	

FEMA's *Local Mitigation Planning Handbook* (2023c) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks or vulnerabilities are more or less prevalent as compared to the other participating jurisdictions.

All municipalities in Garrett County are near or adjacent to forest land or agricultural land. As urban development extends into these forest or brush covered lands the possibility of wildfire in urban areas increases as it does throughout the county.

The following table quickly synthesizes the data to capture the jurisdiction-specific aspects of risks and vulnerabilities for each town.

MULTI-JURISDICTIONAL CONSIDERATIONS, WILDFIRE		
<i>Jurisdiction</i>	<i>Comparison</i>	<i>Notes</i>
Garrett County	More	Riskfactor.com (n.d.) lists the county's wildfire risk as "Moderate," with 80% of the properties in the county have some risk of being affected by wildfire over the next 30 years. The vast majority of the forested wildfire risk areas are unincorporated, as are the WUI areas.
Accident	Same	Riskfactor.com (n.d.) indicates Accident's wildfire risk as "Minor," with 37% of properties having some risk of being affected by wildfire over the next 30 years. Accident sits at the edge of what planners estimated as a wildland-urban interface.
Deer Park	More	Riskfactor.com (n.d.) indicates Deer Park's wildfire risk as "Moderate," with 58% of properties having some risk of being affected by wildfire over the next 30 years.
Friendsville	More	Riskfactor.com (n.d.) indicates Friendsville's wildfire risk as "Minor" with 44% of properties having some risk of being affected by wildfire over the next 30 years. The majority of these properties are listed as residential.
Grantsville	Same	Riskfactor.com (n.d.) indicates Grantsville's wildfire risk as "Minor" with 15% of properties having some risk of being affected by wildfire over the next 30 years. The majority of these properties are listed as residential.
Kitzmiller	More	Riskfactor.com (n.d.) indicates Kitzmiller's wildfire risk as "Moderate" with 46% of properties having some risk of being affected by wildfire over the next 30 years. The majority of these properties are listed as residential, with four out of nine commercial properties being at a minor risk of wildfire.
Loch Lynn Heights	Same	Riskfactor.com (n.d.) indicates Loch Lynn Heights' wildfire risk as "Moderate" with 35% of properties having some risk of being affected by wildfire over the next 30 years. The majority of these properties are listed as residential; however, 17 of 19 commercial properties are considered to be at moderate risk.
Mountain Lake Park	Same	Riskfactor.com (n.d.) indicates Mountain Lake Park's wildfire risk as "Moderate" with 35% of properties having some risk of being affected by wildfire over the next 30 years. The majority of these properties are listed as residential, with 19 out of 26 commercial properties being located in moderate risk areas.
Oakland	More	Riskfactor.com (n.d.) indicates Oakland's wildfire risk as "Moderate" with 49% of properties having some risk of being affected by wildfire over the next 30 years. The majority of these properties are listed as residential; however, 104 commercial properties are located in areas classified as being at moderate risk.

2.0 RISK ASSESSMENT

2.3 Hazard Rankings

Section 2.2: Describe Hazards outlines a means for describing the probability and severity of the hazard effects on Garrett County. The individual profiles in Section 2.2 calculate the probability and severity of the hazard in question. The following table summarizes that data and presents a ranked list of anticipated hazard impacts.

SUMMARY OF HAZARD RANKINGS – GARRETT COUNTY									
<i>Hazard</i>	<i>Risk Ranking</i>	<i>Frequency</i>	<i>Response</i>	<i>Onset</i>	<i>Magnitude</i>	<i>Business</i>	<i>Human</i>	<i>Property</i>	<i>Total</i>
Cyber-Threat	High	3	5	4	2	4	2	2	22
Dam & Levee Failure	Low	2	2	3	1	4	1	1	14
Dense Fog-Transportation	Medium	5	2	4	2	1	3	1	18
Drought	Low	2	4	1	3	2	1	2	15
Flooding	Medium	5	3	3	1	2	3	2	19
Hazmat Release	Medium	3	3	5	1	1	3	1	17
Landslide	Medium	4	4	5	1	3	2	1	20
Public Health Emergency	Medium	3	5	1	1	4	2	1	17
Severe Summer Weather	High	5	3	3	4	2	2	2	21
Severe Winter Weather	High	5	3	2	4	2	3	2	21
Tornado	Medium	2	3	4	1	3	3	3	19
Wildfire	Medium	4	3	5	1	2	2	1	18

The Federal Emergency Management Agency (FEMA) created the National Risk Index (NRI) in 2021 to illustrate risk in the communities of the United States from a dataset of 18 natural hazards. The tool is an interactive online map ranking risk variables such as expected annual loss, social vulnerability, and community resilience (which produce an aggregated risk score). For the hazards that appear in both this plan and the NRI, a comparison with the rankings in the preceding table can validate the findings of this risk assessment. The hazards that appear in both the NRI and this plan are as follows.

- Cold wave (as “severe winter weather”)
- Drought
- Hail (as “severe summer weather”)
- Heat wave (as “severe summer weather”)
- Ice storm (as “severe winter weather”)
- Landslide
- Lightning (as “severe summer weather”)
- Riverine flooding
- Strong wind (as “severe summer weather”)
- Tornado
- Wildfire
- Winter weather

Garrett County’s NRI scores¹ for overall risk, expected annual loss, social vulnerability, and community resilience appear below. Scoring is on a scale of 0 to 100. Per the NRI, lower risk is driven by lower loss, lower social vulnerability, and higher community resilience.

GARRETT COUNTY RISK INDEX				
County	Risk Index	Expected Annual Loss	Social Vulnerability	Community Resilience
Garrett County	9.2 (Very Low)	10.37 (Very Low)	23.27 (Relatively Low)	53.82 (Relatively Moderate)

The following table compares the risk index scores for the hazards in this plan that also appear in the NRI only, and ranks them from highest to lowest. The far-right column describes the variance from the overall hazard rankings table above (derived from the hazard profile analysis).

NRI & HAZARD PROFILE RANKINGS COMPARISON					
Hazard	Risk Index (Avg. of Scores)	Absolute NRI Ranking	Hazard Profile Vulnerability Assignment	Absolute Hazard Profile Ranking	Hazard Profile Absolute / Ranking Placement Difference
Drought	0.0	7	Low (15)	7	↔
Flooding	41.0	2	Medium (19)	T-4	↑ - 2
Landslide	72.1	1	Medium (20)	3	↑ - 2
Severe Summer Weather	32.4	3	High (21)	T-1	↓ - 2
Severe Winter Weather	22.5	4	High (21)	T-1	↓ - 3
Tornado	20.5	6	Medium (19)	T-4	↓ - 2
Wildfire	22.3	5	Medium (18)	6	↑ - 1

¹ To ensure that hazard categories aligned, for this table, planners averaged the NRI scores for “hail”, “lightning”, and “strong wind” into a score for “severe summer weather”, as well as the scores for “ice storm” and “winter weather” into a “severe winter weather) category.

When comparing the data, the first acknowledgments should be that the mitigation plan and the NRI considered different variables, and comparisons are for planning purposes only. Despite these different variables nearly all the hazards had similar rankings.

The most significant source of difference between the rankings lies with the severe winter weather hazard. The hazard profile identifies the phenomenon as frequently-occurring, and it situates the impacts across a large geographic area. The stakeholders in Garrett County depict severe winter weather as a more serious hazard than the NRI.

This plan considered cyber-threats as a hazard (and, thus, risk reduction) for the second consecutive planning cycle. (As a human-caused hazard, cyber-threat does not appear in the NRI.) Cyber-threats are impacting Garrett County (and many other communities) in profound ways. These impacts are economical, as communities realize lost productivity in business sectors. These impacts resulted in cyber-threats being the highest-ranked risk for Garrett County.

2.0 RISK ASSESSMENT

2.4 Development Trends & Vulnerability Implications

§ 201.6(d)(3)

Revisions to reflect changes in development. Describe the changes in development that have occurred in hazard-prone areas that have increased or decreased each community's vulnerability since the previous plan was approved.

Section 1.2.4 above presents information about development trends in Garrett County by land use type. This section revisits those trends and assesses and describes how changes in development over the past five years within known hazard-prone areas have increased, decreased, or had no effect on each community's vulnerability.

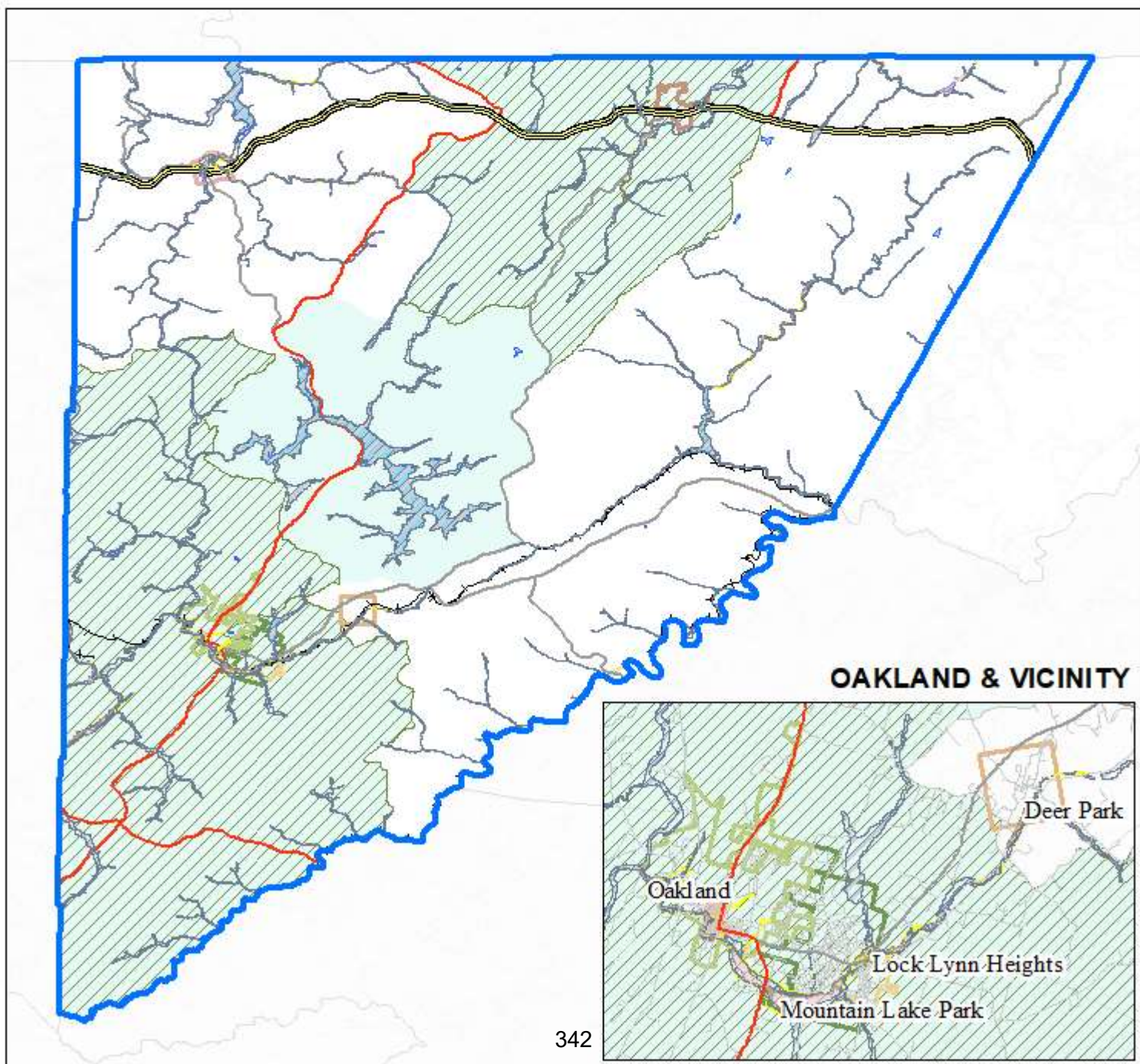
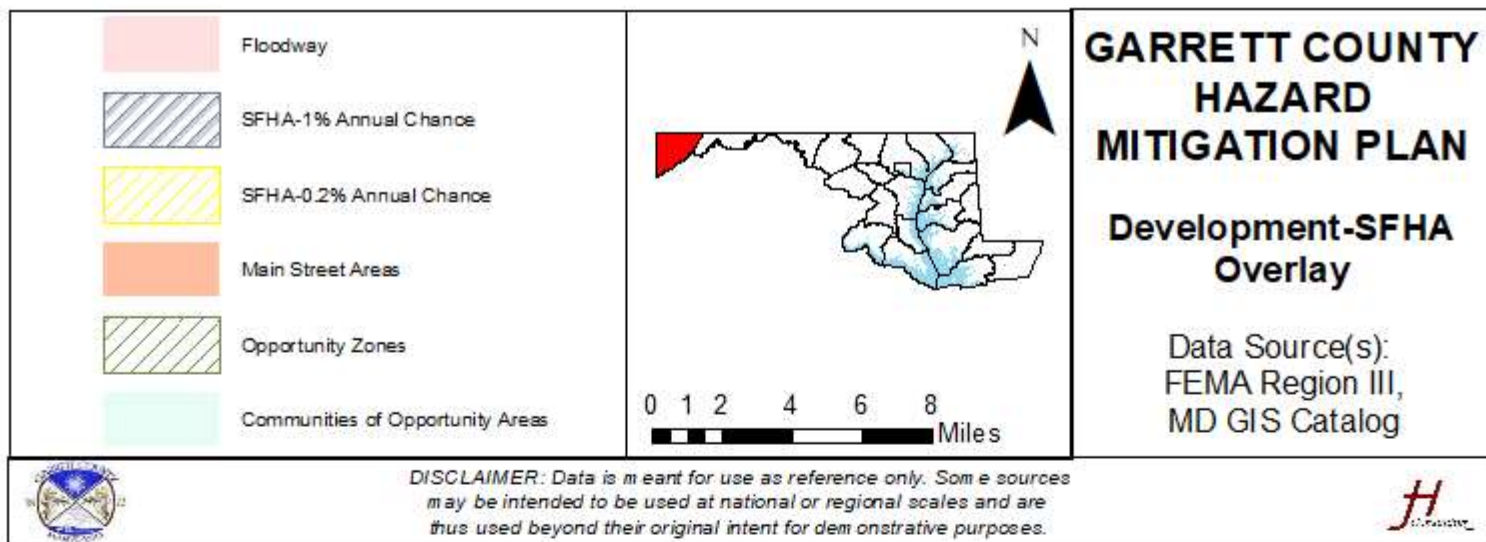
The mapping in the "Development Trends" Section calls out "proposed land uses", which indicate growth areas, and the narrative explains that local officials target these areas for commercial and industrial development as well as large-scale residential development. The majority of Garrett County is not proposed as designated growth area, which is a strategic decision made by local officials. The county and the participating municipalities value their rurality, as do residents (based on sentiments shared via the public survey). The use of growth areas and the intentional down-zoning of the non-growth areas (allowing for much less dense single-family residential development and the preservation of open space) preserves much of this character. From the perspective of risk reduction, it maintains areas throughout the county for naturalized mitigation (e.g., green space that can absorb water from heavy precipitation, naturalized streams, etc.).

Proactive mitigation considerations for the growth areas will likely be necessary. Construction and development can change natural drainage paths and create or increase flood risks. Timbering processes may alter natural drainage paths or change the vegetation available to absorb rainwater, this processes can also increase areas to landslide incidents. Though most of the growth areas lie outside of Special Flood Hazard Areas (SFHAs) related to riverine flooding, flash floods from runoff during heavy precipitation events may be a concern, particularly as new commercial and industrial developments pave more and more of the land in growth areas with impervious surfaces. New buildings, parking lots, and roads (i.e., impervious surfaces) mean less land to absorb excess precipitation forcing water into places it previously would not reach. Additionally, the Intergovernmental Panel on Climate Change (IPCC) suggests that areas in the Northeast (including Maryland) could see an increased risk of extreme precipitation and flooding. Some areas of the county may experience heavy rain in a short period, while other nearby areas may experience little precipitation. Further, storms forecasted to be minor have in them pockets



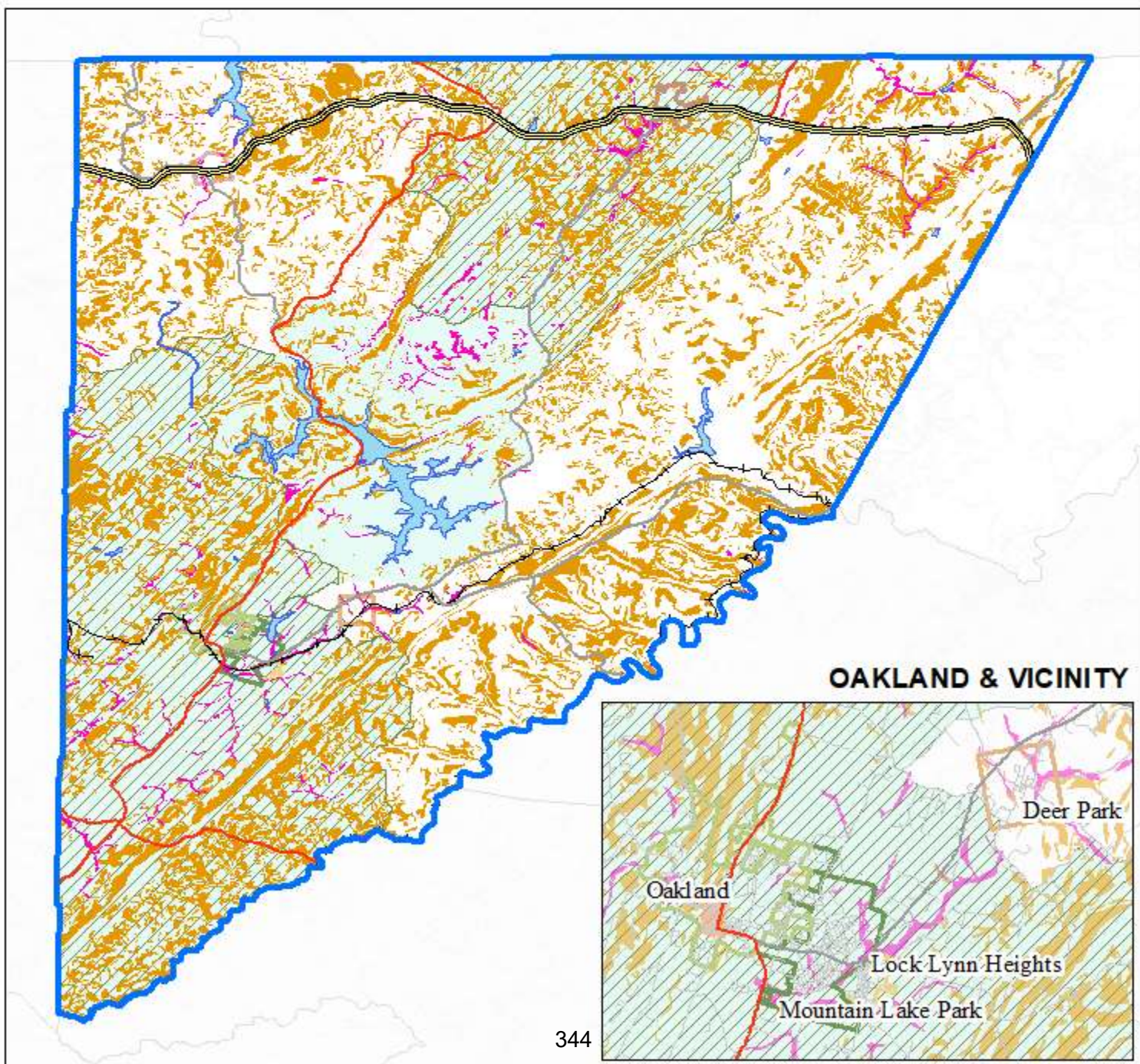
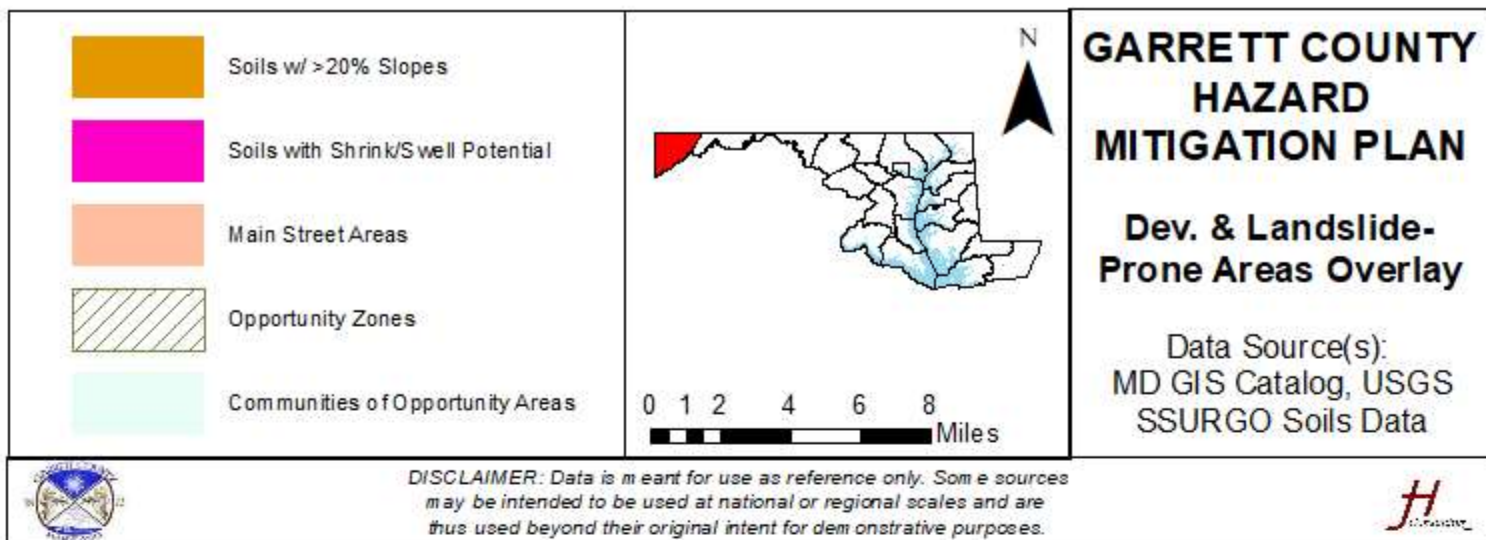
of heavy precipitation, leading to relatively small areas (in geographic terms) of severe damage. These changing weather conditions often interact with the built environment to create damage related to runoff.

The following map illustrates areas of the county classified as “development opportunity zones” and communities of opportunity areas overlaid with Special Flood Hazard Areas (SFHAs). The intersection of these areas with SFHAs may provide local leaders with insights as to where to concentrate hazard mitigation efforts related to stormwater management and flash flooding.



The answer is not always to limit development, and this narrative does not advocate restricting development within the growth areas. Instead, the governmental bodies for the municipal areas (and the county government for the unincorporated areas) within the designated growth areas may encourage (or consider requiring) mitigation measures like on-site stormwater management through retention basins and other green infrastructure solutions as part of future development projects. Many of the existing stormwater management regulations that are in place already encourage these measures. Their necessity may become more evident in the future.

A unique concern related to development within Garrett County is the issue of landslides. Based on the geologic makeup of the county, it is more likely to experience naturally occurring landslides. Suburban and urban areas, where man-made soil movement has taken place to facilitate development, are also more prone to landslide activity. According to information obtained from the United States Geological Survey (USGS) the vast majority of Garrett County is located within a high susceptibility, moderate landslide incidence area. The following map illustrates areas with slopes greater than 20% that coincide with potential growth areas. The county, and all municipalities have ordinances in place to restrict development within areas that have slopes in excess of 25%.



Vulnerability Implications

Direct, measurable consequences of disasters can include fatalities, injuries, and damages to humans, animals, or property. Disasters do not end there; there are several indirect effects, tangible and intangible, associated with them. Some examples of these include loss of livelihood and income, loss of community and population, mental and psychosocial impacts, costs of rebuilding, repair or replacement, loss of inventory, wages and tax revenue, etc. (Coppola, 2015). All of these also have a cost associated with them, but it is much more challenging to assign a specific dollar value and quantify them accurately. Often, disasters exacerbate risks already in a community (Comfort et al., 1999; Raker, Arcaya, Lowe, Zacher, Rhodes, & Waters, 2020). For instance, in areas where poverty is a concern, a disaster makes the challenges faced by those living in poverty much more difficult. In areas where access to public services is a concern, disasters may highlight how segments of the population cannot access assistance. Local leaders in areas where public trust in governmental systems is low may have difficulty rallying residents to follow the community's response strategy.

In Garrett County, Census tracts with socially vulnerable populations (e.g., persons below 150% of the poverty rate, persons with no high school diploma, single-parent households, persons speaking English "less than well," households with no vehicle available, etc.) overlap designated growth areas. Local officials should remain mindful of the challenges these populations face regarding access to information and resources as well as in participating in community initiatives. Ensuring their ability to participate in decision-making about risk reduction will be vital to ensuring the community remains inclusive, responsive, and resilient.

Countless instances of the hazards identified in Section 2.2 could disrupt critical infrastructure systems throughout the county. Loosely-related variables, often considered *cascading hazards*, can complicate some events. For example, high winds may cause sporadic damage but usually do not become a significant countywide concern until a large number of residents are without power. In addition to weather-related power outages, cascading hazards in Garrett County could include (but not be limited to) the following:

- Damage to infrastructure (i.e., roads, bridges, pipelines, utility poles, etc.) and residences following flooding
- Flooding of downstream or protected areas in the event of a dam failure
- Drinking water supply shortages and contamination following severe and prolonged drought conditions or floods
- Power outages, ruptured gas lines, etc. following severe weather
- Public health concerns following flooding conditions
- Permanent or temporary population displacement before, during, or after an event

The following table summarizes these development trends for the jurisdictions participating in this plan. It utilizes the definition of “changes in development” from FEMA’s *Local Mitigation Planning Policy Guide* (2022c), and provides space for descriptions to briefly explain the reasoning for identified increases and decreases in vulnerability resulting from development. There were no instances of a recognized decrease in vulnerability. The policy guide definitions appear in the table as follows (2022c, p. 31).

- **Recent Development:** For example, construction completed since the last plan was approved.
- **Potential Development:** For example, development planned or under consideration by the jurisdiction.
- **General Trends:** Conditions that may affect the risks and vulnerabilities of the jurisdictions (for example, climate change, declining populations or projected increases in population, or foreclosures).
- **Social Vulnerability:** Shifts in the needs of underserved communities or gaps in social equity. This can also include changes in local policies, standards, codes, regulations, land use regulations, and other conditions.

Participating jurisdictions marked several hazards with “No Change” regarding social vulnerability because there is a growing understanding of the social impacts related to the hazards that affect the area, yet that growing awareness does not indicate a similarly-increasing risk. The key for the table is as follows:

- Changes have resulted in an **Increase** in vulnerability for the jurisdiction (↑)
- Changes have resulted in **No Change** in vulnerability for the jurisdiction (↔)

Development Trends & Vulnerability Implications Summary						
Jurisdiction		Change Type				Notes
		Recent Devel.	Potential Devel.	General Trends	Social Vulner.	
CYBER-THREAT	Accident	↔	↑	↔	↔	Limited future commercial growth is expected in Accident, which would increase the number of systems exposed to cyber-threats.
	Deer Park	↔	↔	↔	↔	N/A
	Friendsville	↔	↔	↔	↔	N/A
	Grantsville	↔	↑	↔	↔	Future commercial growth is expected in Grantsville, which would increase the number of systems exposed to cyber-threats.
	Kitzmiller	↔	↔	↔	↔	N/A
	Loch Lynn Heights	↔	↔	↔	↔	N/A
	Mountain Lake Park	↔	↑	↔	↔	Limited future commercial growth is expected in Mountain Lake Park, which would increase the number of systems exposed to cyber-threats.
	Oakland	↔	↑	↔	↔	Future commercial growth is targeted for Oakland, which would increase the number of systems exposed to cyber-threats.
Jurisdiction		Change Type				Notes
		Recent Devel.	Potential Devel.	General Trends	Social Vulner.	
DAM-LEEVE FAILURE	Accident	↔	↔	↔	↔	N/A
	Deer Park	↔	↔	↑	↔	The predicted increases in frequency and intensity of heavy precipitation in the northeastern U.S. could strain the Little Youghiogheny Site 7 Dam.
	Friendsville	↔	↔	↑	↔	The predicted increases in frequency and intensity of heavy precipitation in the northeastern U.S. could strain the Deep Creek Lake Dam.
	Grantsville	↔	↔	↔	↔	N/A
	Kitzmiller	↔	↔	↑	↔	The predicted increases in frequency and intensity of heavy precipitation in the northeastern U.S. could strain the Mount Storm or Stoney River Dams or the Kitzmiller Levee System.
	Loch Lynn Heights	↔	↔	↑	↔	The predicted increases in frequency and intensity of heavy precipitation in the northeastern U.S. could strain the SCD Site 5 dam.
	Mountain Lake Park	↔	↔	↑	↔	The predicted increases in frequency and intensity of heavy precipitation in the northeastern U.S. could strain the SCD Site 5 dam.
	Oakland	↔	↔	↑	↔	The predicted increases in frequency and intensity of heavy precipitation in the northeastern U.S. could strain the SCD Sites 1, 2, or 3 dams.

DEVELOPMENT TRENDS & VULNERABILITY IMPLICATIONS SUMMARY					
	Jurisdiction	Change Type			
		Recent Devel.	Potential Devel.	General Trends	Social Vulner.
DENSE FOG-TRANS.	Accident	↔	↔	↔	↔
	Deer Park	↔	↔	↔	↔
	Friendsville	↔	↔	↔	↔
	Grantsville	↔	↔	↔	↔
	Kitzmilller	↔	↔	↔	↔
	Loch Lynn Heights	↔	↔	↔	↔
	Mountain Lake Park	↔	↔	↔	↔
	Oakland	↔	↔	↔	↔
Development trends have not caused any discernable increases or decreases in vulnerability to transportation being impacted by dense fog for any participating jurisdictions.					
	Jurisdiction	Change Type			
		Recent Devel.	Potential Devel.	General Trends	Social Vulner.
DROUGHT	Accident	↔	↑	↑	↔
	Deer Park	↔	↔	↔	↔
	Friendsville	↔	↔	↔	↔
	Grantsville	↔	↑	↑	↔
	Kitzmilller	↔	↔	↔	↔
	Loch Lynn Heights	↔	↔	↔	↔
	Mountain Lake Park	↔	↔	↔	↔
	Oakland	↔	↔	↔	↔
Accident was one of only two towns in the county that experienced population growth from 2010 to 2020. Agricultural growth is projected for areas on the perimeter of the town. Rising air and water temperatures and changes in precipitation are intensifying droughts in certain areas.					
N/A					
N/A					
Grantsville was one of only two towns in the county that experienced population growth from 2010 to 2020. Agricultural growth is projected for the southeast and southwest corners, and northern part of the town, as well as western boundary north of Main Street. Rising air and water temperatures and changes in precipitation are intensifying droughts in certain areas.					
N/A					
N/A					
N/A					
N/A					

DEVELOPMENT TRENDS & VULNERABILITY IMPLICATIONS SUMMARY						
	Jurisdiction	Change Type				Notes
		Recent Devel.	Potential Devel.	General Trends	Social Vulner.	
FLOODING	Accident	↔	↔	↑	↔	Accident was one of only two towns in the county that experienced population growth from 2010 to 2020. The predicted increases in frequency and intensity of localized heavy precipitation in the northeastern U.S. could contribute to an increase in flooding.
	Deer Park	↔	↔	↔	↔	N/A
	Friendsville	↔	↔	↑	↔	The predicted increases in frequency and intensity of localized heavy precipitation in the northeastern U.S. could contribute to an increase in flooding.
	Grantsville	↔	↔	↔	↔	N/A
	Kitzmilller	↔	↔	↑	↔	The predicted increases in frequency and intensity of localized heavy precipitation in the northeastern U.S. could contribute to an increase in flooding.
	Loch Lynn Heights	↔	↔	↔	↔	N/A
	Mountain Lake Park	↔	↔	↔	↔	N/A
	Oakland	↔	↔	↑	↔	The predicted increases in frequency and intensity of localized heavy precipitation in the northeastern U.S. could contribute to an increase in flooding.
	Jurisdiction	Change Type				Notes
		Recent Devel.	Potential Devel.	General Trends	Social Vulner.	
HAZMAT RELEASE	Accident	↔	↔	↔	↔	Development trends have not caused any discernable increases or decreases in vulnerability to hazardous materials releases for any participating jurisdictions.
	Deer Park	↔	↔	↔	↔	
	Friendsville	↔	↔	↔	↔	
	Grantsville	↔	↔	↔	↔	
	Kitzmilller	↔	↔	↔	↔	
	Loch Lynn Heights	↔	↔	↔	↔	
	Mountain Lake Park	↔	↔	↔	↔	
	Oakland	↔	↔	↔	↔	

Development Trends & Vulnerability Implications Summary						
		Change Type				
		Recent Devel.	Potential Devel.	General Trends	Social Vulner.	
Jurisdiction						Notes
LANDSLIDE	Accident	↔	↔	↔	↔	Development trends have not caused any discernable increases or decreases in vulnerability to landslides for any participating jurisdictions.
	Deer Park	↔	↔	↔	↔	
	Friendsville	↔	↔	↔	↔	
	Grantsville	↔	↔	↔	↔	
	Kitzmilller	↔	↔	↔	↔	
	Loch Lynn Heights	↔	↔	↔	↔	
	Mountain Lake Park	↔	↔	↔	↔	
	Oakland	↔	↔	↔	↔	
		Change Type				
		Recent Devel.	Potential Devel.	General Trends	Social Vulner.	
Jurisdiction						Notes
PUBLIC HEALTH EMERGENCY	Accident	↔	↔	↔	↔	N/A
	Deer Park	↔	↔	↔	↔	N/A
	Friendsville	↔	↔	↔	↑	The median age among the residents of Friendsville is 52, approximately 27% of the town's population is over the age of 65. .
	Grantsville	↔	↔	↔	↑	
	Kitzmilller	↔	↔	↔	↔	Approximately 30% of the town's population is over the age of 65. Approximately 28% live below the poverty line.
	Loch Lynn Heights	↔	↔	↔	↔	N/A
	Mountain Lake Park	↔	↔	↔	↔	N/A
	Oakland	↔	↔	↔	↔	N/A
		Change Type				
		Recent Devel.	Potential Devel.	General Trends	Social Vulner.	
Jurisdiction						Notes
S. SUMMER WEATHER	Accident	↔	↔	↑	↔	The predicted increases in frequency and intensity of localized heavy precipitation in the northeastern U.S. could contribute to an increase vulnerability to severe summer weather.
	Deer Park	↔	↔	↑	↔	
	Friendsville	↔	↔	↑	↔	
	Grantsville	↔	↔	↑	↔	
	Kitzmilller	↔	↔	↑	↔	
	Loch Lynn Heights	↔	↔	↑	↔	
	Mountain Lake Park	↔	↔	↑	↔	
	Oakland	↔	↔	↑	↔	

DEVELOPMENT TRENDS & VULNERABILITY IMPLICATIONS SUMMARY					
	Jurisdiction	Change Type			
		Recent Devel.	Potential Devel.	General Trends	Social Vulner.
S. WINTER WEATHER	Accident	↔	↔	↔	↔
	Deer Park	↔	↔	↔	↔
	Friendsville	↔	↔	↔	↔
	Grantsville	↔	↔	↔	↔
	Kitzmilller	↔	↔	↔	↔
	Loch Lynn Heights	↔	↔	↔	↔
	Mountain Lake Park	↔	↔	↔	↔
	Oakland	↔	↔	↔	↔
Development trends have not caused any discernable increases or decreases in vulnerability to severe winter weather for any participating jurisdictions.					
	Jurisdiction	Change Type			
		Recent Devel.	Potential Devel.	General Trends	Social Vulner.
TORNADO	Accident	↔	↔	↑	↔
	Deer Park	↔	↔	↑	↔
	Friendsville	↔	↔	↑	↔
	Grantsville	↔	↔	↑	↔
	Kitzmilller	↔	↔	↑	↔
	Loch Lynn Heights	↔	↔	↑	↔
	Mountain Lake Park	↔	↔	↑	↔
	Oakland	↔	↔	↑	↔
Though the county has seen slow steady growth and development, there are residential and commercial structures in all participating jurisdictions that area aging (i.e., built per-building code) that may be at more risk.					
	Jurisdiction	Change Type			
		Recent Devel.	Potential Devel.	General Trends	Social Vulner.
WILDFIRE	Accident	↔	↑	↔	↔
	Deer Park	↔	↑	↔	↔
	Friendsville	↔	↑	↔	↔
	Grantsville	↔	↑	↔	↔
	Kitzmilller	↔	↑	↔	↔
	Loch Lynn Heights	↔	↑	↔	↔
	Mountain Lake Park	↔	↑	↔	↔
	Oakland	↔	↑	↔	↔
Future development anywhere within the county or municipalities would increase the Wildland-Urban Interface (WUI) vulnerability. According to the Maryland Department of Natural Resources (MDNR) the entirety of Garrett County is at a very high to extreme WUI fire threat potential.					

Public Health, Social Vulnerability, and Other General Vulnerability Indicators

Vulnerability is the “measure of the propensity of an object, area, individual, group, community, country, or other entity to incur the consequences of a hazard” (Coppola, 2015, p. 33). Many aspects contribute to the vulnerability of society; these can include income disparity, class, race or ethnicity, gender, age, disability, health, and literacy (Thomas & Phillips, 2013, pp. 2-3). Understanding the overall health status of the community is essential in determining the vulnerability of the population to any given hazard; emergencies and disaster situations can exacerbate existing medical conditions. Vulnerable populations, populations of concern, or populations at risk are those individuals or groups of people who are more exposed to the dangers of the impacts of a hazard because of their age, gender, income, occupation, disability, physical or mental health, literacy, religion, education, or ethnicity.

Some groups face several stressors related to both climate and non-climate factors. For example, people living in impoverished urban or isolated rural areas, floodplains, and other at-risk locations are more vulnerable not only to extreme weather and persistent climate change but also to social and economic stressors. Many of these stressors can occur simultaneously or consecutively. Over time, this accumulation of multiple, complex stressors is expected to become more evident as climate impacts interact with stressors associated with existing mental and physical health conditions and with other socioeconomic and demographic factors. Where appropriate (and where information is available), hazard profiles provide further vulnerability details.

Understanding trends associated with populations corresponding with various social vulnerability indicators can inform hazard mitigation decision-making. For instance, in areas with a low median household income, households may not be able to afford mitigation measures on their own. Populations living under the poverty line may have difficulty recovering. Thus, a community can lessen the indirect losses those families incur by strengthening capabilities to support those populations (e.g., assisting with access to FEMA and other governmental agencies accepting requests for disaster assistance, considering all options for structural mitigation projects to protect areas where clusters of those populations live, etc.). Phillips, Thomas, Fothergill, and Blinn-Pike (2010) provide a series of social vulnerability indicators. The following indicators¹ correspond to data that are available to the Garrett County planning committee.

¹ Definitions are quotes from the Phillips et al. text. See p. 3 of the first edition.

- **Age:** Senior citizens are reluctant to secure aid after a disaster out of concern they may lose their independence. Approximately 24% of the population of Garrett County is over the age of 65. (Proxy Data per Census: Under 18, 65+)
- **Class:** Lower-income families and households tend to live in housing that suffers disproportionately during disasters. Approximately 11% of the population of Garrett County is below the poverty line. (Proxy Data per Census: Median household income, Poverty %)
- **Gender:** Women tend to be the ones most likely to secure relief aid for the family, yet they are under-represented and under-used in recovery efforts. Approximately 50% of the population of Garrett County is female. (Proxy Data per Census: Female population)
- **Literacy:** Few options exist to inform and prepare people with low reading levels. Approximately 24.6% of the population of Garrett County does not possess a high school diploma. (Proxy Data per Census: No diploma)
- **Race & Ethnicity:** Warning messages tend to be in the dominant language with an expectation that people will take the recommended action immediately. Research indicates that culture influences how people may receive and interpret warnings and how they may respond. Approximately 3.1% of the population of Garrett County speak a language other than English. (Proxy Data per Census: White, Black/African American, Two or more races, Language other than English spoken in the home)

The complicating variables related to each hazard often appear in the hazard profiles. The information presented relates to worst-case scenario events; a single event may not always reach all impacts described. It is important, however, to understand that the implications of hazards go beyond those seen immediately after the event. The effects of one event can last months or even years, especially where public health, social, economic, environmental, and infrastructure impacts are concerned.

Hazards and Climate Change

Many natural hazards are related to the climate or weather, such as droughts, severe weather, and floods. There is an important distinction between weather and climate. Weather refers to the atmospheric conditions of a geographical region over a short period, such as days or weeks. Climate, in contrast, refers to the atmospheric conditions of a geographic area over long periods, such as years or even decades (Keller & Devecchio, 2015, pp. 406-407).

According to the U.S. Global Change Research Program, there are weather and climate changes already observed in the United States.

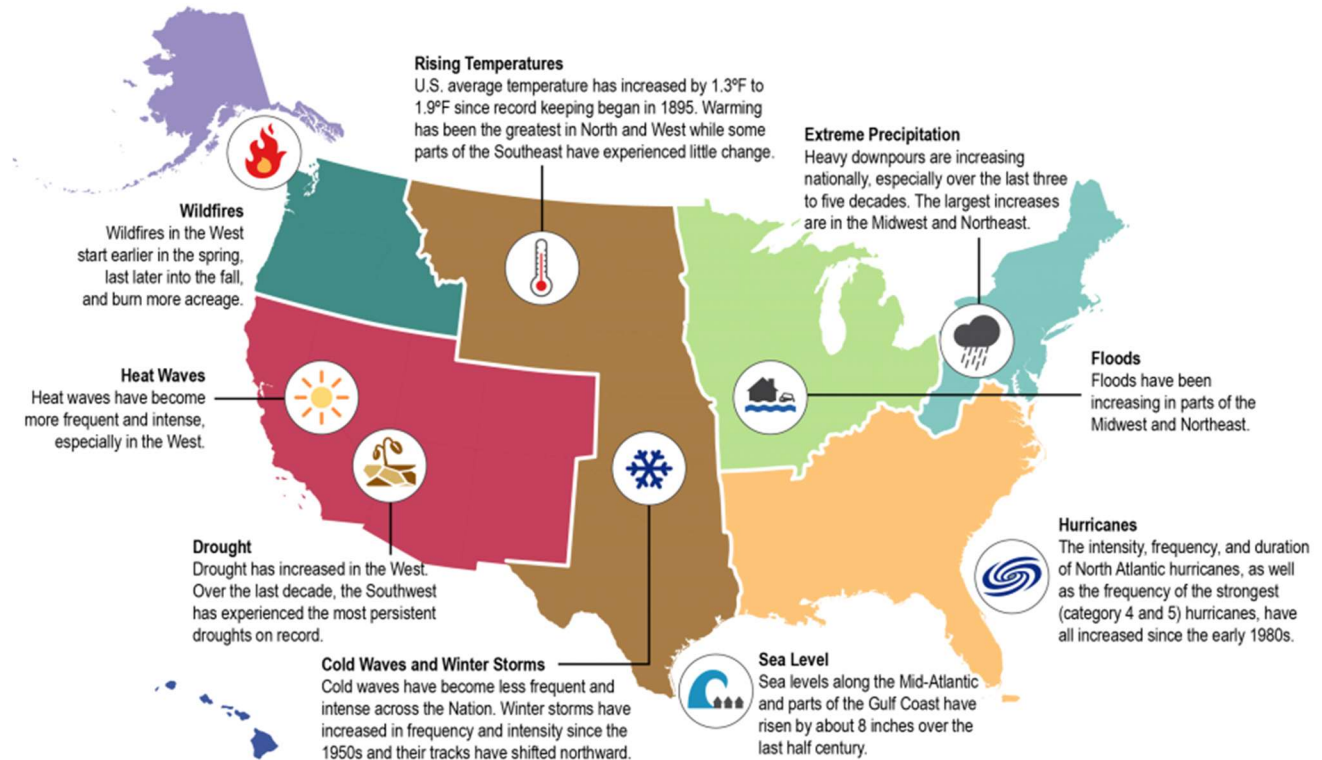
- Since recordkeeping began in 1895, the average U.S. temperature has increased by 1.3°F to 1.9°F, with most of the increase happening since 1970. Also, the first decade of the 2000s was the warmest on record.
- The average precipitation across the U.S. has increased since 1900, with some areas experiencing higher than the national average and some lower. Heavy downpours are increasing, especially over the last 30-50 years.
- Drought events have increased in the west. Changes in precipitation and runoff, combined with changes in consumption and withdrawal, have reduced surface and groundwater supplies in many areas.
- Some types of severe weather events have experienced changes. Heatwaves are more frequent and intense.

Climate change can have a significant impact on human health and the environment. The changes mentioned above can affect the environment by leading to changes in land use, ecosystems, infrastructure conditions, geography, and agricultural production. Extreme heat, poor air quality, reduced food and water supply and quality, changes in infectious agents, and population displacement can lead to public health concerns such as heat-related illnesses, cardiopulmonary illnesses, food, water, and vector-borne diseases and have consequences on mental health and stress (USGCRP, 2016).

The National Climate Assessment (NCA) defined climate trends for national U.S. regions in 2014. The major trends are:

- wildfires and heat waves on the west coast,
- rising temperatures and increased severity and frequency of winter storms in the middle of the country, and
- more rain and flooding in the Midwest and northeastern parts of the country.

The Intergovernmental Panel on Climate Change (IPCC) largely concurs with the above list (IPCC, n.d.). In Maryland, the trend will likely be an increase in extreme precipitation, as noted in the graphic below.



Mitigation efforts are becoming more challenging as a result of climate change (i.e., more severe, frequent, widespread and costly disasters). “From 1980 to 2022 there were, on average, 7.9 disasters per year in which damages reached at least one billion dollars. Within the last five years, there was an annual average of 17.8 of these billion-dollar disasters”. (FEMA, 2023, p. 2).

“In addition to driving increased frequency and severity of natural hazards climate change is shifting the geographic areas affected by certain types of natural hazards. This means in addition to preparing for more frequent and more severe hazards, communities may need to prepare for new hazards that they have not historically experienced”. (FEMA, 2023, p. 4).

3.0 MITIGATION STRATEGY

§ 201.6(c)(3)

A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

Mitigation is defined as any sustained actions taken to reduce or eliminate long-term risk to life and property from hazards. Mitigation strategies are the plan's primary purpose. All other sections contribute to, and inform, the following mitigation actions.

According to FEMA (2013), "the mitigation strategy is made up of three main required components: mitigation goals, mitigation actions, and action plan for implementation. These provide the framework to identify, prioritize, and implement actions to reduce risk to hazards." This section contains the aforementioned items; it describes the updated goals and objectives for this multi-jurisdictional mitigation plan, it outlines the action items (or projects) for each participating jurisdiction within Garrett County by priority, and each project identifies the agency responsible for completing the project as well as a general timeline for completion.

3.0 MITIGATION STRATEGY

3.1 Mitigation Goals and Objectives

Hazard mitigation goals and objectives represent what Garrett County wants to achieve by implementing risk reduction projects. These goals work together to lessen the loss of life, injury, and damage to property, the economy, and the environment from the hazards identified in Section 2.2 above.

During the first plan update meeting, the steering committee decided to keep the goals and objectives from the 2018 plan. The committee felt that the existing goals and associated objectives were still realistic and relevant. The committee realized there are several ways to organize goals, but decided to keep the 10 overarching goals and 42 specific objectives that can be achieved through the mitigation projects included in the plan. The overarching goals and objectives apply to the unincorporated areas as well as the municipalities; this way all communities within the county are working towards the same objectives and ultimately towards the overall goals. Goals as identified in this plan are broad-based and long-term in nature.

During the first meeting, the committee members approved the following as this plan's organizing goals and objectives.

MITIGATION GOALS & OBJECTIVES – GARRETT COUNTY		
Goals	Description	Objectives
GOAL 1	Maintain and enhance Garrett County's Department of Emergency Management's capacity to continuously make Garrett County less vulnerable to hazards.	1.1: Institutionalize hazard mitigation.
		1.2: Improve organizational efficiency.
		1.3: Maximize utilization of best technology.
		1.4: Maximize utilization of GIS software and applications. Make county GIS mapping seamless with public safety and 911 communications.
		1.5: Maximize use of hazard vulnerability data, such as HAZUS Risk Map products.
		1.6: Coordinate efforts with the Health Department and other organizations for intervention and interdiction related to Opioid use.
GOAL 2	Build and support municipal capacity and commitment to become continuously less vulnerable to hazards.	2.1: Increase awareness and knowledge of hazard mitigation principles and practices among local and municipal public officials.
		2.2: Provide assistance to municipal officials and help municipalities obtain funding for mitigation planning and project activities.
		2.3: Prepare technical reports for critical facilities as necessary.

MITIGATION GOALS & OBJECTIVES – GARRETT COUNTY		
Goals	Description	Objectives
GOAL 3	Improve coordination and communication with other relevant organizations.	3.1: Establish and maintain lasting partnerships.
		3.2: Streamline policies to eliminate conflicts and duplication of efforts.
		3.3: Incorporate hazard mitigation into activities of other organizations.
GOAL 4	Increase public understanding, support, and demand for hazard mitigation.	4.1: Identify hazard specific issues and needs.
		4.2: Heighten public awareness of natural hazards.
		4.3: Publicize and encourage the adoption of appropriate hazard mitigation actions.
		4.4: Increase the number of businesses that have developed a business risk reduction plan.
		4.5: Increase by 25% the proportion of businesses and residences that have flood insurance.
GOAL 5	Protect existing and future properties (i.e., residential, commercial, public, and critical facilities).	5.1: Utilize the most effective approaches to protect buildings from flooding, including acquisition and elevation.
		5.2: Enact and enforce regulatory measures to ensure that new development will not increase hazard threats from dam failures, flooding, steep slope failure and the threat of wildfire at the wildland/urban interface.
		5.3: Within two years, reduce by 20% the number of houses in the floodplain that are subject to repetitive losses from flooding.
		5.4: Within five years, increase by 25% the number of critical facilities that have carried out mitigation measures to ensure their functionality in a 100-year flood event, winter storm or high wind event.
		5.5: Review and update Building Codes to ensure that manufactured housing, including mobile homes, are constructed and installed in a manner to minimize wind damage.
		5.6: Ensure existing high-risk residential structures are utilizing retrofitting techniques to mitigate repetitive flooding.
GOAL 6	Ensure that public funds are used in the most efficient manner.	6.1: Prioritize new mitigation projects, starting with sites facing the greatest threat to life, health, and property.
		6.2: Use public funding to protect public services and critical facilities.
		6.3: Use public funding on private property where benefits exceed costs.
		6.4: Maximize the use of outside funding sources.
		6.5: Encourage property-owner self-protection measures.
GOAL 7	Promote sustainable development to improve the quality of life.	7.1: Establish open space parks and recreational areas in flood hazards areas.
		7.2: Provide for the conservation and preservation of natural resources.
		7.3: Limit additional housing (especially elderly and high density) in areas of high hazard risk.

MITIGATION GOALS & OBJECTIVES – GARRETT COUNTY		
Goals	Description	Objectives
GOAL 8	Prevent destruction of forests and structures in the Wildland Urban Interface.	8.1: Improve communications capability between municipal and county emergency management and law enforcement personnel.
		8.2: Identify specific high hazard areas in the wildland/urban interface and notify residents of measures to protect their property from wildfire damage.
		8.3: Develop evacuation procedures to enable residents near forested areas to evacuate safely.
GOAL 9	Increase public understanding, support, and demand for hazard mitigation.	9.1: Upgrade or replace public roads and storm water management features to include mitigation into the project design and construction.
		9.2: Improve routes utilized in flood hazard events to mitigate life threatening road conditions and road closures.
		9.3: Mitigate problem road sections within the county and municipalities.
		9.4: Ensure continuous power supply to critical and public facilities.
		9.5: Mitigate cyber threats to ensure the continuous operation of county information technology infrastructure.
GOAL 10	Integrate plans and policies across disciplines and agencies within the county through the consideration of potential hazards and future development.	10.1: Integrate hazard mitigation into areas such as land use, transportation, climate change, natural and cultural resource protection, water resources, and economic development.
		10.2: Solicit participation and offer opportunities for various departments to work together on a regular basis.
		10.3: Clearly define roles of, and improve intergovernmental coordination between planners, emergency managers, engineers, and other staff, and municipal and regional partners in improving disaster resiliency.

These goals are clear and collectively-derived. Most importantly, though, these goals and objectives are written such that jurisdictions are able to measure their progress toward risk reduction.

Garrett County developed six different mitigation actions that are geared toward reducing the long-term vulnerabilities from High Hazard Potential Dams (HHPDs), the town of Kitzmiller also developed a goal for this purpose. The following table links the mitigation actions to relevant goals listed above.

HHPD MITIGATION ACTIONS & ASSOCIATED MITIGATION GOALS		
<i>Garrett County HHPD Mitigation Actions</i>	<i>Relevant Mitigation Goals</i>	
Identify structures that would be candidates for retrofit projects focusing efforts in underserved communities.	Goal 5	Protect existing and future properties (i.e., residential, commercial, public, and critical facilities)
	Goal 7	Promote sustainable development to improve the quality of life.
Perform necessary maintenance and upgrades to high and significant hazard dams throughout the county.	Goal 5	Protect existing and future properties (i.e., residential, commercial, public, and critical facilities)
	Goal 6	Ensure that public funds are used in the most efficient manner.
Review new 2024 Hazard Mitigation Plan and integrate it with new Comprehensive Plan slated for completion in 2024, as well as with municipal comprehensive plans.	Goal 3	Improve coordination and communication with other relevant organizations.
	Goal 10	Integrate plans and policies across disciplines and agencies within the county through the consideration of potential hazards and future development.
Consider placing development restrictions on land use for vacant parcels within hazard areas.	Goal 5	Protect existing and future properties (i.e., residential, commercial, public, and critical facilities)
	Goal 7	Promote sustainable development to improve the quality of life.
Hold disaster exercises in various areas of the county. Types of exercise: cyberthreat, dam/levee failure, flood, high wind, winter storm, hazardous materials release, public health emergency, tornado, wildfire, and bio-terrorism exercises.	Goal 3	Improve coordination and communication with other relevant organizations.
	Goal 10	Integrate plans and policies across disciplines and agencies within the county through the consideration of potential hazards and future development.
Distribute educational material in print and via social media throughout the underserved and social vulnerable populations of the county and municipalities regarding the county's mass notification system, including the process of signing up for notifications.	Goal 3	Improve coordination and communication with other relevant organizations.
	Goal 4	Increase public understanding, support, and demand for hazard mitigation.
<i>Kitzmiller HHPD Mitigation Action</i>	<i>Relevant Mitigation Goals</i>	
Coordinate with dam and levee owners to bolster warning capability in the event of a failure or abnormal operating condition.	Goal 2	Build and support municipal capacity and commitment to become continuously less vulnerable to hazards.
	Goal 3	Improve coordination and communication with other relevant organizations.

3.0 MITIGATION STRATEGY

3.2 Mitigation Actions

This section serves as a mitigation action plan to reduce the losses and other impacts Garrett County may suffer from the hazards included in the risk assessment. “A mitigation action is a specific action, project, activity, or process taken to reduce or eliminate long-term risk to people and property from hazards and their impacts. Implementing mitigation actions helps achieve the plan’s goals and objectives. The actions to reduce vulnerability to threats and hazards form the core of the plan, and are a key outcome of the planning process” (FEMA, 2013).

§ 201.6(c)(3)	A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.
§ 201.6(c)(3)(ii)	A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§ 201.6(c)(3)(iii)	An action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost-benefit review of the proposed projects and their associated costs.

The mitigation steering committee, and the county’s consultant, coordinated directly with the jurisdictions throughout the county on various plan elements. Outreach included individual calls and technical assistance. Further, Section 1.1.2 – Jurisdictional Involvement, contains tables of virtual planning meetings held with each municipality. Topics discussed during these meetings included; the completion of a capability survey, mitigation project status indicators, the development of new mitigation projects, and the plan adoption process. The narrative below is the result of that outreach.

Types of Mitigation Actions

There are five primary types of mitigation actions that can work to reduce long-term vulnerability: local plans and regulations, structure and infrastructure projects, natural systems protection, education programs, and preparedness and response activities (Coastal Hazards Research Center & Center for Sustainable Community Design, n.d.).

- **Local Plans and Regulations:** Local land use or comprehensive plans embody the goals, values, and aspirations of the community, as expressed through a process of community engagement. Local ordinances and review processes influence land development and building construction. In some cases, plans and regulations can work at cross-purposes. For example, a capital improvement plan may call for extending water and sewer lines to an area that is vulnerable to natural hazards. Examples include the following.
 - Comprehensive plans
 - Land use ordinances
 - Subdivision regulations
 - Development review
 - Building codes and enforcement
 - NFIP Community Rating System (CRS)
 - Capital improvement programs
 - Open space preservation
 - Storm water management regulations and master plans

- **Structure and Infrastructure Projects:** These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. These projects could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct human-made structures to reduce the impact of hazards. Examples include the following.
 - Acquisitions and elevations of structures in flood-prone areas
 - Utility undergrounding
 - Structural retrofits
 - Floodwalls and retaining walls
 - Detention and retention structures
 - Culverts
 - Safe rooms

- **Natural Systems Protection:** These are actions that minimize damage and losses while preserving or restoring the functions of natural systems. Examples include the following.
 - Sediment and erosion control
 - Stream corridor restoration
 - Forest management
 - Conservation easements
 - Wetland restoration and preservation

- **Education Programs:** These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Although this type of mitigation reduces risk less directly than structural projects or regulations, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public can lead to direct actions. Examples include the following.
 - Radio or television spots
 - Websites with maps and information
 - Real estate disclosure
 - Presentations to school groups or neighborhood organizations
 - Mailings to residents in hazard-prone areas
 - StormReady
 - Firewise Communities

- **Preparedness and Response Activities:** Mitigation actions that reduce or eliminate long-term risk are different from actions taken to prepare for, or respond to hazard events. Mitigation activities lessen or eliminate the need for preparedness or response resources in the future. When analyzing risks and identifying mitigation actions, the planning team may also identify emergency response or operational preparedness actions.

For some hazards such as tornadoes, including preparedness actions in the mitigation plan may be necessary and practical. The mitigation plan may be the best place for your community to capture and justify the need for these actions. However, these will not supplant or meet the federal requirements for identifying mitigation actions. It is important that the planning team understands the difference and can distinguish between mitigation and other emergency management activities.

To help committee members and participating jurisdictions better understand the types of mitigation techniques that work best for the hazards identified in the risk assessment, the following table serves as a reference.

HAZARD	MITIGATION TECHNIQUES				
	Local Plans & Regulations	Structure & Infrastructure Projects	Natural Systems Protection	Education Programs	Preparedness & Response Activities
Cyber-Threat	X			X	
Dam & Levee Failure	X			X	X
Dense Fog-Transportation				X	X
Drought	X	X	X	X	X
Flooding	X	X	X	X	X
HazMat Release	X	X		X	X
Landslide	X		X	X	
Public Health Emergency				X	X
Severe Summer Weather	X	X		X	X
Severe Winter Weather	X	X		X	X
Tornado	X			X	X
Wildfire	X			X	X

Possible Funding Sources

The following is a list of relevant funding sources, including but not limited to grant programs that can potentially be utilized to implement the mitigation strategies identified below.

- Assistance to Firefighters Grant (AFG)
- Building Resilient Infrastructure and Communities (BRIC)
- Community Development Block Grant (CDBG)
- FEMA Public Assistance Grant Program
- Flood Mitigation Assistance (FMA) Program
- Floodplain Management Services Program (FMSP)
- Hazardous Materials Emergency Program (HMEP)
- Hazard Mitigation Grant Program (HMGP)
- High Hazard Potential Dams (HHPD) Grant
- Homeland Security Grant Program (HSGP)
- Hospital Preparedness Program (HPP)
- Increased Cost of Compliance (ICC) under NFIP
- National Flood Insurance Program (NFIP)
- Repetitive Flood Claim (RFC) Program
- Severe Repetitive Loss (SRL) Program
- Small Business Administration (SBA) Loans
- Transportation Alternatives Program (TAP)

Project Prioritization

Garrett County prioritized the action items (i.e., mitigation projects) included in this plan. The county utilized the FEMA “STAPLEE” evaluation criteria to prioritizing the mitigation projects. STAPLEE evaluation criteria stands for and uses Social, Technical, Administrative, Political, Legal, Economic, and Environmental rankings in order to prioritize mitigation actions. The following are examples from FEMA to consider when examining each of these categories:

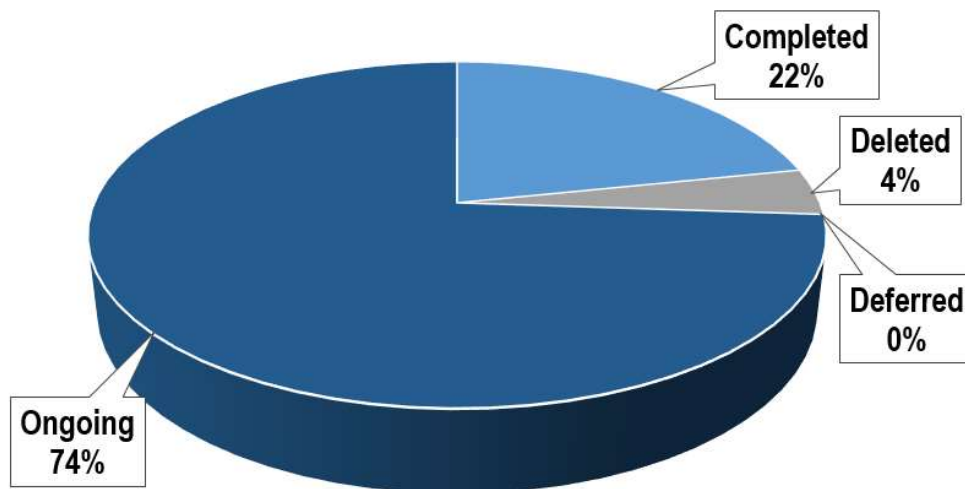
- **Social Impacts:** Consider whether the public would support implementation of the project. If so, priority likely rises.
 - Will the action adversely affect one segment of the population?
 - Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?
 - Is the action compatible with present and future community values?
- **Technical Feasibility:** Consider whether the project can be done and if it will yield the intended outcomes. If yes, priority would likely rise.
 - How effective is the action in avoiding or reducing future losses?
 - Will it create more problems than it solves?
 - Does it solve the problem or only a symptom?
- **Administrative Requirements:** Consider the staffing, funding, and maintenance requirements of the project. If current capabilities can successfully manage and sustain the project, priority would be strengthened.
 - Does the jurisdiction have the capability (i.e., staff, technical experts, and/or funding) to implement the action, or can it be readily obtained?
 - Can the community provide the necessary maintenance?
 - Can it be accomplished in a timely manner?
 - Is this action a project for the county staff, or contractor, or both?

- **Political Impacts:** Consider the acceptability of the project from the political frame. If it is likely to cause political upheaval, it would receive a lower priority. Proposed mitigation objectives sometimes fail because of a lack of political acceptability. This can be avoided by determining:
 - Is there political support to implement and maintain this action?
 - Have political leaders participated in the planning process so far?
 - Is there a local champion willing to help see the action to completion?
 - Who are the stakeholders in this proposed action?
 - Is there enough public support to ensure the success of the action?
 - Have all the stakeholders been offered an opportunity to participate in the planning process?
 - How can the mitigation objectives be accomplished at the lowest “cost” to the public?
- **Legal Ramifications:** Consider whether the project can be lawfully implemented. If not, the project cannot be listed. Determine whether the jurisdiction has the legal authority at the state, or local level to implement the action, or if the jurisdiction must pass new laws or regulations.
 - Does the state, county, or community have the authority to implement the proposed action?
 - Are the proper laws, ordinances, and resolutions in place to implement the action?
 - Are there any potential legal consequences?
 - Will the community be liable for the actions or support of actions, or lack of action?
 - Is the action likely to be challenged by stakeholders who may be negatively affected?
- **Economic Impacts/Cost Benefit:** Consider the criteria in *FEMA Publication 386-5: Using Benefit Cost Review in Mitigation Planning* (2007) to determine the “pros” and “cons” of each project. Maximizing the use of available funds would positively affect a project’s priority. Every local and state government experiences budget constraints at one time or another. Cost-effective mitigation actions that can be funded in current or upcoming budget cycles are much more likely to be implemented. Economic considerations must include the present economic base and projected growth and should be based on answers to questions such as:
 - Are there currently sources of funds that can be used to implement the action?
 - What benefits will the action provide?

- Does the cost seem reasonable for the size of the problem and likely benefits?
 - What burden will be placed on the tax base or local economy to implement this action?
 - Does the action contribute to other community economic goals, such as capital improvements or economic development?
- **Environmental Impacts:** Consider whether there would be negative consequences to environmental assets should the project be implemented. If assets are impacted, priority would be likely to fall.
 - How will this action affect the environment (i.e., land, water, endangered species)?
 - Will this action comply with local, state, and federal environmental laws or regulations?
 - Is the action consistent with community environmental goals?

As part of the plan update process, the 23 mitigation action items identified for Garrett County in the 2018 Hazard Mitigation Plan were assessed. Each mitigation action was assigned a status indicator of “Completed”, “Deleted”, “Deferred”, or “Ongoing”. While 22% or five mitigation actions were fully completed from the 2018 HMP, approximately 74% of the actions are considered ongoing.





2023 MITIGATION ACTIONS STATUS






Jurisdictional Mitigation Actions

During the development of the 2024 Hazard Mitigation Plan (HMP) update, mitigation action items within the 2018 HMP were reviewed by the planning committee. Status updates were obtained and are provided in the table below, as well as in Appendix 3 – Inactive Projects. The following tables lists the active (i.e., new and ongoing) hazard mitigation actions for Garrett County and the participating jurisdictions. These actions have broad applicability and benefit multiple jurisdictions or unincorporated areas. See Appendix 3 for a list of inactive (i.e., completed, deleted, and deferred) projects.





2024 MITIGATION ACTION PLAN – GARRETT COUNTY

Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
1.1 Cyberthreat	Protect IT infrastructure	Determine additional mitigation measures to protect IT infrastructure, including hardware, software, networks, and other equipment.	On-going	Preparedness Activities	5 Years	1/1/24	12/31/28	Medium	Safety & Security 
Project Coordinator: CG DoIT Funding Source: Local Cost Estimate: \$5,000 Status Note: This is an on-going strategy. Establish a committee and conduct interviews with key staff. Hold meetings with a committee to determine “critical” and create a prioritization process.									
1.2 Cyberthreat	Gap analysis	Conduct a gap analysis to identify and prioritize cyber security needs.	New	Preparedness Activity	3 Years	1/1/24	12/31/26	High	Safety & Security 
Project Coordinator: GC DoIT Funding Source: Local Cost Estimate: \$10,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
2.1 Dam Failure 5.1 Flooding 10.1 Winter Weather	Structural retrofits	Identify structures that would be candidates for retrofit projects focusing efforts in underserved communities.	On-going	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Low	Food, Hydration, Shelter 
Project Coordinator: GCDEM, Garrett County Engineering Funding Source: BRIC, CDBG, HHPD Cost Estimate: \$20,000 Status Note: This is an on-going strategy. During the review of this action item, planning committee members identified the following facilities for consideration: Friendsville and Crellin Wastewater Treatment Plants, Bloomington and Gorman 40+ year old pump stations, pump stations around the lake, and the Oakland Hospital Dam, other dams in that area that are aging (total of 6 dams in downtown Oakland to prevent flooding).									
2.2 Dam Failure	Dam Upgrades	Perform necessary maintenance and upgrades to high and significant hazard dams throughout the county.	New	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	Safety & Security 
Project Coordinator: Dam Owners, MDNR Funding Source: HHPD, Local Cost Estimate: \$10,000,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									





2024 MITIGATION ACTION PLAN – GARRETT COUNTY

Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
5.2 Flooding 7.1 Landslide	Sensitive Areas Ordinance revision	The current Sensitive Areas Ordinance allows for development on slopes up to 30%. Reduce this to 20 or 25%.	On-going	Local Plans & Regulations	3 Years	1/1/24	12/31/26	Medium	Safety & Security 
Project Coordinator: Garrett County Planning Funding Source: Local Cost Estimate: No additional funding necessary Status Note: This is an on-going strategy. Currently still 30% slope limit on new lots; however, private roads are now limited to 12%, and septic permits are limited to 25%.									
5.3 Flooding 10.2 Winter Weather	Building Codes	Adopt the new 2018 International Building Code, including the International Energy Conservation Code (IECC).	On-going	Local Plans & Regulations	3 Years	1/1/24	12/31/26	High	Safety & Security 
Project Coordinator: Garrett County and all municipal floodplain coordinators Funding Source: Local Cost Estimate: No additional funding necessary Status Note: This is an on-going strategy. Garrett County adopted a new floodplain ordinance in 2019, which includes the IRC and IBC building code. Garrett County is still in the process of adopting 2021 Building codes, likely to do so sometime in 2024.									
5.4 Flooding	Buy-outs	Target properties on the FEMA NFIP Repetitive Loss Property (RLP) listing for mitigation, specifically flood buy-out program. Particularly the RLP on Stanley Lane. This property experiences frequent flooding from both small and large storm events.	On-going	Structure & Infrastructure Project	3 Years	1/1/24	12/31/26	Medium	Safety & Security 
Project Coordinator: GCDEM Funding Source: FMA, HMGP, ICC, RFC Cost Estimate: \$500,000 Status Note: This is an on-going strategy. There are scattered sites around the county, this project has been discussed but no action has been taken to this point.									




2024 MITIGATION ACTION PLAN – GARRETT COUNTY

Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
5.5 Flooding	Base flood elevation determinations	Complete a technical report detailing base flood elevations and first floor elevations for critical facilities identified as having high vulnerability to flooding in the risk assessment. Mitigation alternatives and a detailed cost/benefit analysis should be completed.	On-going	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	Safety & Security 
Project Coordinator: Garrett County Planning (Floodplain Coordinator) Funding Source: FMSP, Local Cost Estimate: \$25,000 Status Note: This is an on-going strategy. This project has been derailed by the COVID-19 pandemic, there is still an interest in completing this project.									
5.6 Flooding	Public outreach campaign	Conduct public outreach campaigns focusing on underserved communities and social vulnerable populations that suggest preparedness activities for those located in high hazard areas such as the 100-year floodplain.	On-going	Education Program	3 Years	1/1/24	12/31/26	Medium	Communications 
Project Coordinator: Garrett County Planning and Dam Owners Funding Source: HMGP, Local Cost Estimate: \$8,000 Status Note: This is an on-going strategy. Social media awareness has been conducted. Citizens connect alert and notification systems has been utilized, and some information has been provided on the county website. Include information such as age of Significant and High hazard dams in the county (i.e., Jennings Randolph Lake Dam, Savage River Dam, Deep Creek Lake Dam).									
5.7 Flooding	Public awareness campaign	Develop a one-page handout on flood insurance and distribute to local insurance companies, municipal buildings, police stations, and county office buildings.	On-going	Education Program	3 Years	1/1/24	12/31/26	Medium	Safety & Security 
Project Coordinator: GCDEM and Garrett County Planning Funding Source: HMGP, Local Cost Estimate: \$5,000 Status Note: This is an on-going strategy. There is a hazard mitigation plan section on the county website which is used to distribute this information.									
5.8 Flooding	CRS Enrollment	Prepare CRS (Community Rating System) application to reduce the cost of flood insurance within the county.	On-going	Local Plans & Regulations	3 Years	1/1/24	12/31/26	Medium	Safety & Security 
Project Coordinator: GCDEM Funding Source: Local Cost Estimate: \$3,000 Status Note: This is an on-going strategy. No incorporated or unincorporated areas in Garrett County are currently enrolled in the CRS program.									



2024 MITIGATION ACTION PLAN – GARRETT COUNTY

Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
5.9 Flooding	Buy-outs	Elevate, relocate or acquire property affected by flooding in targeted areas.	On-going	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	Safety & Security
Project Coordinator: GCDEM Funding Source: RFC, SRL, Local Cost Estimate: \$10,000,000 Status Note: This is an on-going strategy. In 1999, six homes located within the 100-year floodplain were purchased and demolished in the Shallmar community. Since that time, no additional structures have been modified for flood protection.									
5.10 Flooding	Storm water upgrades	Improve storm water drainage system capacity by repairing required infrastructure and installing culverts and making necessary bridge modifications.	New	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	Water Systems
Project Coordinator: Garrett County Public Utilities Division Funding Source: BRIC, CDBG, Local Cost Estimate: \$75,000,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
7.2 Landslide	Landslide restoration	Conduct landslide restoration project at landslide area along Route 495.	New	Structure & Infrastructure Project	3 Years	1/1/24	12/31/26	Medium	Transportation
Project Coordinator: County Engineering and Roads Division Funding Source: BRIC, USACE, Local Cost Estimate: \$750,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
8.1 Public Health Emergency	Training	Create a “speakers bureau” consisting of various stakeholders and partners including medical, prevention, treatment, recovery, legal, affected family members, etc. Speakers Bureau members will receive consistent training and informational resources in order to present a uniform messaging in the community.	On-going	Education Program	3 Years	1/1/24	12/31/26	High	Health & Medical
Project Coordinator: Garrett County Health Department Funding Source: Local Cost Estimate: \$5,000 Status Note: This is an on-going strategy. Have bureau through “Stand Together.” Needs to be reconstituted now the COVID-19 is not the main priority. Bring a new focus to the group regarding risk reduction.									


2024 MITIGATION ACTION PLAN – GARRETT COUNTY

Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
8.2 Public Health Emergency	Medical training	Deliver “mini” Screening, Brief Intervention, and Referral to Treatment (SBIRT) training to medical offices that serve underserved communities and social vulnerable populations on local and regional treatment and recovery resources.	On-going	Preparedness Activity	3 Years	1/1/24	12/31/26	High	Health & Medical 
Project Coordinator: Garrett County Health Department Funding Source: Local Cost Estimate: \$15,000 Status Note: This is an on-going strategy. The program is a cooperation between GCDEM and the Health Department and is up and functioning as it should. Is a big part of taking care of opioid overdoses in the county. Stand Together meetings were discontinued recently, there is a need and a desire to continue these meetings.									
12.1 Wildfire	Wildfire Planning	Promote community & neighborhood planning for wildfire protection.	On-going	Education Program	3 Years	1/1/24	12/31/26	Medium	Safety & Security 
Project Coordinator: GCDEM Funding Source: Local Cost Estimate: \$5,000 Status Note: This is an on-going strategy. The Garrett County Health Department's Environmental Health Division provides information on wildfire protection.									
13.1 Cyberthreat Dam & Levee Dense Fog Drought Flooding HazMat Release Landslide Public Health Emergency Summer Weather Winter Weather Tornado Wildfire	Plan integration	Review new 2024 Hazard Mitigation Plan and integrate it with new Comprehensive Plan slated for completion in 2024, as well as with municipal comprehensive plans.	On-going	Local Plans & Regulations	3 Years	1/1/24	12/31/26	Medium	Safety & Security 


2024 MITIGATION ACTION PLAN – GARRETT COUNTY

Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
Project Coordinator: Garrett County Economic Development and all participating municipal planning departments Funding Source: Local Cost Estimate: No additional funding necessary Status Note: This is an on-going strategy. The COVID-19 pandemic derailed this project; however, there is still interest in completing this project.									
13.2 Dam & Levee Flooding Landslide Wildfire	Vacant parcel development restrictions	Consider placing development restrictions on land use for vacant parcels within hazard areas.	On-going	Local Plans & Regulations	5 Years	1/1/24	12/31/28	Medium	Safety & Security 
Project Coordinator: Garrett County Planning and all participating municipal planning departments Funding Source: FMSP, Local Cost Estimate: \$5,000 Status Note: This is an on-going strategy. Need to conduct a more in-depth review of the repetitive loss property listing.									
13.3 Flooding Landslide Summer Weather Winter Weather Tornado Wildfire	Critical facility prioritization	Work with public utility companies to identify and prioritize facilities located in high hazard areas, underserved communities, and that provide service to social vulnerable populations.	On-going	Preparedness Activity	5 Years	1/1/24	12/31/28	Medium	Energy 
Project Coordinator: Garrett County Public Utilities Division and all participating municipal town councils Funding Source: Local Cost Estimate: \$5,000 Status Note: This is an on-going strategy. The project has been initiated and is still in progress.									



2024 MITIGATION ACTION PLAN – GARRETT COUNTY




Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
13.4 Cyberthreat Dam & Levee Flooding Hazmat Release Public Health Emergency Summer Weather Winter Weather Tornado Wildfire	Preparedness exercises	Hold disaster exercises in various areas of the county. Types of exercise: cyberthreat, dam/levee failure, flood, high wind, winter storm, hazardous materials release, public health emergency, tornado, wildfire, and bio-terrorism exercises.	On-going	Preparedness Activity	3 Years	1/1/24	12/31/26	High	<div>Safety & Security</div> <div></div>
<div>Project Coordinator: GCDEM and all participating municipal jurisdictions town councils</div> <div>Funding Source: EMPG, HMEP</div> <div>Cost Estimate: \$25,000</div> <div>Status Note: This is an on-going strategy. Garrett County’s Emergency Management Division conducts disaster exercises on a regular basis in different locations across the County. Recent exercises include: HazMat exercise, Interoperability regional exercise, and hospital evacuation exercise.</div>									

2024 MITIGATION ACTION PLAN – GARRETT COUNTY





Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
13.5 Cyberthreat Dam & Levee Dense Fog Drought Flooding HazMat Release Landslide Public Health Emergency Summer Weather Winter Weather Tornado Wildfire	Notification & Warning	Distribute educational material in print and via social media throughout the underserved and social vulnerable populations of the county and municipalities regarding the county's mass notification system, including the process of signing up for notifications.	New	Preparedness Activity	3 Years	1/1/24	12/31/26	High	Communications 
Project Coordinator: GCDEM and all participating municipal town councils Funding Source: Local Cost Estimate: \$5,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. During the plan updating process several municipalities were unaware of the County's Mass Notifications and the fact that individuals must sign-up to receive notifications and warnings via email and text.									

2024 MITIGATION ACTION PLAN – TOWN OF ACCIDENT





Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
5.1 Flooding	Storm water upgrade	Increase size of culvert(s) at Industrial Park Avenue.	New	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	High	Water Systems
Project Coordinator: Town Council Funding Source: BRIC, CDBG, Local Cost Estimate: \$25,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. South Branch Bear Creek floods the only access to the Central Garrett Industrial Park on Industrial Park Avenue.									
5.2 Flooding	Storm water upgrade	Determine feasibility of installing a drop inlet at the lower part of Town Park West hillside, and run storm water drain tying-in to most economic existing storm drain.	New	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	Water Systems
Project Coordinator: Town Council Funding Source: BRIC, CDBG, Local Cost Estimate: \$75,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									

2024 MITIGATION ACTION PLAN – TOWN OF DEER PARK									
Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
5.1 Flooding	Evacuation capability study	Evaluate existing evacuation capability of areas located downstream of Soil Conservation District Site #5 Dam.	New	Preparedness Activity	5 Years	1/1/23	12/31/27	Medium	Safety & Security 
Project Coordinator: Town Council Funding Source: HMGP, Local Cost Estimate: \$5,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. There are 26 residential structures of Deer Park located within the Dam EAP inundation area.									
6.1 Hazmat	Highway / Railway crossing detour	Erect signage directing tractor trailers (i.e., lowboy trailers) off of Sand Flats Road onto MD 135 towards Loch Lynn Heights, then left on MD 560.	New	Structure & Infrastructure Project	3 Years	1/1/23	12/31/25	Medium	Transportation 
Project Coordinator: Town Council, State Highway Administration Funding Source: Local Cost Estimate: \$2,500 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. Lowboy trailers have become stuck on the railroad crossing at Main Street and Edgewood Drive, at least one incident involving a low-boy and train has resulted.									
6.2 Hazmat	Highway intersection modification	Develop an interchange at the intersection of MD 135 and Sand Flat Road, increasing existing sight distance coming west on MD 135.	New	Structure & Infrastructure Project	5 Years	1/1/23	12/31/27	Low	Transportation 
Project Coordinator: Town Council, State Highway Administration Funding Source: TAP, Local Cost Estimate: \$500,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. Several accidents and numerous near misses have occurred at this intersection.									


2024 MITIGATION ACTION PLAN – TOWN OF FRIENDSVILLE

Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
1.1 Cyberthreat	Notification & Warnings	Work with Garrett County Department of Technology & Communications to increase notification and warning capability regarding cyber threats.	New	Preparedness Activity	3 Years	1/1/24	12/31/26	High	Communications
Project Coordinator: Town Council Funding Source: Local Cost Estimate: No additional funding necessary Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
5.1 Flooding	Upgrade flood-prone roadways	Mitigate and upgrade flood prone roadways as funding is available. Specifically, roads that were identified as “high” by the planning committee.	On-going	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	Transportation
Project Coordinator: County Roads Department and Town Council Funding Source: BRIC, FMA, HMGP Cost Estimate: \$500,000 Status Note: This is an on-going strategy. This project is underway, there is interest in maintaining this project moving forward.									
5.2 Flooding	Impervious surface reduction	Calculate impervious surface area within known floodplains and establish a strategy for long-term reduction.	New	Natural Systems Protection	5 Years	1/1/24	12/31/28	High	Safety & Security
Project Coordinator: Town Council Funding Source: BRIC, FMSP Cost Estimate: \$15,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
5.3 Flooding	Storm water capacity analysis	Conduct an analysis of the town’s existing storm water capacity, especially near Elder Hill.	New	Education Program	3 Years	1/1/24	12/31/26	Medium	Water Systems
Project Coordinator: Town Council Funding Source: BRIC, HMGP, Local Cost Estimate: \$30,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. Identify opportunities to increase capacity, and/or re-route storm water.									



2024 MITIGATION ACTION PLAN – TOWN OF FRIENDSVILLE

Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
5.4 Flooding	Flood mitigation for Water Treatment Plan	Conduct elevations where possible, or build dikes around the water treatment plant.	New	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	Water Systems
Project Coordinator: Town Council Funding Source: BRIC, CDBG, HMGP, USACE, Local Cost Estimate: \$750,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. The Water Treatment Plant is currently located in a SFHA. Could possibly use Small Flood Control Projects Grant provided by the USACE for this project.									
8.1 Public Health Emergency	POD Sites	Identify strategic Points of Dispensing (POD) site to conduct mass vaccinations focusing on underserved communities.	New	Preparedness Activity	3 Years	1/1/24	12/31/26	Medium	Health & Medical
Project Coordinator: Town Council Funding Source: HMGP, Local Cost Estimate: \$5,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
10.1 Severe Winter Weather	Road treatment substitution	Eliminate road salt by substitution method to decrease vehicle damage (i.e., metal corrosion) and environmental impacts.	New	Natural Systems Protection	3 Years	1/1/24	12/31/26	Medium	Safety & Security
Project Coordinator: Town Council Funding Source: BRIC, HMGP, Local Cost Estimate: \$25,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. Possible substitutes include Calcium Chloride, Calcium Magnesium Acetate, and sand.									
11.1 Tornado	Severe weather plan	Develop a comprehensive severe weather plan for the town that considers large events (i.e., Celtic Festival).	New	Education Program	3 Years	1/1/24	12/31/26	High	Safety & Security
Project Coordinator: Town Council Funding Source: EMPG, HMGP, Local Cost Estimate: \$15,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									





2024 MITIGATION ACTION PLAN – TOWN OF FRIENDSVILLE

Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
13.1 Summer Weather Winter Weather Tornado	Back-up power supply	Install a back-up power supply for the town's critical facilities (i.e., solar array, battery system, etc.)	New	Structure & Infrastructure Project	3 Years	1/1/24	12/31/26	Medium	<div>Energy</div> 
Project Coordinator: Town Council Funding Source: BRIC, HMGP, Local Cost Estimate: \$150,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									



2024 MITIGATION ACTION PLAN – TOWN OF GRANTSVILLE

Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
5.1 Flooding	Pump station upgrade	The existing pump station located near the intersection of Maple Grove and State Route 495 frequently gets overrun and the riverbank is eroding near the pump station.	New	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	<div>Water Systems</div> 
Project Coordinator: Town Council Funding Source: BRIC, HMGP, Local Cost Estimate: \$500,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
6.1 Hazmat	Training	Provide additional hazmat training opportunities for local fire departments.	New	Preparedness Activity	5 Years	1/1/24	12/31/28	High	<div>HazMat</div> 
Project Coordinator: Town Council Funding Source: EMPG, HSGP, Local Cost Estimate: \$15,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									


2024 MITIGATION ACTION PLAN – TOWN OF GRANTSVILLE





Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
8.1 Public Health Emergency	Remote financial services capability	Develop a capability to conduct town financial services (i.e., accounts payable, accounts receivable) remotely.	New	Preparedness Activity	3 Years	1/1/24	12/31/26	High	Safety & Security 
Project Coordinator: Town Council Funding Source: BRIC, SBA Loan, Local Cost Estimate: \$10,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
8.2 Public Health Emergency	Increase public education	Increase public education throughout underserved communities and social vulnerable populations with regards to substance abuse and existing mental health resources that are available.	New	Education Program	3 Years	1/1/24	12/31/26	High	Health & Medical 
Project Coordinator: Town Council, GCHD Funding Source: Local Cost Estimate: No additional funding necessary Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
8.3 Public Health Emergency	Drug take-back program	Install drug take-back boxes at strategic locations within the town (i.e., town hall and fire hall).	New	Preparedness Activity	3 Years	1/1/24	12/31/26	Medium	Health & Medical 
Project Coordinator: Town Council Funding Source: BRIC, Local Cost Estimate: \$10,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
13.1 Flooding Hazmat Summer Weather Winter Weather Tornado	Sheltering Plan	Develop a comprehensive Sheltering Plan for the town that provides details to the citizens regarding available shelters.	New	Education Program	3 Years	1/1/24	12/31/26	High	Food, Hydration, Shelter 
Project Coordinator: Town Council Funding Source: BRIC, Local Cost Estimate: \$20,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									



2024 MITIGATION ACTION PLAN – TOWN OF GRANTSVILLE





Project #	Project #	Project #	Project #	Project #	Project #	Project #	Project #	Project #	Project #
13.2 Summer Weather Winter Weather Tornado	Bury powerlines	Bury powerlines during new construction, as well as existing overhead powerlines from Church Street / Main Street to Bank Street / Main Street.	New	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	Energy 
Project Coordinator: Town Council Funding Source: BRIC, HMGP, CDBG, Local Cost Estimate: \$1,500,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
13.3 Summer Weather Winter Weather Tornado	Back-up power supply	Install a back-up power supply at Town Hall (i.e., solar array, battery system, etc.).	New	Structure & Infrastructure Project	3 Years	1/1/24	12/31/26	Medium	Energy 
Project Coordinator: Town Council Funding Source: BRIC, HMGP, Local Cost Estimate: \$30,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									




2024 MITIGATION ACTION PLAN – TOWN OF KITZMILLER





Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
2.1 Dam & Levee Failure	Notification & Warning	Coordinate with dam and levee owners to bolster warning capability in the event of a failure or abnormal operating condition.	New	Preparedness Activity	5 Years	1/1/24	12/31/28	High	Communication 
Project Coordinator: Town Council, Dam and Levee Owners Funding Source: HMGP, USACE, Local Cost Estimate: \$150,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. Warning for Stoney River & Mount Storm Lake Dams and Kitzmiller Levee System.									


2024 MITIGATION ACTION PLAN – TOWN OF KITZMILLER									
Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
5.1 Flooding	Streambank restoration	Ensure proper bank stabilization by planting vegetation on slopes, creating terraces along road banks, use of riprap boulders and geotextile fabric.	New	Structure & Infrastructure Project	5 Yeas	1/1/24	12/31/28	Medium	Safety & Security 
Project Coordinator: Town Council Funding Source: FMA, HMGP, USACE Cost Estimate: \$200,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. Area of concern is East Main Street near water treatment plant and Shallmar Road. USACE Grant – Emergency Streambank and Shoreline Protection									
7.1 Landslide	Erosion stabilization	Install catch-fall nets made of high-tensile steel wire mesh along a segment of Shallmar Road west of Kitzmiller off of North Hill Road.	New	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	Transportation 
Project Coordinator: Town Council, MDOT Funding Source: BRIC, HMGP Cost Estimate: \$350,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
8.1 Public Health Emergency	Vaccine Distribution	Develop a mobile Points of Dispensing (POD) capability for vaccines that can be utilized in underserved communities.	New	Preparedness Activity	3 Years	1/1/24	12/31/26	High	Health & Medical 
Project Coordinator: Town Council Funding Source: HMGP, Local Cost Estimate: \$500,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
8.2 Public Health Emergency	Recovery Capability	Establish the Kitzmiller Recovery Community Group to provide substance abuse assistance.	New	Preparedness Activity	5 Years	1/1/24	12/31/28	Medium	Health & Medical 
Project Coordinator: Town Council Funding Source: HPP, Local Cost Estimate: \$20,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. The establishment of the group has been initiated.									

2024 MITIGATION ACTION PLAN – TOWN OF KITZMILLER									
Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
10.1 Severe Winter Weather	Increase internet service	Coordinate with internet providers to identify methods to decrease service interruptions in the Kitzmiller area during heavy snow fall.	New	Preparedness Activity	3 Years	1/1/24	12/31/26	Medium	Communication 
Project Coordinator: Town Council Funding Source: Local Cost Estimate: \$5,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
13.1 Summer Weather Winter Weather Tornado	Tree pruning	Develop a tree pruning program to prune or remove hazardous trees and limbs within overhead utility line Right-of-Ways.	New	Natural Systems Protection	3 Years	1/1/24	12/31/26	Medium	Energy 
Project Coordinator: Town Council Funding Source: HMGP, Local Cost Estimate: \$100,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									

2024 MITIGATION ACTION PLAN – TOWN OF LOCH LYNN HEIGHTS									
Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
3.1 Dense Fog	Increase roadway visibility	Install high-visibility reflectors along both edges and the center line of Route 560.	New	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	High	
Project Coordinator: Town Council Funding Source: BRIC, HMGP, Local Cost Estimate: \$250,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
4.1 Drought	Increase water capacity	Drill additional water wells at Landon's Dam.	New	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	
Project Coordinator: Town Council Funding Source: BRIC, CDBG, Local Cost Estimate: \$350,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. This project is in support of existing county plan to drill additional wells in this location									
5.1 Flooding	Roadway ditch maintenance	Increase roadway ditch maintenance capabilities along all routes leading to Roanoke Avenue.	New	Preparedness Activity	3 Years	1/1/24	12/31/26	Medium	
Project Coordinator: Town Council Funding Source: Local Cost Estimate: \$15,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
6.1 HazMat Release	Commodity Flow Study	Complete a hazardous materials commodity flow study on State Route 560. Monitoring site possible at Dundee Street or Shenandoah Ave (Town of Loch Lynn Heights). Include information on hazardous materials carried by rail into the study.	On-going	Education Program	3 Years	1/1/24	12/31/26	High	
Project Coordinator: Town Council, Garrett County LEPC Funding Source: HMEP, Local Cost Estimate: \$8,000 Status Note: This is an on-going strategy. No action has been taken to this point, still a much needed project.									

2024 MITIGATION ACTION PLAN – TOWN OF LOCH LYNN HEIGHTS									
Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
6.2 HazMat Release	Highway warning signage	Erect steep slope signs at the top of Route 560 and sharp turn warning signs with flashing lights just before Route 560 / Shenandoah Ave intersection. Coordinate with state road to see if rumble strips could be place before sharp turn to slow traffic.	New	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	Safety & Security 
Project Coordinator: Town Council, State Highway Administration Funding Source: BRIC, HMGP, Local Cost Estimate: \$50,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. Trucks are now using Route 560 to access Corridor H (Route 48). Truck traffic has nearly tripled over the past three years with the completion of this segment of Corridor H.									
8.1 Public Health Emergency	Public transportation	Increase public transportation capability, specifically to get individuals without transportation to and from medical facilities.	New	Preparedness Activity	3 Years	1/1/24	12/31/26	Medium	Transportation 
Project Coordinator: Town Council Funding Source: FHWA, Local Cost Estimate: \$200,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
13.1 Summer Weather Winter Weather Tornado	Tree pruning	Develop a tree pruning program to prune or remove hazardous trees and limbs within overhead utility line Right-of-Ways.	New	Natural Systems Protection	3 Years	1/1/24	12/31/26	Medium	Energy 
Project Coordinator: Town Council Funding Source: HMGP, Local Cost Estimate: \$100,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									

2024 MITIGATION ACTION PLAN – TOWN OF MOUNTAIN LAKE PARK									
Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
5.1 Flooding	Storm water upgrade	Increase capacity of existing ditches and storm water infrastructure along Pensinger Boulevard and Oakland Drive to alleviate flooding of the roadway.	New	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	Water System
Project Coordinator: Town Council, County Roads Department Funding Source: BRIC, CDBG, Local Cost Estimate: \$175,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
8.1 Public Health Emergency	Emergency public information	Establish, or make available a local Maryland news channel in this area to disseminate public health information.	New	Education Program	5 Years	1/1/24	12/31/28	Low	Communication
Project Coordinator: Town Council Funding Source: Local Cost Estimate: \$50,000 / year Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									
8.2 Public Health Emergency	Increase public health capability	Retain and assign a certified Health Officer for Garrett County exclusively.	New	Preparedness Activity	3 Years	1/1/24	12/31/26	Medium	Health & Medical
Project Coordinator: Town Council, GCHD Funding Source: Local Cost Estimate: \$98,000 / year Status Note: This is a new mitigation strategy, developed during the 2024 plan update process. Currently there is one certified Health Officer serving two counties, headquartered in Cumberland, Maryland.									
8.3 Public Health Emergency	Broadband expansion	Expand broadband internet to all areas of the town to increase ability to conduct remote learning and tele-work.	New	Structure & Infrastructure Project	5 Years	1/1/23	12/31/27	Medium	Communication
Project Coordinator: Town Council Funding Source: BRIC, CDBG, Local Cost Estimate: \$2,000,000 Status Note: This is a new mitigation strategy, developed during the 2024 plan update process.									

2024 MITIGATION ACTION PLAN – TOWN OF OAKLAND									
Project #	Mitigation Action	Strategy	Project Status	Project Type	Estimated Timeframe	Start Date	End Date	Project Priority	Community Lifeline
5.1 Flooding	Upgrade flood-prone roadways	Mitigate and upgrade flood prone roadways as funding is available. Specifically, roads that were identified as “high” by the planning committee.	On-going	Structure & Infrastructure Project	5 Years	1/1/24	12/31/28	Medium	Transportation
Project Coordinator: Town Council, County Roads Department Funding Source: BRIC, FMA, HMGP Cost Estimate: \$3,500,000 Status Note: This is an on-going strategy. This project is underway, there is interest in maintaining this project moving forward.									

See Appendix 3 for a list of inactive (i.e., completed, deleted, and deferred) projects.

4.0 PLAN MAINTENANCE AND INTEGRATION

§ 201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§ 201.6(c)(4)(ii)	[The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.
§ 201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Monitoring, evaluating, and updating this plan is critical to maintaining its value and success in Garrett County’s hazard mitigation efforts. Ensuring effective implementation of mitigation activities paves the way for continued momentum in the planning process and gives direction for future value. This section explains who will be responsible for maintenance activities and what those responsibilities entail. It also provides a methodology and schedule of maintenance activities, including a description of how the public will have the opportunity to participate on a continuous basis.

4.1 Monitoring, Evaluating and Updating the Plan

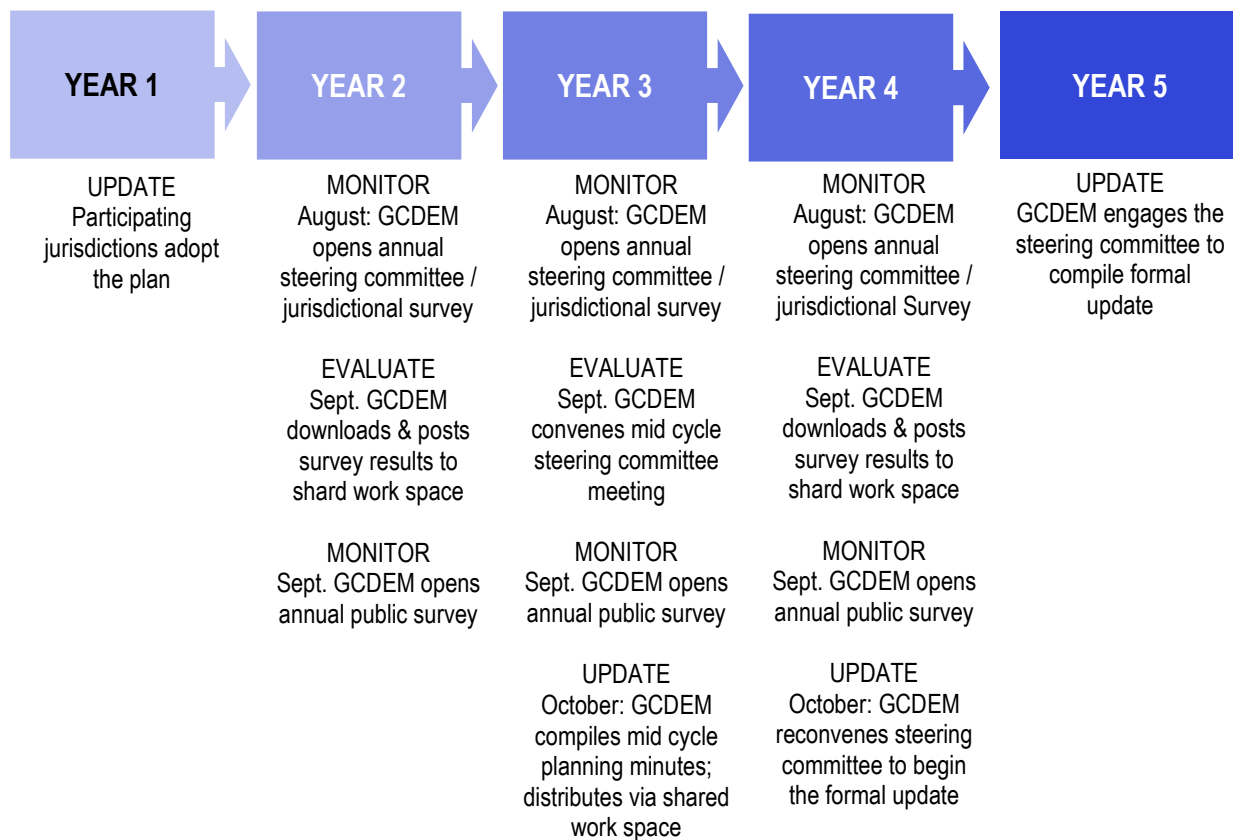
The custodial agency responsible for the maintenance and updating of this plan is the Garrett County Department of Emergency Management (GCDEM). The steering committee recognizes the importance of a plan maintenance *process*, not only as a function of the regulatory driver governing completion of mitigation plans (as a requirement for mitigation funding) but also as an opportunity to support networking amongst key stakeholders. Further, the committee recognizes that postponing the plan update results in an ineffective effort wherein it is difficult to garner enthusiasm and participation on the part of extended stakeholders. To this end, the plan maintenance schedule was sent to the planning committee in the middle of January, 2024, the committee agreed to a maintenance process based on annual reviews conducted by the participating jurisdictions focusing on revisiting the goals of objectives



of this plan, status of mitigation projects, review of asset inventory lists, and making note of any events that occur, and the impact of those events.

For the next planning cycle, **the Garrett County Department of Emergency Management (GCDEM) will continue to be the custodial agency for the county’s mitigation plan.** In this role, the GCDEM will be responsible for maintaining the document consistent with the FEMA-suggested five-year cycle (see image above), to include making it available to member governments and the public, as well as coordinate with the steering committee and convene review meetings. The first year after obtaining “approved pending adoption” (APA) status will be for local government adoption. In Year 4, the GCDEM will work with the Maryland Department of Emergency Management (MDEM) to initiate the next update, and once funding is secured, convene the steering committee for the more intensive, formal updating process (in Year 5).

A series of annual activities will support keeping the plan current. The general scheduling for plan maintenance appears in the following graphic.



Year 1 (after obtaining state and federal approval) focuses on the adoption process for all eight participating jurisdictions, and as implied above, Year 5 will include the next formal update. **Years 2, 3, and 4 provide opportunities to track the progress/status of the mitigation actions identified in Section 3.0 and to evaluate the overall effectiveness of the plan.**

In the second, third, and fourth years, the GCDEM will survey steering committee members about hazard experiences and mitigation action status. The survey will be a convenient way for committee members to submit comments, especially given their busy schedules. Online surveys will also provide an easy way to document committee member comments in their own words. The survey would include the following information.

GARRETT COUNTY HAZARD MITIGATION PLAN ANNUAL STEERING COMMITTEE / JURISDICTIONAL SURVEY	
It's that time of the year again! The survey below is part of Garrett County's process to maintain an accurate, viable hazard mitigation plan to reduce risks throughout the county.	
If you have any questions regarding the survey, or if you feel a meeting is necessary to discuss this information in more detail, feel free to contact the Garrett County Department of Emergency Management at (301) 334-7619.	
Q1: HAZARD EXPERIENCES	
Did you experience any of the following within the past year?	
<input type="checkbox"/> Cyber-Threat	<input type="checkbox"/> Landslide
<input type="checkbox"/> Dam-Levee Failure	<input type="checkbox"/> Public Health Emergency
<input type="checkbox"/> Dense Fog	<input type="checkbox"/> Severe Summer Weather
<input type="checkbox"/> Drought	<input type="checkbox"/> Severe Winter Weather
<input type="checkbox"/> Flooding	<input type="checkbox"/> Tornado
<input type="checkbox"/> Hazmat Release	<input type="checkbox"/> Wildfire
What comments would you add about these events?	
<hr/> <hr/> <hr/>	
Did your jurisdiction or agency complete any mitigation projects? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Description / Notes:	
<hr/> <hr/> <hr/>	
Did your jurisdiction or agency update a plan that might be compatible with the mitigation plan? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Description / Notes:	
<hr/> <hr/> <hr/>	
<i>Thank you for supporting our risk reduction efforts!</i>	



The GCDEM will download the survey results and place them into a shared digital workspace (like a Google Drive or OneDrive folder). Sharing the digital workspace with the steering committee will allow committee members the opportunity to review data at their convenience. Steering committee members, particularly those representing the eight municipalities, will have the ability to download the report to share with their governing bodies.

The steering committee also recognized the benefit of a meeting to discuss the information collected by the survey in more detail. The September (i.e., National Preparedness Month) that falls at the mid-point of the planning cycle (i.e., Year 3) would serve as a time for the steering committee to meet in person. The GCDEM will be responsible for polling the steering committee to determine whether the meeting will be in-person or virtual, and then planning and scheduling the meeting. The agenda for the mid-cycle meeting will be similar to Worksheet #10 in the *Local Mitigation Planning Guide* (FEMA, 2023c, p. 227).

The following specific evaluation criteria will be utilized by the Garrett County Department of Emergency Management (GCDEM) annually to determine continued plan effectiveness:

- Planning goals address current and expected conditions.
- Have the nature or magnitude of the risks changed.
- Current resources for funding, personnel, and equipment are appropriate for implementing the HMP, and if additional resources are now available.
- Schedules and budgets are feasible, and if actions taken are cost effective.
- Implementation problems, such as technical, political, legal or coordination issues with other agencies, are present.
- Outcomes occurred as expected.
- New agencies/departments/staff or other local governments should be included.

Year 2

- Custodial Agency (i.e., GCDEM) Responsibilities
 1. Reach out to participating jurisdictions. Provide them with a copy of their project lists (see Section 3.2) and the worksheet below. Request that they submit copies of the worksheet for each of their active mitigation projects *before holding the steering committee meeting*.
 2. Convene the annual steering committee meeting.

GARRETT COUNTY HAZARD MITIGATION PLAN MID-CYCLE STEERING COMMITTEE MEETING AGENDA	
Date:	
Time:	
Location:	
Re:	Garrett County Hazard Mitigation Plan Year 2 Maintenance Meeting
<hr/>	
1.	Welcome and Introductions
2.	Hazard Occurrences <ul style="list-style-type: none">• Review the data from annual surveys• Discuss major hazard events – How did they affect your communities?• Should we add any new hazards to the plan? Why?• Should we remove any hazards from the plan? Why?
3.	Mitigation Strategy <ul style="list-style-type: none">• Roundtable discussion about experiences implementing projects.<ul style="list-style-type: none">○ Implementation challenges?○ Consider new goals? Why?○ New funding sources?○ Overlap with other planning mechanisms (e.g., stormwater management, comprehensive planning)?• Activity: Participants to mark status of the mitigation actions listed in the existing plan<ul style="list-style-type: none">○ Complete, in-progress, not started, or cancelled
4.	Capabilities <ul style="list-style-type: none">• Any new or revised ordinances, policies, programs at the municipal level?• Any changes to NFIP administration?• General Discussion
5.	Data <ul style="list-style-type: none">• New data sources (e.g., studies, maps, websites, etc.)?• Asset inventory updates (additions, deletions, changes)?• General discussion about development trends (e.g., developments in hazard areas, emerging risk-related impacts on new developments, etc.)?
6.	Participants <ul style="list-style-type: none">• Any new special bodies to invite (e.g., utilities, park districts, etc.)?• Partners to recognize (that have helped implement risk reduction mitigation projects)?• Have there been any changes in public support or priorities about risk reduction mitigation?• Necessary changes to the planning process?
7.	General Q & A
8.	Adjournment

Year 3

- Custodial Agency (i.e., GCDEM) Responsibilities
 1. Reach out to participating jurisdictions. Provide them with a copy of their project lists (see Section 3.2) and the worksheet below. Request that they submit copies of the worksheet for each of their active mitigation projects *before holding the steering committee meeting*.
 2. Convene the annual steering committee meeting.

**GARRETT COUNTY HAZARD MITIGATION PLAN
MID-CYCLE STEERING COMMITTEE MEETING AGENDA**

Date:

Time:

Location:

Re: Garrett County Hazard Mitigation Plan Year 3 Maintenance Meeting

1. *Welcome and Introductions*
2. *Discussion: Hazard Occurrences (since the Year 2 meeting)*
3. *Review: Project Status Worksheets from Participating Jurisdictions*
 - *What are you hearing – are participating jurisdictions having implementation challenges?*
 - *Should we consider new goals? Why?*
 - *Have you learned of any new funding sources?*
 - *Have you identified any other planning mechanisms (e.g., stormwater management, comprehensive planning) where projects are overlapping with the efforts in the mitigation plan?*
4. *Capabilities*
 - *Have participating jurisdictions adopted new policies, plans, regulations, or reports that could support this plan?*
 - *Are there different or new education and outreach programs and resources available for mitigation activities?*
 - *Has NFIP participation changed in the participating jurisdictions?*
5. *General Q & A*
6. *Adjournment*



Year 4

- Custodial Agency (i.e., GCDEM) Responsibilities
 1. Coordinate with the MDEM (or other sources) regarding any available funding to support the next formal update. Compile necessary applications.
 2. Convene the annual steering committee meeting.

**GARRETT COUNTY HAZARD MITIGATION PLAN
MID-CYCLE STEERING COMMITTEE MEETING AGENDA**

Date:

Time:

Location:

Re: Garrett County Hazard Mitigation Plan Year 4 Maintenance Meeting

1. Welcome and Introductions

2. Hazards

- *Review hazard occurrences (since the Year 3 meeting).*
- *Think about the hazards that have occurred since 2024. How did they affect your communities?*
- *Should we add any new hazards to the plan? Why?*
- *Should we remove any hazards from the plan? Why?*
- *Have there been any new issues with hazards in certain areas of your communities?*

3. Review: Project Status Worksheets from Participating Jurisdictions

- *What are you hearing – are participating jurisdictions having implementation challenges?*
- *Should we consider new goals? Why?*
- *Have you learned of any new funding sources?*
- *Have you identified any other planning mechanisms (e.g., stormwater management, comprehensive planning) where projects are overlapping with the efforts in the mitigation plan?*

4. Data

- *Are any new data sources available (e.g., studies, reports, maps, etc.)?*
- *Do any new critical facilities or infrastructure need to be added to the asset inventory?*
- *Have any changes in development trends occurred that could create additional risks?*
- *Does any new development REDUCE risk?*

5. General Q & A

6. Adjournment

Project Status / Evaluation Worksheet¹

Progress Report Period:	
Describe the action or project.	
Who is responsible for the action?	
Project status:	<input type="checkbox"/> Complete <input type="checkbox"/> In progress, anticipated completion date: _____ <input type="checkbox"/> Not started <input type="checkbox"/> Cancelled
Has there been any progress with this project so far?	
Are there any obstacles or challenges with this action so far?	
What steps do you need to take to complete this project?	
Other comments:	

¹ See Worksheet #9 in the *Local Mitigation Planning Handbook* (FEMA, 2023c, pp. 225-226).

4.2 Implementation through Existing Programs

As the custodial agency of the *Garrett County Multi-Jurisdictional Hazard Mitigation Plan*, the GCDEM should ensure that mitigation planning is incorporated, as appropriate, into other planning mechanisms. Section of the risk assessment from the 2018 version of this plan were integrated into the county's 2022 Garrett County Comprehensive Plan. Such a statement is not meant to say that mitigation planning should inhibit other types of planning, such as community and economic development efforts. Ensuring compatibility between these initiatives, rather, should provide an opportunity for all types of planners to understand the interplay between risk and development and the potential future vulnerabilities of fully-developed areas. Integration can open a dialogue between planners about how to responsibly plan the future of the communities throughout Garrett County. The GCDEM acts as a sort of clearinghouse for planning initiatives around its region. The GCDEM does not “regulate” or “supervise” these efforts, but it does maintain a central repository of efforts that are underway throughout the planning area.

Finally, it is significant to note that all eight member governments within Garrett County are represented by GCDEM itself. As the custodial agency of this document, the GCDEM can schedule a regular review with its member governments at one of its council meetings to ensure that local officials are educated as to the plan's contents – and in agreement with its contents – even as those officials change and this document is updated. This representation should also facilitate local government comment on both the risks facing their jurisdictions and the types and numbers of mitigation projects that could be implemented.

Most local leaders are aware of, and understand traditional hazard mitigation funding programs (e.g., the Hazard Mitigation Grant Program [HMGP], Pre-Disaster Mitigation [PDM] program, etc.). However, the key to the widespread implementation of the mitigation plan is the recognition of opportunities for integrating opportunities for mitigation into other planning and community development initiatives. For instance, highway or streetscape projects present opportunities to address runoff and potential flash flooding. The development of parks and other open spaces can also mitigate weather hazards. Even substantial preparedness for the inevitable hazard occurrences can double as mitigation efforts in that a more efficient and effective response can lessen the overall loss the community experiences. As such, many other funding sources and programs beyond HMGP and PDM enable hazard mitigation.

Six existing mechanisms can support mitigation in Garrett County: (1) floodplain management, (2) emergency operations planning, (3) infrastructure planning, (4) community and economic development, (5) public health planning, and (6) transportation planning. The following table describes the potential integration of these elements with hazard mitigation in detail.

GENERAL PLAN INTEGRATION OPPORTUNITIES			
Existing Program	Participating Agencies	Specific Integration Action(s)	
Floodplain Management	Garrett County Engineer's Office Municipal Floodplain Administrators	<p>APPLICABLE PLAN: Floodplain Ordinances (county and municipal)</p> <p>PLAN INTEGRATION PROCESS Continue managing the county's (and towns') participation in the NFIP; Floodplain Administrator to serve as a steering committee members for HMP updates; ensure accuracy of county/town RL/SRL information in the HMP; contribute suggestions for priority flood mitigation projects throughout the county. Delineate areas of high flood hazards identified, as well as flood mitigation projects developed into floodplain management plans and consider possible modifications to ordinances.</p>	
		<p>PLAN ELEMENTS / POLICIES</p> <p>Support resilience by ensuring new development stays clear of known hazard areas or is built in such a way as to withstand the effects of known hazards.</p> <p>Protect green spaces in special flood hazard areas.</p>	<p>ASSOCIATED MITIGATION OBJECTIVES (FROM HMP)</p> <p>4.5 Increase by 25% businesses and residences that have flood insurance.</p> <p>5.1 Protect buildings from flooding (acquisition and elevation)</p> <p>5.2 Enforce regulatory measures to ensure new development will not increase flooding issues.</p> <p>5.3 Within 2 years reduce by 20% the number of houses in the floodplain.</p> <p>7.1 Establish open space parks and recreational areas in flood hazard areas.</p>
Stormwater Management)	Garrett County Engineer's Office Garrett County Dept. of Public Works Utility Providers	<p>APPLICABLE PLAN: Jurisdictional MS4 Permitting Processes)</p> <p>PLAN INTEGRAITON PROCESS Serve as a steering committee member for HMP updates. Identify site-specific flooding concerns and other water quality issues, provide a means for considering low-impact development options for flood mitigation. Integrate areas identified as having stormwater issues as well as mitigation projects to reduce those issues from this plan into stormwater management plans.</p>	
		<p>PLAN ELEMENTS / POLICIES</p> <p>Encourage onsite management of runoff.</p>	<p>ASSOCIATED MITIGATION OBJECTIVES (FROM HMP)</p> <p>5.2 Enact and enforce regulatory measures to ensure that new development will not increase flood hazard.</p> <p>5.6 Ensure existing high-risk residential structures are utilizing retrofitting techniques to mitigate repetitive flooding.</p> <p>7.1 Establish open space parks and recreational areas in flood hazard areas.</p>

GENERAL PLAN INTEGRATION OPPORTUNITIES			
Existing Program	Participating Agencies	Specific Integration Action(s)	
Infrastructure (Water, Sewer) Development	Garrett County Engineer's Office Garrett County Dept. of Public Works Utility Providers	<p>APPLICABLE PLANS: Garrett County Water and Sewer Plan, Jurisdictional and Utility Specific Capital Improvement Plans, Jurisdictional Source Water Protection Plans</p> <p>PLAN INTEGRATION PROCESS Identify areas of concern and provide that information to GCDEM (upon request) for consideration during HMP updates. Ensure the protection of environmental features when undertaking infrastructure projects. Support resiliency by extending or improving public utility service to residents. Integrate water and sewer mitigation projects developed in this plan into existing water and sewer development plans.</p>	
		PLAN ELEMENTS / POLICIES	ASSOCIATED MITIGATION OBJECTIVES (FROM HMP)
		Support infrastructure development as a means of attracting economic development.	<p>1.3 Maximize utilization of best technology.</p> <p>2.3 Prepare technical reports for critical facilities as necessary.</p> <p>3.3 Incorporate hazard mitigation into activities of other organizations.</p> <p>5.2 Enact and enforce regulatory measures to ensure that new development will not increase hazard threats.</p> <p>6.2 Use public funding to protect public services and critical facilities.</p> <p>9.1 Upgrade or replace public roads and stormwater management features to include mitigation into the project design and construction.</p>

GENERAL PLAN INTEGRATION OPPORTUNITIES			
Existing Program	Participating Agencies	Specific Integration Action(s)	
Emergency Operations Planning	Garrett County Department of Emergency Management Municipal Partners Response Agency Partners Garrett County Health Department	<p>APPLICABLE PLANS: Emergency Operations Plans, Hazard Vulnerability Analysis, Commodity Flow Studies</p> <p>PLAN INTEGRATION PROCESS COUNTY (GCDEM): Sponsor operations planning updates regularly, solicit town participation in operations planning updates, utilize the hazard identification sections of emergency operations plans and the data contained in risk and vulnerability assessments and a commodity flow study to inform hazard discussions in Section 2.0: Risk Assessment of this plan. TOWNS: Ensure town-supported response agencies participate in multi-jurisdictional operations planning efforts, provide town-specific data for studies and assessments.</p> <p>Ensure consistency between hazard analyses and the risk assessment portion of this plan. Integrate information from the risk assessment of this plan into the existing EOP. Consider applicable mitigation projects as part of the overall cycle of emergency management.</p>	
		PLAN ELEMENTS / POLICIES	ASSOCIATED MITIGATION OBJECTIVES (FROM HMP)
		Establish and maintain an effective response program.	1.4 Make GIS mapping seamless with public safety and 911 communications.
		Support continuity of critical infrastructure and key resources	1.6 Coordinate efforts with Health Department and other organizations for intervention related to Opioid use.
		Identify specific risk areas for certain hazards.	2.1 Increase awareness and knowledge of hazard mitigation principles among local and municipal public officials.
			8.1 Improve communications capability between municipal and county emergency management and law enforcement personnel.
			10.2 Solicit participation and offer opportunities for various departments to work together on a regular basis.

GENERAL PLAN INTEGRATION OPPORTUNITIES			
Existing Program	Participating Agencies	Specific Integration Action(s)	
Community & Economic Development	Garrett County Commission Garrett County Dept. of Planning & Land Management Garrett County Planning Commission Jurisdictional Zoning Depts.	<p>APPLICABLE PLANS: Zoning Ordinances, Building Codes, Subdivision and Land Development Ordinances, Comprehensive Plans (each contain “Economic Development,” “Land Use and Development,” “Housing,” “Community Facilities,” and “Historical and Cultural Resources” elements)</p> <p>PLAN INTEGRATION PROCESS A member of the Department of Planning serves as a steering committee member to ensure mitigation planning remains consistent with relevant ordinances and codes as well as to learn about potential information to share with developers to support resilient construction.</p> <p>Ensure adherence to the floodplain, zoning, building, subdivision and other relevant ordinances. Consider incorporating green infrastructure or low-impact development into site-specific projects. Integrate information from this plan’s risk assessment (identified hazard areas) and analyzing development trends section into economic development plans.</p>	
		PLAN ELEMENTS / POLICIES	ASSOCIATED MITIGATION OBJECTIVES (FROM HMP)
		Encourage responsible land use practices.	1.5 Maximize use of hazard vulnerability data, such as HAZUS Risk Map products.
		Identify areas suitable for residential development (or redevelopment).	4.1 Identify hazard specific issues and needs.
Community & Economic Development	Garrett County Commission Garrett County Dept. of Planning & Land Management Garrett County Planning Commission Jurisdictional Zoning Depts.	Identify areas suitable for commercial development (or redevelopment).	4.4 Increase the number of businesses that have developed a business risk reduction plan.
		Identify areas suitable for industrial development (or redevelopment).	5.2 Enact and enforce regulatory measure to ensure that new development will not increase hazards.
			6.1 Prioritize new mitigation projects, starting with sites facing the greatest threat.
			7.3 Limit additional housing in areas of high hazard risk.
Community & Economic Development	Garrett County Commission Garrett County Dept. of Planning & Land Management Garrett County Planning Commission Jurisdictional Zoning Depts.		10.1 Integrate hazard mitigation into areas such as land use, transportation, climate change, natural and cultural resource protection, water resources, and economic development.

GENERAL PLAN INTEGRATION OPPORTUNITIES			
Existing Program	Participating Agencies	Specific Integration Action(s)	
Transportation Planning		<p>APPLICABLE PLANS: Comprehensive Plans (each contain a "Transportation" element).</p> <p>PLAN INTEGRATION PROCESS</p> <p>Involve individuals from the agencies listed on the left to serve as steering committee members to share, among other information, hazard impacts on transportation infrastructure. Acknowledge hazards in long-range transportation planning. Consider response elements to the risks identified in the mitigation plan, as appropriate, concerning transportation (e.g., evacuation). Ensure planned transportation projects do not add to vulnerabilities (e.g., ensure projects utilize proper drainage, are properly elevated, etc.). Consider incorporating green infrastructure/low-impact development as transportation projects are undertaken (e.g., permeable pavements, green streets, and alleys, etc.). Integrate transportation related mitigation projects into transportation planning efforts.</p>	
	Garrett County Engineer's Office	<p>PLAN ELEMENTS / POLICIES</p> <p>Provide emergency access to all parts of the county and safe evacuation routes.</p> <p>Consider upgrades to transportation infrastructures to prevent, to the extent possible, long-term infrastructure decay.</p>	<p>ASSOCIATED MITIGATION OBJECTIVES (FROM HMP)</p> <p>1.3 Maximize utilization of best technology.</p> <p>3.3 Incorporate hazard mitigation into activities of other organizations.</p> <p>9.1 Upgrade or replace public roads to include mitigation into the project design and construction</p> <p>9.2 Improve routes utilized in flood hazard events to mitigate life threatening road conditions and road closures.</p> <p>9.3 Mitigate problem road sections within the county and municipalities.</p>
	Garrett County Dept. of Planning & Land Management		
	Garrett Transit Service		
	Maryland Department of Transportation		
	Municipal Transportation Departments		

4.3 Continued Public Involvement

All adopting jurisdictions maintain copies of this plan. Citizens can review the plan and provide comments at any of these locations. Citizens may also access the plan through the Garrett County Department of Emergency Management (GCDEM). The GCDEM will maintain an electronic copy of the document on its website and social media site. Though the plan is available at these locations, citizens may not be aware of that availability or understand the nature and purpose of a multi-jurisdictional hazard mitigation plan. As such, additional means of public education and involvement are important.

On-going public involvement will occur primarily through online surveying. During September (i.e., National Preparedness Month) of years two, three, and four of the planning cycle, the GCDEM will host the survey, and participating municipal governments will share the survey via websites, social media, etc. (as they did during the 2024 update). For those that do not have

reliable internet access, paper copies of the survey will be available at the GCDEM office and the city/town halls of participating municipalities. The survey would include the following information.

**GARRETT COUNTY HAZARD MITIGATION PLAN
ANNUAL PUBLIC SURVEY**

Thank you for taking the time to respond to this survey and participating in Garrett County's ongoing hazard mitigation planning process. By taking this survey, you are telling local leaders what risks are most important to you and your communities. That will help them to focus on the risk-related issues that matter (versus what might be necessary for other areas of Maryland or the Nation.)

If you have questions about this information or would like to discuss mitigation further, contact the Garrett County Department of Emergency Management at (301) 334-7619.

Q1: HAZARD EXPERIENCES

Did you experience any of the following during the past year (select all that apply)?

- | | |
|--|--|
| <input type="checkbox"/> Cyber-Threat | <input type="checkbox"/> Landslide |
| <input type="checkbox"/> Dam-Levee Failure | <input type="checkbox"/> Public Health Emergency |
| <input type="checkbox"/> Dense Fog | <input type="checkbox"/> Severe Summer Weather |
| <input type="checkbox"/> Drought | <input type="checkbox"/> Severe Winter Weather |
| <input type="checkbox"/> Flooding | <input type="checkbox"/> Tornado |
| <input type="checkbox"/> Hazmat Release | <input type="checkbox"/> Wildfire |
| | <input type="checkbox"/> Other |

Q2: NOTIFICATIONS

Did you receive timely, accurate, and effective notifications about the hazards you've experienced in the past year?

- | | |
|------------------------------|-----------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No |
|------------------------------|-----------------------------|

How did you receive those notifications (select all that apply)?

- | | |
|--|--|
| <input type="checkbox"/> Television | <input type="checkbox"/> Newspaper |
| <input type="checkbox"/> Radio | <input type="checkbox"/> Media website (TV, print, etc.) |
| <input type="checkbox"/> Social media (Facebook, etc.) | <input type="checkbox"/> Text message |
| <input type="checkbox"/> Email | <input type="checkbox"/> Family member, friend, etc. |
| <input type="checkbox"/> Other | |

Q3: COMMUNITY RESPONSE

How would you rate the community's response to the hazards you've experienced in the past year (select one)?

- | | |
|------------------------------------|-------------------------------|
| <input type="checkbox"/> Excellent | <input type="checkbox"/> Good |
| <input type="checkbox"/> Average | <input type="checkbox"/> Fair |
| <input type="checkbox"/> Poor | |

Q4: MITIGATION ACTIONS

Did you undertake any mitigation measures at your home in the past year (select all that apply)?

- | | |
|--|---|
| <input type="checkbox"/> Elevated my home or business | <input type="checkbox"/> Maintained trees/brush |
| <input type="checkbox"/> Repaired or replaced the roof | <input type="checkbox"/> Cleared underbrush |
| <input type="checkbox"/> Other | <input type="checkbox"/> I did not undertake mitigation |

Q5: GENERAL COMMENTS

Thank you for supporting Garrett County's hazard mitigation plan!



Underserved Populations

Revised hazard mitigation planning guidance from FEMA (2023b, p. 35) advises communities to create an equitable planning process moving forward. Garrett County and the participating municipalities supported boosting participation from historically under-served communities and socially vulnerable populations, and did take several steps during this plan update to ensure more equitable participation. It is likely that there are underserved communities that were missed. As such, the efforts contributing to the 2024 update should be considered initial steps on a pathway for more thorough participation by underserved communities moving forward.

The planning committee focused on engaging several providers whose regular clientele are communities and populations that have not regularly participated in emergency preparedness or hazard mitigation planning (an example of “procedural equity” [FEMA, 2023c, p. 235]). Those providers included the following.

- Garrett College (serving a largely transient population who may be unfamiliar with the area)
- Garrett County Public Schools (serving youth [i.e., aged four to 18 years])
- Garrett County Health Department (serving various populations, often through partnerships with an array of service providers with varying clientele)
- Garrett Transit Service (serving individuals without access to a vehicle)
- Garrett County United Way (educational, economic and health resources)
- Garrett County Behavioral Health / Mindful Roots, LLC / Mountain Haven Wellness and Recovery Center / Mountain Laurel Medical Center (serving individuals with behavioral and mental health needs)

APPENDIX 1: PLANNING PROCESS INVOLVEMENT

This appendix provides evidence of the planning process, to include participation at meetings and topics discussed. Appendix 4 provides evidence of public participation.

Hazard Mitigation Planning Committee Contact Information

<u>Name</u>	<u>Organization/Agency</u>	<u>Position/Title</u>	<u>Email</u>	<u>Cell#</u>	<u>Work#</u>
Sam Grant	Garrett County Emergency Services	Director of Emergency Services	sggrant@garrettcountry.org	240-321-8783	301-334-7619
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Paul Harvey	Garrett County Roads	Roads Division Chief	pharvey@garrettcountry.org	301-616-9912	301-334-7488
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Christopher Painter	Garrett College	Director of Campus Facilities, Security & Capital Projects	chris.painter@garrettcollege.edu	724-244-5526	
Shelley Menear	Garrett College	Director of Institutional Compliance & Safety	shelley.menear@garrettcollege.edu	240-321-5790	301-387-3037
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Robert Stephens	Garrett County Health Department	Health Officer	robert.stephens@maryland.gov	301-616-6300	301-334-7700
Craig Umbel	Garrett County Health Department	Environmental Health Director	craig.umbel@maryland.gov	301-616-5499	301-334-7764
Lori Peck	Garrett County Health Department	Public Health Emergency Planner	lori.peck@maryland.gov	301-980-6769	301-334-7774
Eric Cvetnick	Garrett County Health Department	Nursing Supervisor - Personal Health	eric.cvetnick@maryland.gov	301-616-0057	301-334-7773
Kevin Null	Garrett County Administrator	Garrett County Administrator	knull@garrettcountry.org	301-616-7617	301-334-8970
Bradley Williams	Maryland State Police	McHenry Barrack Assistant Commander	bradley.williams@maryland.gov		301-387-1101
Michael Sigmund	Maryland State Police	McHenry Barrack Commander	michael.sigmund@maryland.gov		301-387-1101
Jeffrey Sweitzer	Natural Resources Police	Natural Resources Police	jeffrey.sweitzer@maryland.gov	443-603-6965	443-603-6965
David Kline	FirstEnergy	External Affairs Manager	dkline@firstenergycorp.com		301-491-9100
Megan Roderick	Maryland Hospital Association	Assistant Director of the Hospital Preparedness Program	mroderick@mhaonline.org		301-395-0135
Alicia Streets	Department of Human Services	Director	alicia.streets@maryland.gov	301-616-2340	301-533-2027
Ronald Bray	Garrett County Board of Education	Transportation Manager	ronald.bray@garrettcountyschools.org	301-616-8275	301-334-8920
Richard Carlson	Town of Accident	Mayor	accidenttownhall@verizon.net		301-746-6346
Donald Dawson	Town Of Deer Park	Mayor	townofdeerpark@gmail.com		301-334-4531
Spencer Schlosnagle	Town of Friendsville	Mayor	info@friendsville.org		301-746-5919
Emily Newman-Edwards	Town of Grantsville	Mayor	info@visitgrantsville.com		301-895-3144
Robert Reckart	Town of Kitzy Miller	Mayor	kitzmd@shentel.net		301-453-3449
Carolyn Corley	Town of Loch Lynn Heights	Mayor	lochlynn@shentel.net		301-334-8339
Donald Sincell	Town of Mountain Lake Park	Mayor	mlpcclerk@icloud.com		301-334-2250
Kathryn Shaffer	Town of Oakland	Mayor	townof oak@gmail.com		301-334-2691
David Taylor	Garrett Regional Medical Center	Regional Director of Facilities	david.taylor@wvumedicine.org		301-533-4350
Brooks Carr	Garrett Regional Medical Center	Safety and Compliance Officer	brooks.carr@wvumedicine.org		301-533-4035
Shawn Bender	Beitzel	Chief Operating Officer	shawnbender@beitzelcorp.com	301-616-7769	301-245-4107
Trip Martin	State Highway Administration	Resident Maintenance Engineer of Garrett County	imartin@mdot.maryland.gov		
Todd DeWitt	State Highway Administration	Assistant Resident Maintenance Engineer	tdewitt@mdot.maryland.gov		
Michele Walker	County United Way	Director	michele@cuw.org		301-722-2700
Bobby Bodenschatz	Corsa Coal Company	Director of Safety	bbodenschatz@corsacoal.com	724-762-9573	814-443-4668 ext. 218
Andrew Fusco	Verizon	Crisis Response Team	andrew.fusco@verizon.com	717-574-0614	
Marcia Deppen	Maryland Department of Emergency Management	Director of Consequence Management	marcia.deppen@maryland.gov	302-584-5948	410-517-3600 ext. 2488



Jeffery Harvey <jharvey@jhcreparedness.com>

Contact Information

1 message

David Middleton <dmiddleton@garrettcountry.org>

Thu, Oct 12, 2023 at 9:06 AM

Good morning Hazard Mitigation Planning Committee. I wanted to reach out on behalf of Garrett County Emergency Services and thank those who attended the meeting yesterday both in-person and virtually. Your participation is appreciated. I also wanted to ensure everyone had the email address of some of the speakers from yesterday incase you had any questions, concerns, or ideas moving forward that you would like to share. We look forward to hearing from you and have a great day.

Marcia Barben: Hazard Mitigation Project Officer at Maryland Department of Emergency Management

Marcia.barben@maryland.gov

Sam Grant: Director of Garrett County Emergency Services

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David Middleton: Garrett County Emergency Planner

dmiddleton@garrettcountry.org

Jeff Harvey: Managing Member of JH Consulting

jharvey@jhcreparedness.com

David Middleton, MS

Emergency Planner

Garrett County Emergency Services

Email: dmiddleton@garrettcountry.org

Phone: 301-334-7619

Mobile: 240-321-8401

32 Outfitter Way

McHenry, MD 21541

Web: [www. https://www.garrettcountry.org/emergency-services](http://www.https://www.garrettcountry.org/emergency-services)



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Garrett County Government,
203 South Fourth Street, Oakland, Maryland 21550
www.garrettcountry.org

GARRETT COUNTY HAZARD MITIGATION PLAN 2023 UPDATE

PLANNING MEETING #1

AGENDA

Date: October 11, 2023
Time: 1:00 p.m.
Location: Garrett County Emergency Operations Center
32 Outfitter Way, McHenry, MD 21541
Duration: 90 minutes

1. Welcome & Introductions
2. Mitigation Planning Overview
3. Description of the Planning Area
 - Identification of Problem Areas
 - Development Trends
4. Hazards Review (at right)
5. Engagement Strategy
 - Review Efforts to Date
 - Brainstorming
 - Under-Represented Populations
 - Socially Vulnerable Populations
6. Homework: Asset Inventory
7. Q & A
8. Adjournment

HAZARDS FROM PREVIOUS PLAN

- Drought
- Extreme Heat
- Flood
- Pandemic & Infectious Disease
- Thunderstorm
- Tornado
- Wildfire
- Wind
- Winter Weather



Jeffery Harvey <jharvey@jhcreparedness.com>

HMPC Meeting Agenda

1 message

David Middleton <dmiddleton@garrettcountry.org>

Fri, Oct 6, 2023 at 9:46 AM

Good morning. Below and attached you will find the details and agenda for our upcoming Hazard Mitigation Planning Committee meeting next week. Please remember that this meeting will also be available virtually (link below) for those who may not be able to attend in person. We look forward to seeing you then.

GARRETT COUNTY HAZARD MITIGATION PLAN 2023 UPDATE
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HAZARDS FROM PREVIOUS PLAN

- Drought
- Extreme Heat
- Flood
- Pandemic & Infectious Disease
- Thunderstorm
- Tornado
- Wildfire
- Wind
- Winter Weather



Topic: Garrett County's Hazard Mitigation Planning Committee

Time: Oct 11, 2023 01:00 PM Eastern Time (US and Canada)

Join Zoom Meeting

<https://us02web.zoom.us/j/82395836594?pwd=bW5jYUR6RVpJZVExV1R6S3lvcEZwZz09>

Meeting ID: 823 9583 6594

Passcode: 381203

One tap mobile

+13017158592,,82395836594#,,,,*381203# US (Washington DC)

+13092053325,,82395836594#,,,,*381203# US

Dial by your location

• +1 301 715 8592 US (Washington DC)

• +1 309 205 3325 US

• +1 312 626 6799 US (Chicago)

• +1 646 876 9923 US (New York)

• +1 646 931 3860 US

• +1 305 224 1968 US

• +1 689 278 1000 US

• +1 719 359 4580 US

• +1 253 205 0468 US

• +1 253 215 8782 US (Tacoma)

• +1 346 248 7799 US (Houston)

• +1 360 209 5623 US

• +1 386 347 5053 US

• +1 408 638 0968 US (San Jose)

• +1 507 473 4847 US

• +1 564 217 2000 US

• +1 669 444 9171 US

• +1 669 900 6833 US (San Jose)

Meeting ID: 823 9583 6594

Passcode: 381203

Find your local number:

<https://us02web.zoom.us/j/kcXfYwuQc>

David Middleton, MS

Emergency Planner

Garrett County Emergency Services

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GCHMP-Mtg1_Agenda_10112023.pdf
48K

GARRETT COUNTY HAZARD MITIGATION PLAN (2023)

Planning Meeting #1

October 11, 2023 ~ 1:00 p.m.

Sign In Sheet

	Name	Agency	Contact Info. (Email)
1.	Brooks Carr	Garrett Regional Medical Center	brooks.carr@wvumedicine.org
2.	Misty Deal	County United Way	misty@cuw.org
3.	Michele Walker	County United Way	michele@cuw.org
4.	Edward B. Kelley	Friendsville Town	sgtmajored@gmail.com
5.	Craig F. Umbel	ECHD	craig.umbel@maryland.gov
6.	Chris Painter	Garrett College	Chris.Painter@garrettcollege.edu
7.	Shelley Menear	Garrett College	shelley.menear@garrettcollege.edu
8.	Justin Orendorf	Garrett County Emergency Services	jorendorf@garrettcountry.org
9.	DAVID MIDDLETON	G CES	DMIDDLETON@GARRETTCOUNTY.ORG
10.	Samuel Grant	G CES	sgrant@garrettcountry.org
11.	Brad Williams	MSP	bradley.williams@maryland.gov
12.	WAYNE TIEMERSMA	G CES	WTIEMERSMA@GARRETTCOUNTY.ORG
13.	DON SINCELL	TOWN OF MTN. LAKE PARK (mayor)	dsincell@hotmail.com
14.	Lori Peck	Garrett County Health Dept	Lori.peck@maryland.gov
15.	JEFFREY W. SWEITZER (ONLINE)	MARYLAND DNR	jeffrey.sweitzer@maryland.gov
16.	SHAWN BENDER (ONLINE)	PILLAR INNOVATIONS, LLC	shawnbender@beitzelcorp.com

GARRETT COUNTY HAZARD MITIGATION PLAN (2023)

Planning Meeting #1

October 11, 2023 ~ 1:00 p.m.

Sign In Sheet

	Name	Agency	Contact Info. (Email)
17.	MARCIA BARREN (ONLINE)	HDEM	marcia.barren@maryland.gov
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			
26.			
27.			
28.			
29.			
30.			
31.			
32.			



GARRETT COUNTY HAZARD MITIGATION PLAN UPDATE

*Steering Committee Meeting #1
October 11, 2023 ~ 1:00 p.m.*

WELCOME AND INTRODUCTIONS



AGENDA

1. Welcome & Introductions
2. Mitigation Planning Overview
3. Description of the Planning Area
4. Hazard Review
5. Engagement Strategy
6. Homework: Asset Inventory
7. Q&A

HAZARD MITIGATION 101



Federal Emergency Management Agency (FEMA) – Region III

- Oversees the hazard mitigation process at the local, regional, state, and national levels
- Defines mitigation as, “the effort to reduce loss of life and property by lessening the impact of disasters” (FEMA.gov, 2016)



HAZARD MITIGATION 101



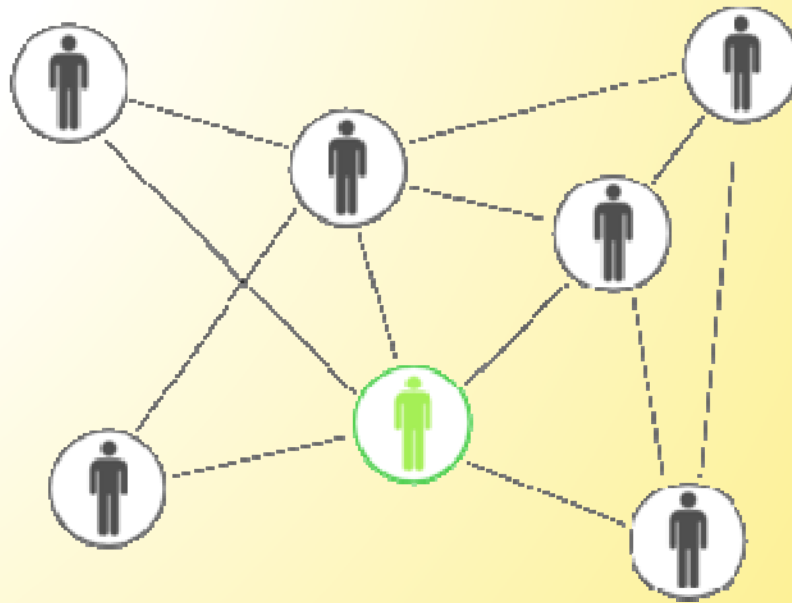
Maryland Department of Emergency Management

- Oversees the hazard mitigation process at the state levels
- Ensure jurisdictional participation
- Ensure alignment with state project and funding strategies



HAZARD MITIGATION 101

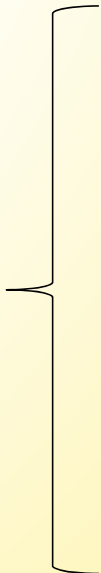
Steering Committee Responsibilities



PLANNING PROCESS

DMA2K ~ Stafford Act, Section 322 ~ 44 CFR 201.6

The
Hazard
Mitigation
Plan

- 
- Planning Process
 - Description of the planning area
 - Risk Assessment
 - Action plan
 - Goals
 - Strategies (projects/actions)
 - Plan maintenance
 - Appendices

DESCRIPTION OF THE PLANNING AREA

Tell us about your community...

Don't forget:

- Identification of Problem Areas (with respect to natural hazards)
- Development Trends



HAZARDS REVIEW

- Drought
- Extreme Heat
- Flood
- Pandemic & Infectious Disease
- Thunderstorm
- Tornado
- Wildfire
- Wind
- Winter Weather
- *Cyber*
- *Dam & Levee Failure*
- *Epidemic (Opioid Crisis)*
- *Hazardous Materials (Transportation & On-Site)*
- *Hurricane/Nor'easter*
- *Major Fire/Explosion*
- *Major Transportation Fog*
- *Soil Movement*

ENGAGEMENT STRATEGY

- Review Efforts to Date
 - *Initial municipal outreach*
 - *Survey*
- Brainstorming
 - *Under-represented populations*
 - *Socially vulnerable populations*



HOMework: ASSET INVENTORY

- Inventory and Summarize Vulnerable “Assets”
 - *Building stock inventory (mapped)*
 - *Manufactured housing units (mobile homes)*
 - *Critical facilities*
 - *Transportation systems (airways, highways, railways, waterways)*
 - *Lifeline utility systems*
 - *Communication systems and networks*
 - *High potential loss facilities (power plants, dams)*
 - *Hazardous material facilities*
 - *Economic elements*
 - *Special consideration areas*
 - *Natural resource areas*
 - *Historic and cultural resources (National Register listed, etc.)*



ADJOURNMENT

GARRETT COUNTY HAZARD MITIGATION PLAN PLANNING COMMITTEE MEETING #2

AGENDA

Date: Thursday, December 7, 2023
Time: 1:00 p.m. to 3:00 p.m.
Estimated Duration: 120 minutes (2-hours)
Location: Google Meet Web Conference

1. Discuss existing and new mitigation projects.
 - **Overview:** Steering committee will review and assign status updates to existing mitigation projects (i.e., completed, deleted, deferred, on-going), and identify new mitigation projects for inclusion into the mitigation plan update.
 - **Discussion:** The contractor emailed existing mitigation strategies for each hazard identified to planning committee members for review prior to the meeting. The contractor shared existing mitigation projects and sample mitigation projects with committee members attending the virtual meeting.
 - **Activity:** Discussion amongst steering committee members to determine the status of existing mitigation projects. Steering committee members discuss the relevance of sample mitigation projects provided by the contractor, and utilized information from the samples to develop new mitigation projects for the plan update.
2. **Actions**
 - The status of each existing mitigation project will be identified and recorded.
 - New mitigation projects will be identified for inclusion into the plan update.
3. Schedule for Next Meetings
4. Adjournment

GARRETT COUNTY HMP UPDATE MEETING #2 – DECEMBER 7, 2023

1:00 P.m. to 2:30 p.m.

GoogleMeet Web Conference

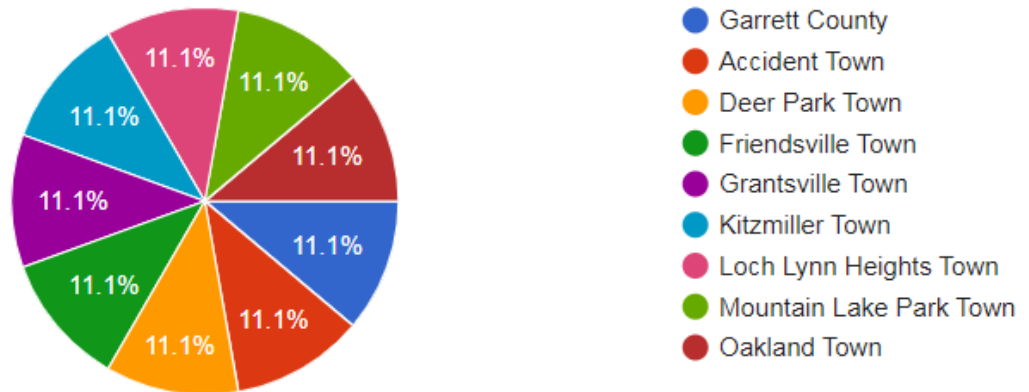
SIGN-IN

<i>Agency/Affiliation</i>	<i>Name</i>	<i>Title</i>	<i>In-Attendance</i>
State Highway Administration	Trip Martin	Resident Maintenance Engineer	X
Grantsville Town Council	Jody Theriot	Council Member	X
Garrett Regional Medical Center	Brooks Carr	Safety and Compliance Officer	X
Garrett County Dept. of Emergency Mgmt.	Dave Middleton	Emergency Planner	X
Maryland State Police	Mike Sigmund	McHenry Barrack Commander	X
Garrett County Dept. of Emergency Mgmt.	Justin Orendorf	Communications Chief	X
Garrett College	Shelley Menear	Director of Institutional Compliance & Safety	X
Verizon	Andrew Fusco	Crisis Response Team	X
Beitzel	Shawn Bender	Chief Operating Officer	X
Garrett County Dept. of Emergency Mgmt.	Sam Grant	Director	X
Garrett County Health Department	Lori Peck	Public Health Emergency Planner	X
Garrett County Health Department	Eric Cvetnick	Nursing Supervisor – Personal Health	X
Garrett College	Chris Painter		X
Garrett County IT Department	Nathanel Watkins	Chief Information Officer	X
JH Consulting, LLC	Doug Britvec	Division Manager	X

GARRETT COUNTY CAPABILITY SURVEY SUMMARY

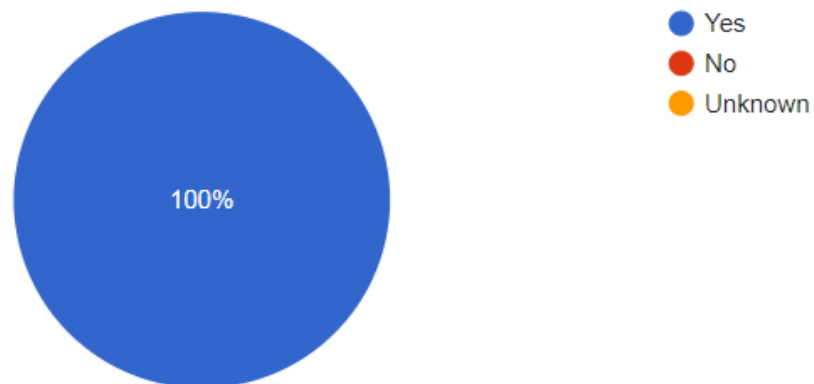
With which jurisdiction are you affiliated?

9 responses



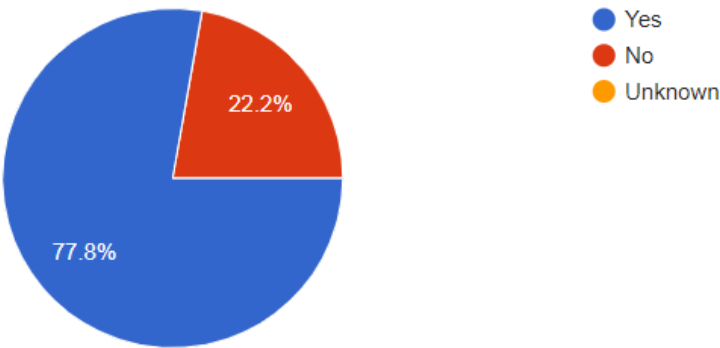
Comprehensive plans promote sound land use and regional cooperation among local governments to address planning issues. These plans serve as the official policy guide for including the location, type and extent of future development by establishing the basis for decision-making and review processes on zoning matters, subdivision and land development, land uses, public facilities and housing needs over time. Does your jurisdiction have or participate in a comprehensive plan?

9 responses



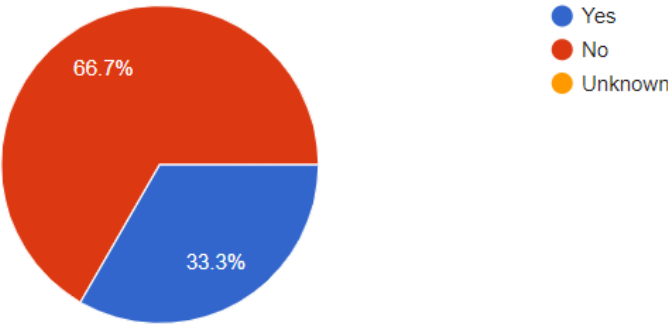
Do emergency responders or representatives from emergency management participate in the comprehensive planning process?

9 responses



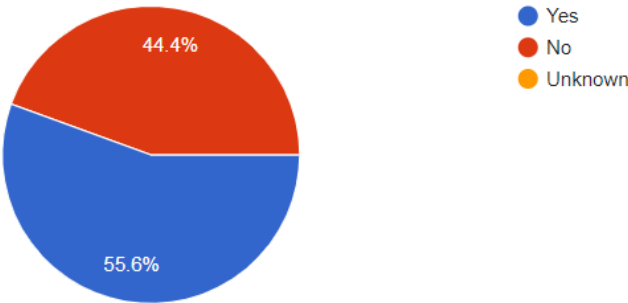
Building codes regulate construction standards for new construction and substantially renovated buildings. Does your jurisdiction have a building code in place?

9 responses



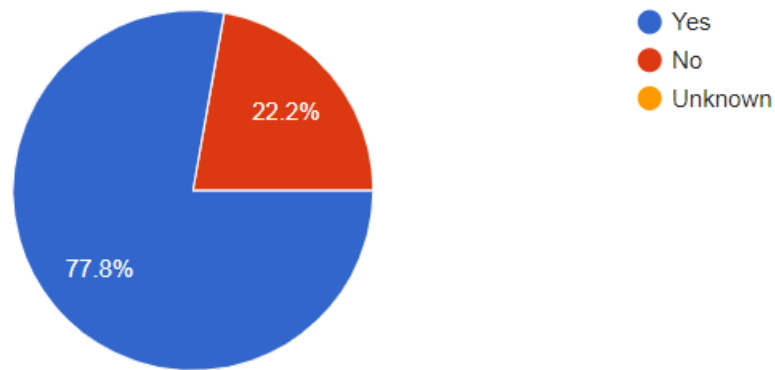
Subdivision and land development ordinances (SALDOs) are intended to regulate the development of housing, commercial, industrial, or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Within these ordinances, guidelines on how land will be divided, the placement and size of roads and the location of infrastructure can reduce exposure of development to hazard events. Does your jurisdiction have a subdivision and/or land use ordinance?

9 responses



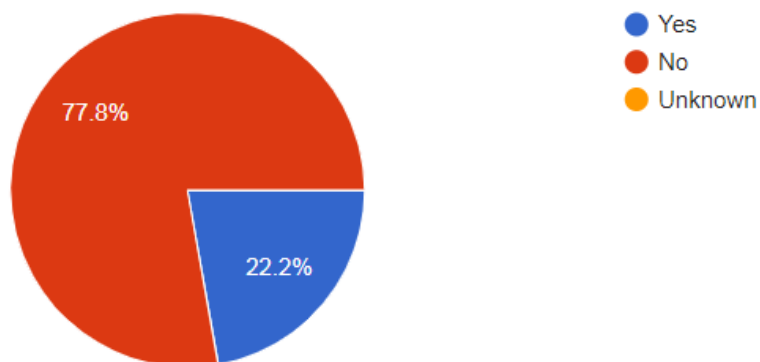
Zoning ordinances allow for local communities to regulate the use of land in order to protect the interests and safety of the general public. Zoning ordinances can be designed to address unique conditions or concerns in a given community. Does your jurisdiction have a zoning ordinance?

9 responses



Has your municipality adopted a compliant floodplain management ordinance that at minimum: (a) regulates development in special flood hazard areas (SFHAs); (b) utilizes any base flood elevation (BFE) and floodway data (and/or requires BFE data of subdivision proposals and other development proposals larger than 50 lots or 5 acres); (c) identifies measures to keep all new and substantially-improved construction reasonably safe from flooding or above the BFE; and (d) documents and maintains records of elevation data for new or substantially-improved structures?

9 responses



If your jurisdiction makes DFIRM/FIRM information available, how are they made available (e.g., on website, at municipal building, etc.)? If not available, type N/A.

9 responses

Municipal Building
Information available at the county.
County website
Would go to Garrett County Planning and Land Development
Is on website and at the municipal building
FIRMs are made available on the county website
n/a
Garrett County Website, or come to town hall.
Through the county Land Development

If your jurisdiction supports requests for map updates, explain how (N/A if you do not).

9 responses

N/A
Reach out to FEMA
Garrett County Planning and Land Development
Garrett County requests map updates for the town.
Garrett County Emergency Management or Planning & Land Management Division would coordinate with the state to request from FEMA
n/a
Through Garrett County then to the State
Through Garrett County Land Development

What type of technical assistance, if any, does your jurisdiction provide with local floodplain determination?

9 responses

Floodplain determinations are made by Garrett County

N/A

The county does this.

Garrett County

Garrett County and MDE does this.

Garrett County Planning and Land Management Division makes floodplain determinations.

None

Garrett County and the state make these determination.

Through Garrett County Land Development in coordination with Mayor

What office is responsible for issuing permits for all proposed development in Special Flood Hazard Areas (SFHAs)?

9 responses

The county does this

No known SFHA in the town.

The county does this.

Garrett County through the State

Planning Commission and Zoning Appeals Court hearing

Garrett County Planning & Land Management Division

Town Hall and County government

Garrett County issues these permits on our behalf

Garrett County Land Development

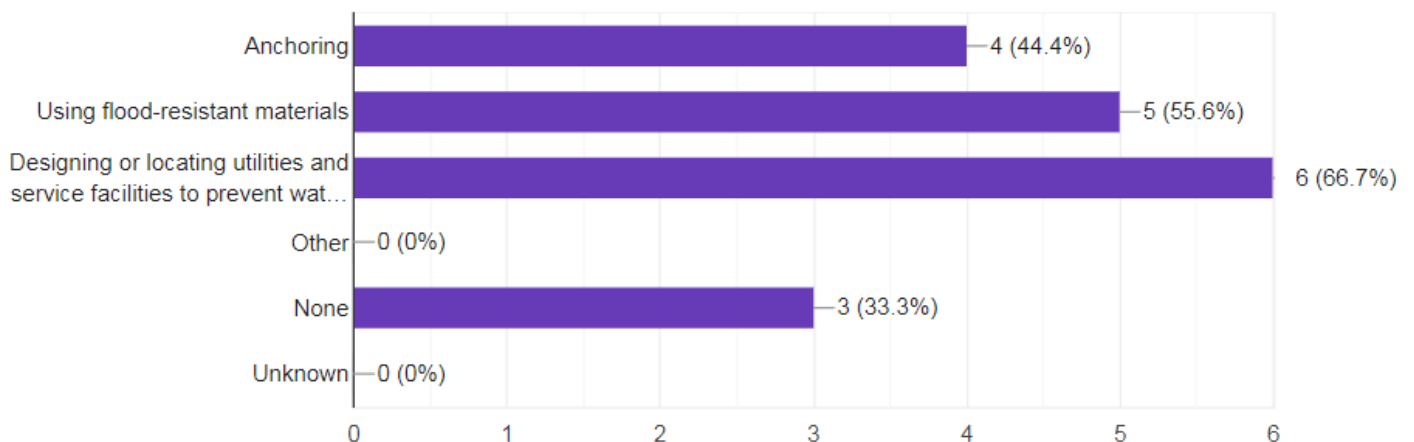
What office is responsible for obtaining, reviewing, and utilizing (or requiring) Base Flood Elevation (BFE) and floodway data for regulated developments?

9 responses

The county does this
Garrett County
The county does this.
Garrett County through the state
Town Council, Planning Commission & Zoning Appeals Court
Garrett County Planning & Land Management Division
Town Hall - Water Department
Garrett County and state of Maryland
Garrett County Land Development

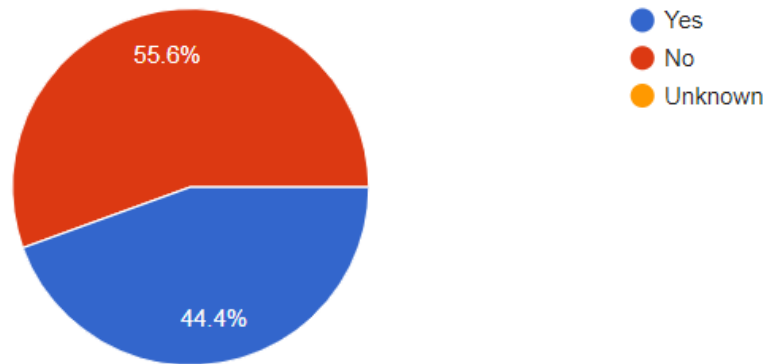
What measures does your municipality encourage to keep new and substantially-improved construction reasonably safe from flooding to or above the BFE?

9 responses



Does your municipality enforce its floodplain ordinance by monitoring compliance and taking remedial action to correct violations?

9 responses



How does your municipality monitor compliance?

9 responses

Through the county's floodplain manager.

N/A

Garrett County monitors compliance within Loch Lynn Heights

Garrett County does this

Done by Garrett County

Garrett County Planning & Land Management Division, compliant driven, monitors new development, inspectors conduct windshield surveys.

Code enforcement

Garrett County Planning & Land Management Division does this.

Through Garrett County Code Enforcement

How does your jurisdiction educate community members about flood insurance (N/A if your jurisdiction does not provide education on flood insurance)?

9 responses

N/A

Garrett County does this

Information is provided on the county web page, distribute handouts as necessary.

Word of mouth

The county does this. We do discuss this with residents as necessary.

Garrett County Land Development

Please describe your process to determine substantial damage and to permit repair and improvement? Be sure to address damage assessments in SFHA.

9 responses

Through the county.

N/A

Garrett County does this.

Friendsville Zoning Ordinance would set lot size, would work with Garrett County on this

Town does not do this

Field assessments with GCEM would be conducted to make determinations. Calculate damages if qualifies as substantial damage, then permits would be based on if value of damage is less than 50% of the structures value.

n/a

Garrett County Planning & Land Management Division does this

How does your municipality enforce the floodplain ordinance section?

9 responses

Through the county.

N/A

Garrett County does this.

Garrett County does enforcement

Through the Zoning Department

Garrett County Planning & Land Management Division does enforcement.

n/a

Garrett County Planning & Land Management Division does this

Garrett County Land Development

In the aftermath of an event do you modify your enforcement of the NFIP in any way?

9 responses

The town has never had to modify.

N/A

No modification

Garrett County would make this decision in coordination with Friendsville

The town does not modify enforcement.

No modifications would be made regardless

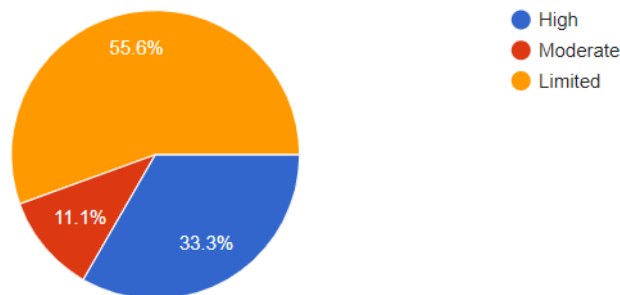
It is reviewed.

Would not modify.

Would work with Garrett County Land Development to identify possible changes

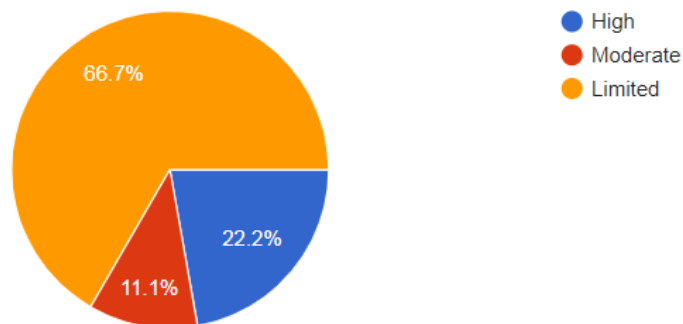
As with all community and economic development and emergency preparedness planning efforts (including participation in the NFIP), there may be a number of barriers to full implementation. With respect to these planning and regulatory capabilities, barriers may include a lack of personnel to enforce existing regulations, a reluctance on the part of the public to participate in planning, etc. You can likely think several others for your jurisdiction. Given the combination of these barriers with the presence of the plans and regulatory elements that have been surveyed thus far, how would you label your jurisdiction's ability to fully meet the planning and regulatory capability?

9 responses



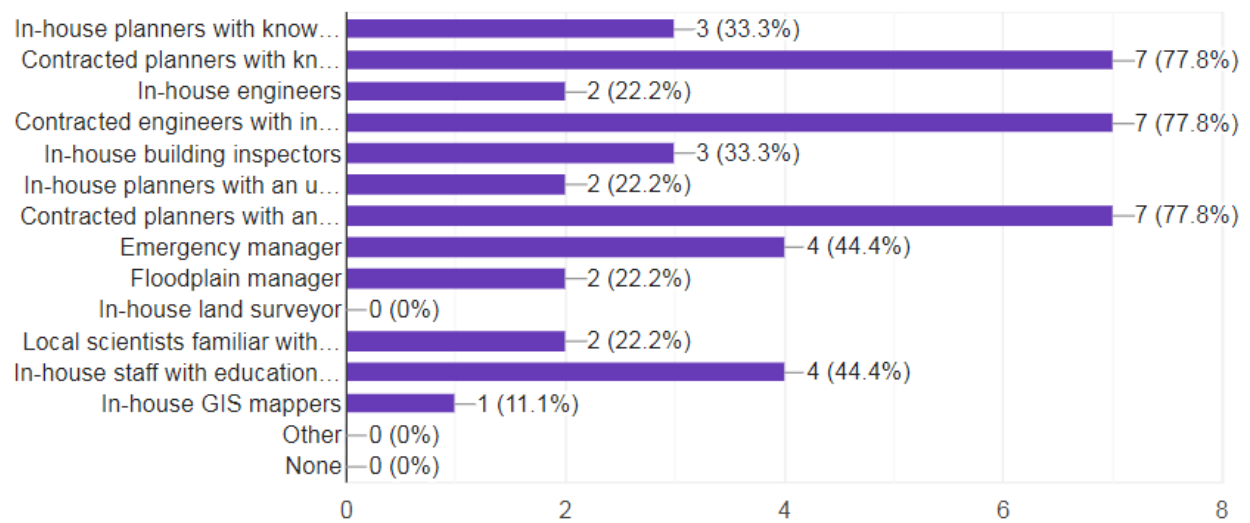
Administrative capability is described by an adequacy of departmental and personnel resources for the implementation of mitigation-related activities. Technical capability relates to an adequacy of knowledge and technical expertise of local government employees or the ability to contract outside resources for this expertise in order to effectively execute mitigation activities. Common examples of skill sets and technical personnel needed for hazard mitigation include the following. (a) Planners with knowledge of land development/management practices. (b) Engineers or professionals trained in construction practices related to buildings and/or infrastructure (e.g., building inspectors). (c) Emergency managers. (d) Floodplain managers. (e) Land surveyors. (f) Scientists familiar with hazards in the community. (g) Staff with education or expertise to assess community vulnerability to hazards. (h) Personnel skilled in geographic information systems (GIS).

9 responses



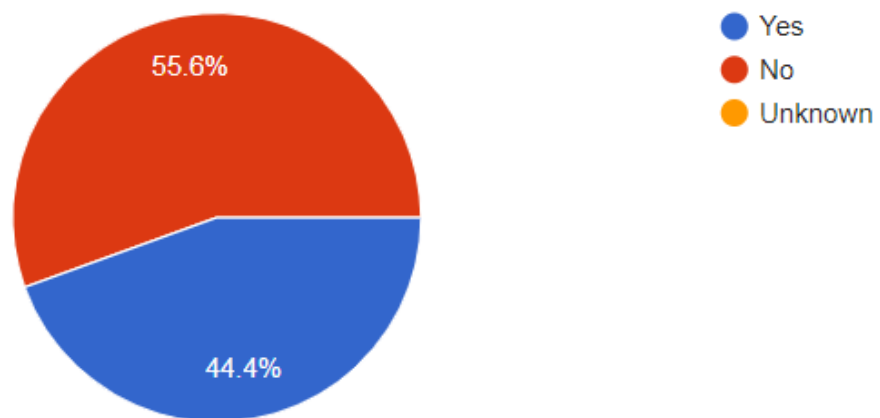
To which type of specialized staff do you have access?

9 responses



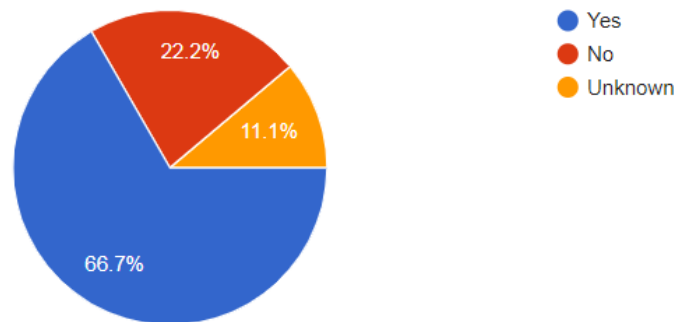
Does your jurisdiction have a paid grants specialist on its payroll?

9 responses



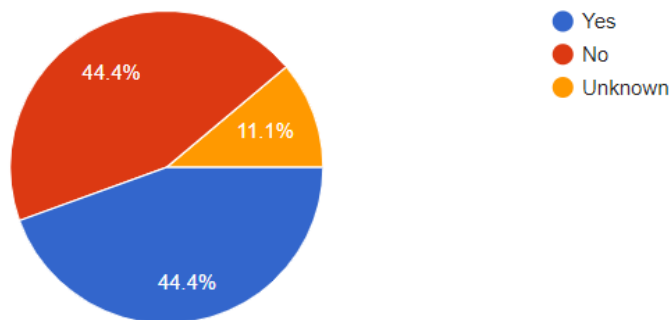
Does your jurisdiction have available funds in its CAPITAL BUDGET that could be used for mitigation projects?

9 responses



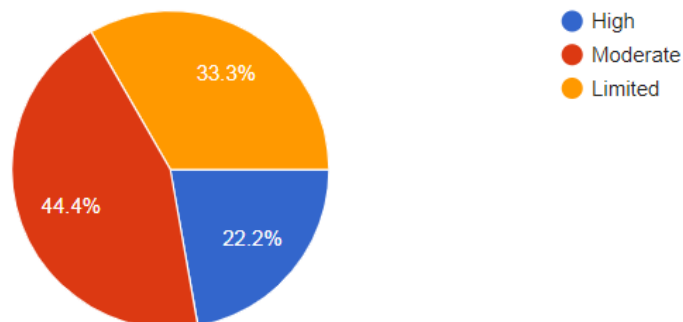
Does your jurisdiction have available funds in its PUBLIC WORKS BUDGET that could be used for mitigation projects?

9 responses



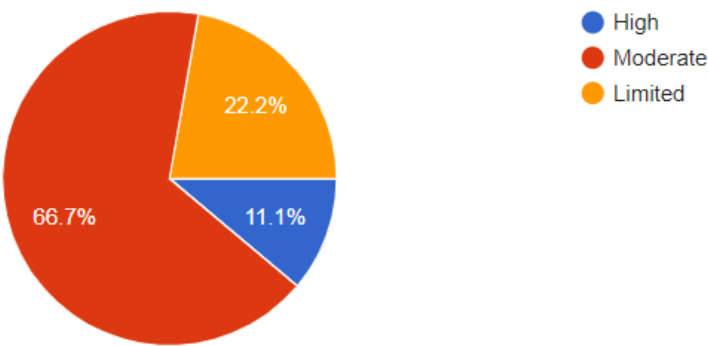
In addition to existing, in-house fiscal resources, mitigation projects can be supported through partnerships with other jurisdictions, the procurement of grants, etc. Given these options as well as the availability of capital and public work funds (as evidenced by your responses above), how would you rate your jurisdiction's fiscal capabilities to support hazard mitigation?

9 responses



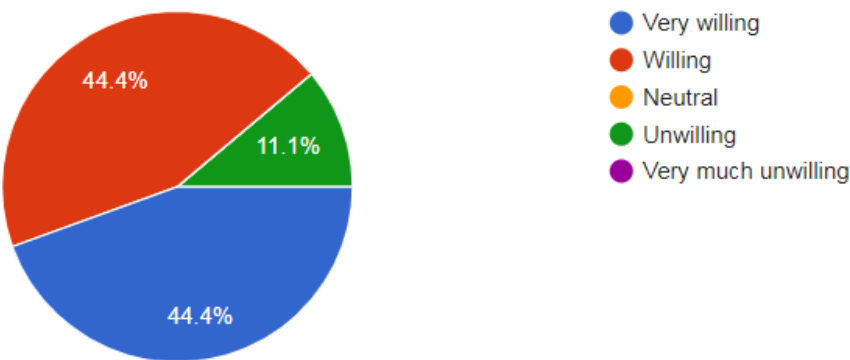
The political capability can be one the most difficult to evaluate due to the strong feelings it can elicit. How would you rank your jurisdiction's political capabilities?
NOTE: A "High" capability refers to a situation where there is significant political will to implement hazard mitigation policies and priorities.

9 responses



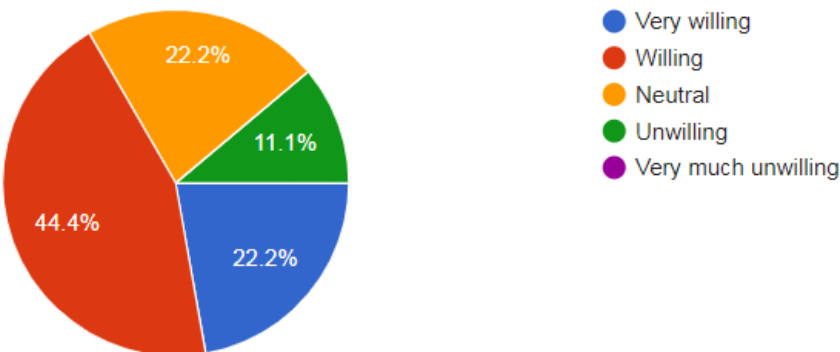
XYZ community guides development away from known hazards areas.

9 responses



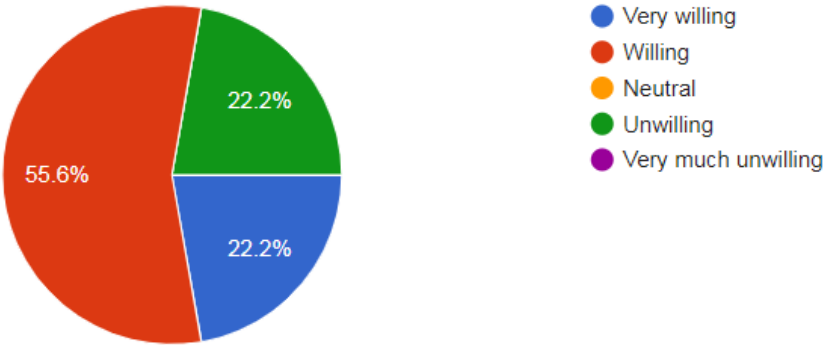
XYZ community restricts public investments or capital improvements within hazard areas.

9 responses



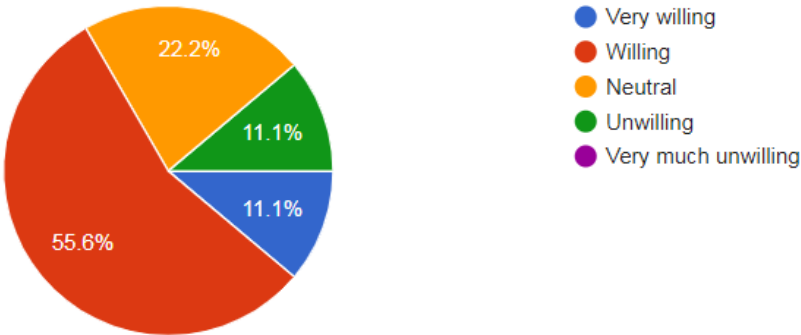
XYZ community enforces local development standards (e.g., building codes, floodplain management ordinances, etc.) that go beyond minimum state or federal requirements.

9 responses



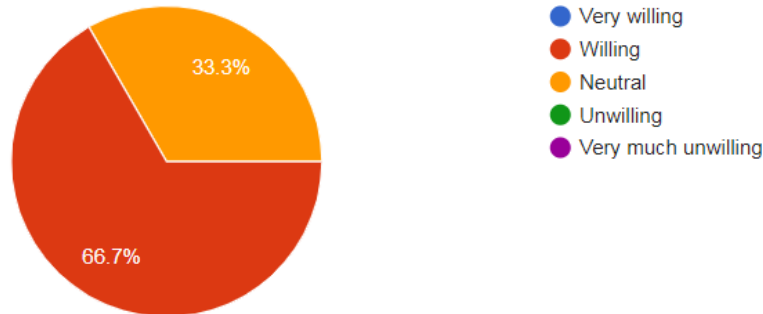
XYZ community offers financial incentives (e.g., through property tax credits) to individuals and businesses that employ resilient construction techniques (e.g., voluntarily elevates structures, employ landscape designs to establish buffers, etc.).

9 responses



XYZ community offers financial incentives (e.g., through property tax credits) to individuals and businesses that employ green infrastructure techniques (e.g., pave sidewalks and driveways utilizing permeable materials, install drought tolerant plants to capture, clean and/or infiltrate rain water, increase green space in urban areas, etc.).

9 responses



APPENDIX 2: PROJECT PRIORITIZATION

This appendix contains a spreadsheet used to calculate project prioritization scores. Scores were then utilized to place each mitigation action or project in to a “High”, “Medium”, or “Low” category. Section 3.2 – Mitigation Strategy; Project Prioritization outlines the “STAPLEE” evaluation criteria used to prioritize the mitigation actions.

GARRETT COUNTY HAZARD MITIGATION PLAN (2024 UPDATE)

Mitigation Strategy Prioritization

Definition of Priority Scoring

5		Best outcome for each criterion (e.g., very few negative social impacts, minimal (or doable in-house) administrative requirements, etc.)
4	↓	High = 35 to 28
3	↓	Medium = 27 to 20
2	↓	Low = 19 to 0
1		Worst outcome for each criterion (e.g., significant political drawback, economically unfeasible, negative environmental consequences, etc.)

STRATEGY		PRIORITY CATEGORIES							SUM	RES. PRIORITY
Number	Description	Social Impacts	Technical Feasibility	Admin. Requirements	Political Impacts	Legal Ramifications	Env. Impacts	Economic / Cost Benefit		
13.5	Distribute educational material in print and via social media throughout the county and municipalities regarding the county's mass notification system, including the process of signing up for notifications.	5	4	4	5	5	5	5	33	High
8.2	Deliver "mini" Screening, Brief Intervention, and Referral to Treatment (SBIRT) training to medical offices on local and regional treatment and recovery resources.	4	5	5	4	5	5	4	32	High
8.1	Create a "speakers bureau" consisting of various stakeholders and partners including medical, prevention, treatment, recovery, legal, affected family members, etc. Speakers Bureau members will receive consistent training and informational resources in order to present a uniform messaging in the community.	4	5	5	4	5	5	3	31	High
13.4	Hold disaster exercises in various areas of the county. Types of exercise: flood, high wind, winter storm. Hazardous Materials spills, Weapons of Mass Destruction, and Bio-Terrorism exercises.	4	4	4	5	5	5	3	30	High
5.3 / 10.2	Adopt the new 2018 International Building Code, including the International Energy Conservation Code (IECC).	3	5	4	4	5	5	3	29	High
1.2	Conduct a gap analysis to identify and prioritize cyber security needs.	4	3	4	4	5	5	3	28	High

5.4	Target properties on the FEMA NFIP Repetitive Loss Property (RLP) listing for mitigation, specifically flood buy-out program. Particularly the RLP on Stanley Lane. This property experiences frequent flooding from both small and large storm events.	3	4	3	3	5	5	4	27	Medium
5.6	Target residence for public outreach campaign that suggest preparedness activities for those located in high hazard areas such as the 100-year floodplain.	4	4	4	3	5	5	2	27	Medium
13.1	Review new 2024 Hazard Mitigation Plan and integrate it with new Comprehensive Plan slated for completion in 2024, as well as with municipal comprehensive plans.	3	3	4	5	5	5	2	27	Medium
5.8	Prepare CRS (Community Rating System) application to reduce the cost of flood insurance within the county.	3	4	4	3	5	5	2	26	Medium
12.1	Promote community & neighborhood planning for wildfire protection.	3	5	3	3	5	5	2	26	Medium
5.5	Complete a technical report detailing base flood elevations and first floor elevations for critical facilities identified as having high vulnerability to flooding in the risk assessment. Mitigation alternatives and a detailed cost/benefit analysis should be completed.	3	3	3	3	5	5	3	25	Medium
5.9	Elevate, relocate or acquire property affected by flooding in targeted areas.	2	4	4	3	4	5	3	25	Medium
5.10	Improve storm water drainage system capacity by repairing required infrastructure and installing culverts and making necessary bridge modifications.	4	3	4	4	4	3	3	25	Medium
5.2 / 7.1	The current Sensitive Areas Ordinance allows for development on slopes up to 30%. Reduce this to 20 or 25%.	2	3	4	3	4	5	3	24	Medium
5.7	Develop a one-page handout on flood insurance and distribute to local insurance companies, municipal buildings, police stations, and county office buildings.	3	3	3	3	5	5	2	24	Medium
2.2	Perform necessary maintenance and upgrades to high and significant hazard dams throughout the county.	4	2	4	3	5	4	2	24	Medium
13.3	Work with public utility companies to identify and prioritize facilities at risk in high hazard areas.	3	3	3	3	5	4	2	23	Medium
7.2	Conduct landslide restoration project at landslide area along Route 495.	3	3	4	3	5	3	2	23	Medium

Friendsville 13.1	Install a back-up power supply for the town's critical facilities (i.e., solar array, battery system, etc.)	3	2	3	3	5	4	3	23	Medium
Friendsville 5.4	Conduct elevations where possible, or build dikes around the water treatment plant.	3	2	3	3	4	3	2	20	Medium
Grantsville 6.1	Provide additional hazmat training opportunities for local fire departments.	5	4	5	5	5	5	3	32	High
Grantsville 8.2	Increase public education with regards to substance abuse and existing mental health resources available.	4	4	4	4	5	5	3	29	High
Grantsville 13.1	Develop a comprehensive Sheltering Plan for the town that provides details to the citizens regarding available shelters.	4	3	4	5	5	5	3	29	High
Grantsville 8.1	Develop a capability to conduct town financial services (i.e., accounts payable, accounts receivable) remotely.	4	3	4	4	5	5	3	28	High
Grantsville 8.3	Install drug take-back boxes at strategic locations within the town (i.e., town hall and fire hall).	3	4	3	5	5	5	2	27	Medium
Grantsville 5.1	The existing pump station located near the intersection of Maple Grove and State Route 495 frequently gets overrun and the riverbank is eroding near the pump station.	3	3	4	4	5	4	2	25	Medium
Grantsville 13.2	Bury powerlines during new construction, as well as existing overhead powerlines from Church Street / Main Street to Bank Street / Main Street.	4	2	3	3	4	4	4	24	Medium
Grantsville 13.3	Install a back-up power supply at Town Hall (i.e., solar array, battery system, etc.).	3	3	3	3	5	4	2	23	Medium
Kitzmiller 2.1	Coordinate with dam and levee owners to bolster warning capability in the event of a failure or abnormal operating condition.	4	3	5	4	5	5	4	30	High
Kitzmiller 5.1	Ensure proper bank stabilization by planting vegetation on slopes, creating terraces along road banks, use of riprap boulders and geotextile fabric.	4	2	3	3	3	3	3	21	Medium
Kitzmiller 7.1	Install catch-fall nets made of high-tensile steel wire mesh along a segment of Shallmar Road west of Kitzmiller off of North Hill Road.	3	3	3	3	3	4	4	23	Medium
Kitzmiller 8.1	Develop a mobile Points of Dispensing (POD) capability for vaccines.	4	3	4	4	5	5	3	28	High
Kitzmiller 8.2	Establish the Kitzmiller Recovery Community Group to provide substance abuse assistance.	4	3	3	3	5	5	3	26	Medium

Kitzmiller 10.1	Coordinate with internet providers to identify methods to decrease service interruptions in the Kitzmiller area during heavy snow fall.	5	2	4	4	5	4	3	27	Medium
Kitzmiller 13.1	Develop a tree pruning program to prune or remove hazardous trees and limbs within overhead utility line Right-of-Ways.	3	2	3	3	4	4	3	22	Medium
Loch Lynn Heights 6.1	Complete a hazardous materials commodity flow study on State Route 560. Monitoring site possible at Dundee Street or Shenandoah Ave (Town of Loch Lynn Heights). Include information on hazardous materials carried by rail into the study.	4	3	4	5	5	5	3	29	High
Loch Lynn Heights 3.1	Install high-visibility reflectors along both edges and the center line of Route 560.	5	2	4	4	5	5	3	28	High
Loch Lynn Heights 5.1	Increase roadway ditch maintenance capabilities along all routes leading to Roanoke Avenue.	4	3	4	4	5	4	3	27	Medium
Loch Lynn Heights 13.1	Develop a tree pruning program to prune or remove hazardous trees and limbs within overhead utility line Right-of-Ways.	4	3	4	4	5	4	3	27	Medium
Loch Lynn Heights 8.1	Increase public transportation capability, specifically to get individuals without transportation to and from medical facilities.	5	4	3	3	5	4	2	26	Medium
Loch Lynn Heights 4.1	Drill additional water wells at Landon's Dam.	4	2	3	3	4	3	3	22	Medium
Loch Lynn Heights 6.2	Erect steep slope signs at the top of Route 560 and sharp turn warning signs with flashing lights just before Route 560 / Shenandoah Ave intersection. Coordinate with state road to see if rumble strips could be placed before sharp turn to slow traffic.	3	3	3	3	2	4	3	21	Medium
Mountain Lake Park 8.2	Retain and assign a certified Health Officer for Garrett County exclusively.	4	3	3	4	5	5	2	26	Medium
Mountain Lake Park 8.3	Expand broadband internet to all areas of the town to increase ability to conduct remote learning and tele-work.	5	2	3	4	5	3	3	25	Medium
Mountain Lake Park 5.1	Increase capacity of existing ditches and storm water infrastructure along Pensinger Boulevard and Oakland Drive to alleviate flooding of the roadway.	3	2	3	3	4	4	3	22	Medium
Mountain Lake Park 8.1	Establish, or make available a local Maryland news channel in this area to disseminate public health information.	4	1	2	3	3	5	1	19	Low

Oakland 5.1	Mitigate and upgrade flood prone roadways as funding is available. Specifically, roads that were identified as "high" by the planning committee.	4	2	3	3	4	4	3	23	Medium
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APPENDIX 3: INACTIVE PROJECTS

This appendix lists projects that have appeared in previous versions of the mitigation plan (i.e., 2012 and 2018). It serves as a record of the inactive mitigation projects, those that have been completed, deleted, or deferred by the steering committee. Mitigation projects listed as “on-going” remain active and thus appear in Section 3.2 of this plan.

Project # (Prior Plan)	Hazard	Strategy	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Completed / Deleted
2012 – INACTIVE PROJECTS							
County N/A	Flooding	Review and where necessary revise and update local floodplain ordinances. Possible changes include vegetative buffers and freeboard requirements.	Local Plans & Regulations	Existing Budget	5 Years	County Planning	Completed. New Floodplain Ordinance was adopted following the effective FEMA Floodplain Mapping and Flood Insurance Study in 2015.
County N/A	All Hazards	Expand the mission of the Local Emergency Planning Committee (LEPC) to include All Hazards disaster planning.	Preparedness Activity	Existing Budget	3 Years	LEPC	Completed. Membership of the LEPC has doubled since the previous planning cycle and is now an all hazard disaster planning committee.
County N/A	Flooding	Work with FEMA, MEMA, and MDE to develop digital FIRMS and identify areas for revision of FIRMS.	Local Plans & Regulations	Existing Budget	5 Years	GCDEM	Completed. Digital Flood Insurance Rate Maps (DFIRMs) are being developed by FEMA and a preliminary product was released in November 2011 and the final product was made effective in September 2013.
County N/A	HazMat Release	Conduct a Hazardous Materials Survey to identify all hazardous materials that are either stored or traveling through the county	Local Plans & Regulations	HMEP Local	3 Years	GCDEM	Completed. The Garrett County Hazardous Materials Emergency Response Plan was completed in 2007 and was updated in 2012 and again in 2014. In 2009 a Commodity Flow Study was also completed. Five sites throughout the County were surveyed.
County N/A	HazMat Release	Using Hazardous Materials Survey results, develop a plan to mitigate any identified risks	Local Plans & Regulations	HMEP Local	3 Years	GCDEM	Completed. Risks identified in the 2009 Commodity Flow Study were incorporated into the 2012 Garrett County Hazardous Materials Emergency Response Plan, as well as the 2014 update.
County N/A	All Hazards	Allocate county resources and assistance to mitigation projects when possible. Include mitigation projects in Capital Improvement Plan.	Preparedness Activity	Local	5 Years	County Commission	Completed. Mitigation projects are stated in the Garrett County Budget Report. Matching funds for various projects have been allocated and utilized during the 2012-2017 plan cycle.
County N/A	Flooding Dam Failure	Work with the Soil Conservation District, NRCS and MDE to complete mapping of flood inundation areas to complete plans for the six SCD Flood Control Dams in the Little Youghiogheny Basin.	Local Plans & Regulations	HMGP Local	5 Years	County Planning	Completed. EAPs for the six SCD Flood Control Dams in the Little Youghiogheny Basin were completed in 2007. The Deep Creek Hydroelectric Emergency Action Plan was updated during this planning cycle.



Project # (Prior Plan)	Hazard	Strategy	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Completed / Deleted
County N/A	Dense Fog	Work with SHA, County Roads, State Police, Sheriff and Fire & Rescue organizations to develop a fog monitoring and warning system.	Preparedness Activity	BRIC HMGP Local	3 Years	County Roads	Completed. Camera/weather systems are located on I-68. The County also utilizes the Coordinated Highways Action Response Team (CHART) to inform the public about local traffic information, winter storm information, visibility, and precipitation for a particular area. In addition, electric signboards are located on Interstate 68 to inform motorists of fog warnings in the area.
County N/A	S. Summer Weather S. Winter Weather	Work with DNR, Allegheny Power, Verizon and other utilities to promote an ongoing tree-trimming program.	Natural Systems Protection	HMGP Local	3 Years	County Public Works	Completed. All utility companies must be licensed by the State and obtain roadside tree cutting permits. State Highway Administration and the County Roads Department work with all utility companies to mitigate the effects of severe weather disrupting their services.
County N/A	Wildfire	Work with DNR to monitor and warn residents of Wildfires dangers.	Education Program	Local	3 Years	GCDEM	Completed. The Maryland DNR Forest Service maintains a list of qualified personnel who meet or exceed the minimum requirements necessary in order to be eligible for dispatch. The agency actively recruits department and fire service personnel to participate in this program with many of the participants returning year after year for fire duty. The NWS also monitors wildfires across the U.S. and will issue a fire weather watch for the area if a wildfire threat exists in the area.
County N/A	All Hazards	Incorporate information about disaster preparedness and mitigation activities and opportunities on the County's website.	Education Program	Local	3 Years	GCDEM Health Dept.	Completed. Disaster preparedness information is available from the Garrett County Emergency Management website and the County's Health Department: Public Health Preparedness website.
County N/A	All Hazards	Work with FEMA & MEMA to hold Business Continuity Training Workshops.	Local Plans & Regulations	Local	3 Years	GCDEM	Completed. The MEMA website provides information on business continuity. Additional information is available in the County's Emergency Health Plan Appendix H: Business Continuity Plan.



Project # (Prior Plan)	Hazard	Strategy	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Completed / Deleted
County N/A	Dense Fog Flooding S. Summer Weather S. Winter Weather Wildfire	Partner with the National Weather Service to provide training to people throughout the county on Storm Spotting.	Preparedness Activity	HMPG Local	5 Years	GCDEM	Completed. The National Weather Service conducts free classes on its SWYWARN program regularly for citizens in the County. The two areas that provide training to Garrett County residents are Pittsburgh, PA and Baltimore, MD.
County N/A	Dense Fog Flooding S. Summer Weather S. Winter Weather Wildfire	Conduct natural hazards awareness programs in schools and community centers.	Education Program	Local	5 Years	GCDEM	Completed. Rick Cain from the National Weather Service conducted presentations at County schools. Garrett College also conducted SKYWARN classes.
County N/A	All Hazards	Coordinate with the American Red Cross to upgrade all shelter resources.	Preparedness Activity	HMGP Local	5 Years	GCDEM	Completed. The Red Cross has a regional chapter located in Baltimore; however, a part-time point of contact is located in Garrett County.
County N/A	All Hazards	Teach Community Emergency Response Training (CERT) classes to interested citizens to assist first responders at specified emergencies throughout the county.	Preparedness Activity	EMPG Local	5 Years	GCDEM	Completed. The CERT program conducts CERT Basic Training Course twice a year with a total of 180 individuals that have completed this training. CERT also participates in various disaster type exercises and conducts training for basic first aid and additional CBRNE awareness.
County N/A	All Hazards	Develop list of all training opportunities and distribute to all local emergency responders.	Education Program	Local	3 Years	Garrett College	Completed. Training opportunities are advertised, and registration is handled by Garrett College Continuing Education or the MEMA Learning Management System.



Project # (Prior Plan)	Hazard	Strategy	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Completed / Deleted
County N/A	All Hazards	Utilize and where necessary update hazard warning systems.	Preparedness Activity	BRIC HMGP Local	5 Years	GCDEM	Complete. GCDEM utilizes a Reverse 911 Public Notification System. Reverse 9-1-1 is a communications tool that combines the 9-1-1 database with GIS mapping to deliver outbound emergency notification from the 9-1-1 Center. Users can quickly target a precise geographic area and place thousands of calls in a short time. In addition, a citizen alert sign-up system has been added to the tools used by Garrett County for notification.
County N/A	Public Health Emerg.	Work with the County Health Department to provide information to citizens on infectious diseases.	Education Program	Local	3 Years	Health Department	Completed. Information on infectious disease is available at the Garrett County Health Department website.
County N/A	Flooding	Prohibit or restrict additional housing in areas of high risk, particularly in the 100-year floodplain.	Preparedness Activity	Local	5 Years	County Planning	Deleted. No restrictions have been implemented.
County N/A	All Hazards	Initiate a program to inspect and ensure operation of power generators at pre-identified critical facilities.	Preparedness Activity	Local	3 Years	GCDEM	Deleted. At this time fire companies inspect generators at scene by not all facilities.
County N/A	Flooding	Work with representatives from the National Flood Insurance Program to hold courses in the County for real estate and flood insurance agents.	Education Program	Local	5 Years	Garrett County Planning	Deleted. The NFIP holds regional training, workshops and conferences for adjusters, agents, and lenders on flood insurance dealing with real estate.
County N/A	Flooding	Pursue vegetation and restoration practices that assist in enhancing and restoring the natural and beneficial functions of the watershed.	Natural Systems Protection	HMGP Local	3 Years	Garrett County Public Works	Deleted. Restoring the natural and beneficial functions of watersheds in the county is primarily conducted by the Department of Natural Resources (DNR) and Maryland Department of the Environment (MDE).
County N/A	All Hazards	Review and update all annexes in the County Emergency Operations Plan. Include participation from all municipalities.	Local Plans & Regulations	EMPG	3 Years	GCDEM	Deleted. This project is completed in a piece-meal fashion utilizing grant funding sources not tied to hazard mitigation.
2018 – INACTIVE PROJECTS							
County N/A	Flooding	Adopt new floodplain management ordinance. FEMA has made distinctions between accessory structure and pertinent structure.	Local Plans & Regulations	Local	3 Years	Garrett County Planning	Completed. Garrett County adopted a new floodplain ordinance in 2019, which includes the IRC and IBC building code.



Project # (Prior Plan)	Hazard	Strategy	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Completed / Deleted
County N/A	All Hazards	Distribute annual mitigation informational brochure or newsletter to residents and business owners. Add Emergency contact and citizen alert notification information to <i>Garrett County Chamber of Commerce 2018 Community Profile and Directory</i> . Distribute to both business owners and tourists.	Education Program	HMGP Local	3 Years	GCDEM	Deleted. All of this information has been moved to the county website.
County N/A	All Hazards	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 information. Include emergency related information on Chamber of Commerce and tourism Facebook pages, Twitter, and Instagram.	Education Program	HMGP Local	3 Years	Garrett County Visitors/Tourism Bureau	Completed. The county website has a place where the public can sign up to receive alerts. They can pick which hazards they want to be alerted for.
County N/A	All Hazards	Build an E-911 back-up facility and EOC in the County.	Structure & Infrastructure Project	BRIC HMGP Local	5 Years	GCDEM	Completed. Facility has been constructed and is operational.
County N/A	All Hazards	Install back-up generator at new E-911 back-up facility and EOC.	Structure & Infrastructure Project	BRIC HMGP Local	5 Years	GCDEM	Completed. Back-up generator has been purchased and installed.
County N/A	All Hazards	Ensure that designated primary shelters have adequate back-up power. These shelters include; Northern and Southern High Schools, and Northern and Southern Middle Schools.	Structure & Infrastructure Project	BRIC HMGP Local	5 Years	GCDEM	Completed. Grant applications were submitted by GCDEM for generators at Deep Creek VFD, Kitzmiller VFD, and Eastern Garrett VFD. Generators have been obtained and installed.
Accident 5.1	Flooding	Mitigate and upgrade flood prone roadways as funding is available. Specifically, roads that were identified as "high" by the planning committee.	Structures & Infrastructure Project	BRIC FMA HMGP	5 Years	County Roads / Town Council	Deleted. Town representatives made the decision to delete this project due to lack of interest.
Friendsville 5.1	Flooding	Review and discuss with FEMA the Flood Insurance Study (FIS) specific to the Town of Friendsville. Maps are incorrect in the area of Water Street – Floodway.	Local Plans & Regulations	Local	2 Years	Town Administration	Completed. FIRMS have since been updated.



Project # (Prior Plan)	Hazard	Strategy	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Completed / Deleted
Friendsville 5.2	Flooding	Target properties located along Water Street for Flood Acquisition Program	Structures & Infrastructure Project	BRIC HMGP Local	5 Years	Town Administration	Deleted. Due to lack of funding.



APPENDIX 4: PUBLIC PARTICIPATION

The appendix contains a summary of the raw data from the online survey distributed as part of this project, as well as other evidence of public participation.

Garrett County 2022/2023 HMP Update

Date	Target Audience	Meeting or Other Outreach	Notes
4/13/2022	FEMA Region 3, MDEM, Western Region including GC DES Staff	Maryland 2022 Plan Implementation and Grants Development	12:30-4:30- Virtual Meeting included review of 2018 HMP Mitigation Action Items and Projects.
4/25/2022	MDEM & GC DES Staff	BRIC Award Kick-Off Meeting	
6/6/2022	GC DES Staff, MDE Water Resources-Dam Safety & NFIP staff, Dam Owners & Operators	Community Resilience: Hazard Mitigation and Floodplain Management for Dams	Online & In-Person Meeting 10AM- 1PM
6/16/2022	Dam Owners & Operators, Garrett County Staff, State Representatives, and Town of Oakland	Dam Hazard Table-Top Exercise	All-day TTX was for the following High Hazard Dams: Jennings-Randolph, Savage River, Oakland Little Yough Dams (3); both the Mayor and Town Clerk of Oakland attended.
6/21/2022	Municipalities	Introduction Email	Initiating HMP Update and requesting POC for each municipality. Response from Grantsville, Loch Lynn Heights, and Town of Oakland.
6/28/2022	Municipalities	Introduction Email- 2nd attempt: Friendsville, Kitz miller, Grantsville, Deer Park, Mt. Lake Park	
8/15/2022	Public	Dam Safety GC Content, Tips, "Dam Safety with Beaverly", a children's coloring book.	Added to Garrett County Website under DES
8/23/2022	Municipalities	Municipal Survey Link	Included Hazards of Concern and municipal specific questions. Surveys was customized for each municipality.
8/23/2022	GC JIC-PIO Contacts	Training Opportunity Flyer	Advanced PIO Training Opportunity
9/7/2022	HMPC Members	LEPC Meeting- HMPC Planning Session held.	Meeting notes developed and distributed.
9/7/2022	HMPC Members	HMPC Survey	Included Hazards of Concerns and requesting ideas for new mitigation actions.
10/19/2022	Public	Public Survey	Included Hazards of Concern and additional questions including ideas for minimizing hazard impacts. Posted on County Website.
10/19/2022	Municipalities	Follow-up Email	Municipal Survey
10/20/2022	HMPC Members	New HIRA distributed	New HIRA included "Community Perspective" which are the results of HMPC survey.

10/24/2022	Public	Public Survey FB & Twitter Image and Text Posting	Garrett County Government Facebook (https://www.facebook.com/photo/?fbid=494652719372875&set=a.230864329085050) and Twitter (https://twitter.com/GCCCommissioners/status/1584589044415365121/photo/1)
10/25/2022	Public	Public Survey FB & Twitter Image and Text Posting	Shared on GC Health Dept. Facebook, website, and in our twice-daily email newsletter; October report- Garrett County Department of Emergency Services Survey - 70 total, 66 unique
11/3/2022	Regional Mtg.	Meeting at Savage River Dam to discuss hazard warning and notification.	In attendance: Town of Luke, Garrett County Army Corp- Jennning Radolph Dam, and Savage River Dam Operator(s.) Mitigation Ideas: citizen notification savage river dam - sirens \$7,500; purchase of a portable radio With accessories. so that dam operator would be able to make contact with both PSAP 911 , EOC and public safety VFD Fire Chief. This would be approximately \$7,000.00
11/16/2022	County Staff	NOAA SKYWARN Weather Spotter	20 County Staff attended the training.
December-February 2022	Public	MHT- webinars and In-Person Workshops	Repairs to Historic Properties. Participants will learn about: the eligibility of applicant organizations, properties, and projects; documentation required for the application; selection criteria; easement requirements; and more. December 1 Webinar, December 13 In Person Workshop, January 5 In-Person, and February 9 and 22, Webinars
11/30/2022	County Staff	Resiliency Meeting w/ MDEM	Meeting with MDEM- Disaster Risk Reduction Directorate staff to discuss resiliency and new low-interests loan program.
12/6/2022	County Roads	Repetitive Flooded Roadways	Sent Table 22- Repetitive Flooded Roadways for review and update.
12/6/2022	Municipalities	Repetitive Flooded Roadways	Sent Table 22- Repetitive Flooded Roadways for review and update.
1/18/2023	HMPC Members	LEPC Meeting- HMPC Planning Session held.	Meeting notes developed and distributed. New HIRA were distributed along with meeting notes.
1/20/2023	Municipalities	Plan Update email distributed.	Requested that all municipalities take the survey and provided new HIRA for review.
2/1/2023	Municipalities	Garrett Co. Municipalities Meeting GC	Discussed surveys and three towns indicated that they had not participated, as yet. Survey links were sent out to those towns, again.
4/5/2023	MDEM	Quarterly Report submitted	
4/25/2023	HMPC Members	Meeting	

Garrett County Hazard Mitigation Plan Update



Virginia Smith

To: accidenttownhall@verizon.net; townofdeerpark@gmail.com; townoffriendsville@gcol.net; info@visitgrantsville.com; kitzmd@shentel.net;
lochlynn@shentel.net; mlpclerk@mac.com; townofaak@gmail.com
Cc: [John Frank](#)

[Reply](#) [Reply All](#) [Forward](#) [Share](#) [More](#)

Tue 6/21/2022 10:41 AM

Greetings,

The Garrett County Department of Emergency Services is initiating the plan update process for the Hazard Mitigation Plan. The Hazard Mitigation Plan is updated every five years and is a FEMA requirement for grant eligibility. In the past, Garrett County municipalities have participated in the plan update process and have subsequently adopted the County Hazard Mitigation Plan. Municipal adoption of the plan ensures grant eligibility for FEMA mitigation and resilience planning and projects.

At this time we are requesting that each municipality provide a point of contact. Please provide the following for each POC: name, title, email, and phone number. We will be hosting a meeting to further discuss the plan update in July.

Please contact me or John Frank, GC DES Director, if you should have any questions. Thanks! Ginny

Note: For your reference the GC [HMP](#) is available online, please click on blue hyperlink to view.

Virginia Smith, AICP
Garrett County Emergency Services
301.707.1173

Review new 2018 Hazard Mitigation Plan and integrate with new Comprehensive Plan slated for completion in 2019. In addition municipal comprehensive plans, **2002 Oakland, 2005 Grantsville, 2009 Accident, 2009 Friendsville, 2009 Kitzmiller, 2009 Loch Lynn, and 2010 Mountain Lake Park.**

Garrett County

Jurisdiction	Current Plan / Adoption Date
Garrett Master Plan	CMP-2008
Municipalities:	
The Comprehensive Plan for the Towns of: Accident, Deer Park, Friendsville, Kitzmiller, and Mountain Lake Park CMP-2009 Volume 1	
Accident	CMP-2009
Deer Park	CMP-2009
Friendsville	CMP-2009
Grantsville	CMP-2009
Kitzmiller	CMP-2009
Loch Lynn Heights	CMP-2009
Mountain Lake Park	CMP-2010
Oakland	CMP-2002

Review and discuss with FEMA the Flood Insurance Study (FIS) specific to the **Town of Friendsville**. Maps are incorrect in the area of Water Street-Floodway.

Adopt the new 2018 International Building Code, including the International Energy Conservation Code (IECC) **(including all municipalities)**.

Complete a hazardous materials commodity flow study on MD 560. Monitoring site possibly at Dundee Street or Shenandoah Avenue (**Town of Loch Lynn**). Include information on hazardous materials carried by rail into the study.

Target Water Street properties in **Friendsville** for the Flood Acquisition Program.

Work with the Department of Natural Resources (DNR) to identify soil movement mitigation measures on State land, specifically the three rockslide locations identified in *Chapter 11: Soil Movement (Kitzmiller)*.

Mitigate and upgrade flood prone roadways when funding is available. Specifically, roads that were identified as “High” by the HMPC in Table 19 in *Chapter 6: Riverine Flooding* includes **Towns of Accident, Friendsville, Mountain Lake Park, and Oakland.**

Road	Maintained By	Municipality	Ranking
West Liberty Street (at Bradley Run)	Municipal	Oakland	High

Shallmar Road (along N. Branch Potomac River)	County	N/A	High
Underwood Road (at Youghiogheny River)	County	N/A	High
Route 742 on Maple Street (flooding of Youghiogheny)	Municipal	Friendsville	High
Water Street (flooding of Youghiogheny)	Municipal	Friendsville	High

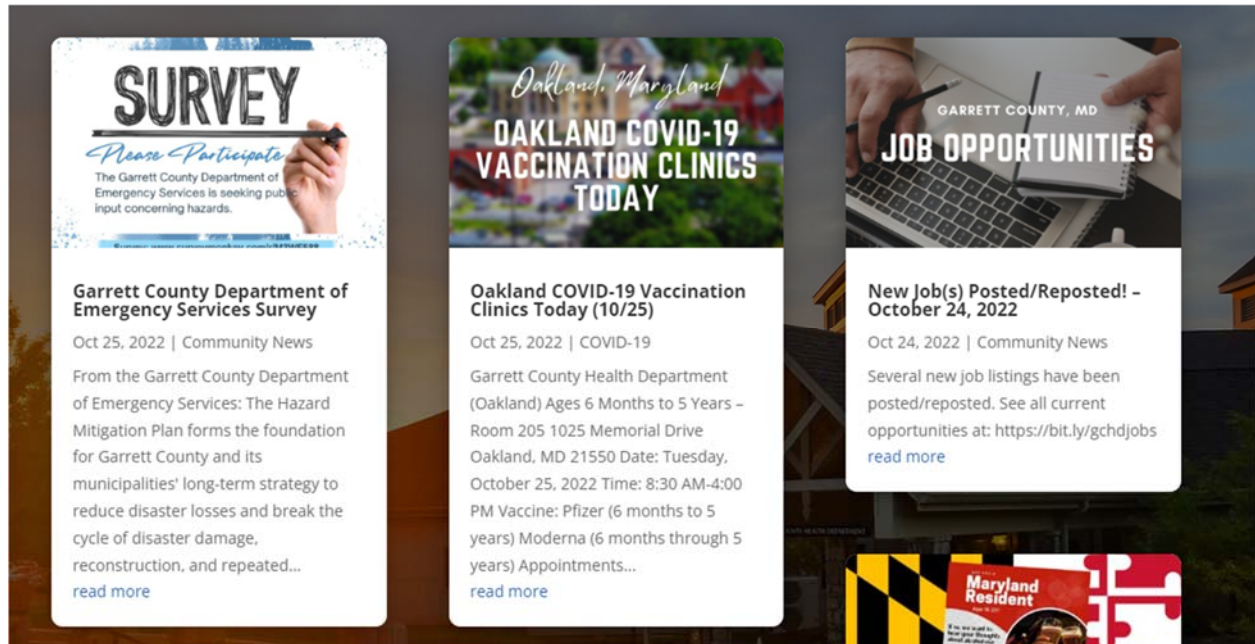
Town of Oakland- Municipal Questionnaire

According to the Maryland Department of Planning website, the Comprehensive Plan for the Town of Oakland was adopted in 2002. Is this correct? Is this plan currently in the update process, or is an update planned?

Did the Town of Oakland adopt the 2018 International Building Code, including the International Energy Conservation Code (IECC)?

Has any work been completed on West Liberty Street (at Bradley Run) to mitigate flooding?

Please use the following survey link to provide your jurisdictions level of concern for each of Garrett County's identified hazards.



Ginny,

John shared on Facebook, website, and in our twice-daily email newsletter. I tried to share the email with you, but your server blocked it... go to garretthealth.org and scroll down to see the post, and check out Garrett County Health Department FB page.

Thanks,

Diane



Garrett County Health Department

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Intro

The Garrett County Health Department is the recognized Public Health agency in Garrett County, Maryland

Page · Government organization

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Garrett County Health Department

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Garrett County Department of Emergency Services Survey



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Garrett County Department of Emergency Services Survey - Garrett County Health Department



From the Garrett County Department of Emergency Services:

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

To the end, the Garrett County Hazard Mitigation Plan update is underway. This is an update to the previous 2018 Hazard Mitigation Plan. Garrett County's Department of Emergency Services is the lead agency for this plan effort.

One of the first steps in the planning process is to complete the Hazard Identification Risk Assessment (HIRA). FEMA requires natural hazards be identified and assessed. Therefore, the Department of Emergency Services is seeking input on stakeholders' concerns regarding hazards. This survey is being used to collect your insight and perspective on hazards identified in the Plan.

Please take our public survey HERE: <https://www.surveymonkey.com/r/M3WF588>

#1

COMPLETE

Collector: Web Link 1 (Web Link)
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Last Modified: Tuesday, August 23, 2022 2:53:52 PM
Time Spent: 00:10:22
IP Address: 167.102.88.7

Page 1: Public Survey

Q1 Yes

Are you a resident of Garrett County?

Q2 Loch Lynn Heights

Please select which community you are representing.

Page 2

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Severe Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. The northern and western areas of Maryland typically experience the most extreme winter weather and with the highest frequency of events. Winter storms in Garrett County are normally widespread and affect the municipalities in much the same way as they do the county in general. There are occasions when the northern towns, Accident, Friendsville and Grantsville, are affected more by "Lake Effect" snow than the other towns, but by and large, the towns are similar to the county in terms of winter storm effects.	Concerned
Riverine Flooding - In Garrett County flooding is normally associated with rapid runoff from excessive rainfall or from rapid snowmelt or some combination of the two. Steep slopes, poor soil condition for retaining moisture and the geologic structure of the County make flooding more likely for a given amount of precipitation than would be the case in an area having mildly sloping terrain and good soil conditions. Of the eight municipalities in Garrett County, three are located within the floodplain of major streams, and five are located along the headwaters of streams but have floodplain areas within the town limits.	Somewhat Concerned
Thunderstorm - 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. Garrett County is affected by thunderstorm activity both by the interaction of warm and cool air masses and by the lifting of warm air as it passes over the Appalachian Plateau. Intense thunderstorms over the steep terrain in Garrett County result in rapid runoff, particularly in the headwaters of small stream basins.	Somewhat Concerned
Major Transportation-Fog - Garrett County lies in the area of the eastern U. S. having the greatest number of dense fog days per year. According to the Department of Agriculture's "Climate and Man", most of the Appalachian Plateau has 30 or more dense fog days annually, but the Plateau area from central West Virginia to southern Pennsylvania has more than 50 dense fog days annually. Garrett County is prone to dense fog conditions in every season, but particularly so during winter and spring months when temperature inversions are common.	Somewhat Concerned
High Wind -Garrett County is situated in the lower part of the westerly wind belt which extends from latitude 35 to latitude 60. Over time, prevailing winds in Garrett County are from the southwest in summer and the northwest in winter. Grantsville and Accident are more exposed to wind due to their location on high, nearly level land, whereas Friendsville and Kitzmiller are more protected from high winds due to their valley setting.	Somewhat Concerned
Tornado - 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. Even though Garrett County is located in mountainous terrain it still has been subjected to violent storms including tornadoes. Between 1950 and 1998 there were 8 reported touchdowns of tornadoes in the County.	Somewhat Concerned

Garrett County Hazard Mitigation Municipal Survey

	Level of Concern
<p>Soil Movement - The most common types of soil movement are the landslide and the slump. A landslide typically involves earth and rock that have been disturbed by some other action or loosened by moisture and slide downslope. A slump is similar but involves the slippage of a mass of earth and rock along a rotational axis (slip plane). Garrett County is underlain by layered sedimentary rocks that have been folded moderately. These rock units alternate between sandstone, shale and limestone. When exposed on steep slopes, normally the sandstone forms the cap rock at the top of the slope with shale or limestone lying underneath. When these weaker rocks are disturbed, the sandstone eventually fails and moves downslope. The slump type of soil movement is most common, particularly in road cuts and in strip mining operations. While these movements are not normally on a large scale, they do result in road blockage from time to time, particularly where narrow valley floors are shared by a stream and a road or railroad.</p>	Not Concer ned
<p>Transportation & On-Site HazMat - Historically, most HazMats moving through Garrett County have been on the CSX rail system and its predecessors, the Baltimore and Ohio Railroad, and the Western Maryland Railroad. Today, however, the bulk of hazardous materials pass through the county by truck, particularly on I-68, which crosses the northern part of the county from west to east. The municipalities most susceptible to transportation HazMat incidents include Friendsville and Grantsville, which are adjacent to I-68, and Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park which are near the CSX rail line that crosses the southern part of the county. On site HazMats include water and sewer plants located in municipalities and the hospital in Oakland.</p>	Concer ned
<p>Dam Failure - Dam failure refers to a collapse, overtopping, breaching or any related condition that causes downstream flooding. The largest dams in the county include the Savage River Dam, the Bloomington Dam on the Potomac River, and the Deep Creek Lake Dam. Smaller dams include the Piney Creek Dam and the New Germany Dam. The town of Kitzmiller is downstream from both the Stony River Dam and the Mt. Storm Dam. In addition, the town of Friendsville is located downstream from the Deep Creek Lake Dam. Finally, six flood control impoundments constructed by the Soil Conservation Service in the 1970's are located upstream of parts of Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park in the Little Youghiogheny Watershed</p>	Not Concer ned
<p>Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Because more than 70% of Garrett County's land surface is covered by forests, wildfire is a major concern. With 70,000 acres owned by the State of Maryland, the Department of Natural Resources takes a leading role in fire suppression throughout the county. All municipalities in Garrett County are near or adjacent to forest land or agricultural land. As urban development extends into these forest or brush covered lands the possibility of wild fire in urban areas increases as it does throughout the county.</p>	Somew hat Concer ned
<p>Major Fire/Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. All municipalities in Garrett County share the threat of fire to residential, commercial or other structures. The municipalities of Oakland, Mt. Lake Park, Loch Lynn Hts, Deer Park and Kitzmiller which are near CSX rail lines face the threat of fire or explosion from a transportation incident while Friendsville and Grantsville have the possibility of a similar incident along I-68. Grantsville and Accident have a higher threat of fire to industrial because they are the only municipalities in the County with industrial or technological parks.</p>	Concer ned
<p>Hurricane - With its inland situation, Garrett County is not normally as affected by the high winds associated with the passage of a hurricane as a coastal community would be. However, hurricanes do still carry a lot of moisture over the mountainous terrain and the amount of runoff associated with the resulting precipitation can be deadly. Municipalities share the same concerns as the county. The towns of Friendsville and Kitzmiller face more danger from flooding associated with the remnants of a hurricane because of their floodplain location, while the towns of Accident and Grantsville are more susceptible to wind damage because of their exposed location on higher, more level ground.</p>	Somew hat Concer ned

Epidemics - Epidemics are characterized by an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. Epidemics may also take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service. An epidemic may also be a secondary effect from other disasters such as flooding, tornadoes, hurricanes, or hazmat incidents.

**Concer
ned**

Cyber Threat - Cyber threats to a control system refer to persons who attempt unauthorized access to a control system device and/or network using a data communications pathway. This access can be directed from within an organization by trusted users or from remote locations by unknown persons using the Internet. With more and more data accessible from anywhere in the world, passwords are not enough protection alone.

**Concer
ned**

Page 3: Public Survey

Q4

Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)

**Severe Winter Weather ,
Major Fire/Explosion,
Thunderstorm,
Transportation & On-Site HazMat**

Q5

Respondent skipped this question

Are you concerned with any other hazards not identified in this survey?

Page 4: Public Survey

Q6

In terms of social vulnerability, do you feel that a specific group or groups in your municipality that are particularly at risk for or could be harmed by any of the hazards events listed in questions 4 or 5? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

**Age,
Medical Issues and Disability**

Q7

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

**Severe Winter Weather,
Major Fire/Explosion**

Page 5

Q8

Which of the following mitigation project types do you believe should focused on to reduce disruptions of services and strengthen the community (check all that apply)?

Work on improving the damage resistance of utilities (electricity, communications, water/sewer, etc.)

,

Assist vulnerable property owners with securing funding to mitigate impacts to their property

Q9

In the last 10 years, has there been an evacuation from in your community as a result of a disaster (ex. flooding, power, water failure)? If so, how long were citizens displaced? Was a shelter setup?

no

Q10

Respondent skipped this question

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

Q11

Do you have any mitigation action items specific for your municipality for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

no

#2

COMPLETE

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Page 1: Public Survey

Q1 Yes
Are you a resident of Garrett County?

Q2 Oakland
Please select which community you are representing.

Page 2

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Severe Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. The northern and western areas of Maryland typically experience the most extreme winter weather and with the highest frequency of events. Winter storms in Garrett County are normally widespread and affect the municipalities in much the same way as they do the county in general. There are occasions when the northern towns, Accident, Friendsville and Grantsville, are affected more by "Lake Effect" snow than the other towns, but by and large, the towns are similar to the county in terms of winter storm effects.	Very Concerned
Riverine Flooding - In Garrett County flooding is normally associated with rapid runoff from excessive rainfall or from rapid snowmelt or some combination of the two. Steep slopes, poor soil condition for retaining moisture and the geologic structure of the County make flooding more likely for a given amount of precipitation than would be the case in an area having mildly sloping terrain and good soil conditions. Of the eight municipalities in Garrett County, three are located within the floodplain of major streams, and five are located along the headwaters of streams but have floodplain areas within the town limits.	Very Concerned
Thunderstorm - 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. Garrett County is affected by thunderstorm activity both by the interaction of warm and cool air masses and by the lifting of warm air as it passes over the Appalachian Plateau. Intense thunderstorms over the steep terrain in Garrett County result in rapid runoff, particularly in the headwaters of small stream basins.	Concerned
Major Transportation-Fog - Garrett County lies in the area of the eastern U. S. having the greatest number of dense fog days per year. According to the Department of Agriculture's "Climate and Man", most of the Appalachian Plateau has 30 or more dense fog days annually, but the Plateau area from central West Virginia to southern Pennsylvania has more than 50 dense fog days annually. Garrett County is prone to dense fog conditions in every season, but particularly so during winter and spring months when temperature inversions are common.	Concerned
High Wind -Garrett County is situated in the lower part of the westerly wind belt which extends from latitude 35 to latitude 60. Over time, prevailing winds in Garrett County are from the southwest in summer and the northwest in winter. Grantsville and Accident are more exposed to wind due to their location on high, nearly level land, whereas Friendsville and Kitzmiller are more protected from high winds due to their valley setting.	Concerned
Tornado - 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. Even though Garrett County is located in mountainous terrain it still has been subjected to violent storms including tornadoes. Between 1950 and 1998 there were 8 reported touchdowns of tornadoes in the County.	Concerned

Garrett County Hazard Mitigation Municipal Survey

	Level of Concern
<p>Soil Movement - The most common types of soil movement are the landslide and the slump. A landslide typically involves earth and rock that have been disturbed by some other action or loosened by moisture and slide downslope. A slump is similar but involves the slippage of a mass of earth and rock along a rotational axis (slip plane). Garrett County is underlain by layered sedimentary rocks that have been folded moderately. These rock units alternate between sandstone, shale and limestone. When exposed on steep slopes, normally the sandstone forms the cap rock at the top of the slope with shale or limestone lying underneath. When these weaker rocks are disturbed, the sandstone eventually fails and moves downslope. The slump type of soil movement is most common, particularly in road cuts and in strip mining operations. While these movements are not normally on a large scale, they do result in road blockage from time to time, particularly where narrow valley floors are shared by a stream and a road or railroad.</p>	Somewhat Concerned
<p>Transportation & On-Site HazMat - Historically, most HazMats moving through Garrett County have been on the CSX rail system and its predecessors, the Baltimore and Ohio Railroad, and the Western Maryland Railroad. Today, however, the bulk of hazardous materials pass through the county by truck, particularly on I-68, which crosses the northern part of the county from west to east. The municipalities most susceptible to transportation HazMat incidents include Friendsville and Grantsville, which are adjacent to I-68, and Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park which are near the CSX rail line that crosses the southern part of the county. On site HazMats include water and sewer plants located in municipalities and the hospital in Oakland.</p>	Very Concerned
<p>Dam Failure - Dam failure refers to a collapse, overtopping, breaching or any related condition that causes downstream flooding. The largest dams in the county include the Savage River Dam, the Bloomington Dam on the Potomac River, and the Deep Creek Lake Dam. Smaller dams include the Piney Creek Dam and the New Germany Dam. The town of Kitzmiller is downstream from both the Stony River Dam and the Mt. Storm Dam. In addition, the town of Friendsville is located downstream from the Deep Creek Lake Dam. Finally, six flood control impoundments constructed by the Soil Conservation Service in the 1970's are located upstream of parts of Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park in the Little Youghiogheny Watershed</p>	Concerned
<p>Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Because more than 70% of Garrett County's land surface is covered by forests, wildfire is a major concern. With 70,000 acres owned by the State of Maryland, the Department of Natural Resources takes a leading role in fire suppression throughout the county. All municipalities in Garrett County are near or adjacent to forest land or agricultural land. As urban development extends into these forest or brush covered lands the possibility of wild fire in urban areas increases as it does throughout the county.</p>	Somewhat Concerned
<p>Major Fire/Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. All municipalities in Garrett County share the threat of fire to residential, commercial or other structures. The municipalities of Oakland, Mt. Lake Park, Loch Lynn Hts, Deer Park and Kitzmiller which are near CSX rail lines face the threat of fire or explosion from a transportation incident while Friendsville and Grantsville have the possibility of a similar incident along I-68. Grantsville and Accident have a higher threat of fire to industrial because they are the only municipalities in the County with industrial or technological parks.</p>	Concerned
<p>Hurricane - With its inland situation, Garrett County is not normally as affected by the high winds associated with the passage of a hurricane as a coastal community would be. However, hurricanes do still carry a lot of moisture over the mountainous terrain and the amount of runoff associated with the resulting precipitation can be deadly. Municipalities share the same concerns as the county. The towns of Friendsville and Kitzmiller face more danger from flooding associated with the remnants of a hurricane because of their floodplain location, while the towns of Accident and Grantsville are more susceptible to wind damage because of their exposed location on higher, more level ground.</p>	Somewhat Concerned

	Level of Concern
Epidemics - Epidemics are characterized by an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. Epidemics may also take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service. An epidemic may also be a secondary effect from other disasters such as flooding, tornadoes, hurricanes, or hazmat incidents.	Concerned
Cyber Threat - Cyber threats to a control system refer to persons who attempt unauthorized access to a control system device and/or network using a data communications pathway. This access can be directed from within an organization by trusted users or from remote locations by unknown persons using the Internet. With more and more data accessible from anywhere in the world, passwords are not enough protection alone.	Very Concerned

Page 3: Public Survey

Q4

Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)

Severe Winter Weather ,
Riverine Flooding,
High Winds,
Dam Failure,
Major Fire/Explosion,
Cyber Threat,
Transportation & On-Site HazMat,
Epidemics

Q5

Respondent skipped this question

Are you concerned with any other hazards not identified in this survey?

Page 4: Public Survey

Q6

In terms of social vulnerability, do you feel that a specific group or groups in your municipality that are particularly at risk for or could be harmed by any of the hazards events listed in questions 4 or 5? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

Age,
Medical Issues and Disability

Q7

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

Severe Winter Weather,
Epidemics,
Riverine Flooding,
Transportation & On-Site HazMat,
Dam Failure

Page 5

Q8

Which of the following mitigation project types do you believe should focused on to reduce disruptions of services and strengthen the community (check all that apply)?

Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.
,
Replace inadequate or vulnerable bridges ,
Retrofit infrastructure, such as elevating roadways and improving drainage systems
,
Work on improving the damage resistance of utilities (electricity, communications, water/sewer, etc.)
,
Strengthen codes, ordinances, and plans to require higher hazard risk management standards
,
Provide better information about hazard risk and high-hazard areas
,
Assist vulnerable property owners with securing funding to mitigate impacts to their property

Q9

In the last 10 years, has there been an evacuation from in your community as a result of a disaster (ex. flooding, power, water failure)? If so, how long were citizens displaced? Was a shelter setup?

none

Q10

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

better education

Q11

Do you have any mitigation action items specific for your municipality for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

review/evaluate the nearby dams and their conditions
and establish town-wide notification system

#3

COMPLETE

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Time Spent: 00:04:30
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Page 1: Public Survey

Q1 **Yes**
Are you a resident of Garrett County?

Q2 **Accident**
Please select which community you are representing.

Page 2

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Severe Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. The northern and western areas of Maryland typically experience the most extreme winter weather and with the highest frequency of events. Winter storms in Garrett County are normally widespread and affect the municipalities in much the same way as they do the county in general. There are occasions when the northern towns, Accident, Friendsville and Grantsville, are affected more by "Lake Effect" snow than the other towns, but by and large, the towns are similar to the county in terms of winter storm effects.	Somewhat Concerned
Riverine Flooding - In Garrett County flooding is normally associated with rapid runoff from excessive rainfall or from rapid snowmelt or some combination of the two. Steep slopes, poor soil condition for retaining moisture and the geologic structure of the County make flooding more likely for a given amount of precipitation than would be the case in an area having mildly sloping terrain and good soil conditions. Of the eight municipalities in Garrett County, three are located within the floodplain of major streams, and five are located along the headwaters of streams but have floodplain areas within the town limits.	Somewhat Concerned
Thunderstorm - 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. Garrett County is affected by thunderstorm activity both by the interaction of warm and cool air masses and by the lifting of warm air as it passes over the Appalachian Plateau. Intense thunderstorms over the steep terrain in Garrett County result in rapid runoff, particularly in the headwaters of small stream basins.	Not Concerned
Major Transportation-Fog - Garrett County lies in the area of the eastern U. S. having the greatest number of dense fog days per year. According to the Department of Agriculture's "Climate and Man", most of the Appalachian Plateau has 30 or more dense fog days annually, but the Plateau area from central West Virginia to southern Pennsylvania has more than 50 dense fog days annually. Garrett County is prone to dense fog conditions in every season, but particularly so during winter and spring months when temperature inversions are common.	Concerned
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Garrett County Hazard Mitigation Municipal Survey

	Level of Concern
<p>Soil Movement - The most common types of soil movement are the landslide and the slump. A landslide typically involves earth and rock that have been disturbed by some other action or loosened by moisture and slide downslope. A slump is similar but involves the slippage of a mass of earth and rock along a rotational axis (slip plane). Garrett County is underlain by layered sedimentary rocks that have been folded moderately. These rock units alternate between sandstone, shale and limestone. When exposed on steep slopes, normally the sandstone forms the cap rock at the top of the slope with shale or limestone lying underneath. When these weaker rocks are disturbed, the sandstone eventually fails and moves downslope. The slump type of soil movement is most common, particularly in road cuts and in strip mining operations. While these movements are not normally on a large scale, they do result in road blockage from time to time, particularly where narrow valley floors are shared by a stream and a road or railroad.</p>	Somewhat Concerned
<p>Transportation & On-Site HazMat - Historically, most HazMats moving through Garrett County have been on the CSX rail system and its predecessors, the Baltimore and Ohio Railroad, and the Western Maryland Railroad. Today, however, the bulk of hazardous materials pass through the county by truck, particularly on I-68, which crosses the northern part of the county from west to east. The municipalities most susceptible to transportation HazMat incidents include Friendsville and Grantsville, which are adjacent to I-68, and Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park which are near the CSX rail line that crosses the southern part of the county. On site HazMats include water and sewer plants located in municipalities and the hospital in Oakland.</p>	Concerned
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<p>Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Because more than 70% of Garrett County's land surface is covered by forests, wildfire is a major concern. With 70,000 acres owned by the State of Maryland, the Department of Natural Resources takes a leading role in fire suppression throughout the county. All municipalities in Garrett County are near or adjacent to forest land or agricultural land. As urban development extends into these forest or brush covered lands the possibility of wild fire in urban areas increases as it does throughout the county.</p>	Somewhat Concerned
<p>Major Fire/Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. All municipalities in Garrett County share the threat of fire to residential, commercial or other structures. The municipalities of Oakland, Mt. Lake Park, Loch Lynn Hts, Deer Park and Kitzmiller which are near CSX rail lines face the threat of fire or explosion from a transportation incident while Friendsville and Grantsville have the possibility of a similar incident along I-68. Grantsville and Accident have a higher threat of fire to industrial because they are the only municipalities in the County with industrial or technological parks.</p>	Somewhat Concerned
<p>Hurricane - With its inland situation, Garrett County is not normally as affected by the high winds associated with the passage of a hurricane as a coastal community would be. However, hurricanes do still carry a lot of moisture over the mountainous terrain and the amount of runoff associated with the resulting precipitation can be deadly. Municipalities share the same concerns as the county. The towns of Friendsville and Kitzmiller face more danger from flooding associated with the remnants of a hurricane because of their floodplain location, while the towns of Accident and Grantsville are more susceptible to wind damage because of their exposed location on higher, more level ground.</p>	Not Concerned

	Level of Concern
Epidemics - Epidemics are characterized by an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. Epidemics may also take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service. An epidemic may also be a secondary effect from other disasters such as flooding, tornadoes, hurricanes, or hazmat incidents.	Not Concerned
Cyber Threat - Cyber threats to a control system refer to persons who attempt unauthorized access to a control system device and/or network using a data communications pathway. This access can be directed from within an organization by trusted users or from remote locations by unknown persons using the Internet. With more and more data accessible from anywhere in the world, passwords are not enough protection alone.	Somewhat Concerned

Page 3: Public Survey

Q4

Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)

Severe Winter Weather ,
High Winds,
Tornado,
Major Fire/Explosion,
Cyber Threat,
Transportation & On-Site HazMat

Q5

Are you concerned with any other hazards not identified in this survey?

Respondent skipped this question

Page 4: Public Survey

Q6

In terms of social vulnerability, do you feel that a specific group or groups in your municipality that are particularly at risk for or could be harmed by any of the hazards events listed in questions 4 or 5? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

Age,
Medical Issues and Disability

Q7

Severe Winter Weather

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

Page 5

Q8

**Work on improving the damage resistance of utilities
(electricity, communications, water/sewer, etc.)**

Which of the following mitigation project types do you believe should focused on to reduce disruptions of services and strengthen the community (check all that apply)?

Q9

In the last 10 years, has there been an evacuation from in your community as a result of a disaster (ex. flooding, power, water failure)? If so, how long were citizens displaced? Was a shelter setup?

no

Q10

Respondent skipped this question

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

Q11

Do you have any mitigation action items specific for your municipality for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

no

#4

COMPLETE

Collector: Web Link 1 (Web Link)
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Time Spent: 00:10:31
IP Address: 204.111.230.5

Page 1: Public Survey

Q1 Yes

Are you a resident of Garrett County?

Q2 Mountain Lake Park

Please select which community you are representing.

Page 2

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Severe Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. The northern and western areas of Maryland typically experience the most extreme winter weather and with the highest frequency of events. Winter storms in Garrett County are normally widespread and affect the municipalities in much the same way as they do the county in general. There are occasions when the northern towns, Accident, Friendsville and Grantsville, are affected more by "Lake Effect" snow than the other towns, but by and large, the towns are similar to the county in terms of winter storm effects.	Somewhat Concerned
Riverine Flooding - In Garrett County flooding is normally associated with rapid runoff from excessive rainfall or from rapid snowmelt or some combination of the two. Steep slopes, poor soil condition for retaining moisture and the geologic structure of the County make flooding more likely for a given amount of precipitation than would be the case in an area having mildly sloping terrain and good soil conditions. Of the eight municipalities in Garrett County, three are located within the floodplain of major streams, and five are located along the headwaters of streams but have floodplain areas within the town limits.	Somewhat Concerned
Thunderstorm - 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. Garrett County is affected by thunderstorm activity both by the interaction of warm and cool air masses and by the lifting of warm air as it passes over the Appalachian Plateau. Intense thunderstorms over the steep terrain in Garrett County result in rapid runoff, particularly in the headwaters of small stream basins.	Not Concerned
Major Transportation-Fog - Garrett County lies in the area of the eastern U. S. having the greatest number of dense fog days per year. According to the Department of Agriculture's "Climate and Man", most of the Appalachian Plateau has 30 or more dense fog days annually, but the Plateau area from central West Virginia to southern Pennsylvania has more than 50 dense fog days annually. Garrett County is prone to dense fog conditions in every season, but particularly so during winter and spring months when temperature inversions are common.	Concerned
High Wind -Garrett County is situated in the lower part of the westerly wind belt which extends from latitude 35 to latitude 60. Over time, prevailing winds in Garrett County are from the southwest in summer and the northwest in winter. Grantsville and Accident are more exposed to wind due to their location on high, nearly level land, whereas Friendsville and Kitzmiller are more protected from high winds due to their valley setting.	Somewhat Concerned
Tornado - 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. Even though Garrett County is located in mountainous terrain it still has been subjected to violent storms including tornadoes. Between 1950 and 1998 there were 8 reported touchdowns of tornadoes in the County.	Somewhat Concerned

Garrett County Hazard Mitigation Municipal Survey

	Level of Concern
<p>Soil Movement - The most common types of soil movement are the landslide and the slump. A landslide typically involves earth and rock that have been disturbed by some other action or loosened by moisture and slide downslope. A slump is similar but involves the slippage of a mass of earth and rock along a rotational axis (slip plane). Garrett County is underlain by layered sedimentary rocks that have been folded moderately. These rock units alternate between sandstone, shale and limestone. When exposed on steep slopes, normally the sandstone forms the cap rock at the top of the slope with shale or limestone lying underneath. When these weaker rocks are disturbed, the sandstone eventually fails and moves downslope. The slump type of soil movement is most common, particularly in road cuts and in strip mining operations. While these movements are not normally on a large scale, they do result in road blockage from time to time, particularly where narrow valley floors are shared by a stream and a road or railroad.</p>	Not Concer ned
<p>Transportation & On-Site HazMat - Historically, most HazMats moving through Garrett County have been on the CSX rail system and its predecessors, the Baltimore and Ohio Railroad, and the Western Maryland Railroad. Today, however, the bulk of hazardous materials pass through the county by truck, particularly on I-68, which crosses the northern part of the county from west to east. The municipalities most susceptible to transportation HazMat incidents include Friendsville and Grantsville, which are adjacent to I-68, and Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park which are near the CSX rail line that crosses the southern part of the county. On site HazMats include water and sewer plants located in municipalities and the hospital in Oakland.</p>	Concer ned
<p>Dam Failure - Dam failure refers to a collapse, overtopping, breaching or any related condition that causes downstream flooding. The largest dams in the county include the Savage River Dam, the Bloomington Dam on the Potomac River, and the Deep Creek Lake Dam. Smaller dams include the Piney Creek Dam and the New Germany Dam. The town of Kitzmiller is downstream from both the Stony River Dam and the Mt. Storm Dam. In addition, the town of Friendsville is located downstream from the Deep Creek Lake Dam. Finally, six flood control impoundments constructed by the Soil Conservation Service in the 1970's are located upstream of parts of Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park in the Little Youghiogeny Watershed</p>	Not Concer ned
<p>Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Because more than 70% of Garrett County's land surface is covered by forests, wildfire is a major concern. With 70,000 acres owned by the State of Maryland, the Department of Natural Resources takes a leading role in fire suppression throughout the county. All municipalities in Garrett County are near or adjacent to forest land or agricultural land. As urban development extends into these forest or brush covered lands the possibility of wild fire in urban areas increases as it does throughout the county.</p>	Somew hat Concer ned
<p>Major Fire/Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. All municipalities in Garrett County share the threat of fire to residential, commercial or other structures. The municipalities of Oakland, Mt. Lake Park, Loch Lynn Hts, Deer Park and Kitzmiller which are near CSX rail lines face the threat of fire or explosion from a transportation incident while Friendsville and Grantsville have the possibility of a similar incident along I-68. Grantsville and Accident have a higher threat of fire to industrial because they are the only municipalities in the County with industrial or technological parks.</p>	Somew hat Concer ned
<p>Hurricane - With its inland situation, Garrett County is not normally as affected by the high winds associated with the passage of a hurricane as a coastal community would be. However, hurricanes do still carry a lot of moisture over the mountainous terrain and the amount of runoff associated with the resulting precipitation can be deadly. Municipalities share the same concerns as the county. The towns of Friendsville and Kitzmiller face more danger from flooding associated with the remnants of a hurricane because of their floodplain location, while the towns of Accident and Grantsville are more susceptible to wind damage because of their exposed location on higher, more level ground.</p>	Somew hat Concer ned

	Level of Concern
Epidemics - Epidemics are characterized by an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. Epidemics may also take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service. An epidemic may also be a secondary effect from other disasters such as flooding, tornadoes, hurricanes, or hazmat incidents.	Somewhat Concerned
Cyber Threat - Cyber threats to a control system refer to persons who attempt unauthorized access to a control system device and/or network using a data communications pathway. This access can be directed from within an organization by trusted users or from remote locations by unknown persons using the Internet. With more and more data accessible from anywhere in the world, passwords are not enough protection alone.	Very Concerned

Page 3: Public Survey

Q4	Severe Winter Weather ,
Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)	High Winds,
	Major Fire/Explosion,
	Hurricane,
	Cyber Threat,
	Thunderstorm,
	Transportation & On-Site HazMat

Q5
Are you concerned with any other hazards not identified in this survey?
No

Page 4: Public Survey

Q6	Age,
In terms of social vulnerability, do you feel that a specific group or groups in your municipality that are particularly at risk for or could be harmed by any of the hazards events listed in questions 4 or 5? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.	Medical Issues and Disability

Q7

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

Severe Winter Weather,
Major Fire/Explosion,
High Winds,
Cyber Threat

Page 5

Q8

Which of the following mitigation project types do you believe should focused on to reduce disruptions of services and strengthen the community (check all that apply)?

Replace inadequate or vulnerable bridges ,
Retrofit infrastructure, such as elevating roadways and improving drainage systems
,
Provide better information about hazard risk and high-hazard areas
,
Assist vulnerable property owners with securing funding to mitigate impacts to their property

Q9

In the last 10 years, has there been an evacuation from in your community as a result of a disaster (ex. flooding, power, water failure)? If so, how long were citizens displaced? Was a shelter setup?

No

Q10

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

Keep a constant eye on dead and dying trees and those that have large dead limbs that can exacerbate hazards during storms and high winds.

Q11

Do you have any mitigation action items specific for your municipality for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

None specific for my community.

#5

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Friday, October 21, 2022 9:12:23 AM
Last Modified: Friday, October 21, 2022 9:17:43 AM
Time Spent: 00:05:19
IP Address: 167.102.88.139

Page 1: Public Survey

Q1 Yes
Are you a resident of Garrett County?

Q2 Grantsville
Please select which community you are representing.

Page 2

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Severe Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. The northern and western areas of Maryland typically experience the most extreme winter weather and with the highest frequency of events. Winter storms in Garrett County are normally widespread and affect the municipalities in much the same way as they do the county in general. There are occasions when the northern towns, Accident, Friendsville and Grantsville, are affected more by "Lake Effect" snow than the other towns, but by and large, the towns are similar to the county in terms of winter storm effects.	Very Concerned
Riverine Flooding - In Garrett County flooding is normally associated with rapid runoff from excessive rainfall or from rapid snowmelt or some combination of the two. Steep slopes, poor soil condition for retaining moisture and the geologic structure of the County make flooding more likely for a given amount of precipitation than would be the case in an area having mildly sloping terrain and good soil conditions. Of the eight municipalities in Garrett County, three are located within the floodplain of major streams, and five are located along the headwaters of streams but have floodplain areas within the town limits.	Somewhat Concerned
Thunderstorm - 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. Garrett County is affected by thunderstorm activity both by the interaction of warm and cool air masses and by the lifting of warm air as it passes over the Appalachian Plateau. Intense thunderstorms over the steep terrain in Garrett County result in rapid runoff, particularly in the headwaters of small stream basins.	Somewhat Concerned
Major Transportation-Fog - Garrett County lies in the area of the eastern U. S. having the greatest number of dense fog days per year. According to the Department of Agriculture's "Climate and Man", most of the Appalachian Plateau has 30 or more dense fog days annually, but the Plateau area from central West Virginia to southern Pennsylvania has more than 50 dense fog days annually. Garrett County is prone to dense fog conditions in every season, but particularly so during winter and spring months when temperature inversions are common.	Somewhat Concerned
High Wind -Garrett County is situated in the lower part of the westerly wind belt which extends from latitude 35 to latitude 60. Over time, prevailing winds in Garrett County are from the southwest in summer and the northwest in winter. Grantsville and Accident are more exposed to wind due to their location on high, nearly level land, whereas Friendsville and Kitzmiller are more protected from high winds due to their valley setting.	Very Concerned
Tornado - 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. Even though Garrett County is located in mountainous terrain it still has been subjected to violent storms including tornadoes. Between 1950 and 1998 there were 8 reported touchdowns of tornadoes in the County.	Not Concerned

Garrett County Hazard Mitigation Municipal Survey

	Level of Concern
<p>Soil Movement - The most common types of soil movement are the landslide and the slump. A landslide typically involves earth and rock that have been disturbed by some other action or loosened by moisture and slide downslope. A slump is similar but involves the slippage of a mass of earth and rock along a rotational axis (slip plane). Garrett County is underlain by layered sedimentary rocks that have been folded moderately. These rock units alternate between sandstone, shale and limestone. When exposed on steep slopes, normally the sandstone forms the cap rock at the top of the slope with shale or limestone lying underneath. When these weaker rocks are disturbed, the sandstone eventually fails and moves downslope. The slump type of soil movement is most common, particularly in road cuts and in strip mining operations. While these movements are not normally on a large scale, they do result in road blockage from time to time, particularly where narrow valley floors are shared by a stream and a road or railroad.</p>	Somew hat Concer ned
<p>Transportation & On-Site HazMat - Historically, most HazMats moving through Garrett County have been on the CSX rail system and its predecessors, the Baltimore and Ohio Railroad, and the Western Maryland Railroad. Today, however, the bulk of hazardous materials pass through the county by truck, particularly on I-68, which crosses the northern part of the county from west to east. The municipalities most susceptible to transportation HazMat incidents include Friendsville and Grantsville, which are adjacent to I-68, and Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park which are near the CSX rail line that crosses the southern part of the county. On site HazMats include water and sewer plants located in municipalities and the hospital in Oakland.</p>	Concer ned
<p>Dam Failure - Dam failure refers to a collapse, overtopping, breaching or any related condition that causes downstream flooding. The largest dams in the county include the Savage River Dam, the Bloomington Dam on the Potomac River, and the Deep Creek Lake Dam. Smaller dams include the Piney Creek Dam and the New Germany Dam. The town of Kitzmiller is downstream from both the Stony River Dam and the Mt. Storm Dam. In addition, the town of Friendsville is located downstream from the Deep Creek Lake Dam. Finally, six flood control impoundments constructed by the Soil Conservation Service in the 1970's are located upstream of parts of Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park in the Little Youghiogheny Watershed</p>	Not Concer ned
<p>Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Because more than 70% of Garrett County's land surface is covered by forests, wildfire is a major concern. With 70,000 acres owned by the State of Maryland, the Department of Natural Resources takes a leading role in fire suppression throughout the county. All municipalities in Garrett County are near or adjacent to forest land or agricultural land. As urban development extends into these forest or brush covered lands the possibility of wild fire in urban areas increases as it does throughout the county.</p>	Not Concer ned
<p>Major Fire/Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. All municipalities in Garrett County share the threat of fire to residential, commercial or other structures. The municipalities of Oakland, Mt. Lake Park, Loch Lynn Hts, Deer Park and Kitzmiller which are near CSX rail lines face the threat of fire or explosion from a transportation incident while Friendsville and Grantsville have the possibility of a similar incident along I-68. Grantsville and Accident have a higher threat of fire to industrial because they are the only municipalities in the County with industrial or technological parks.</p>	Somew hat Concer ned
<p>Hurricane - With its inland situation, Garrett County is not normally as affected by the high winds associated with the passage of a hurricane as a coastal community would be. However, hurricanes do still carry a lot of moisture over the mountainous terrain and the amount of runoff associated with the resulting precipitation can be deadly. Municipalities share the same concerns as the county. The towns of Friendsville and Kitzmiller face more danger from flooding associated with the remnants of a hurricane because of their floodplain location, while the towns of Accident and Grantsville are more susceptible to wind damage because of their exposed location on higher, more level ground.</p>	Not Concer ned

Epidemics - Epidemics are characterized by an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. Epidemics may also take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service. An epidemic may also be a secondary effect from other disasters such as flooding, tornadoes, hurricanes, or hazmat incidents.

**Very
Concer
ned**

Cyber Threat - Cyber threats to a control system refer to persons who attempt unauthorized access to a control system device and/or network using a data communications pathway. This access can be directed from within an organization by trusted users or from remote locations by unknown persons using the Internet. With more and more data accessible from anywhere in the world, passwords are not enough protection alone.

**Very
Concer
ned**

Page 3: Public Survey

Q4

Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)

**Severe Winter Weather ,
High Winds,
Major Fire/Explosion,
Thunderstorm,
Transportation & On-Site HazMat,
Epidemics**

Q5

Are you concerned with any other hazards not identified in this survey?

Respondent skipped this question

Page 4: Public Survey

Q6

In terms of social vulnerability, do you feel that a specific group or groups in your municipality that are particularly at risk for or could be harmed by any of the hazards events listed in questions 4 or 5? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

Age

Q7

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

Severe Winter Weather,
Major Fire/Explosion,
High Winds,
Epidemics,
Thunderstorm,
Transportation & On-Site HazMat

Page 5

Q8

Which of the following mitigation project types do you believe should focused on to reduce disruptions of services and strengthen the community (check all that apply)?

Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.
,
Work on improving the damage resistance of utilities (electricity, communications, water/sewer, etc.)
,
Inform property owners of ways they can mitigate damage to their property
,
Assist vulnerable property owners with securing funding to mitigate impacts to their property

Q9

In the last 10 years, has there been an evacuation from in your community as a result of a disaster (ex. flooding, power, water failure)? If so, how long were citizens displaced? Was a shelter setup?

Power outages during winter wind and snow events are most devastating. With an elderly population this is very concerning. The fire department has a warming station that was recently set up so things are actually better than before.

Q10

Respondent skipped this question

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

Q11

Respondent skipped this question

Do you have any mitigation action items specific for your municipality for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

#6

INCOMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, January 23, 2023 11:32:57 AM
Last Modified: Monday, January 23, 2023 11:33:13 AM
Time Spent: 00:00:15
IP Address: 167.102.88.139

Page 1: Public Survey

Q1 Yes

Are you a resident of Garrett County?

Q2 Grantsville

Please select which community you are representing.

Page 2

Q3 Respondent skipped this question

Please indicate your level of concern for each hazard using the drop down menu.

Page 3: Public Survey

Q4 Respondent skipped this question

Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)

Q5 Respondent skipped this question

Are you concerned with any other hazards not identified in this survey?

Page 4: Public Survey

Q6

Respondent skipped this question

In terms of social vulnerability, do you feel that a specific group or groups in your municipality that are particularly at risk for or could be harmed by any of the hazards events listed in questions 4 or 5? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

Q7

Respondent skipped this question

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

Page 5

Q8

Respondent skipped this question

Which of the following mitigation project types do you believe should focused on to reduce disruptions of services and strengthen the community (check all that apply)?

Q9

Respondent skipped this question

In the last 10 years, has there been an evacuation from in your community as a result of a disaster (ex. flooding, power, water failure)? If so, how long were citizens displaced? Was a shelter setup?

Q10

Respondent skipped this question

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

Q11

Respondent skipped this question

Do you have any mitigation action items specific for your municipality for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

#7

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, March 02, 2023 9:48:57 AM
Last Modified: Thursday, March 02, 2023 9:55:29 AM
Time Spent: 00:06:32
IP Address: 137.103.140.170

Page 1: Public Survey

Q1 Yes
Are you a resident of Garrett County?

Q2 Kitzmiller
Please select which community you are representing.

Page 2

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Severe Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. The northern and western areas of Maryland typically experience the most extreme winter weather and with the highest frequency of events. Winter storms in Garrett County are normally widespread and affect the municipalities in much the same way as they do the county in general. There are occasions when the northern towns, Accident, Friendsville and Grantsville, are affected more by "Lake Effect" snow than the other towns, but by and large, the towns are similar to the county in terms of winter storm effects.	Concerned
Riverine Flooding - In Garrett County flooding is normally associated with rapid runoff from excessive rainfall or from rapid snowmelt or some combination of the two. Steep slopes, poor soil condition for retaining moisture and the geologic structure of the County make flooding more likely for a given amount of precipitation than would be the case in an area having mildly sloping terrain and good soil conditions. Of the eight municipalities in Garrett County, three are located within the floodplain of major streams, and five are located along the headwaters of streams but have floodplain areas within the town limits.	Very Concerned
Thunderstorm - 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. Garrett County is affected by thunderstorm activity both by the interaction of warm and cool air masses and by the lifting of warm air as it passes over the Appalachian Plateau. Intense thunderstorms over the steep terrain in Garrett County result in rapid runoff, particularly in the headwaters of small stream basins.	Concerned
Major Transportation-Fog - Garrett County lies in the area of the eastern U. S. having the greatest number of dense fog days per year. According to the Department of Agriculture's "Climate and Man", most of the Appalachian Plateau has 30 or more dense fog days annually, but the Plateau area from central West Virginia to southern Pennsylvania has more than 50 dense fog days annually. Garrett County is prone to dense fog conditions in every season, but particularly so during winter and spring months when temperature inversions are common.	Very Concerned
High Wind -Garrett County is situated in the lower part of the westerly wind belt which extends from latitude 35 to latitude 60. Over time, prevailing winds in Garrett County are from the southwest in summer and the northwest in winter. Grantsville and Accident are more exposed to wind due to their location on high, nearly level land, whereas Friendsville and Kitzmiller are more protected from high winds due to their valley setting.	Somewhat Concerned
Tornado - 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. Even though Garrett County is located in mountainous terrain it still has been subjected to violent storms including tornadoes. Between 1950 and 1998 there were 8 reported touchdowns of tornadoes in the County.	Somewhat Concerned

Garrett County Hazard Mitigation Municipal Survey

	Level of Concern
<p>Soil Movement - The most common types of soil movement are the landslide and the slump. A landslide typically involves earth and rock that have been disturbed by some other action or loosened by moisture and slide downslope. A slump is similar but involves the slippage of a mass of earth and rock along a rotational axis (slip plane). Garrett County is underlain by layered sedimentary rocks that have been folded moderately. These rock units alternate between sandstone, shale and limestone. When exposed on steep slopes, normally the sandstone forms the cap rock at the top of the slope with shale or limestone lying underneath. When these weaker rocks are disturbed, the sandstone eventually fails and moves downslope. The slump type of soil movement is most common, particularly in road cuts and in strip mining operations. While these movements are not normally on a large scale, they do result in road blockage from time to time, particularly where narrow valley floors are shared by a stream and a road or railroad.</p>	Concerned
<p>Transportation & On-Site HazMat - Historically, most HazMats moving through Garrett County have been on the CSX rail system and its predecessors, the Baltimore and Ohio Railroad, and the Western Maryland Railroad. Today, however, the bulk of hazardous materials pass through the county by truck, particularly on I-68, which crosses the northern part of the county from west to east. The municipalities most susceptible to transportation HazMat incidents include Friendsville and Grantsville, which are adjacent to I-68, and Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park which are near the CSX rail line that crosses the southern part of the county. On site HazMats include water and sewer plants located in municipalities and the hospital in Oakland.</p>	Concerned
<p>Dam Failure - Dam failure refers to a collapse, overtopping, breaching or any related condition that causes downstream flooding. The largest dams in the county include the Savage River Dam, the Bloomington Dam on the Potomac River, and the Deep Creek Lake Dam. Smaller dams include the Piney Creek Dam and the New Germany Dam. The town of Kitzmiller is downstream from both the Stony River Dam and the Mt. Storm Dam. In addition, the town of Friendsville is located downstream from the Deep Creek Lake Dam. Finally, six flood control impoundments constructed by the Soil Conservation Service in the 1970's are located upstream of parts of Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park in the Little Youghiogeny Watershed</p>	Very Concerned
<p>Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Because more than 70% of Garrett County's land surface is covered by forests, wildfire is a major concern. With 70,000 acres owned by the State of Maryland, the Department of Natural Resources takes a leading role in fire suppression throughout the county. All municipalities in Garrett County are near or adjacent to forest land or agricultural land. As urban development extends into these forest or brush covered lands the possibility of wild fire in urban areas increases as it does throughout the county.</p>	Very Concerned
<p>Major Fire/Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. All municipalities in Garrett County share the threat of fire to residential, commercial or other structures. The municipalities of Oakland, Mt. Lake Park, Loch Lynn Hts, Deer Park and Kitzmiller which are near CSX rail lines face the threat of fire or explosion from a transportation incident while Friendsville and Grantsville have the possibility of a similar incident along I-68. Grantsville and Accident have a higher threat of fire to industrial because they are the only municipalities in the County with industrial or technological parks.</p>	Very Concerned
<p>Hurricane - With its inland situation, Garrett County is not normally as affected by the high winds associated with the passage of a hurricane as a coastal community would be. However, hurricanes do still carry a lot of moisture over the mountainous terrain and the amount of runoff associated with the resulting precipitation can be deadly. Municipalities share the same concerns as the county. The towns of Friendsville and Kitzmiller face more danger from flooding associated with the remnants of a hurricane because of their floodplain location, while the towns of Accident and Grantsville are more susceptible to wind damage because of their exposed location on higher, more level ground.</p>	Very Concerned

Epidemics - Epidemics are characterized by an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. Epidemics may also take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service. An epidemic may also be a secondary effect from other disasters such as flooding, tornadoes, hurricanes, or hazmat incidents.

**Very
Concer
ned**

Cyber Threat - Cyber threats to a control system refer to persons who attempt unauthorized access to a control system device and/or network using a data communications pathway. This access can be directed from within an organization by trusted users or from remote locations by unknown persons using the Internet. With more and more data accessible from anywhere in the world, passwords are not enough protection alone.

**Concer
ned**

Page 3: Public Survey

Q4

Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)

**Riverine Flooding,
Dam Failure,
Major Fire/Explosion,
Thunderstorm,
Soil Movement**

Q5

Are you concerned with any other hazards not identified in this survey?

Respondent skipped this question

Page 4: Public Survey

Q6

In terms of social vulnerability, do you feel that a specific group or groups in your municipality that are particularly at risk for or could be harmed by any of the hazards events listed in questions 4 or 5? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

**Age,
Medical Issues and Disability**

Q7

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

**Major Fire/Explosion,
Riverine Flooding,
Dam Failure**

Page 5

Q8

Which of the following mitigation project types do you believe should focused on to reduce disruptions of services and strengthen the community (check all that apply)?

Work on improving the damage resistance of utilities (electricity, communications, water/sewer, etc.)

,

Provide better information about hazard risk and high-hazard areas

Q9

In the last 10 years, has there been an evacuation from in your community as a result of a disaster (ex. flooding, power, water failure)? If so, how long were citizens displaced? Was a shelter setup?

it was not Kitzmiller but right above in Shallmar and yes a shelter was set up at the KVFD.

Q10

Respondent skipped this question

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

Q11

Respondent skipped this question

Do you have any mitigation action items specific for your municipality for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

#8

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, March 02, 2023 12:28:27 PM
Last Modified: Thursday, March 02, 2023 1:13:16 PM
Time Spent: 00:44:49
IP Address: 50.222.103.250

Page 1: Public Survey

Q1 Yes
Are you a resident of Garrett County?

Q2 Friendsville
Please select which community you are representing.

Page 2

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Severe Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. The northern and western areas of Maryland typically experience the most extreme winter weather and with the highest frequency of events. Winter storms in Garrett County are normally widespread and affect the municipalities in much the same way as they do the county in general. There are occasions when the northern towns, Accident, Friendsville and Grantsville, are affected more by "Lake Effect" snow than the other towns, but by and large, the towns are similar to the county in terms of winter storm effects.	Somewhat Concerned
Riverine Flooding - In Garrett County flooding is normally associated with rapid runoff from excessive rainfall or from rapid snowmelt or some combination of the two. Steep slopes, poor soil condition for retaining moisture and the geologic structure of the County make flooding more likely for a given amount of precipitation than would be the case in an area having mildly sloping terrain and good soil conditions. Of the eight municipalities in Garrett County, three are located within the floodplain of major streams, and five are located along the headwaters of streams but have floodplain areas within the town limits.	Very Concerned
Thunderstorm - 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. Garrett County is affected by thunderstorm activity both by the interaction of warm and cool air masses and by the lifting of warm air as it passes over the Appalachian Plateau. Intense thunderstorms over the steep terrain in Garrett County result in rapid runoff, particularly in the headwaters of small stream basins.	Somewhat Concerned
Major Transportation-Fog - Garrett County lies in the area of the eastern U. S. having the greatest number of dense fog days per year. According to the Department of Agriculture's "Climate and Man", most of the Appalachian Plateau has 30 or more dense fog days annually, but the Plateau area from central West Virginia to southern Pennsylvania has more than 50 dense fog days annually. Garrett County is prone to dense fog conditions in every season, but particularly so during winter and spring months when temperature inversions are common.	Not Concerned
High Wind -Garrett County is situated in the lower part of the westerly wind belt which extends from latitude 35 to latitude 60. Over time, prevailing winds in Garrett County are from the southwest in summer and the northwest in winter. Grantsville and Accident are more exposed to wind due to their location on high, nearly level land, whereas Friendsville and Kitzmiller are more protected from high winds due to their valley setting.	Somewhat Concerned
Tornado - 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. Even though Garrett County is located in mountainous terrain it still has been subjected to violent storms including tornadoes. Between 1950 and 1998 there were 8 reported touchdowns of tornadoes in the County.	

Garrett County Hazard Mitigation Municipal Survey

	Level of Concern
<p>Soil Movement - The most common types of soil movement are the landslide and the slump. A landslide typically involves earth and rock that have been disturbed by some other action or loosened by moisture and slide downslope. A slump is similar but involves the slippage of a mass of earth and rock along a rotational axis (slip plane). Garrett County is underlain by layered sedimentary rocks that have been folded moderately. These rock units alternate between sandstone, shale and limestone. When exposed on steep slopes, normally the sandstone forms the cap rock at the top of the slope with shale or limestone lying underneath. When these weaker rocks are disturbed, the sandstone eventually fails and moves downslope. The slump type of soil movement is most common, particularly in road cuts and in strip mining operations. While these movements are not normally on a large scale, they do result in road blockage from time to time, particularly where narrow valley floors are shared by a stream and a road or railroad.</p>	Concerned
<p>Transportation & On-Site HazMat - Historically, most HazMats moving through Garrett County have been on the CSX rail system and its predecessors, the Baltimore and Ohio Railroad, and the Western Maryland Railroad. Today, however, the bulk of hazardous materials pass through the county by truck, particularly on I-68, which crosses the northern part of the county from west to east. The municipalities most susceptible to transportation HazMat incidents include Friendsville and Grantsville, which are adjacent to I-68, and Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park which are near the CSX rail line that crosses the southern part of the county. On site HazMats include water and sewer plants located in municipalities and the hospital in Oakland.</p>	Very Concerned
<p>Dam Failure - Dam failure refers to a collapse, overtopping, breaching or any related condition that causes downstream flooding. The largest dams in the county include the Savage River Dam, the Bloomington Dam on the Potomac River, and the Deep Creek Lake Dam. Smaller dams include the Piney Creek Dam and the New Germany Dam. The town of Kitzmiller is downstream from both the Stony River Dam and the Mt. Storm Dam. In addition, the town of Friendsville is located downstream from the Deep Creek Lake Dam. Finally, six flood control impoundments constructed by the Soil Conservation Service in the 1970's are located upstream of parts of Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park in the Little Youghiogheny Watershed</p>	Very Concerned
<p>Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Because more than 70% of Garrett County's land surface is covered by forests, wildfire is a major concern. With 70,000 acres owned by the State of Maryland, the Department of Natural Resources takes a leading role in fire suppression throughout the county. All municipalities in Garrett County are near or adjacent to forest land or agricultural land. As urban development extends into these forest or brush covered lands the possibility of wild fire in urban areas increases as it does throughout the county.</p>	Concerned
<p>Major Fire/Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. All municipalities in Garrett County share the threat of fire to residential, commercial or other structures. The municipalities of Oakland, Mt. Lake Park, Loch Lynn Hts, Deer Park and Kitzmiller which are near CSX rail lines face the threat of fire or explosion from a transportation incident while Friendsville and Grantsville have the possibility of a similar incident along I-68. Grantsville and Accident have a higher threat of fire to industrial because they are the only municipalities in the County with industrial or technological parks.</p>	Very Concerned
<p>Hurricane - With its inland situation, Garrett County is not normally as affected by the high winds associated with the passage of a hurricane as a coastal community would be. However, hurricanes do still carry a lot of moisture over the mountainous terrain and the amount of runoff associated with the resulting precipitation can be deadly. Municipalities share the same concerns as the county. The towns of Friendsville and Kitzmiller face more danger from flooding associated with the remnants of a hurricane because of their floodplain location, while the towns of Accident and Grantsville are more susceptible to wind damage because of their exposed location on higher, more level ground.</p>	Very Concerned

	Level of Concern
Epidemics - Epidemics are characterized by an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. Epidemics may also take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service. An epidemic may also be a secondary effect from other disasters such as flooding, tornadoes, hurricanes, or hazmat incidents.	Concerned
Cyber Threat - Cyber threats to a control system refer to persons who attempt unauthorized access to a control system device and/or network using a data communications pathway. This access can be directed from within an organization by trusted users or from remote locations by unknown persons using the Internet. With more and more data accessible from anywhere in the world, passwords are not enough protection alone.	Concerned

Page 3: Public Survey

Q4

Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)

**Severe Winter Weather ,
Riverine Flooding,
Tornado,
Dam Failure,
Major Fire/Explosion,
Hurricane,
Transportation & On-Site HazMat,
Wildfire**

Q5

Respondent skipped this question

Are you concerned with any other hazards not identified in this survey?

Page 4: Public Survey

Q6

Medical Issues and Disability

In terms of social vulnerability, do you feel that a specific group or groups in your municipality that are particularly at risk for or could be harmed by any of the hazards events listed in questions 4 or 5? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

Q7

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

**Major Fire/Explosion,
Wildfires**

Page 5

Q8

Which of the following mitigation project types do you believe should focused on to reduce disruptions of services and strengthen the community (check all that apply)?

Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.
,
Work on improving the damage resistance of utilities (electricity, communications, water/sewer, etc.)
,
Provide better information about hazard risk and high-hazard areas
,
Inform property owners of ways they can mitigate damage to their property
,
Assist vulnerable property owners with securing funding to mitigate impacts to their property

Q9

In the last 10 years, has there been an evacuation from in your community as a result of a disaster (ex. flooding, power, water failure)? If so, how long were citizens displaced? Was a shelter setup?

No Evacuations

Q10

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

The State and the County already have good plans in place. Unfortunately, we do not receive good radio service to let individuals know of a concern.

Q11

Respondent skipped this question

Do you have any mitigation action items specific for your municipality for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

#9

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Friday, March 17, 2023 9:08:03 AM
Last Modified: Friday, March 17, 2023 9:21:16 AM
Time Spent: 00:13:12
IP Address: 204.111.173.231

Page 1: Public Survey

Q1 Yes

Are you a resident of Garrett County?

Q2 Deer Park

Please select which community you are representing.

Page 2

Q3

Please indicate your level of concern for each hazard using the drop down menu.

	Level of Concern
Severe Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. The northern and western areas of Maryland typically experience the most extreme winter weather and with the highest frequency of events. Winter storms in Garrett County are normally widespread and affect the municipalities in much the same way as they do the county in general. There are occasions when the northern towns, Accident, Friendsville and Grantsville, are affected more by "Lake Effect" snow than the other towns, but by and large, the towns are similar to the county in terms of winter storm effects.	Somewhat Concerned
Riverine Flooding - In Garrett County flooding is normally associated with rapid runoff from excessive rainfall or from rapid snowmelt or some combination of the two. Steep slopes, poor soil condition for retaining moisture and the geologic structure of the County make flooding more likely for a given amount of precipitation than would be the case in an area having mildly sloping terrain and good soil conditions. Of the eight municipalities in Garrett County, three are located within the floodplain of major streams, and five are located along the headwaters of streams but have floodplain areas within the town limits.	Somewhat Concerned
Thunderstorm - 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. Garrett County is affected by thunderstorm activity both by the interaction of warm and cool air masses and by the lifting of warm air as it passes over the Appalachian Plateau. Intense thunderstorms over the steep terrain in Garrett County result in rapid runoff, particularly in the headwaters of small stream basins.	Somewhat Concerned
Major Transportation-Fog - Garrett County lies in the area of the eastern U. S. having the greatest number of dense fog days per year. According to the Department of Agriculture's "Climate and Man", most of the Appalachian Plateau has 30 or more dense fog days annually, but the Plateau area from central West Virginia to southern Pennsylvania has more than 50 dense fog days annually. Garrett County is prone to dense fog conditions in every season, but particularly so during winter and spring months when temperature inversions are common.	Concerned
High Wind -Garrett County is situated in the lower part of the westerly wind belt which extends from latitude 35 to latitude 60. Over time, prevailing winds in Garrett County are from the southwest in summer and the northwest in winter. Grantsville and Accident are more exposed to wind due to their location on high, nearly level land, whereas Friendsville and Kitzmiller are more protected from high winds due to their valley setting.	Somewhat Concerned
Tornado - 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. Even though Garrett County is located in mountainous terrain it still has been subjected to violent storms including tornadoes. Between 1950 and 1998 there were 8 reported touchdowns of tornadoes in the County.	Concerned

Garrett County Hazard Mitigation Municipal Survey

	Level of Concern
<p>Soil Movement - The most common types of soil movement are the landslide and the slump. A landslide typically involves earth and rock that have been disturbed by some other action or loosened by moisture and slide downslope. A slump is similar but involves the slippage of a mass of earth and rock along a rotational axis (slip plane). Garrett County is underlain by layered sedimentary rocks that have been folded moderately. These rock units alternate between sandstone, shale and limestone. When exposed on steep slopes, normally the sandstone forms the cap rock at the top of the slope with shale or limestone lying underneath. When these weaker rocks are disturbed, the sandstone eventually fails and moves downslope. The slump type of soil movement is most common, particularly in road cuts and in strip mining operations. While these movements are not normally on a large scale, they do result in road blockage from time to time, particularly where narrow valley floors are shared by a stream and a road or railroad.</p>	Somewhat Concerned
<p>Transportation & On-Site HazMat - Historically, most HazMats moving through Garrett County have been on the CSX rail system and its predecessors, the Baltimore and Ohio Railroad, and the Western Maryland Railroad. Today, however, the bulk of hazardous materials pass through the county by truck, particularly on I-68, which crosses the northern part of the county from west to east. The municipalities most susceptible to transportation HazMat incidents include Friendsville and Grantsville, which are adjacent to I-68, and Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park which are near the CSX rail line that crosses the southern part of the county. On site HazMats include water and sewer plants located in municipalities and the hospital in Oakland.</p>	Very Concerned
<p>Dam Failure - Dam failure refers to a collapse, overtopping, breaching or any related condition that causes downstream flooding. The largest dams in the county include the Savage River Dam, the Bloomington Dam on the Potomac River, and the Deep Creek Lake Dam. Smaller dams include the Piney Creek Dam and the New Germany Dam. The town of Kitzmiller is downstream from both the Stony River Dam and the Mt. Storm Dam. In addition, the town of Friendsville is located downstream from the Deep Creek Lake Dam. Finally, six flood control impoundments constructed by the Soil Conservation Service in the 1970's are located upstream of parts of Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park in the Little Youghiogheny Watershed</p>	Somewhat Concerned
<p>Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Because more than 70% of Garrett County's land surface is covered by forests, wildfire is a major concern. With 70,000 acres owned by the State of Maryland, the Department of Natural Resources takes a leading role in fire suppression throughout the county. All municipalities in Garrett County are near or adjacent to forest land or agricultural land. As urban development extends into these forest or brush covered lands the possibility of wild fire in urban areas increases as it does throughout the county.</p>	Concerned
<p>Major Fire/Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. All municipalities in Garrett County share the threat of fire to residential, commercial or other structures. The municipalities of Oakland, Mt. Lake Park, Loch Lynn Hts, Deer Park and Kitzmiller which are near CSX rail lines face the threat of fire or explosion from a transportation incident while Friendsville and Grantsville have the possibility of a similar incident along I-68. Grantsville and Accident have a higher threat of fire to industrial because they are the only municipalities in the County with industrial or technological parks.</p>	Concerned
<p>Hurricane - With its inland situation, Garrett County is not normally as affected by the high winds associated with the passage of a hurricane as a coastal community would be. However, hurricanes do still carry a lot of moisture over the mountainous terrain and the amount of runoff associated with the resulting precipitation can be deadly. Municipalities share the same concerns as the county. The towns of Friendsville and Kitzmiller face more danger from flooding associated with the remnants of a hurricane because of their floodplain location, while the towns of Accident and Grantsville are more susceptible to wind damage because of their exposed location on higher, more level ground.</p>	Somewhat Concerned

Epidemics - Epidemics are characterized by an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. Epidemics may also take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service. An epidemic may also be a secondary effect from other disasters such as flooding, tornadoes, hurricanes, or hazmat incidents.

**Concer
ned**

Cyber Threat - Cyber threats to a control system refer to persons who attempt unauthorized access to a control system device and/or network using a data communications pathway. This access can be directed from within an organization by trusted users or from remote locations by unknown persons using the Internet. With more and more data accessible from anywhere in the world, passwords are not enough protection alone.

**Concer
ned**

Page 3: Public Survey

Q4

Please choose from the below list to indicate which hazard events you feel may particularly affect your community. (Please check all that apply.)

**Severe Winter Weather ,
Riverine Flooding,
High Winds,
Tornado,
Major Fire/Explosion,
Transportation & On-Site HazMat,
Wildfire**

Q5

Are you concerned with any other hazards not identified in this survey?

Railroad which is mentioned, however is the biggest concern!

Page 4: Public Survey

Q6

In terms of social vulnerability, do you feel that a specific group or groups in your municipality that are particularly at risk for or could be harmed by any of the hazards events listed in questions 4 or 5? This could be due to age, location, occupation etc. This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.

**Age,
Medical Issues and Disability**

Q7

Based on the group(s) you have selected in the previous question, please select which hazard events you feel may particularly affect those group? (Multiple options may be chosen.)

Severe Winter Weather,
Tornado,
Major Fire/Explosion,
Hurricane,
Epidemics,
Cyber Threat,
Riverine Flooding,
Transportation & On-Site HazMat

Page 5

Q8

Which of the following mitigation project types do you believe should focused on to reduce disruptions of services and strengthen the community (check all that apply)?

Replace inadequate or vulnerable bridges ,
Retrofit infrastructure, such as elevating roadways and improving drainage systems
,
Work on improving the damage resistance of utilities (electricity, communications, water/sewer, etc.)
,
Provide better information about hazard risk and high-hazard areas

Q9

In the last 10 years, has there been an evacuation from in your community as a result of a disaster (ex. flooding, power, water failure)? If so, how long were citizens displaced? Was a shelter setup?

No

Q10

In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

Communication

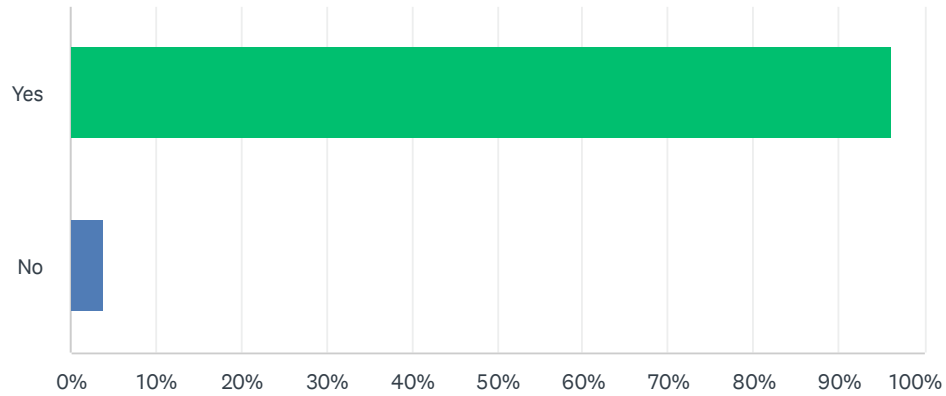
Q11

Respondent skipped this question

Do you have any mitigation action items specific for your municipality for inclusion in the 2022 Plans? If so, please provide action item and provide details, as available.

Q1 Are you a resident of Garrett County?

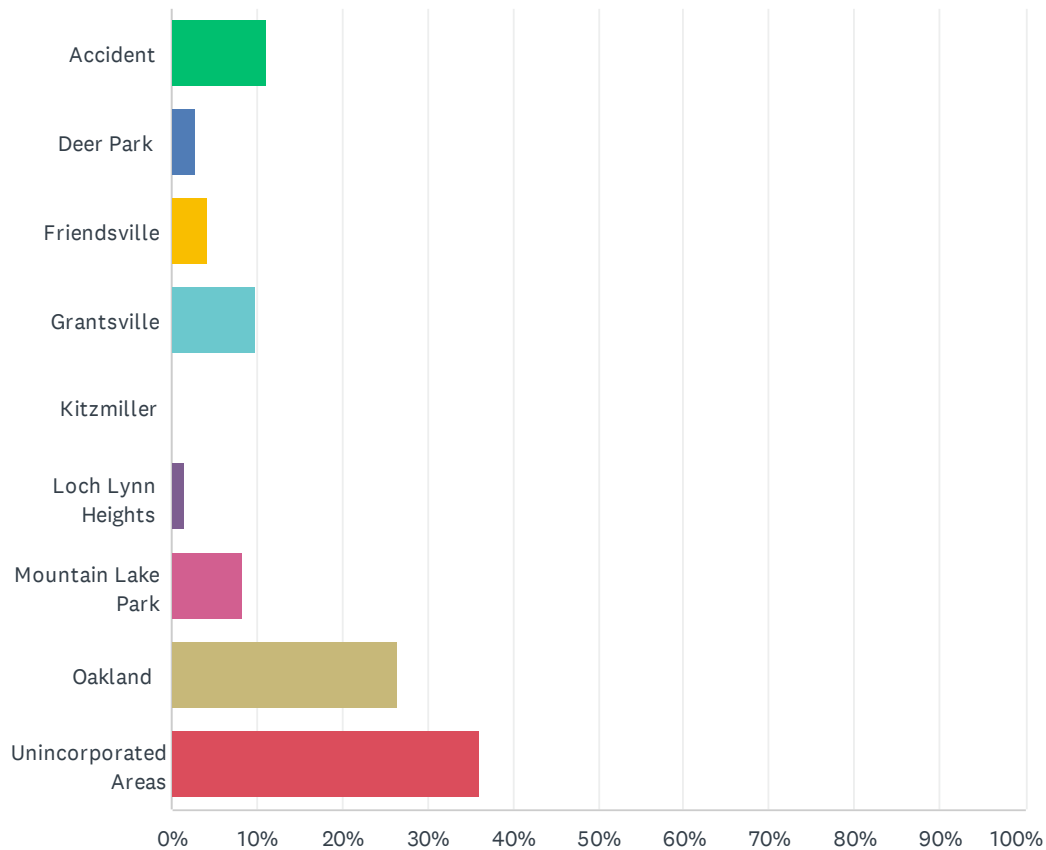
Answered: 77 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	96.10%	74
No	3.90%	3
TOTAL		77

Q2 Please provide the community where you currently live.

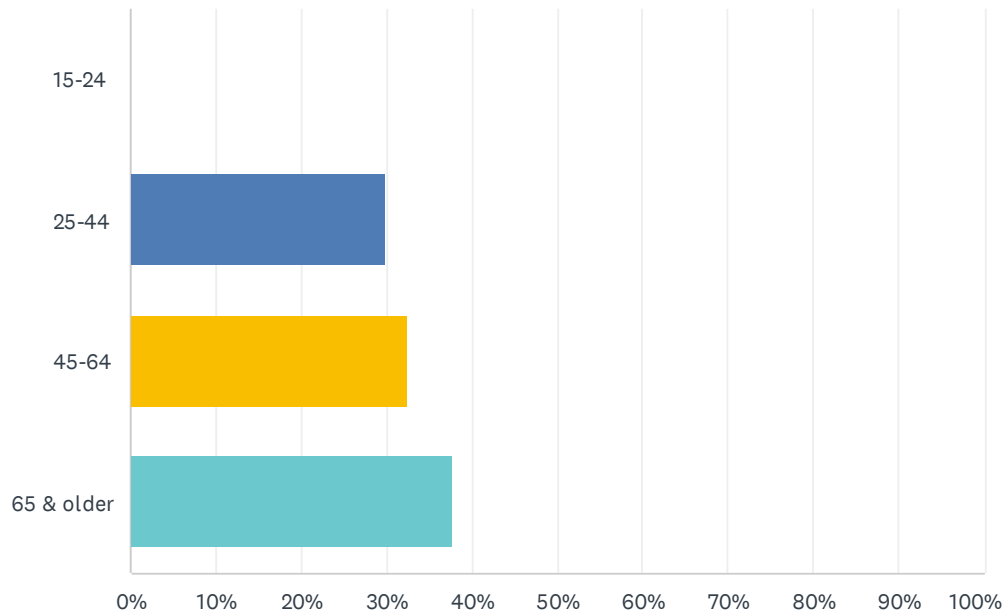
Answered: 72 Skipped: 5



ANSWER CHOICES	RESPONSES	
Accident	11.11%	8
Deer Park	2.78%	2
Friendsville	4.17%	3
Grantsville	9.72%	7
Kitzmiller	0.00%	0
Loch Lynn Heights	1.39%	1
Mountain Lake Park	8.33%	6
Oakland	26.39%	19
Unincorporated Areas	36.11%	26
TOTAL		72

Q3 What age group do you belong?

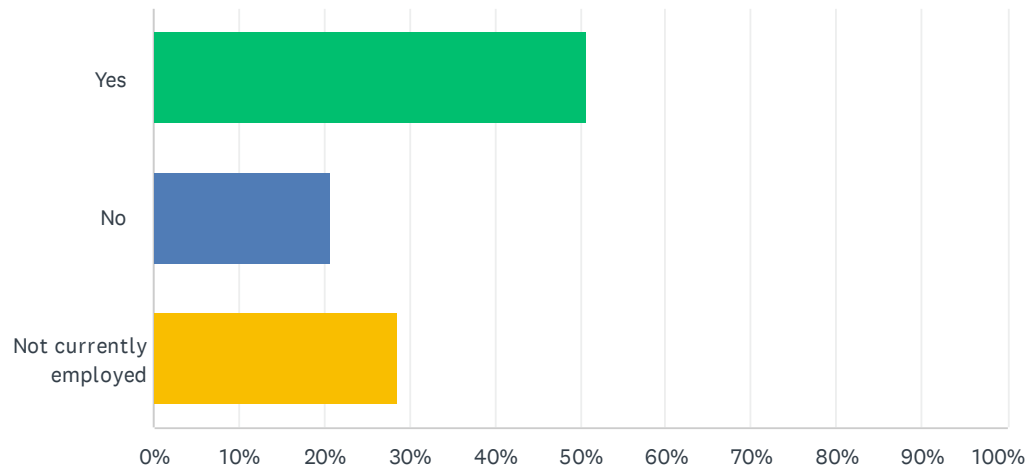
Answered: 77 Skipped: 0



ANSWER CHOICES	RESPONSES	
15-24	0.00%	0
25-44	29.87%	23
45-64	32.47%	25
65 & older	37.66%	29
TOTAL		77

Q4 Do you work in Garrett County?

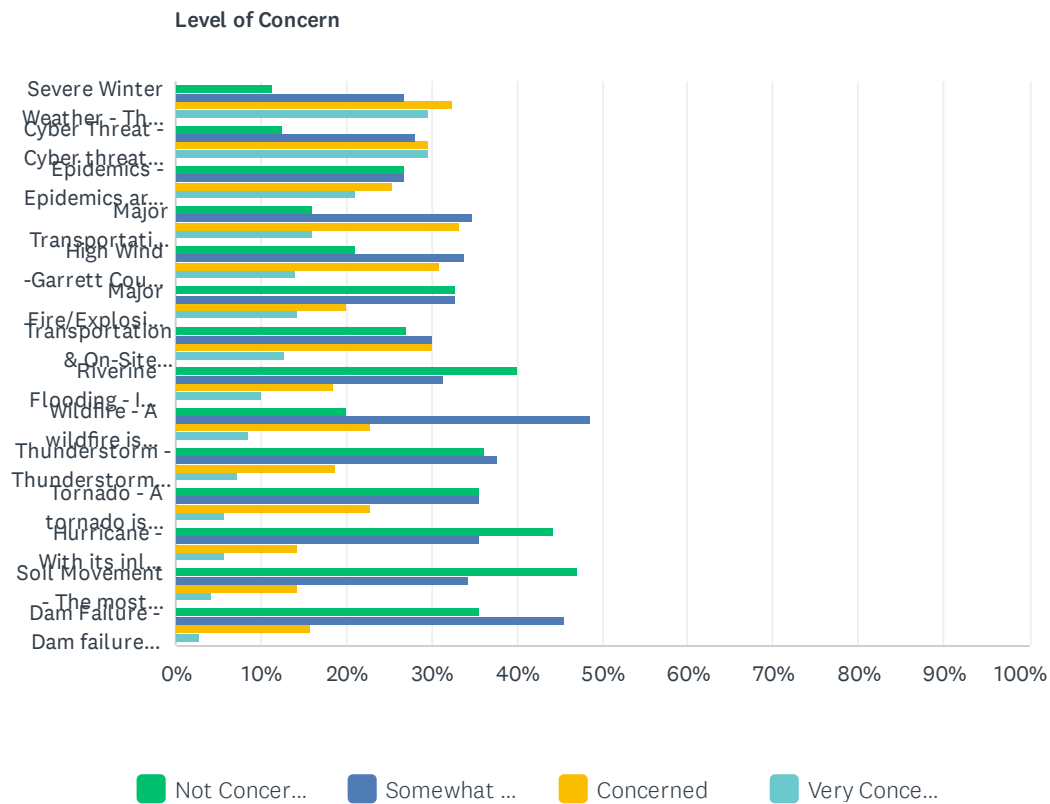
Answered: 77 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	50.65%	39
No	20.78%	16
Not currently employed	28.57%	22
TOTAL		77

Q5 Please indicate your level of concern for each hazard using the drop down menu.

Answered: 71 Skipped: 6



Garrett County Hazard Mitigation Plan Public Survey

Level of Concern					
	NOT CONCERNED	SOMEWHAT CONCERNED	CONCERNED	VERY CONCERNED	TOTAL
Severe Winter Weather - The typical winter storm in Maryland usually brings heavy snowfall (6+ inches), sleet or freezing rain accompanied by cold temperatures and occasionally high winds. The northern and western areas of Maryland typically experience the most extreme winter weather and with the highest frequency of events. Winter storms in Garrett County are normally widespread and affect the municipalities in much the same way as they do the county in general. There are occasions when the northern towns, Accident, Friendsville and Grantsville, are affected more by "Lake Effect" snow than the other towns, but by and large, the towns are similar to the county in terms of winter storm effects.	11.27% 8	26.76% 19	32.39% 23	29.58% 21	71
Cyber Threat - Cyber threats to a control system refer to persons who attempt unauthorized access to a control system device and/or network using a data communications pathway. This access can be directed from within an organization by trusted users or from remote locations by unknown persons using the Internet. With more and more data accessible from anywhere in the world, passwords are not enough protection alone.	12.68% 9	28.17% 20	29.58% 21	29.58% 21	71
Epidemics - Epidemics are characterized by an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. Epidemics may also take the form of large scale incidents of food or water contamination, infestations of disease bearing insects or rodents, or extended periods without adequate water or sewer service. An epidemic may also be a secondary effect from other disasters such as flooding, tornadoes, hurricanes, or hazmat incidents.	26.76% 19	26.76% 19	25.35% 18	21.13% 15	71
Major Transportation-Fog - Garrett County lies in the area of the eastern U. S. having the greatest number of dense fog days per year. According to the Department of Agriculture's "Climate and Man", most of the Appalachian Plateau has 30 or more dense fog days annually, but the Plateau area from central West Virginia to southern Pennsylvania has more than 50 dense fog days annually. Garrett County is prone to dense fog conditions in every season, but particularly so during winter and spring months when temperature inversions are common.	15.94% 11	34.78% 24	33.33% 23	15.94% 11	69
High Wind -Garrett County is situated in the lower part of the westerly wind belt which extends from latitude 35 to latitude 60. Over time, prevailing winds in Garrett County are from the southwest in summer and the northwest in winter. Grantsville and Accident are more exposed to wind due to their location on high, nearly level land, whereas Friendsville and Kitzmiller are more protected from high winds due to their valley setting.	21.13% 15	33.80% 24	30.99% 22	14.08% 10	71
Major Fire/Explosion - Fire/explosion refers to a major incident involving a commercial/industrial or transportation fire or explosion. All municipalities in Garrett County share the threat of fire to residential,	32.86% 23	32.86% 23	20.00% 14	14.29% 10	70

Garrett County Hazard Mitigation Plan Public Survey

commercial or other structures. The municipalities of Oakland, Mt. Lake Park, Loch Lynn Hts, Deer Park and Kitzmiller which are near CSX rail lines face the threat of fire or explosion from a transportation incident while Friendsville and Grantsville have the possibility of a similar incident along I-68. Grantsville and Accident have a higher threat of fire to industrial because they are the only municipalities in the County with industrial or technological parks.

Transportation & On-Site HazMat - Historically, most HazMats moving through Garrett County have been on the CSX rail system and its predecessors, the Baltimore and Ohio Railroad, and the Western Maryland Railroad. Today, however, the bulk of hazardous materials pass through the county by truck, particularly on I-68, which crosses the northern part of the county from west to east. The municipalities most susceptible to transportation HazMat incidents include Friendsville and Grantsville, which are adjacent to I-68, and Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park which are near the CSX rail line that crosses the southern part of the county. On site HazMats include water and sewer plants located in municipalities and the hospital in Oakland.	27.14% 19	30.00% 21	30.00% 21	12.86% 9	70
Riverine Flooding - In Garrett County flooding is normally associated with rapid runoff from excessive rainfall or from rapid snowmelt or some combination of the two. Steep slopes, poor soil condition for retaining moisture and the geologic structure of the County make flooding more likely for a given amount of precipitation than would be the case in an area having mildly sloping terrain and good soil conditions. Of the eight municipalities in Garrett County, three are located within the floodplain of major streams, and five are located along the headwaters of streams but have floodplain areas within the town limits.	40.00% 28	31.43% 22	18.57% 13	10.00% 7	70
Wildfire - A wildfire is defined as any large fire that spreads rapidly and is difficult to extinguish. Because more than 70% of Garrett County's land surface is covered by forests, wildfire is a major concern. With 70,000 acres owned by the State of Maryland, the Department of Natural Resources takes a leading role in fire suppression throughout the county. All municipalities in Garrett County are near or adjacent to forest land or agricultural land. As urban development extends into these forest or brush covered lands the possibility of wild fire in urban areas increases as it does throughout the county.	20.00% 14	48.57% 34	22.86% 16	8.57% 6	70
Thunderstorm - 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. Garrett County is affected by thunderstorm activity both by the interaction of warm and cool air masses and by the lifting of warm air as it passes over the Appalachian Plateau. Intense thunderstorms over the steep terrain in Garrett County result in rapid runoff, particularly in the headwaters of small stream basins.	36.23% 25	37.68% 26	18.84% 13	7.25% 5	69
Tornado - 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.	35.71% 25	35.71% 25	22.86% 16	5.71% 4	70

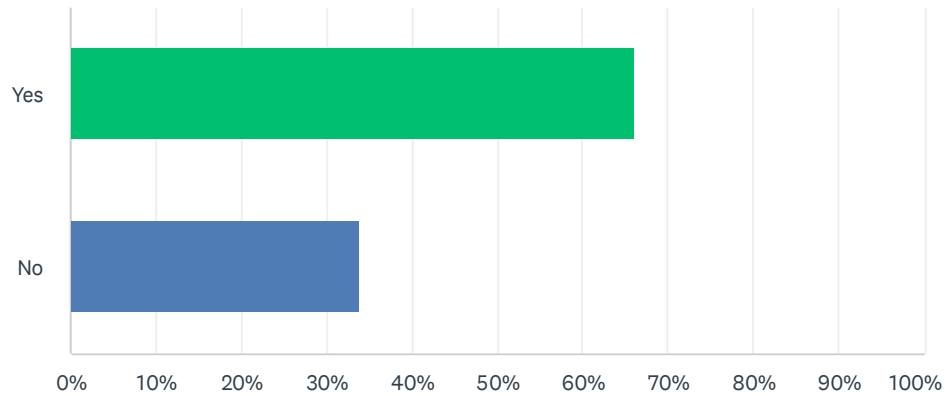
Garrett County Hazard Mitigation Plan Public Survey

Normally thunderstorms and associated tornadoes develop in warm, moist air in advance of strong eastward moving cold fronts in late winter and early spring. Even though Garrett County is located in mountainous terrain it still has been subjected to violent storms including tornadoes. Between 1950 and 1998 there were 8 reported touchdowns of tornadoes in the County.

Hurricane - With its inland situation, Garrett County is not normally as affected by the high winds associated with the passage of a hurricane as a coastal community would be. However, hurricanes do still carry a lot of moisture over the mountainous terrain and the amount of runoff associated with the resulting precipitation can be deadly. Municipalities share the same concerns as the county. The towns of Friendsville and Kitzmiller face more danger from flooding associated with the remnants of a hurricane because of their floodplain location, while the towns of Accident and Grantsville are more susceptible to wind damage because of their exposed location on higher, more level ground.	44.29% 31	35.71% 25	14.29% 10	5.71% 4	70
Soil Movement - The most common types of soil movement are the landslide and the slump. A landslide typically involves earth and rock that have been disturbed by some other action or loosened by moisture and slide downslope. A slump is similar but involves the slippage of a mass of earth and rock along a rotational axis (slip plane). Garrett County is underlain by layered sedimentary rocks that have been folded moderately. These rock units alternate between sandstone, shale and limestone. When exposed on steep slopes, normally the sandstone forms the cap rock at the top of the slope with shale or limestone lying underneath. When these weaker rocks are disturbed, the sandstone eventually fails and moves downslope. The slump type of soil movement is most common, particularly in road cuts and in strip mining operations. While these movements are not normally on a large scale, they do result in road blockage from time to time, particularly where narrow valley floors are shared by a stream and a road or railroad.	47.14% 33	34.29% 24	14.29% 10	4.29% 3	70
Dam Failure - Dam failure refers to a collapse, overtopping, breaching or any related condition that causes downstream flooding. The largest dams in the county include the Savage River Dam, the Bloomington Dam on the Potomac River, and the Deep Creek Lake Dam. Smaller dams include the Piney Creek Dam and the New Germany Dam. The town of Kitzmiller is downstream from both the Stony River Dam and the Mt. Storm Dam. In addition, the town of Friendsville is located downstream from the Deep Creek Lake Dam. Finally, six flood control impoundments constructed by the Soil Conservation Service in the 1970's are located upstream of parts of Oakland, Mountain Lake Park, Loch Lynn Heights and Deer Park in the Little Youghiogheny Watershed	35.71% 25	45.71% 32	15.71% 11	2.86% 2	70

Q6 When you moved into your residence or commercial property, did you consider the impact a natural or non-natural hazard event could have on your property?

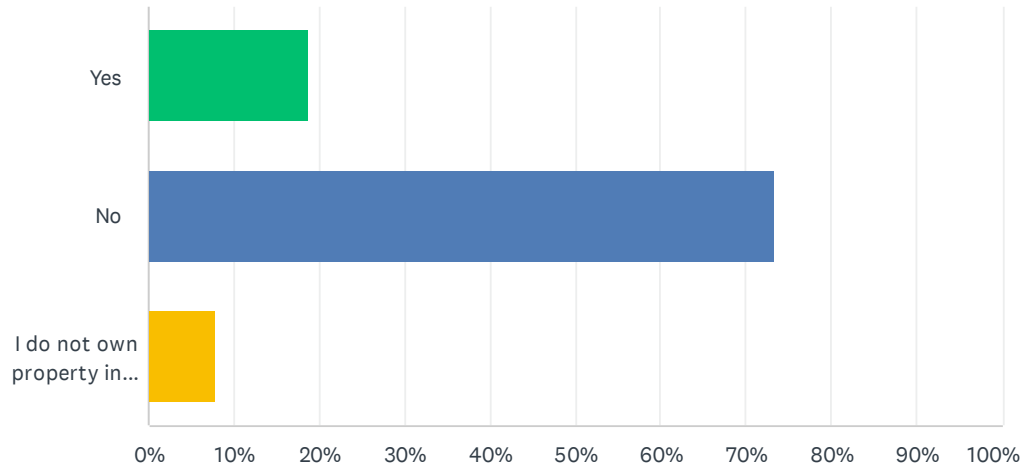
Answered: 65 Skipped: 12



ANSWER CHOICES	RESPONSES	
Yes	66.15%	43
No	33.85%	22
TOTAL		65

Q7 If you own your home or commercial property, do you have flood insurance?

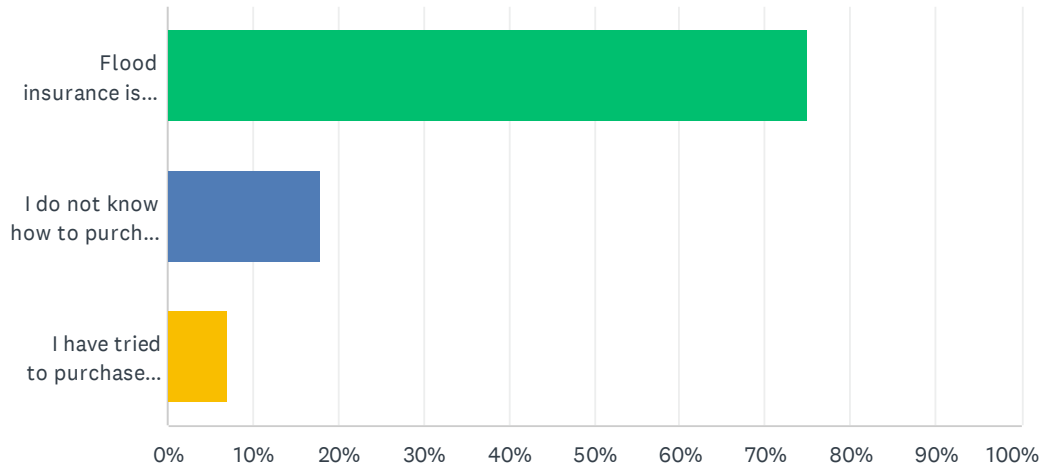
Answered: 64 Skipped: 13



ANSWER CHOICES	RESPONSES	
Yes	18.75%	12
No	73.44%	47
I do not own property in Garrett County	7.81%	5
TOTAL		64

Q8 If “No”, what is the primary reason why you do not carry flood insurance?

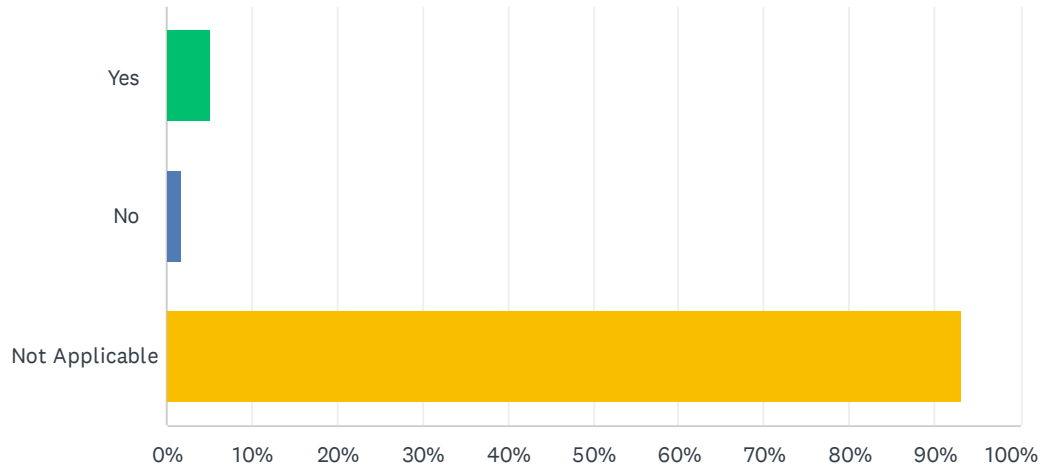
Answered: 28 Skipped: 49



ANSWER CHOICES	RESPONSES	
Flood insurance is too expensive	75.00%	21
I do not know how to purchase flood insurance	17.86%	5
I have tried to purchase flood insurance but have been unsuccessful	7.14%	2
TOTAL		28

Q9 If you rent your place of residence, do you have renter's content insurance?

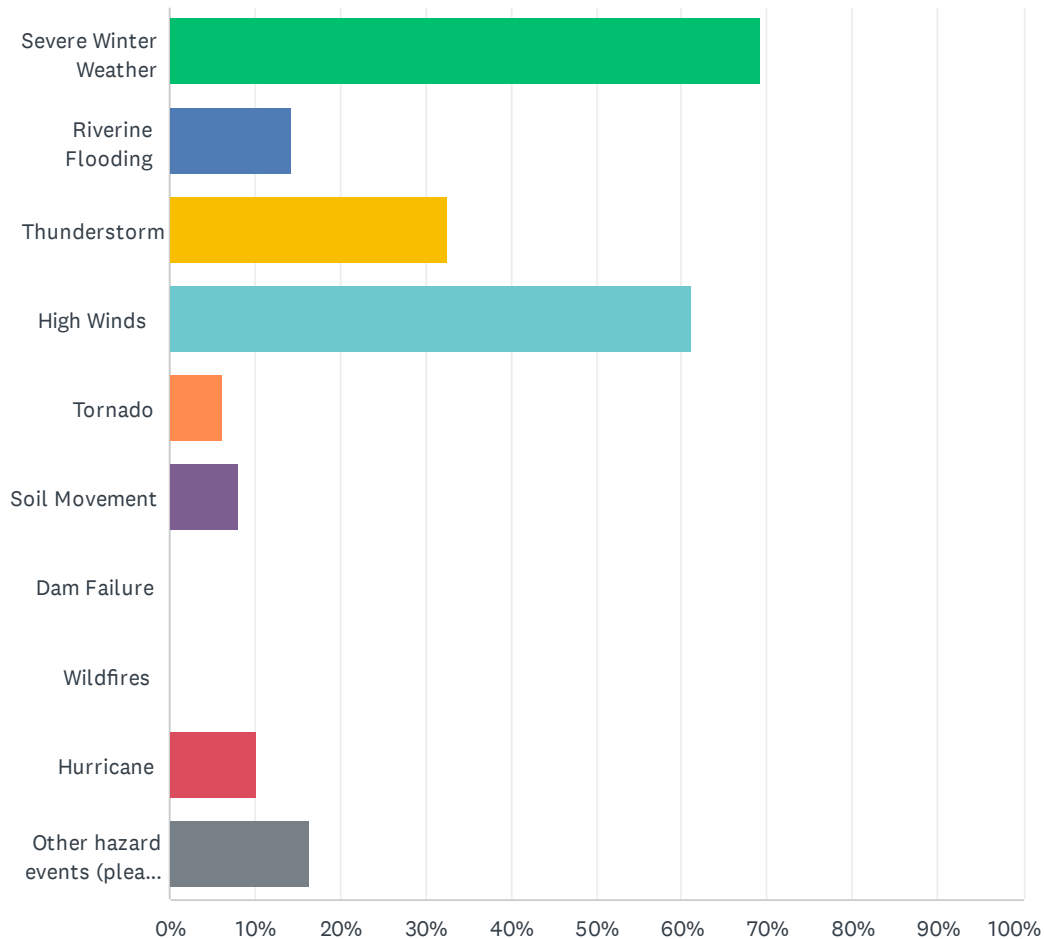
Answered: 58 Skipped: 19



ANSWER CHOICES	RESPONSES	
Yes	5.17%	3
No	1.72%	1
Not Applicable	93.10%	54
TOTAL		58

Q10 If your residence or commercial property has experienced damage from a hazard event, which of the following types of events have you experienced at your property?

Answered: 49 Skipped: 28

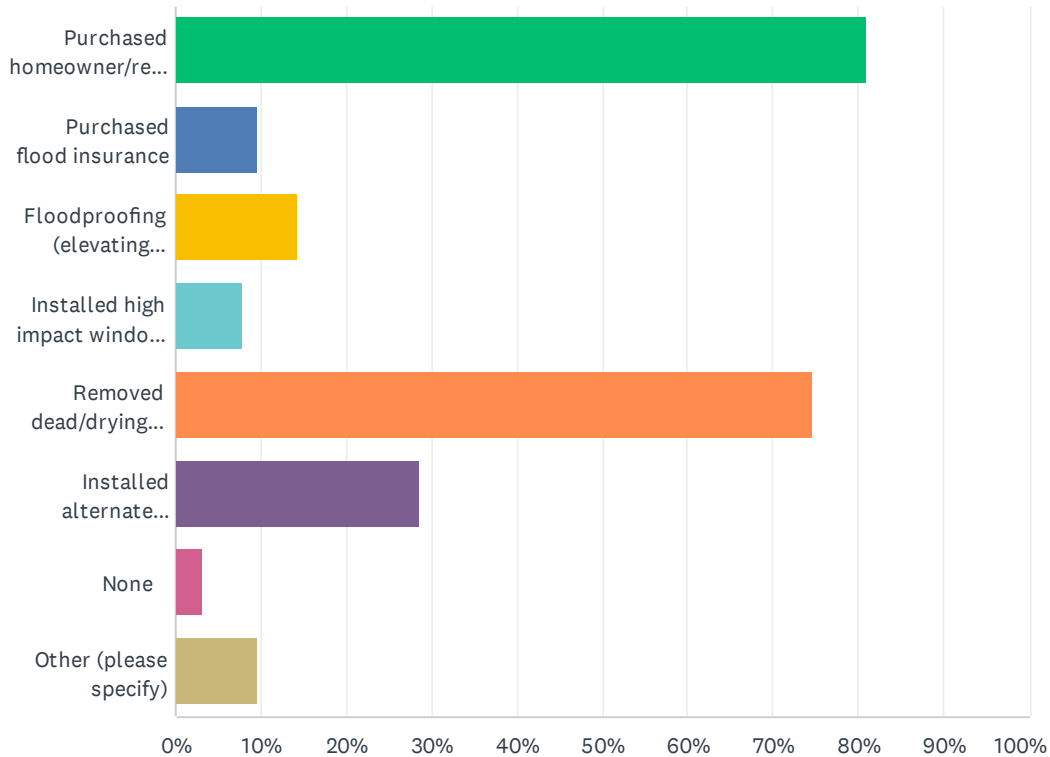


Garrett County Hazard Mitigation Plan Public Survey

ANSWER CHOICES	RESPONSES	
Severe Winter Weather	69.39%	34
Riverine Flooding	14.29%	7
Thunderstorm	32.65%	16
High Winds	61.22%	30
Tornado	6.12%	3
Soil Movement	8.16%	4
Dam Failure	0.00%	0
Wildfires	0.00%	0
Hurricane	10.20%	5
Other hazard events (please describe)	16.33%	8
Total Respondents: 49		

Q11 Have you taken any of the following actions to reduce the risk of hazards to your residence or commercial property?

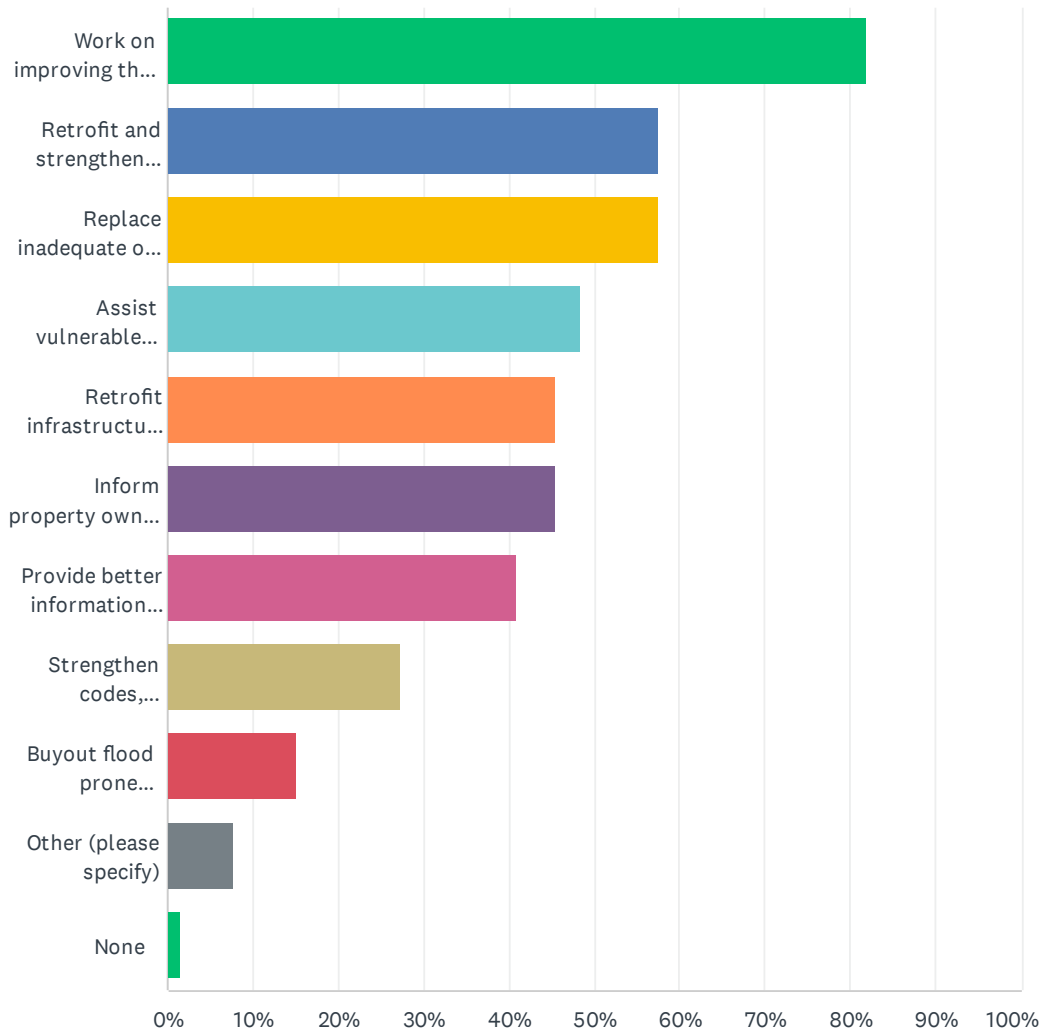
Answered: 63 Skipped: 14



ANSWER CHOICES	RESPONSES	
Purchased homeowner/renter's insurance policies	80.95%	51
Purchased flood insurance	9.52%	6
Floodproofing (elevating furnace, water heaters, electric panels)	14.29%	9
Installed high impact windows or doors to withstand high winds	7.94%	5
Removed dead/drying trees and vegetation from around the home	74.60%	47
Installed alternate power/water supply	28.57%	18
None	3.17%	2
Other (please specify)	9.52%	6
Total Respondents: 63		

Q12 Which of the following mitigation project types do you believe should focused on to reduce disruptions of services and strengthen the community (check all that apply)?

Answered: 66 Skipped: 11

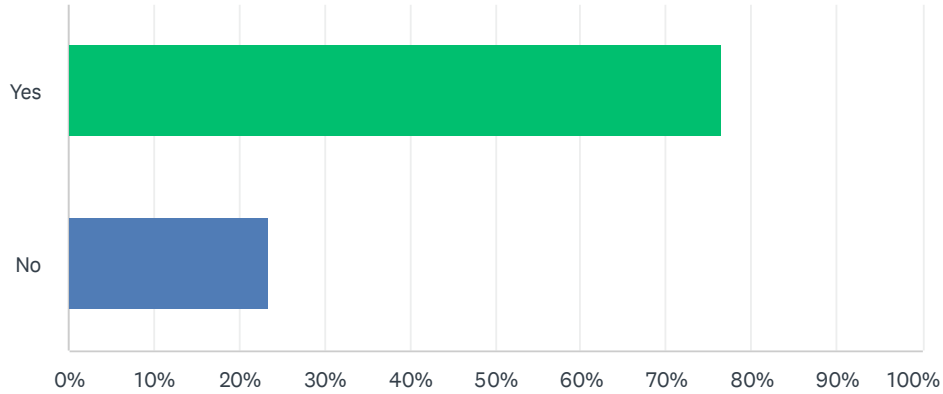


Garrett County Hazard Mitigation Plan Public Survey

ANSWER CHOICES	RESPONSES	
Work on improving the damage resistance of utilities (electricity, communications, water/sewer, etc.)	81.82%	54
Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.	57.58%	38
Replace inadequate or vulnerable bridges	57.58%	38
Assist vulnerable property owners with securing funding to mitigate impacts to their property	48.48%	32
Retrofit infrastructure, such as elevating roadways and improving drainage systems	45.45%	30
Inform property owners of ways they can mitigate damage to their property	45.45%	30
Provide better information about hazard risk and high-hazard areas	40.91%	27
Strengthen codes, ordinances, and plans to require higher hazard risk management standards	27.27%	18
Buyout flood prone properties and maintain as open space	15.15%	10
Other (please specify)	7.58%	5
None	1.52%	1
Total Respondents: 66		

Q13 Do you support policies to restrict or prohibit development in designated hazard zones?

Answered: 64 Skipped: 13



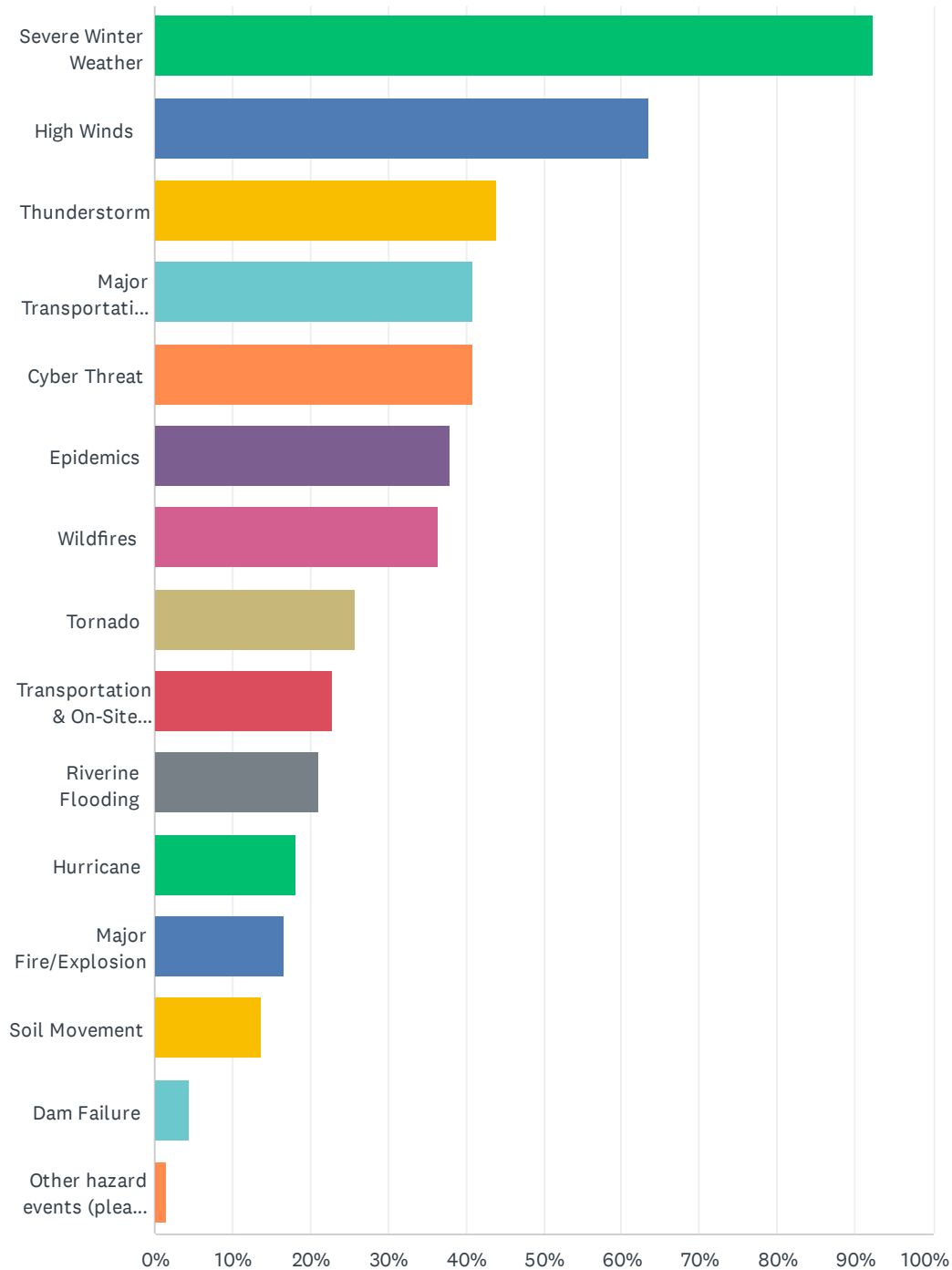
ANSWER CHOICES	RESPONSES	
Yes	76.56%	49
No	23.44%	15
TOTAL		64

Q14 In the last 10 years, have you evacuated from your home or business as a result of a disaster (e.g., flooding, power outage, water failure)? If so, how long were you displaced? Did you go to a shelter?

Answered: 44 Skipped: 33

Q15 Please indicate which hazard events you feel may particularly affect your community. (Please check all that apply)

Answered: 66 Skipped: 11



Garrett County Hazard Mitigation Plan Public Survey

ANSWER CHOICES	RESPONSES	
Severe Winter Weather	92.42%	61
High Winds	63.64%	42
Thunderstorm	43.94%	29
Major Transportation-Fog	40.91%	27
Cyber Threat	40.91%	27
Epidemics	37.88%	25
Wildfires	36.36%	24
Tornado	25.76%	17
Transportation & On-Site HazMat	22.73%	15
Riverine Flooding	21.21%	14
Hurricane	18.18%	12
Major Fire/Explosion	16.67%	11
Soil Movement	13.64%	9
Dam Failure	4.55%	3
Other hazard events (please describe)	1.52%	1
Total Respondents: 66		

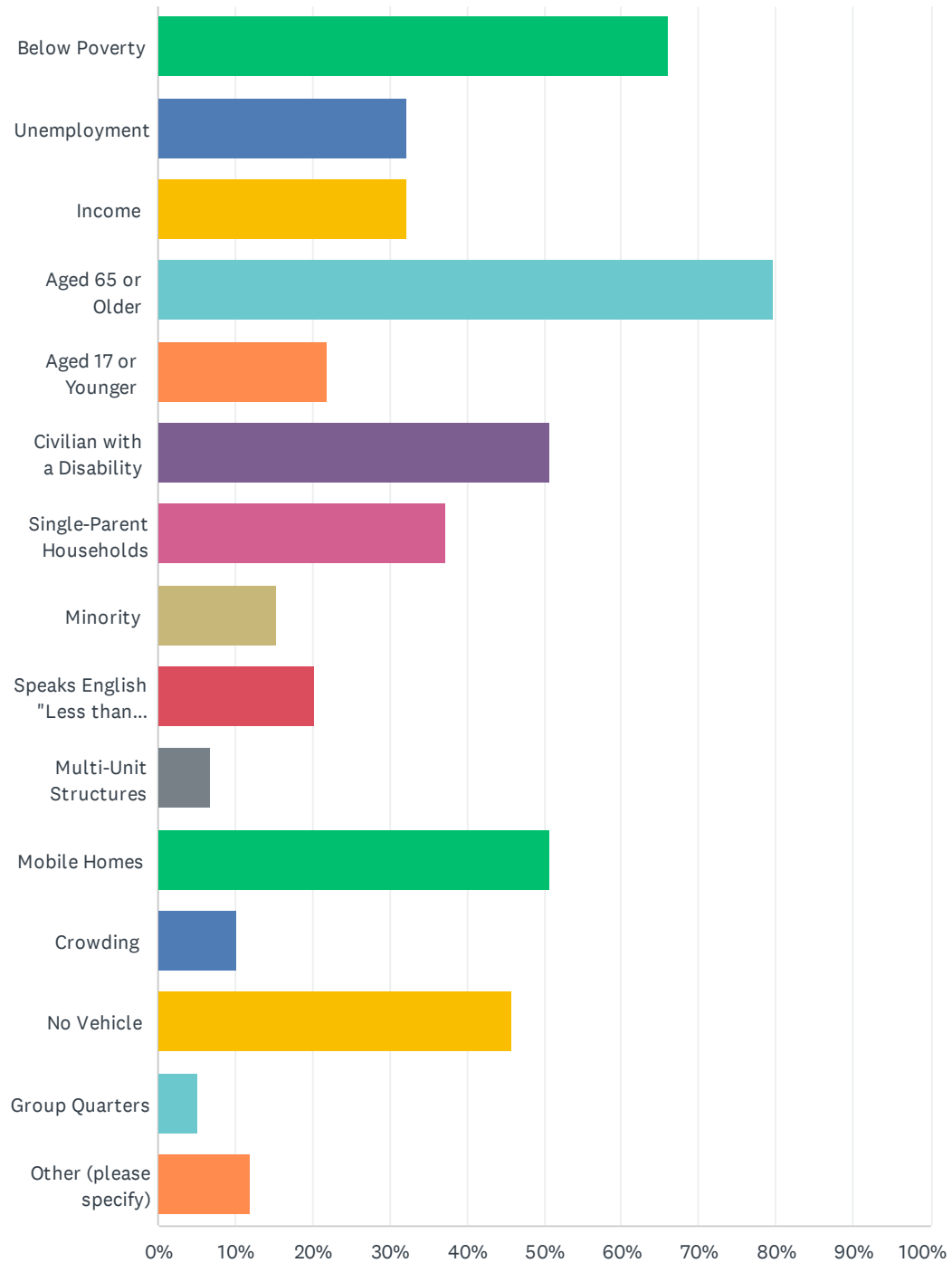
Q16 Are you concerned with any other hazards not identified in this survey?

Answered: 32 Skipped: 45

Q17 In terms of social vulnerability, do you feel that a specific group, or groups, in Garrett County are particularly at risk for, or could be harmed by, any of the hazards listed in Question 2? This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk. Note: CDC 15 Social Factors below.

Answered: 59 Skipped: 18

Garrett County Hazard Mitigation Plan Public Survey



Garrett County Hazard Mitigation Plan Public Survey

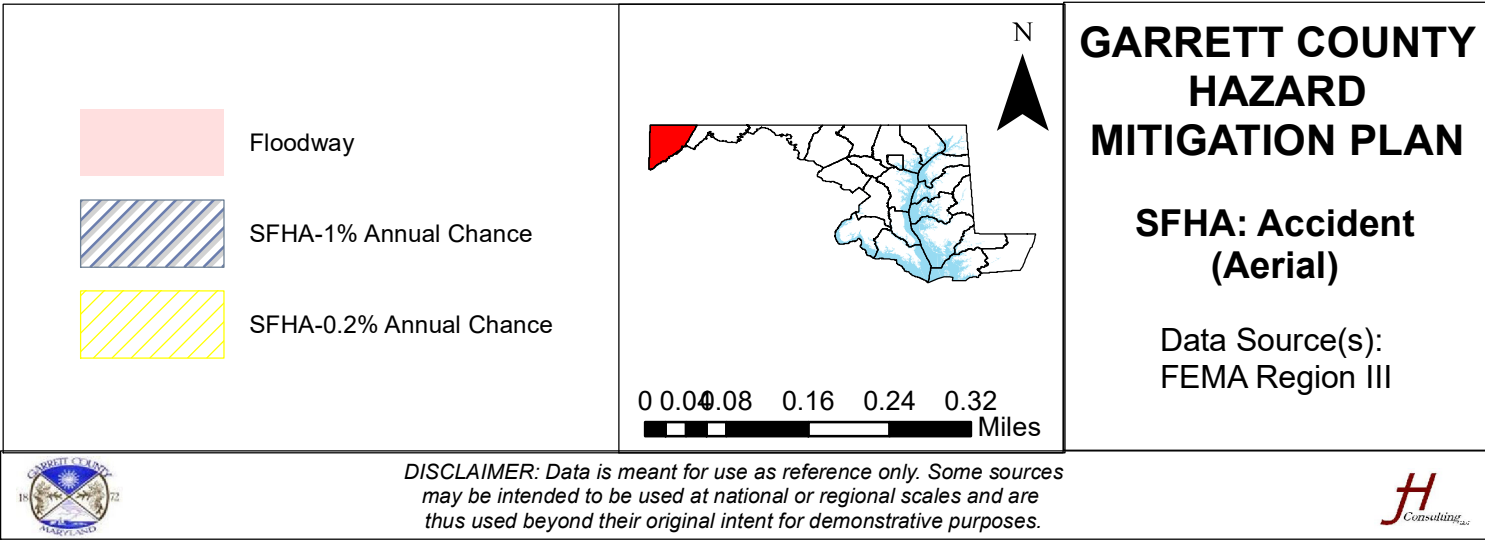
ANSWER CHOICES	RESPONSES	
Below Poverty	66.10%	39
Unemployment	32.20%	19
Income	32.20%	19
Aged 65 or Older	79.66%	47
Aged 17 or Younger	22.03%	13
Civilian with a Disability	50.85%	30
Single-Parent Households	37.29%	22
Minority	15.25%	9
Speaks English "Less than Well"	20.34%	12
Multi-Unit Structures	6.78%	4
Mobile Homes	50.85%	30
Crowding	10.17%	6
No Vehicle	45.76%	27
Group Quarters	5.08%	3
Other (please specify)	11.86%	7
Total Respondents: 59		



Q18 In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

Answered: 28 Skipped: 49

APPENDIX 5: MUNICIPAL FLOOD MAPS

This appendix contains “flood vulnerability maps” for each participating jurisdiction. These maps consist of aerial imagery with Special Flood Hazard Areas (SFHAs) and the jurisdiction’s corporate limits visible over the image.



-  Critical Facility
-  Historical-Cultural
-  Infrastructure



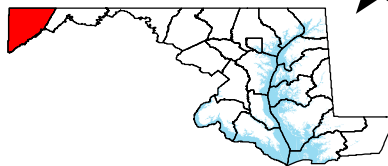
Floodway



SFHA-1% Annual Chance



SFHA-0.2% Annual Chance



0 0.04 0.08 0.16 0.24 0.32
Miles

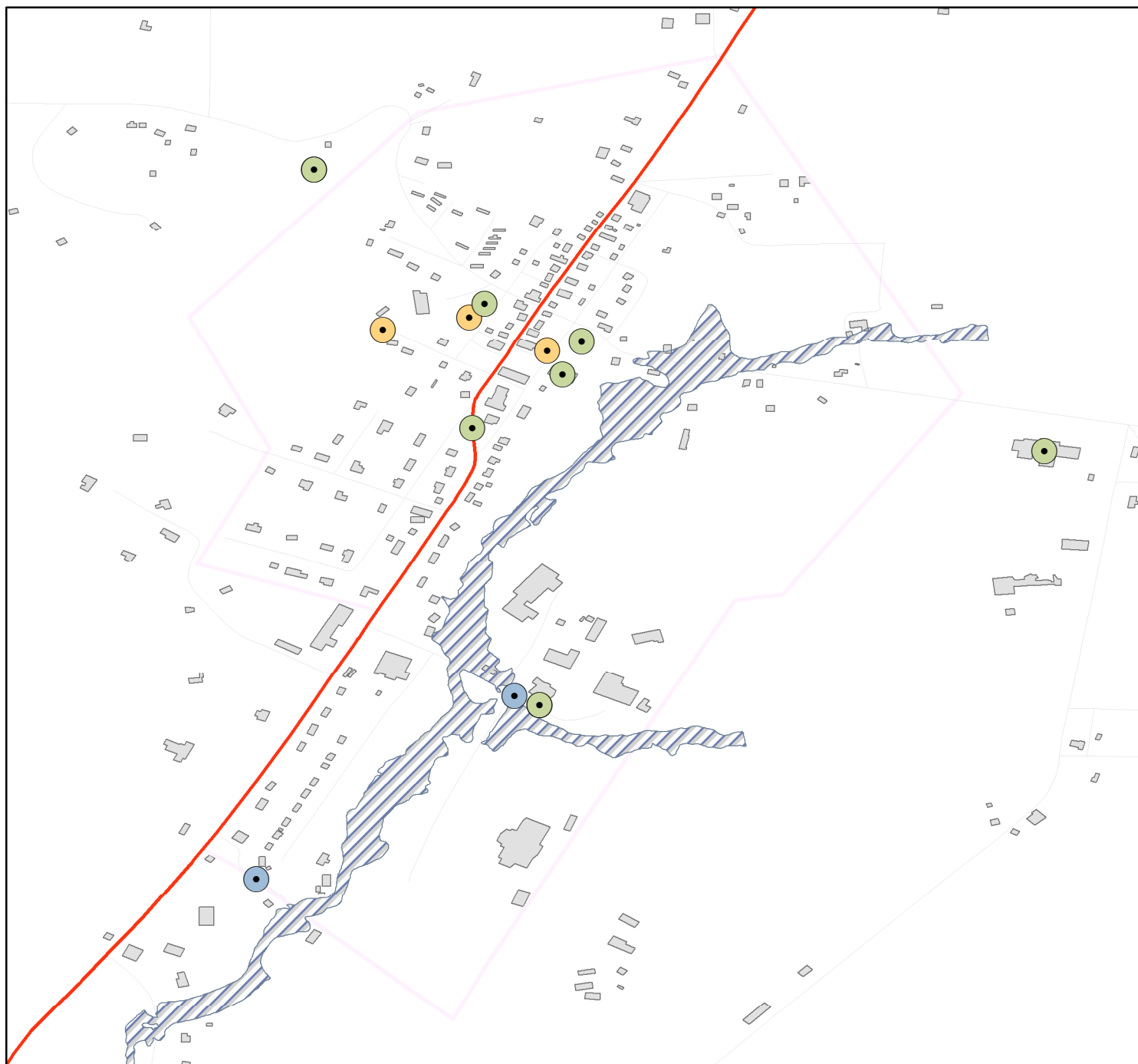
GARRETT COUNTY HAZARD MITIGATION PLAN

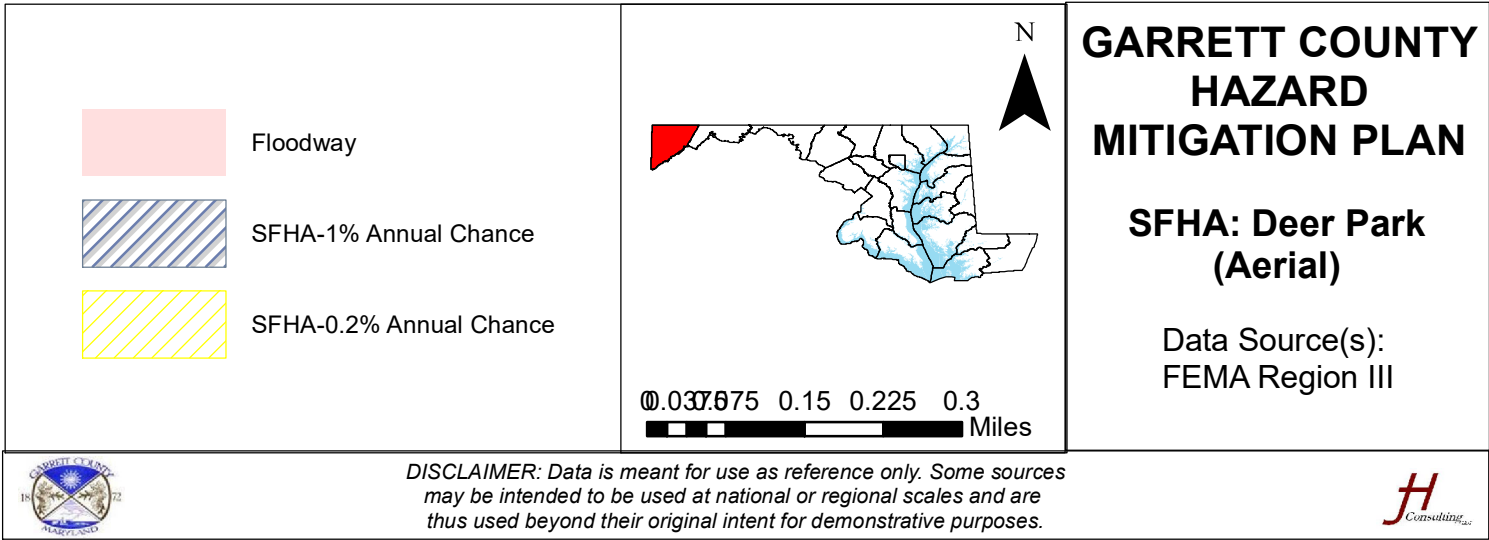
**SFHA: Accident
(Street)**


Data Source(s):
FEMA Region III,
Steering Committee




DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.









Critical Facility




Historical-Cultural




Infrastructure



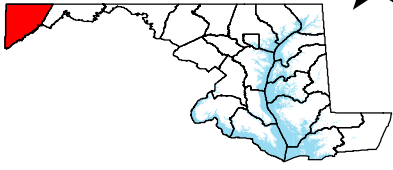
Floodway




SFHA-1% Annual Chance




SFHA-0.2% Annual Chance



N




0.0375 0.15 0.225 0.3




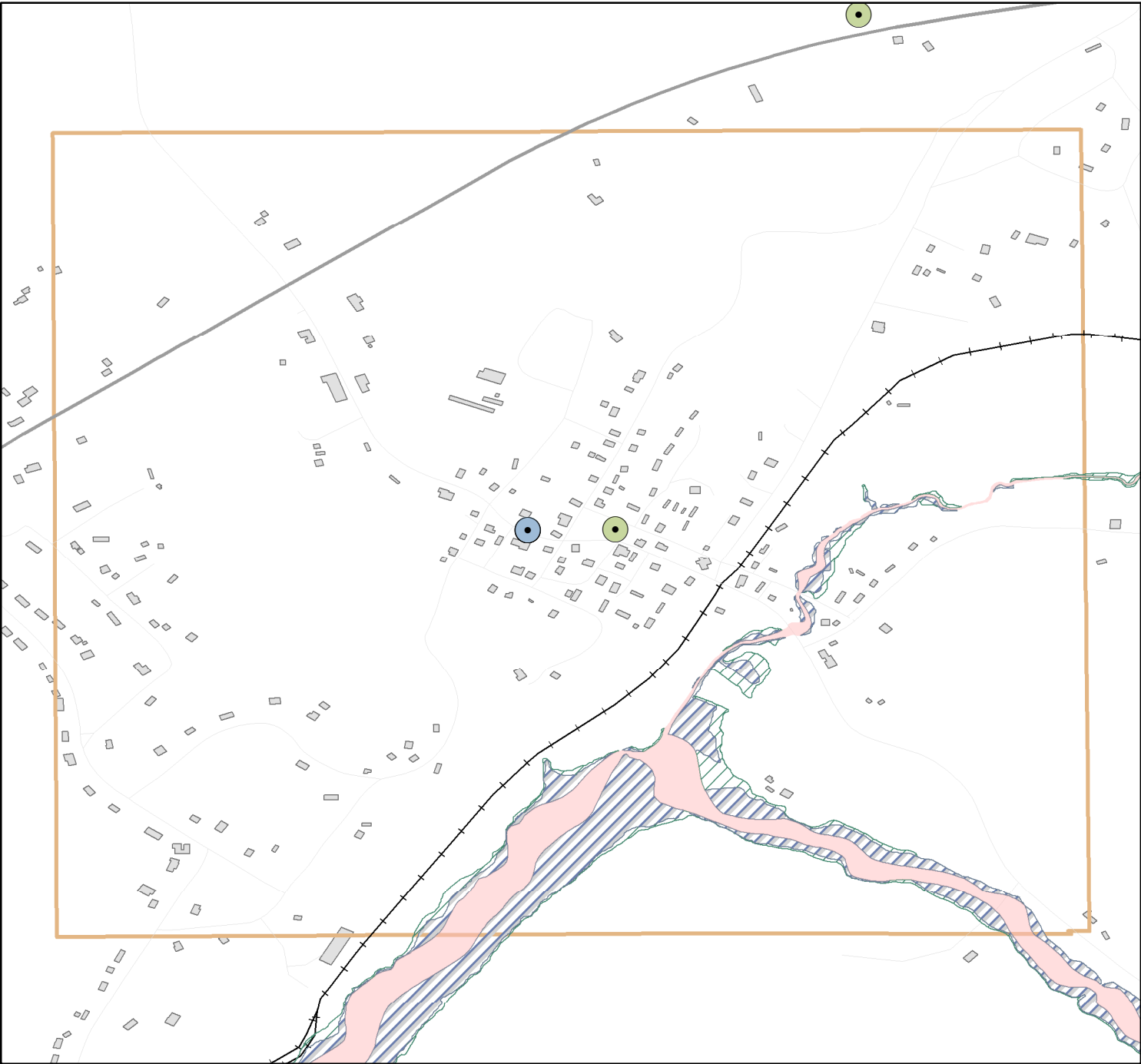
Miles

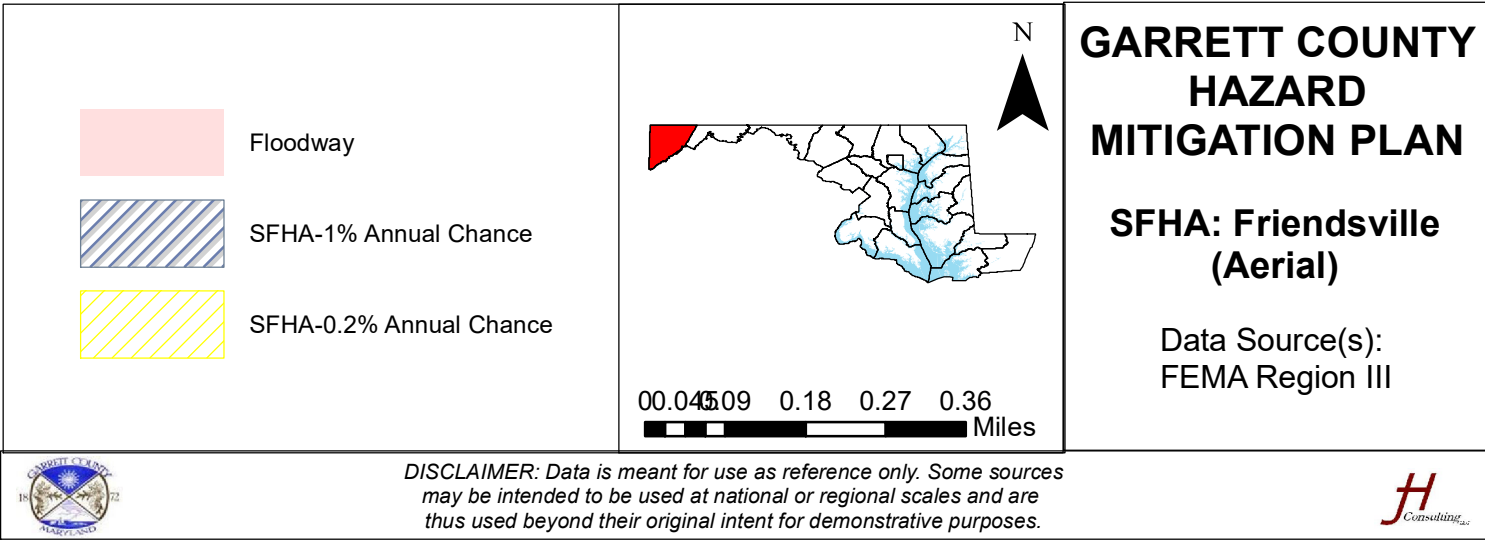
GARRETT COUNTY HAZARD MITIGATION PLAN **SFHA: Deer Park (Street)** Data Source(s): FEMA Region III, Steering Committee




DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.












Critical Facility




Historical-Cultural




Infrastructure



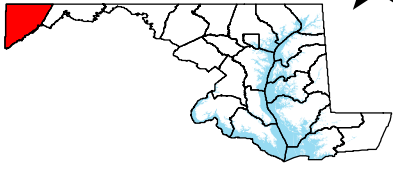
Floodway



SFHA-1% Annual Chance



SFHA-0.2% Annual Chance



N


0.045090.180.270.36

Miles


GARRETT COUNTY
HAZARD
MITIGATION PLAN

SFHA: Friendsville
(Street)

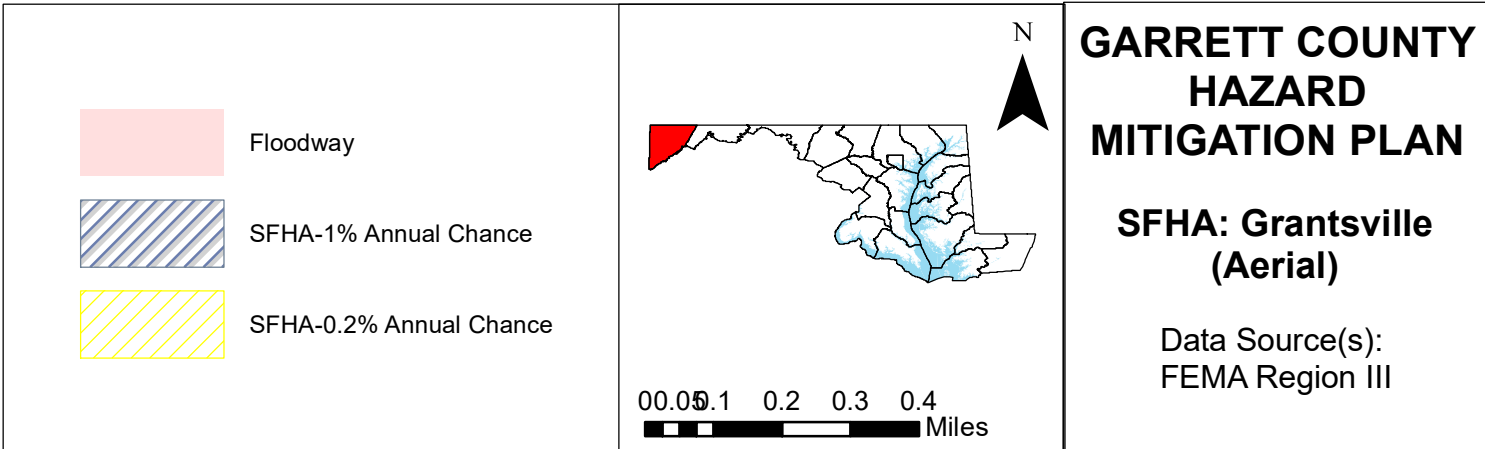
Data Source(s):
FEMA Region III,
Steering Committee



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.




This map displays the hazard mitigation plan for Friendsville, Maryland. It features a central town area with several critical facilities marked by green circles with black dots. A floodway is delineated by a thick pink line, and Special Flood Hazard Areas (SFHAs) are shown with blue (1% annual chance) and green (0.2% annual chance) hatched patterns. The map also includes a road network and a railroad line. A legend in the top left corner defines the symbols used, and a scale bar and north arrow are located in the top right corner of the map area.




DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.







Critical Facility




Historical-Cultural




Infrastructure



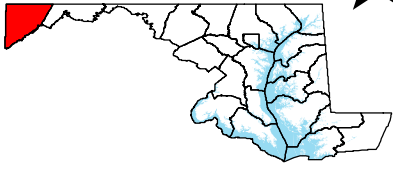
Floodway




SFHA-1% Annual Chance




SFHA-0.2% Annual Chance



N




00.00.1 0.2 0.3 0.4

 Miles


GARRETT COUNTY
HAZARD
MITIGATION PLAN

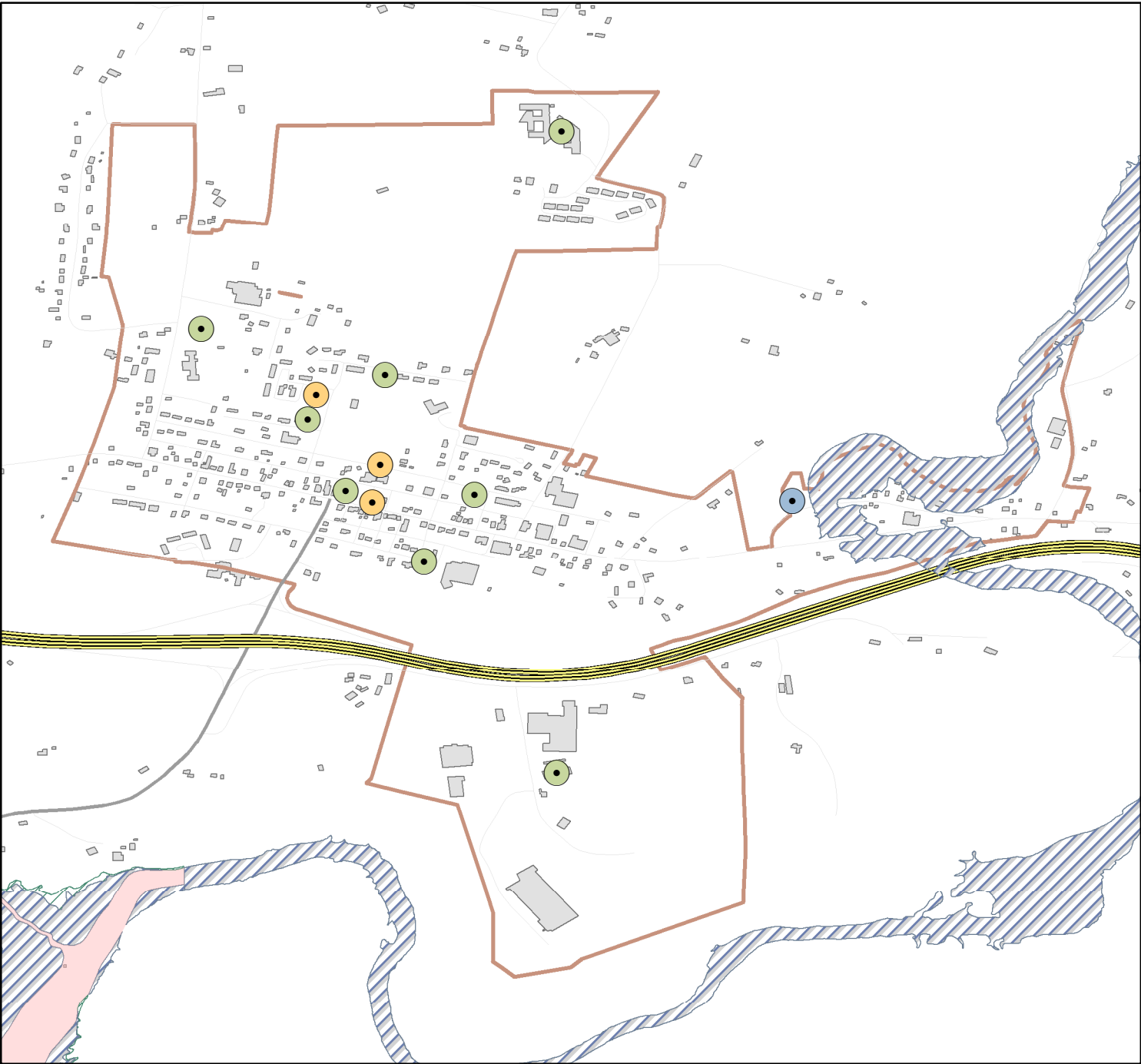
SFHA: Grantsville
(Street)

Data Source(s):
FEMA Region III,
Steering Committee





DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.




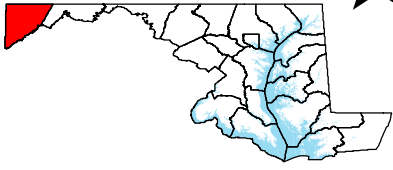


The main map displays the Grantsville area, including the town and surrounding regions. A pink shaded area represents the Floodway. Blue hatched areas indicate the SFHA-1% Annual Chance zone, and green hatched areas indicate the SFHA-0.2% Annual Chance zone. Critical facilities are marked with green circles, historical-cultural sites with orange circles, and infrastructure with a blue circle. The map also shows roads, buildings, and water bodies.

 Floodway


 SFHA-1% Annual Chance

 SFHA-0.2% Annual Chance



N


0.020.055 0.11 0.165 0.22

 Miles


**GARRETT COUNTY
HAZARD
MITIGATION PLAN**

**SFHA: Kitzmiller
(Aerial)**

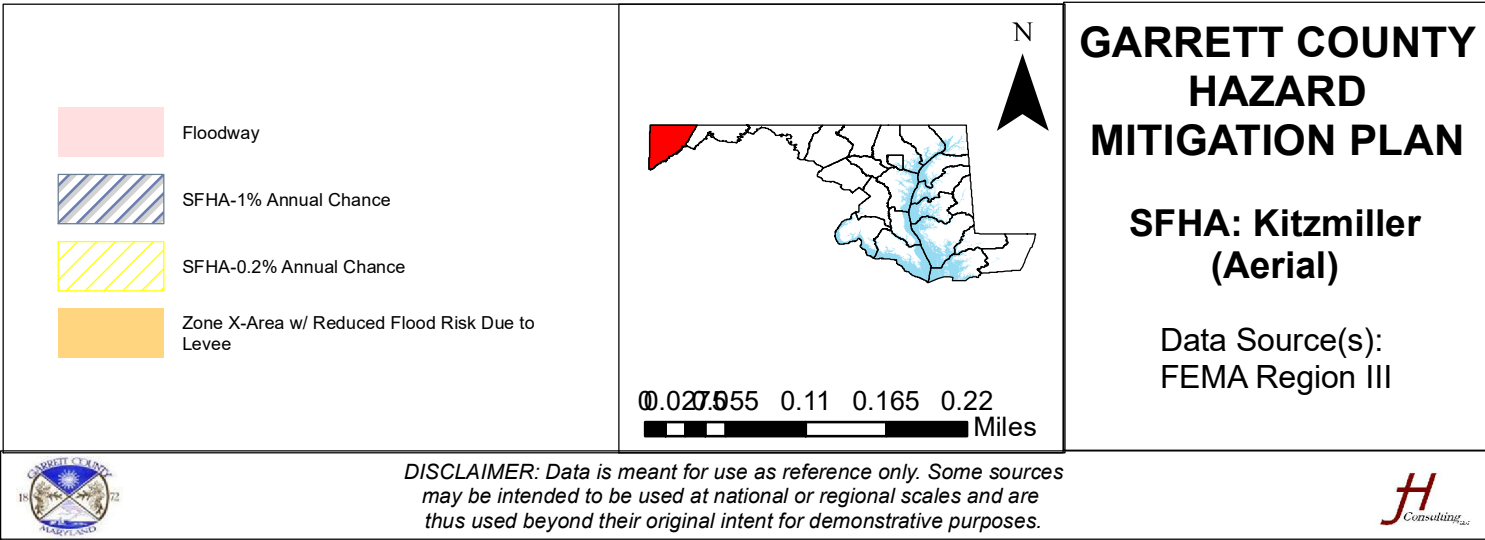
Data Source(s):
FEMA Region III




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Critical Facility




Historical-Cultural




Infrastructure



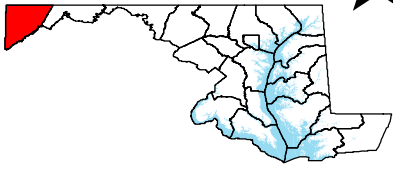
Floodway




SFHA-1% Annual Chance



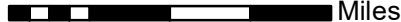
SFHA-0.2% Annual Chance



N




0.020.055 0.11 0.165 0.22

 Miles


GARRETT COUNTY
HAZARD
MITIGATION PLAN

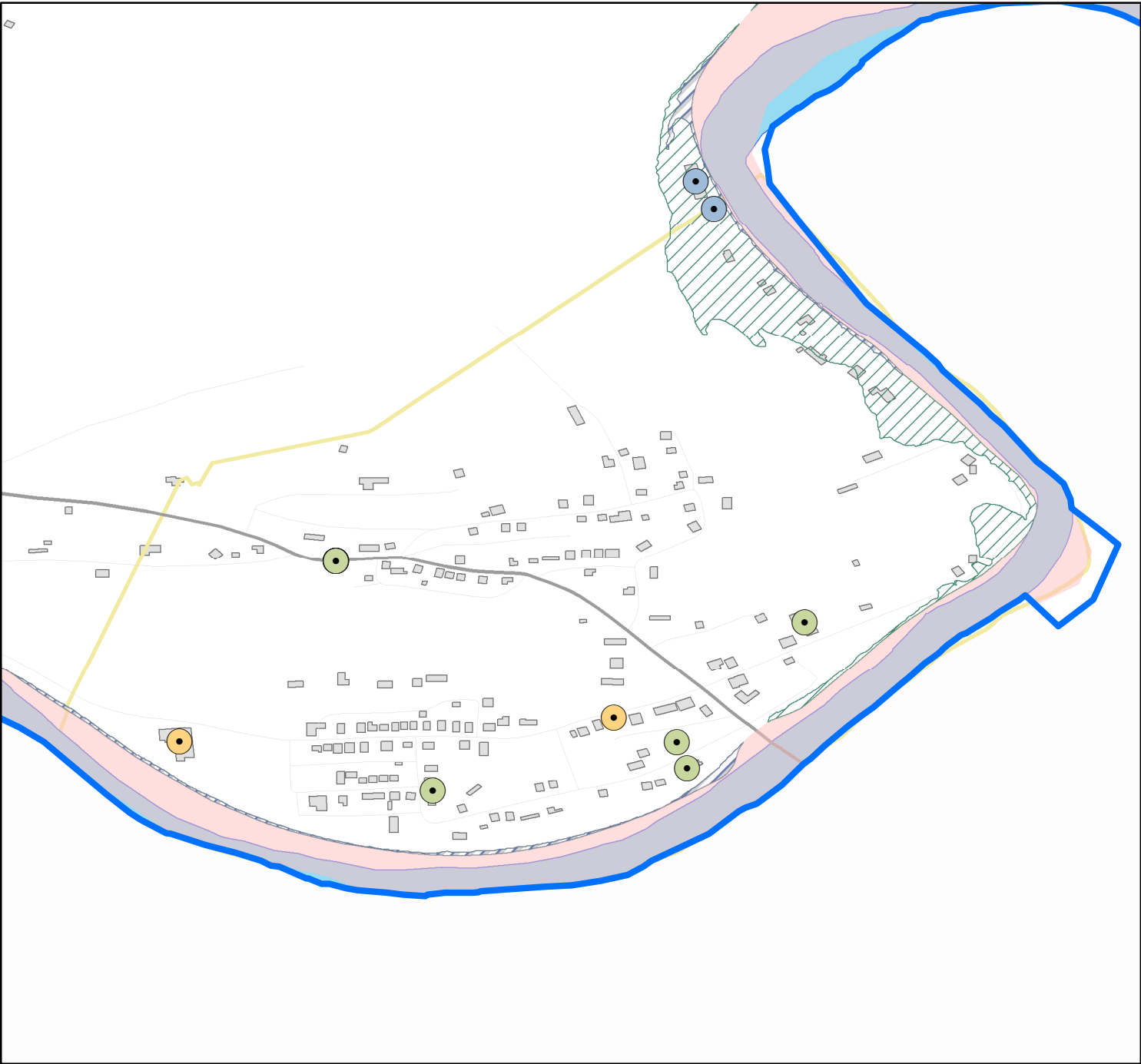
SFHA: Kitzmiller
(Street)


Data Source(s):
FEMA Region III,
Steering Committee




DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.








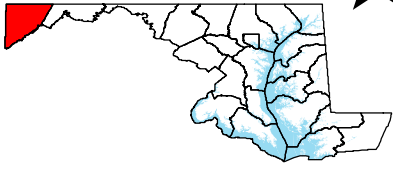
Floodway




SFHA-1% Annual Chance



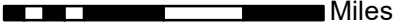
SFHA-0.2% Annual Chance



N




0.0325 0.065 0.13 0.195 0.26 Miles




GARRETT COUNTY HAZARD MITIGATION PLAN

SFHA: Loch Lynn Heights (Aerial)


Data Source(s):
FEMA Region III




DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.








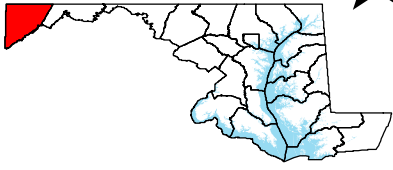
Floodway




SFHA-1% Annual Chance



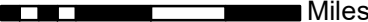
SFHA-0.2% Annual Chance



N




0.0 0.15 0.3 0.45 0.6 Miles




GARRETT COUNTY HAZARD MITIGATION PLAN

SFHA: Mountain Lake Park (Aerial)

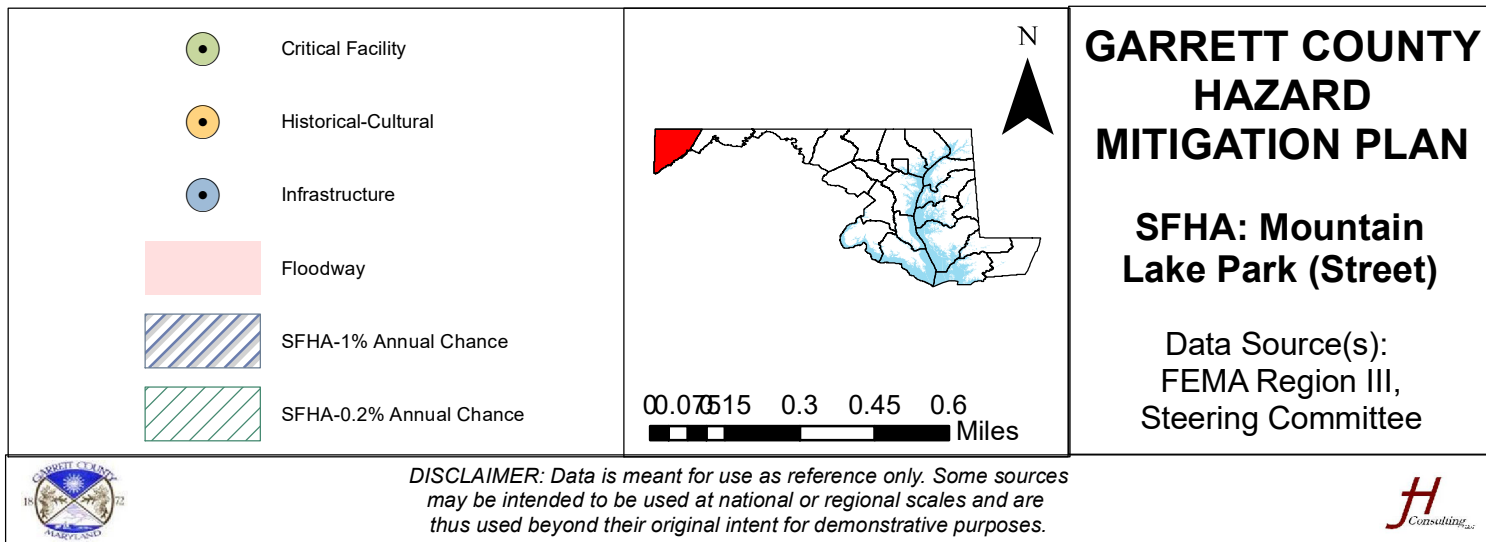
Data Source(s):
FEMA Region III

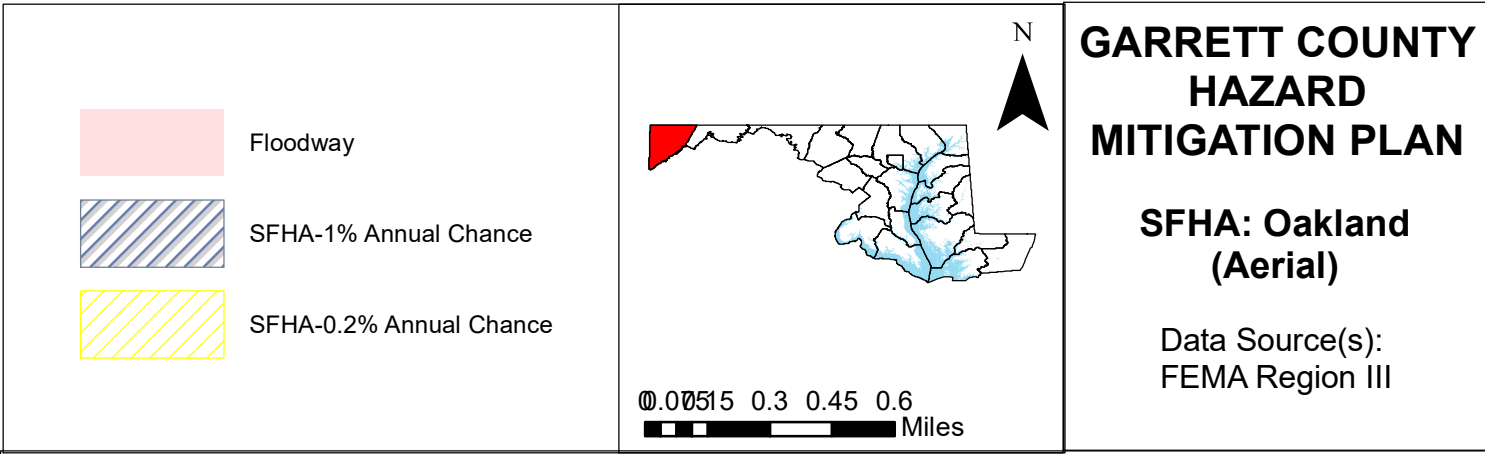


DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

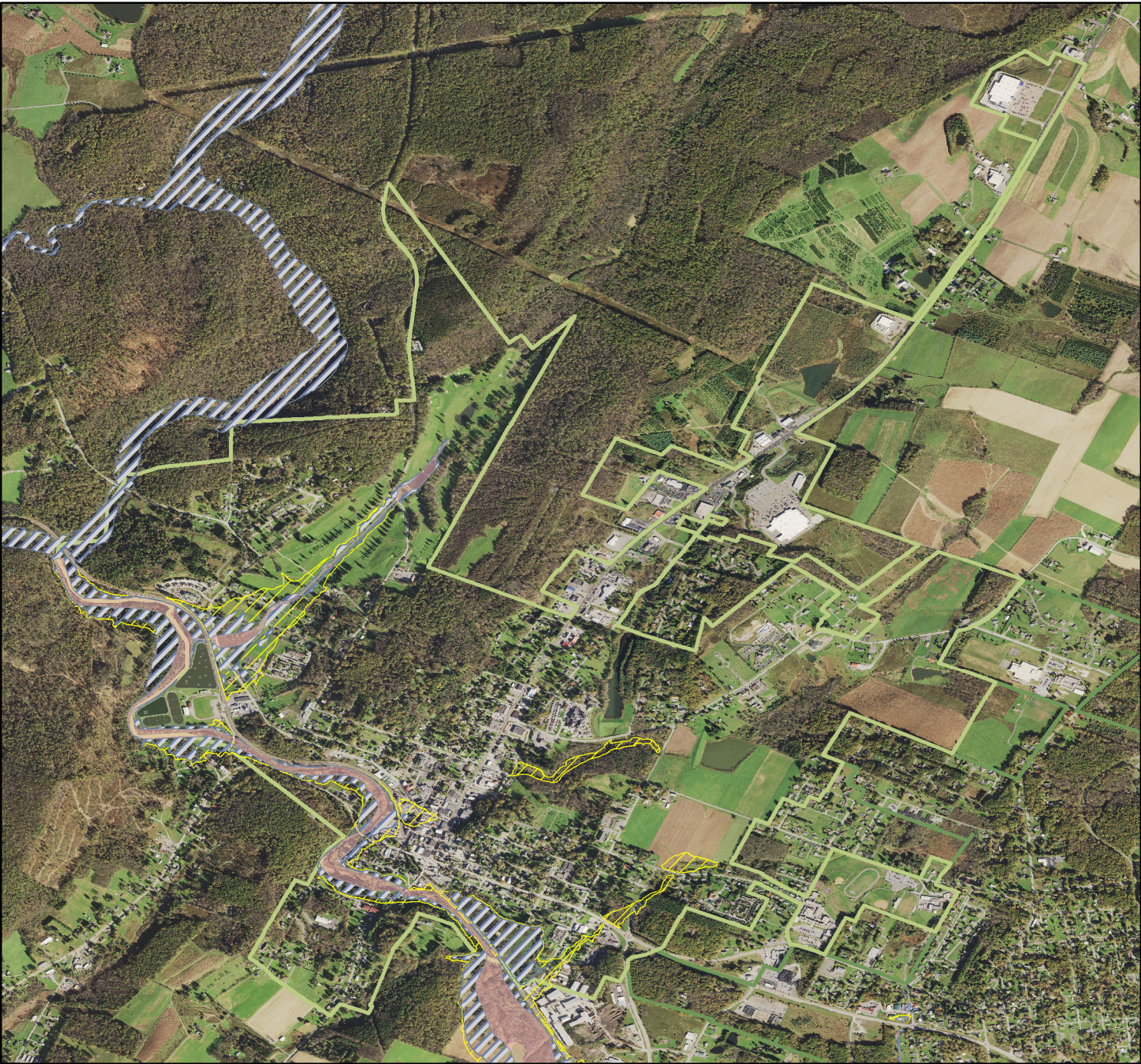












DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.





 Critical Facility

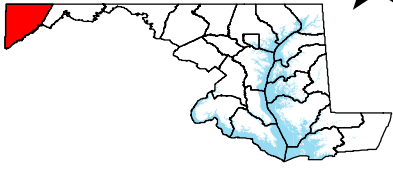
 Historical-Cultural


 Infrastructure

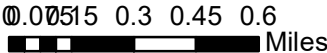
 Floodway

 SFHA-1% Annual Chance

 SFHA-0.2% Annual Chance









GARRETT COUNTY HAZARD MITIGATION PLAN

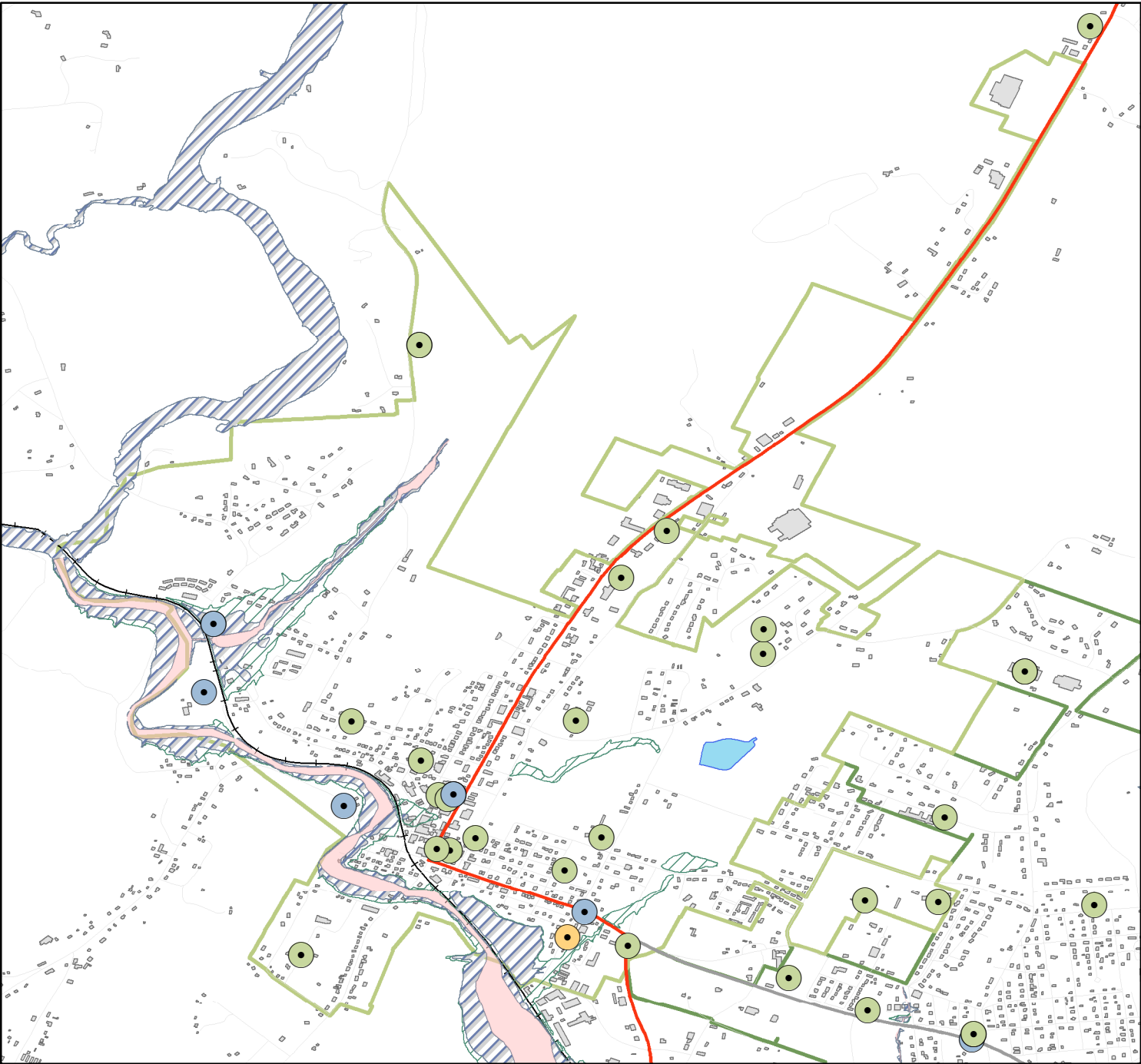
SFHA: Oakland (Street)

Data Source(s):
FEMA Region III,
Steering Committee



DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.





APPENDIX 6: HAZUS DATA

This appendix contains HAZUS runs for Flooding for Garrett County, reflecting loss and damage figures.



Hazus: Flood Global Risk Report

Region Name: Garrett_100yr

Flood Scenario: Garrett100yr

Print Date: Tuesday, January 30, 2024

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.



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Increasing Resilience Together



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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Maryland

Note:

Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is approximately 22 square miles and contains 1,474 census blocks. The region contains over 12 thousand households and has a total population of 28,794 people. The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 20,889 buildings in the region with a total building replacement value (excluding contents) of 7,166 million dollars. Approximately 90.27% of the buildings (and 64.45% of the building value) are associated with residential housing.



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Building Inventory

General Building Stock

Hazus estimates that there are 20,889 buildings in the region which have an aggregate total replacement value of 7,166 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure (\$1000)	Percent of Total
Residential	4,618,387	64.5%
Commercial	1,583,686	22.1%
Industrial	467,454	6.5%
Agricultural	26,100	0.4%
Religion	128,192	1.8%
Government	101,443	1.4%
Education	240,377	3.4%
Total	7,165,639	100%

Building Exposure by Occupancy Type for the Study Region
(\$1000's)

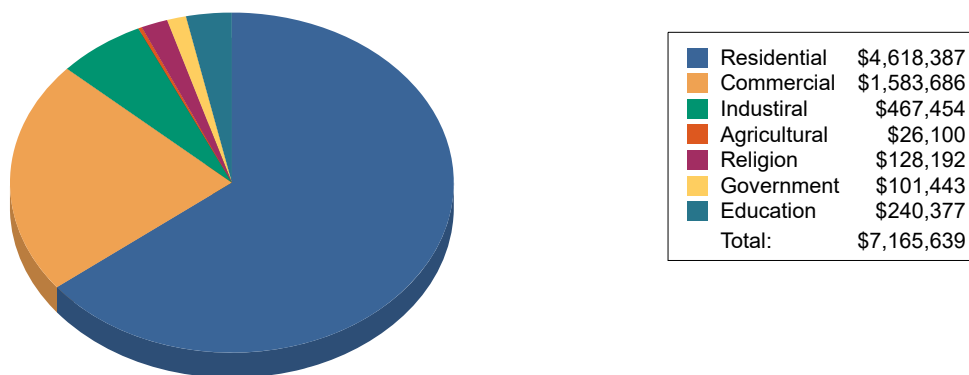
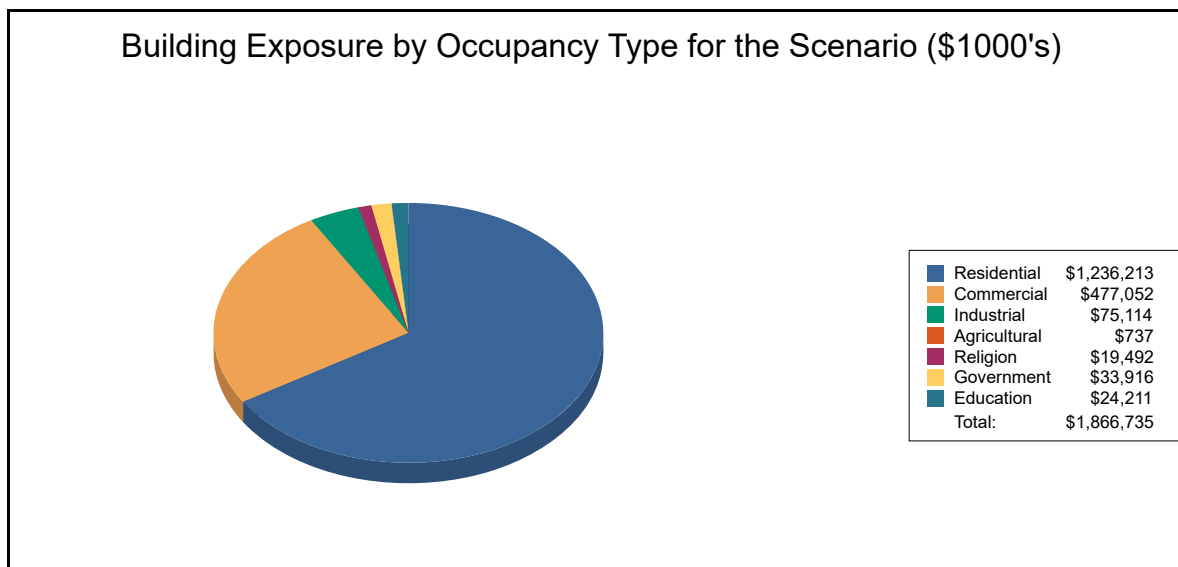




Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure (\$1000)	Percent of Total
Residential	1,236,213	66.2%
Commercial	477,052	25.6%
Industrial	75,114	4.0%
Agricultural	737	0.0%
Religion	19,492	1.0%
Government	33,916	1.8%
Education	24,211	1.3%
Total	1,866,735	100%



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 55 beds. There are 17 schools, 12 fire stations, 2 police stations and 1 emergency operation center.



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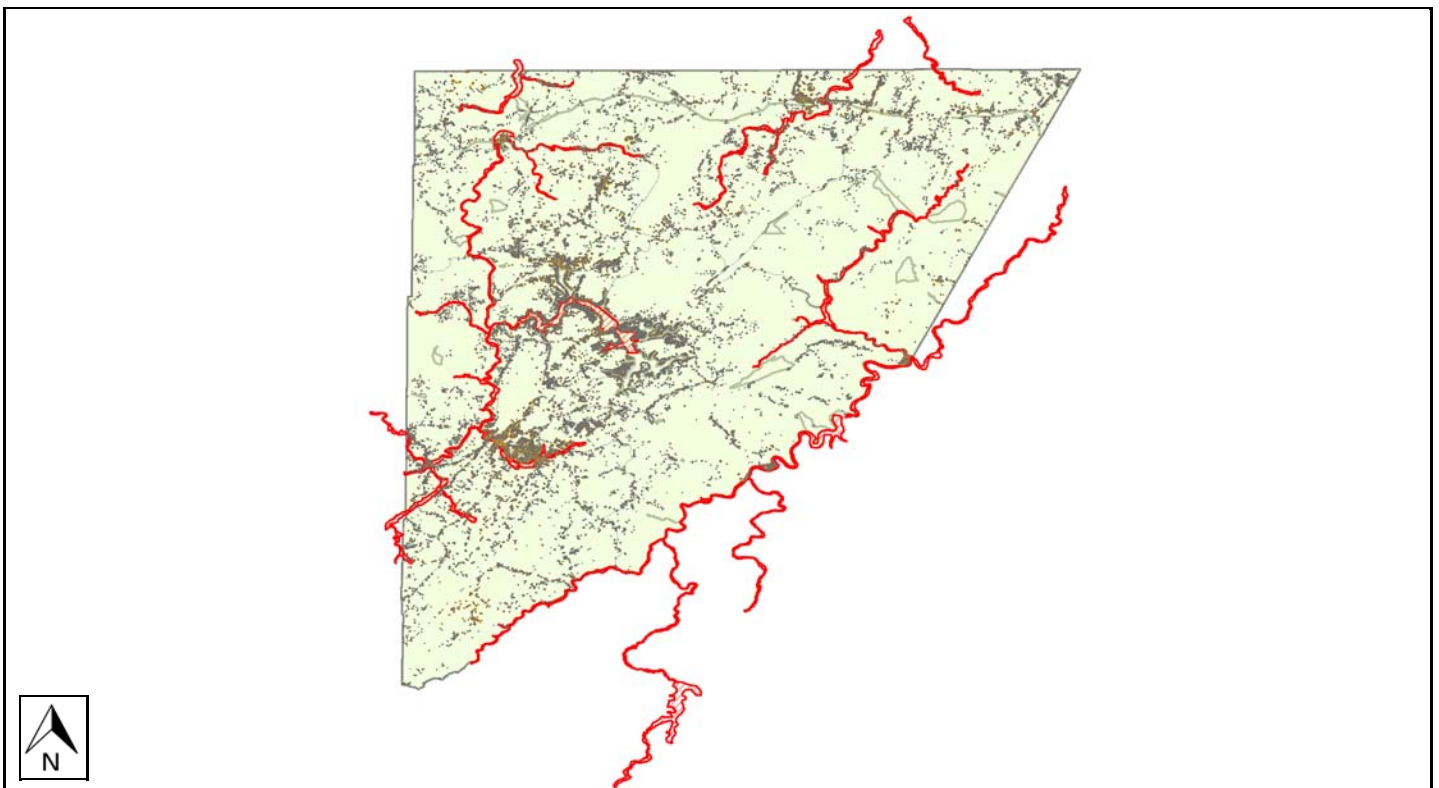
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Garrett_100yr
Scenario Name:	Garrett100yr
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



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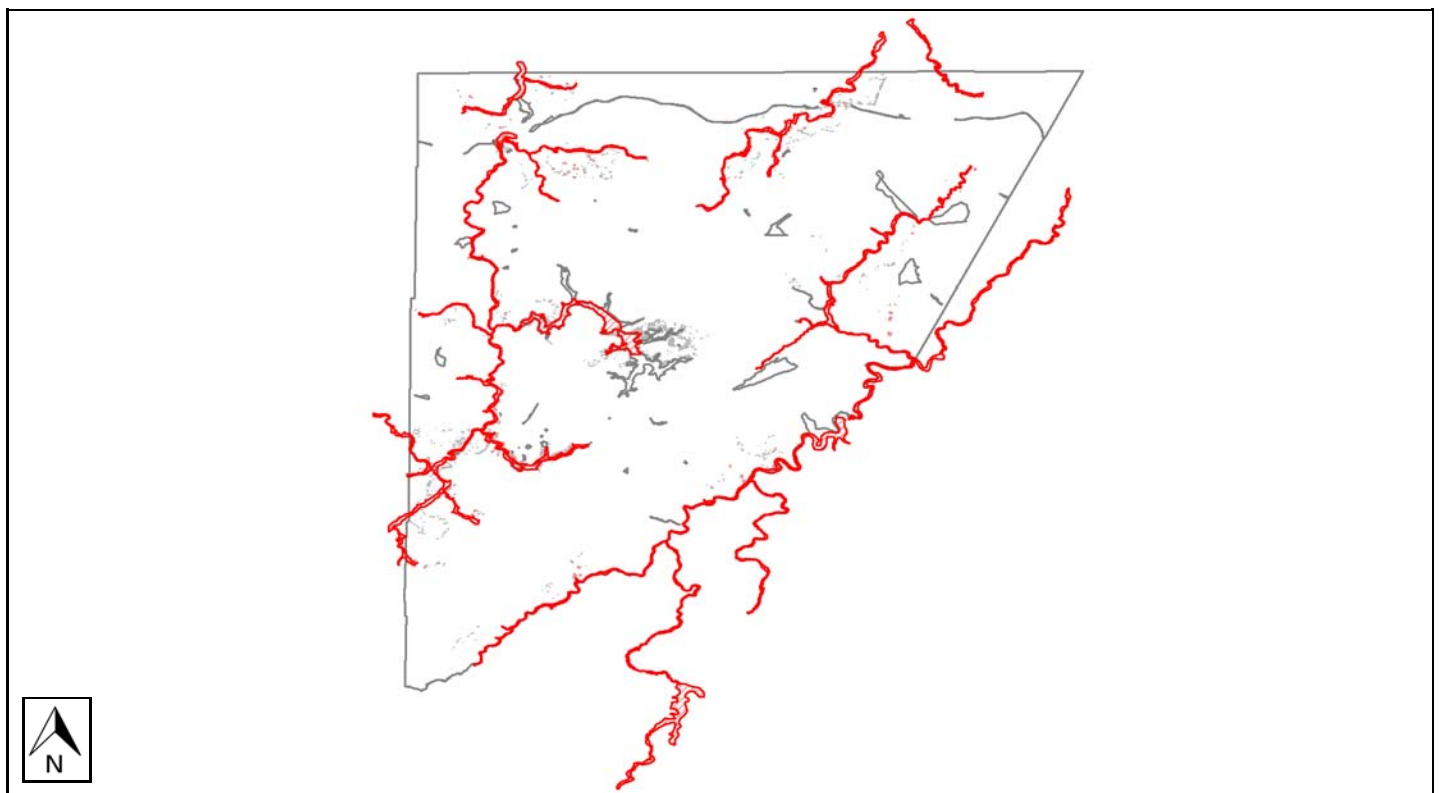


Building Damage

General Building Stock Damage

Hazus estimates that about 111 buildings will be at least moderately damaged. This is over 50% of the total number of buildings in the scenario. There are an estimated 24 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = \$300K) Overview Map



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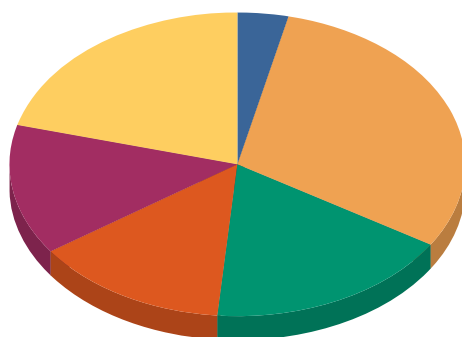
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Table 3: Expected Building Damage by Occupancy

Occupancy	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	11	69	4	25	1	6	0	0	0	0
Education	1	100	0	0	0	0	0	0	0	0	0	0
Government	0	0	1	100	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	1	100	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	3	3	23	24	16	17	15	16	15	16	24	25
Total	4		35		20		16		16		24	

Counts By Damage Level



Damage Level 1-10	4
Damage Level 11-20	35
Damage Level 21-30	20
Damage Level 31-40	16
Damage Level 41-50	16
Damage Level >50	24
Total:	115



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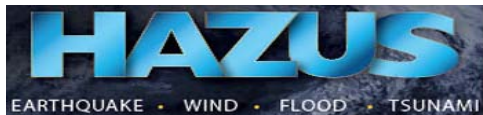


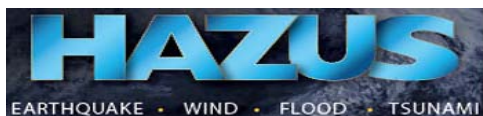
Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	5	100
Masonry	1	4	10	40	4	16	4	16	3	12	3	12
Steel	0	0	7	78	1	11	0	0	1	11	0	0
Wood	2	3	18	25	14	19	11	15	12	16	16	22



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Essential Facility Damage

Before the flood analyzed in this scenario, the region had 55 hospital beds available for use. On the day of the scenario flood event, the model estimates that 55 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	12	0	0	0
Hospitals	1	0	0	0
Police Stations	2	0	0	0
Schools	17	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

- (1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.
- (2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

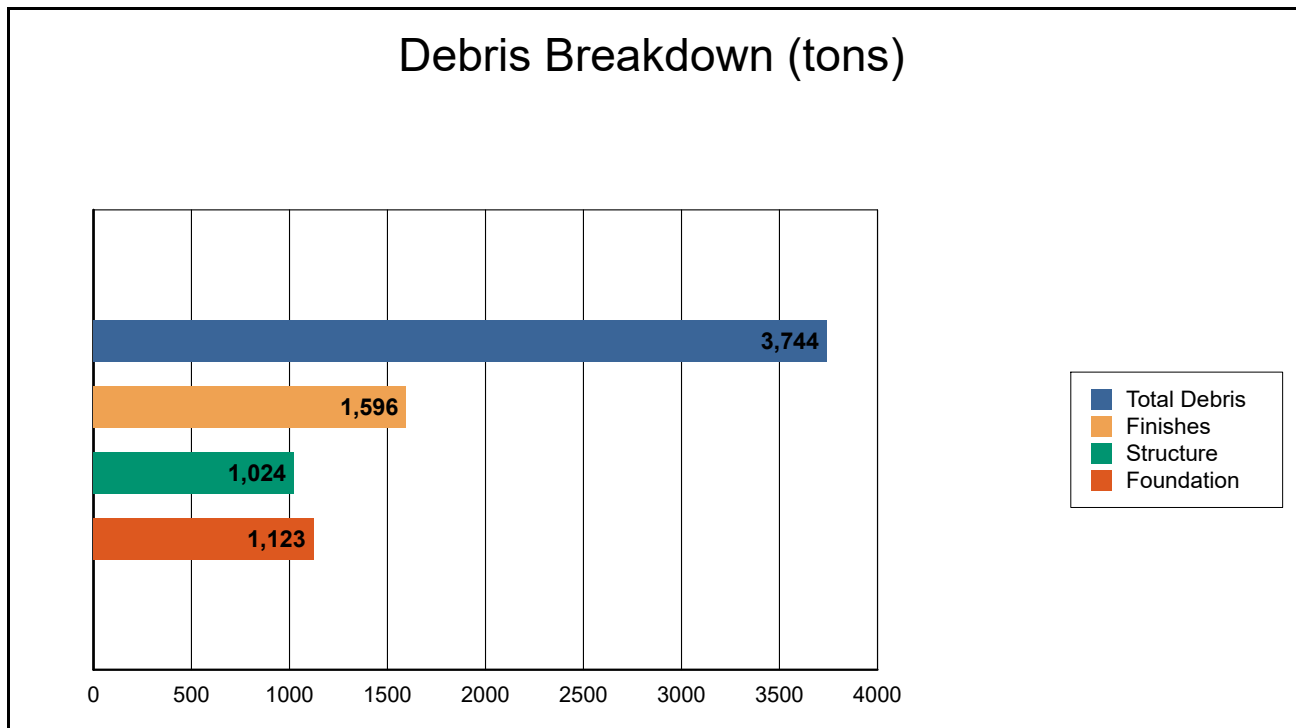


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Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

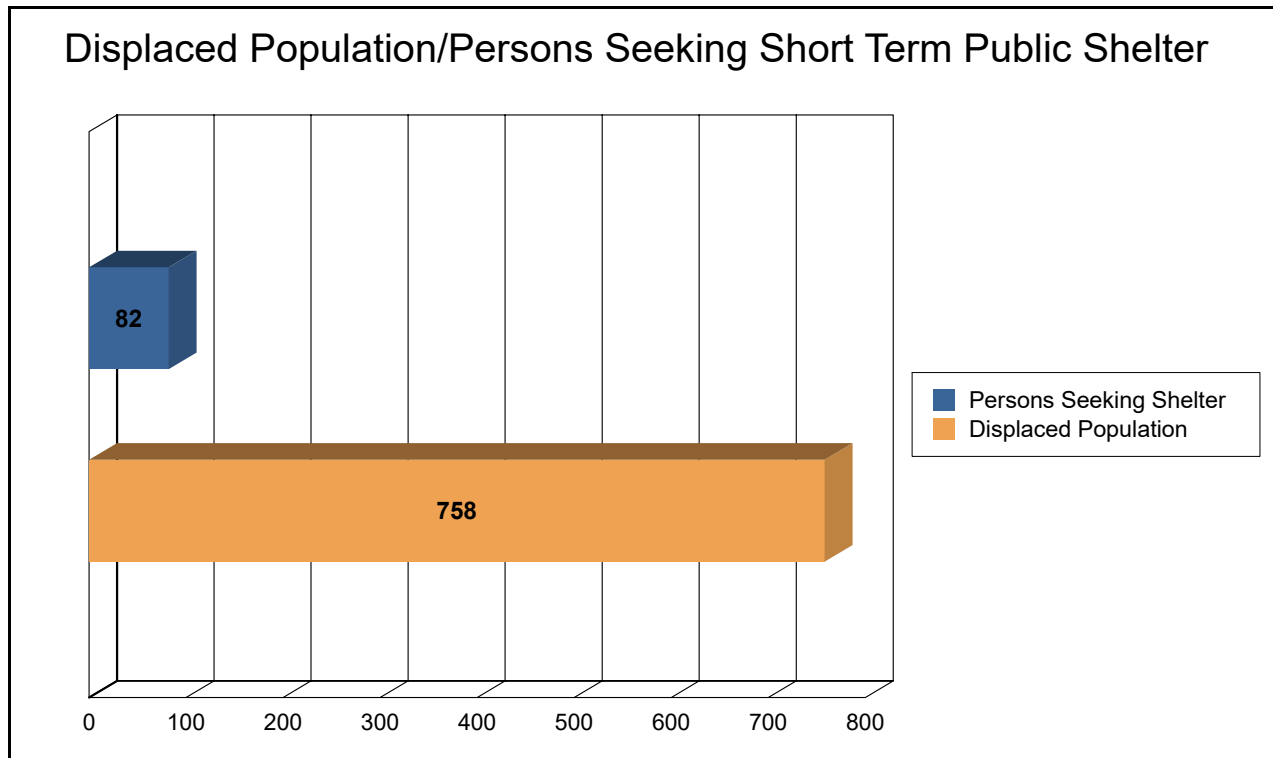


The model estimates that a total of 3,744 tons of debris will be generated. Of the total amount, Finishes comprises 43% of the total, Structure comprises 27% of the total, and Foundation comprises 30%. If the debris tonnage is converted into an estimated number of truckloads, it will require 150 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 253 households (or 758 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 82 people (out of a total population of 28,794) will seek temporary shelter in public shelters.





Economic Loss

The total economic loss estimated for the flood is 337.04 million dollars, which represents 18.06 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 148.40 million dollars. 56% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 19.41% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.



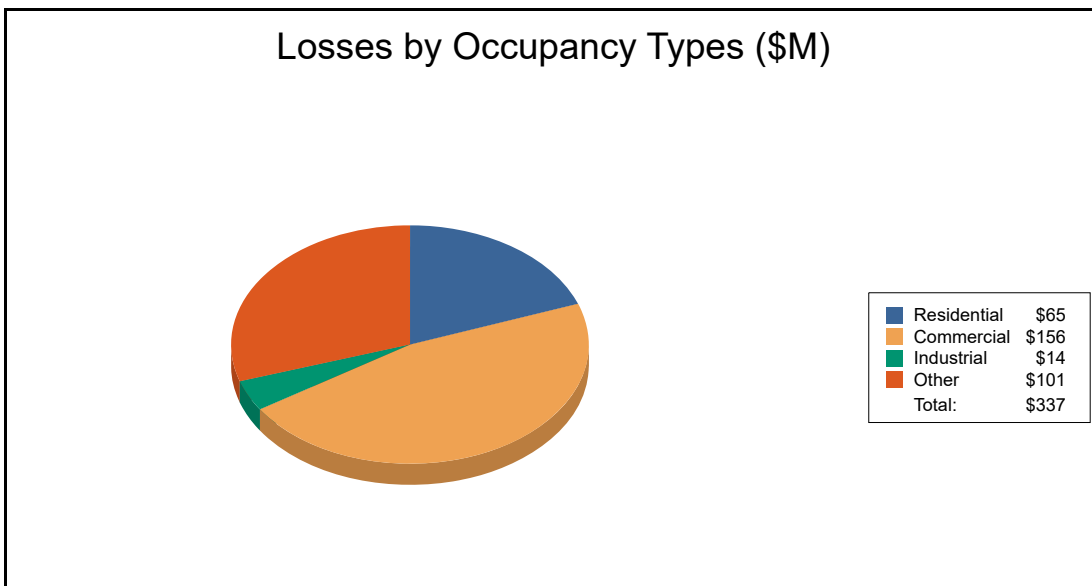
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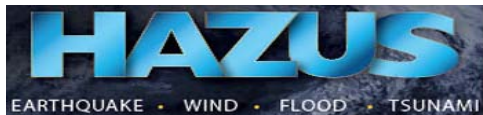
Table 6: Building-Related Economic Loss Estimates
(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	33.71	17.32	3.74	1.92	56.69
	Content	17.51	47.69	8.80	10.58	84.57
	Inventory	0.00	5.91	1.23	0.00	7.14
	Subtotal	51.22	70.92	13.77	12.50	148.40
Business Interruption						
	Income	0.47	30.02	0.14	2.30	32.94
	Relocation	8.78	9.67	0.29	2.00	20.75
	Rental Income	3.83	7.18	0.04	0.28	11.33
	Wage	1.12	38.39	0.25	83.87	123.62
	Subtotal	14.19	85.26	0.73	88.46	188.64
ALL	Total	65.41	156.17	14.50	100.96	337.04



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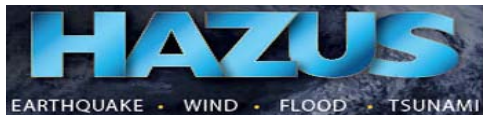
Appendix A: County Listing for the Region

Maryland

- Garrett



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Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Maryland				
Garrett	28,794	4,618,387	2,547,252	7,165,639
Total	28,794	4,618,387	2,547,252	7,165,639
Total Study Region	28,794	4,618,387	2,547,252	7,165,639



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APPENDIX 7: CITATIONS

This appendix assures proper attribution to the many data sources used throughout the hazard mitigation plan.

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APPENDIX 8: CROSSWALKS AND RESOLUTIONS

The appendix contains space to include the approved crosswalks per the Maryland Department of Emergency Management (MDEM) and Federal Emergency Management Agency (FEMA), Region III. It will also house copies of the adopting resolutions upon plan approval.

Annex C. Local Mitigation Plan Review Tool

Cover Page

The Local Mitigation Plan Review Tool (PRT) demonstrates how the local mitigation plan meets the regulation in 44 CFR § 201.6 and offers states and FEMA Mitigation Planners an opportunity to provide feedback to the local governments, including special districts.

1. The Multi-Jurisdictional Summary Sheet is a worksheet that is used to document how each jurisdiction met the requirements of the plan elements (Planning Process; Risk Assessment; Mitigation Strategy; Plan Maintenance; Plan Update; and Plan Adoption).
2. The Plan Review Checklist summarizes FEMA's evaluation of whether the plan has addressed all requirements.

For greater clarification of the elements in the Plan Review Checklist, please see Section 4 of the 2022 Local Mitigation Planning Policy Guide. Definitions of the terms and phrases used in the PRT can be found in Appendix E of the guide.

Plan Information	
Jurisdiction(s)	County: Garrett (Maryland) Towns: Accident, Deer Park, Friendsville, Grantsville, Kitzmiller, Loch Lynn Heights, Mountain Lake Park, Oakland
Title of Plan	Garrett County Multi-Jurisdictional Hazard Mitigation Plan
New Plan or Update	Update
Single- or Multi-Jurisdiction	Multi-Jurisdiction
Date of Plan	2024
Local Point of Contact	
Title	Emergency Planner (David Middleton)
Agency	Garrett County Department of Emergency Management (GCDEM)
Address	32 Outfitter Way, McHenry, MD 21541
Phone Number	301-334-7619
Email	dmiddleton@garrettcountry.org

Additional Point of Contact	
Title	Director (Sam Grant)
Agency	Garrett County Department of Emergency Management (GCDEM)
Address	32 Outfitter Way, McHenry, MD 21541
Phone Number	301-334-7619
Email	sgrant@garrettcountry.org

Review Information	
State Review	
State Reviewer(s) and Title	Marcia Barben, Hazard Mitigation Project Officer Bridget Cantwell Hazard Mitigation Planner
State Review Date	3/19/2024
FEMA Review	
FEMA Reviewer(s) and Title	Joshua Norris, Community Planner, MD FEMA Integration Team (FIT)
Date Received in FEMA Region	Submission #1: 4/12/2024 Submission #2: 6/20/2024
Plan Not Approved	Submission #1: 5/24/2024. Revisions required.
Plan Approvable Pending Adoption	Submission #2: 6/24/2024. Revisions addressed.
Plan Approved	

Plan Review Checklist

The Plan Review Checklist is completed by FEMA. States and local governments are encouraged, but not required, to use the PRT as a checklist to ensure all requirements have been met prior to submitting the plan for review and approval. The purpose of the checklist is to identify the location of relevant or applicable content in the plan by element/sub-element and to determine if each requirement has been “met” or “not met.” FEMA completes the “required revisions” summary at the bottom of each element to clearly explain the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is “not met.” Sub-elements in each summary should be referenced using the appropriate numbers (A1, B3, etc.), where applicable.

Requirements for each element and sub-element are described in detail in Section 4: Local Plan Requirements of this guide.

Plan updates must include information from the current planning process.

If some elements of the plan do not require an update, due to minimal or no changes between updates, the plan must document the reasons for that.

Multi-jurisdictional elements must cover information unique to all participating jurisdictions.

Element A: Planning Process

Element A Requirements	Location in Plan (section and/or page Met number)	Met / Not
A1. Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))		
A1-a. Does the plan document how the plan was prepared, including the schedule or time frame and activities that made up the plan’s development, as well as who was involved?	Section 1.1, pg. 6-14 Appendix 1 – Planning Process Involvement	Met
A1-b. Does the plan list the jurisdiction(s) participating in the plan that seek approval, and describe how they participated in the planning process?	Section 1.1.2, pg. 10-13	Met
A2. Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process? (Requirement 44 CFR § 201.6(b)(2))		

A2-a. Does the plan identify all stakeholders involved or given an opportunity to be involved in the planning process, and how each stakeholder was presented with this opportunity?	Section 1.1.1, pg. 6-8 Appendix 1 – Planning Process Involvement	Met
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Element A Requirements	Location in Plan (section and/or page Met number)	Met / Not
A3. Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval? (Requirement 44 CFR § 201.6(b)(1))		
A3-a. Does the plan document how the public was given the opportunity to be involved in the planning process and how their feedback was included in the plan?	Section 1.1.3, pg. 13 Section 1.1.4, pg. 13 & 14 Appendix 4 – Public Participation	Met
A4. Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement 44 CFR § 201.6(b)(3))		
A4-a. Does the plan document what existing plans, studies, reports and technical information were reviewed for the development of the plan, as well as how they were incorporated into the document?	Section 1.0, pg. 3-5 Section 1.3, pg. 89-91 Section 4.2, pg. 377-382 Appendix 7 – Citations General citations throughout narrative	Met

ELEMENT A REVISIONS

Requested Edit(s):

Resolve grammatical errors throughout the plan including the following:

- Page 99: Change “...are also **address** in the Water and Sewer Plan...” to “...are also **addressed** in the Water and Sewer Plan.”
Garrett County: Section 1.3 Capabilities, Planning & Regulatory Capability, Water & Sewer Plans, Pg. 99
FEMA: Addressed.
- Page 306: Change “...not **build** to withstand...” to “...not **built** to withstand...”
Garrett County: Section 2.2.11 Tornado Hazard Profile, Future Occurrences, Pg. 306
FEMA: Addressed.
- Page 307: Change “...of the county **too** tornados” to “of the county **to** tornados...”

Garrett County: Section 2.2.11 Tornado Hazard Profile, Risk Assessment, Pg. 307

FEMA: Addressed.

- Page 338: Change “The **media** age...” to “the **median** age...”

Garrett County: Section 2.4 Development Trends & Vulnerability Implications, Vulnerability Implications Table, Public Health Emergency Row, Notes Column, Pg. 338

FEMA: Addressed.

Required Revision

FEMA:

A1-b: “The plan must list the representatives from each of the participants in the current plan that will seek approval, and how they participated in the planning process” (2022 Local Mitigation Planning Policy Guide, page 18). The *Garrett County Hazard Mitigation Plan (2024 Update) Community Participation* Table clearly identifies the meetings, worksheets, surveys, and forms that each jurisdiction participated in and/or contributed to during the planning process. Sufficient supporting documentation of plan participation was included for Garrett County. However, sufficient municipal supporting documentation (such as completed survey forms) was not included in Appendix 1 for select survey forms and meetings. The plan must include at least 2 examples of plan participation by each participating jurisdiction in the form of a meeting attended and/or information submission).

To meet this requirement, add additional supporting documentation demonstrating plan participation to the plan (ideally Appendix 1) for the following jurisdictions.

Town of Accident

- Add at least one example of plan participation to Appendix 1 for this jurisdiction. Examples of plan participation include but are not limited to the following.
 - Risk Assessment Updates (a populated form, or transcript, or summary of what was discussed)
 - Asset Updates (a populated form, or transcript, or summary of what was discussed)
 - Capability Survey (a populated form)
 - Mitigation Projects Prioritization and Status Updates (a populated form)
 - One on One Conversation (a transcript or summary of what was discussed)
 - 2/1/2023 Garrett County Municipalities meeting attendance

Garrett County:

1. Section 1.1 Documentation of the Planning Process, 1.1.2 Jurisdictional Involvement, Municipal Planning Meeting – Town of Accident Table, Pg. 11
2. Section 3.2 Mitigation Actions, Town of Accident Table, Mitigation Project Status Notes, Pg 364
3. Appendix 1 – Planning Process Involvement, Capabilities Survey Response from Town of Accident

FEMA: Addressed.

Town of Deer Park

- Add at least two examples of plan participation to Appendix 1 for this jurisdiction. Examples of plan participation include but are not limited to the following.
 - Risk Assessment Updates (a populated form, or transcript, or summary of what was discussed)
 - Asset Updates (a populated form, or transcript, or summary of what was discussed)
 - Capability Survey (a populated form)
 - Mitigation Projects Prioritization and Status Updates (a populated form)

- One on One Conversation (a transcript or summary of what was discussed)
- 2/1/2023 Garrett County Municipalities meeting attendance

Garrett County:

1. Section 1.1 Documentation of the Planning Process, 1.1.2 Jurisdictional Involvement, Municipal Planning Meeting – Town of Deer Park Table, Pg. 11
2. Section 3.2 Mitigation Actions, Town of Deer Park Table, Mitigation Project Status Notes, Pg 365
3. Appendix 1 – Planning Process Involvement, Capabilities Survey Response from Town of Deer Park

FEMA: Addressed.

Town of Friendsville

- Add at least one example of plan participation to Appendix 1 for this jurisdiction. Examples of plan participation include but are not limited to the following.
 - Risk Assessment Updates (a populated form, or transcript, or summary of what was discussed)
 - Asset Updates (a populated form, or transcript, or summary of what was discussed)
 - Capability Survey (a populated form)
 - Mitigation Projects Prioritization and Status Updates (a populated form)
 - One on One Conversation (a transcript or summary of what was discussed)
 - 2/1/2023 Garrett County Municipalities meeting attendance

Garrett County:

1. Section 1.1 Documentation of the Planning Process, 1.1.2 Jurisdictional Involvement, Municipal Planning Meeting – Town of Friendsville Table, Pg. 12
2. Section 3.2 Mitigation Actions, Town of Friendsville Table, Mitigation Project Status Notes, Pg 366
3. Appendix 1 – Planning Process Involvement, Capabilities Survey Response from Town of Friendsville

FEMA: Addressed.

Town of Grantsville

- Add at least one example of plan participation to Appendix 1 for this jurisdiction. Examples of plan participation include but are not limited to the following.
 - Risk Assessment Updates (a populated form, or transcript, or summary of what was discussed)
 - Asset Updates (a populated form, or transcript, or summary of what was discussed)
 - Capability Survey (a populated form)
 - Mitigation Projects Prioritization and Status Updates (a populated form)
 - One on One Conversation (a transcript or summary of what was discussed)
 - 2/1/2023 Garrett County Municipalities meeting attendance

Garrett County:

1. Section 1.1 Documentation of the Planning Process, 1.1.2 Jurisdictional Involvement, Municipal Planning Meeting – Town of Grantsville Table, Pg. 12
2. Section 3.2 Mitigation Actions, Town of Grantsville Table, Mitigation Project Status Notes, Pg 368
3. Appendix 1 – Planning Process Involvement, Capabilities Survey Response from Town of Grantsville

FEMA: Addressed.

Town of Kitzmiller

- Add at least two examples of plan participation to Appendix 1 for this jurisdiction. Examples of plan participation include but are not limited to the following.
 - Risk Assessment Updates (a populated form, or transcript, or summary of what was discussed)
 - Asset Updates (a populated form, or transcript, or summary of what was discussed)
 - Capability Survey (a populated form)
 - Mitigation Projects Prioritization and Status Updates (a populated form)
 - One on One Conversation (a transcript or summary of what was discussed)
 - 2/1/2023 Garrett County Municipalities meeting attendance

Garrett County:

1. Section 1.1 Documentation of the Planning Process, 1.1.2 Jurisdictional Involvement, Municipal Planning Meeting – Town of Kitzmiller Table, Pg. 12
 2. Section 3.2 Mitigation Actions, Town of Kitzmiller Table, Mitigation Project Status Notes, Pg 370
 3. Appendix 1 – Planning Process Involvement, Capabilities Survey Response from Town of Kitzmiller
- FEMA:** Addressed.

Lock Lynn Heights

- Add at least two examples of plan participation to Appendix 1 for this jurisdiction. Examples of plan participation include but are not limited to the following.
 - Risk Assessment Updates (a populated form, or transcript, or summary of what was discussed)
 - Asset Updates (a populated form, or transcript, or summary of what was discussed)
 - Capability Survey (a populated form)
 - Mitigation Projects Prioritization and Status Updates (a populated form)
 - One on One Conversation (a transcript or summary of what was discussed)
 - 2/1/2023 Garrett County Municipalities meeting attendance

Garrett County:

1. Section 1.1 Documentation of the Planning Process, 1.1.2 Jurisdictional Involvement, Municipal Planning Meeting – Town of Lock Lynn Heights Table, Pg. 12
 2. Section 3.2 Mitigation Actions, Town of Lock Lynn Heights Table, Mitigation Project Status Notes, Pg 373
 3. Appendix 1 – Planning Process Involvement, Capabilities Survey Response from Town of Loch Lynn Heights
- FEMA:** Addressed.

Town of Mountain Lake Park

- Add at least one example of plan participation to Appendix 1 for this jurisdiction. Examples of plan participation include but are not limited to the following.
 - Risk Assessment Updates (a populated form, or transcript, or summary of what was discussed)
 - Asset Updates (a populated form, or transcript, or summary of what was discussed)
 - Capability Survey (a populated form)
 - Mitigation Projects Prioritization and Status Updates (a populated form)
 - One on One Conversation (a transcript or summary of what was discussed)
 - 2/1/2023 Garrett County Municipalities meeting attendance

Garrett County:

1. Section 1.1 Documentation of the Planning Process, 1.1.2 Jurisdictional Involvement, Municipal Planning Meeting – Town of Mountain Lake Park Table, Pg. 12

2. Section 3.2 Mitigation Actions, Town of Mountain Lake Park Table, Mitigation Project Status Notes, Pg 375

3. Appendix 1 – Planning Process Involvement, Capabilities Survey Response from Town of Mountain Lake Park

FEMA: Addressed.

Town of Oakland

- Add at least one example of plan participation to Appendix 1 for this jurisdiction. Examples of plan participation include but are not limited to the following.
 - Risk Assessment Updates (a populated form, or transcript, or summary of what was discussed)
 - Asset Updates (a populated form, or transcript, or summary of what was discussed)
 - Capability Survey (a populated form)
 - Mitigation Projects Prioritization and Status Updates (a populated form)
 - One on One Conversation (a transcript or summary of what was discussed)
 - 2/1/2023 Garrett County Municipalities meeting attendance

Garrett County:

1. Section 1.1 Documentation of the Planning Process, 1.1.2 Jurisdictional Involvement, Municipal Planning Meeting – Town of Oakland Table, Pg. 13

2. Section 3.2 Mitigation Actions, Town of Oakland Table, Mitigation Project Status Notes, Pg 376

3. Appendix 1 – Planning Process Involvement, Capabilities Survey Response from Town of Oakland

FEMA: Addressed.

Question:

FEMA:

Were local planning commissions invited to participate in the planning process?

Page 89: "Several planning commissions serve the jurisdictions in Garrett County. These commissions support general community planning within their designated jurisdictions. Miscellaneous powers and duties (Md. Land Use Code Ann. §2-105) include (but may not be limited to) the following...Though the planning commissions do not directly coordinate hazard mitigation planning in Garrett County, their responsibilities for coordinating community-level planning make them valuable resources for creating actionable mitigation strategies."

Garrett County:

Section 1.1.2 Jurisdictional Involvement, Pg 10.

Section 1.3 Planning & Regulatory Capability, Pg. 89

FEMA: Addressed.

Recommended Revisions

FEMA:

A2-a: Add text to the plan explaining how the Garrett County Department of Community Development (ideally at least the Planning & Land Management Division) was invited to participate in the planning process.

Garrett County: Section 1.3 Capabilities, Planning & Regulatory Capability, Pg. 97

FEMA: Addressed.

A2-a: Add text to the plan elaborating on how the following stakeholders with expertise engaging underserved and socially vulnerable populations were invited to participate and provided input during the planning process:

Garrett County: Section 1.1.4 Outreach to Historically Underserved & Socially Vulnerable Populations, Pg. 13

- Garrett College (serving a largely transient population who may be unfamiliar with the
- area)
- Garrett County Public Schools (serving youth [i.e., aged four to 18 years])
- Garrett County Health Department (serving various populations, often through
- partnerships with an array of service providers with varying clientele)
- Garrett Transit Service (serving individuals without access to a vehicle)
- Garrett County United Way (educational, economic and health resources)
- Garrett County Behavioral Health / Mindful Roots, LLC / Mountain Haven Wellness and
- Recovery Center / Mountain

FEMA: Not addressed. No changes to the plan's content were made to address this recommended revision.

A4-a: Update the referenced documents table in Section 1 and relevant narrative elements of the plan to include information from the resources below:

- Climate Essentials July 2023 (fema.gov)

Garrett County: Section 2.4, Pg. 343, Also included in Appendix 7-Citations

FEMA: Addressed.

- FEMA Region 3 High Hazard Potential Dams: Local and Tribal Mitigation Planning Tips

Garrett County: Included in Appendix 7 – Citations

FEMA: Noted. Moving forward, consider further integrating the content of this resource into the main text of the plan.

- Fifth National Climate Assessment (globalchange.gov)

Garrett County: Appears in Hazard Profiles where used (Flooding, Severe Summer Weather, Severe Winter Weather, Wildfire), also included in Appendix 7 - Citations

FEMA: Addressed.

Element B: Risk Assessment

Element B Requirements	Location in Plan (section and/or page Met number)	Met / Not
B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on previous occurrences of hazard events and on the probability of future hazard events? (Requirement 44 CFR § 201.6(c)(2)(i))		
B1-a. Does the plan describe all natural hazards that can affect the jurisdiction(s) in the planning area, and does it provide the rationale if omitting any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area?	Section 2.1, pg. 114-116 Section 2.2, pg. 119-120 Sections 2.2.1-2.2.12 (Hazard Profiles), pg. 128-324	Met
B1-b. Does the plan include information on the location of each identified hazard?	Sections 2.2.1-2.2.12, pg. 128-324 (Location & Extent section of each profile)	Met
B1-c. Does the plan describe the extent for each identified hazard?	Sections 2.2.1-2.2.12, pg. 128-324 (Location & Extent section of each profile)	Met
B1-d. Does the plan include the history of previous hazard events for each identified hazard?	Sections 2.2.1-2.2.12, pg. 128-324 (Previous Occurrences section of each profile)	Met

Element B Requirements	Location in Plan (section and/or page Met number)	Met / Not
B1-e. Does the plan include the probability of future events for each identified hazard? Does the plan describe the effects of future conditions, including climate change (e.g., long-term weather patterns, average temperature and sea levels), on the type, location and range of anticipated intensities of identified hazards?	Sections 2.2.1-2.2.12, pg. 128-324 (Future Occurrences Section and Future Climate Considerations Section of each profile)	Met
B1-f. For participating jurisdictions in a multi-jurisdictional plan, does the plan describe any hazards that are unique to and/or vary from those affecting the overall planning area?	Sections 2.2.1-2.2.12, pg. 128-324 (Location & Extent section of each profile and Risk Assessment section – Multi-Jurisdictional Considerations Tables applicable hazards.)	Met
B2. Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP- insured structures that have been repetitively damaged by floods? (Requirement 44 CFR § 201.6(c)(2)(ii))		
B2-a. Does the plan provide an overall summary of each jurisdiction's vulnerability to the identified hazards?	Sections 2.2.1-2.2.12, pg. 128-324 (Impacts and Vulnerability sections as well as Risk Assessment section of each profile)	Met
B2-b. For each participating jurisdiction, does the plan describe the potential impacts of each of the identified hazards on each participating jurisdiction?	Sections 2.2.1-2.2.12, pg. 128-324 (Impacts and Vulnerability sections, as well as Loss and Damages sections, of each profile)	Met
B2-c. Does the plan address NFIP-insured structures within each jurisdiction that have been repetitively damaged by floods?	Section 2.2.5, pg. 193-220 Section 1.3, pg. 93-99	Met
ELEMENT B REVISIONS		
<p>Required Revision:</p> <p><u>FEMA:</u></p> <p>B2-a: “The risk assessment must describe the vulnerability of plan participant(s) to each identified hazard. The vulnerability description must include a summary (such as a problem statement) of the hazard and its consequences or effects on the participant(s) and their assets. A list of assets without context is not sufficient” (2022 Local Mitigation Planning Policy Guide, page 23). Flooding hazard vulnerability has been sufficiently addressed in the plan.</p> <p>“<u>Vulnerability</u> is a description of which assets, including structures, systems, populations and other assets as defined by the community, within locations identified to be hazard</p>		

prone, are at risk from the effects of the identified hazard(s)” (2022 Local Mitigation Planning Policy Guide, page 23).

“Assets are determined by the community and include, but are not limited to:

- **People** (including **underserved communities and socially vulnerable populations**).
- **Structures** (including facilities, lifelines and critical infrastructure).
- **Systems** (including **networks and capabilities**).
- **Natural, historic, and cultural** resources.
- **Activities that have value to the community.”**

(2022 Local Mitigation Planning Policy Guide, page 23).

The plan’s risk assessment contains tables describing specific assets located in hazard-prone areas for the flooding, landslide, and hazardous materials hazards. However, this analysis of vulnerable asset exposure is not sufficiently included in the plan for all natural hazards and required asset types.

To meet this requirement, add text or maps to the plan that describe the following vulnerable assets for the plan’s identified natural hazards (listed below) and all participating jurisdictions.

- **Severe Summer Weather:**
 - Structures (including facilities, lifelines and critical infrastructure).
 - Systems (such as roadways, cell towers, and other infrastructure networks)
 - Natural, historic, and cultural resources.

Garrett County: Section 2.2.9 Severe Summer Weather Hazard Profile, Risk Assessment, Table, Pg. 282

FEMA: Addressed. Moving forward, include additional vulnerable natural resource assets for each participating jurisdiction and natural hazard within the plan.

- **Tornado and Wildfire:**
 - Systems (such as roadways, cell towers, and other infrastructure networks)
 - Natural, historic, and cultural resources.

Garrett County:

Section 2.2.11 Tornado Hazard Profile, Risk Assessment, Pg. 307

Section 2.2.12 Wildfire Hazard Profile, Risk Assessment, Pg. 323

FEMA: Addressed. Moving forward, include additional vulnerable natural resource assets for each participating jurisdiction and natural hazard within the plan.

- **Dense Fog, Flooding, Landslide, Public Health Emergencies, and Severe Winter Weather:**
 - Natural, historic, and cultural resources.

Garrett County:

Section 2.2.3 Dense Fog Hazard Profile, Risk Assessment, Pg. 174

Section 2.2.8 Public Health Emergency Hazard Profile, Risk Assessment, Pg. 266

Section 2.2.10 Severe Winter Weather Hazard Profile, Risk Assessment, Table, Pg. 295

FEMA: Addressed. Moving forward, include additional vulnerable natural resource assets for each participating jurisdiction and natural hazard within the plan.

Consider using the FEMA [Resilience Analysis and Planning Tool \(RAPT\)](#) to overlay nationally available data layers or import County or State data layers, then integrate a clear image of each map into the plan (for the hazards listed above) to address this required revision. The [RAPT Resource Center](#) provides a quick guide and tips for using the tool.

Recommended Revisions:

FEMA:

B2-a: More explicitly describe which socially vulnerable populations in Garrett County are most at risk to wildfires. The Social Vulnerability Considerations subsection of the wildfire hazard section of the plan summarizes a study's social vulnerability and wildfire risk score for Garrett County, but the section does not explain the significance of the study's results.

Garrett County: [Section 2.2.12 Wildfire Hazard Profile, Social Vulnerability Considerations, Pg. 319](#)

FEMA: Addressed.

Element C: Mitigation Strategy

Element C Requirements	Location in Plan (section and/or page Met number)	Met / Not
C1. Does the plan document each participant's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement 44 CFR § 201.6(c)(3))		
C1-a. Does the plan describe how the existing capabilities of each participant are available to support the mitigation strategy? Does this include a discussion of the existing building codes and land use and development ordinances or regulations?	Section 1.3, pg. 87-112 Building Codes – Section 1.3, pg. 91 & 92 Land Use & Development ordinances – Section 1.3, pg. 92 & 93 Section 4.2, pg. 303-306	Met
C1-b. Does the plan describe each participant's ability to expand and improve the identified capabilities to achieve mitigation?	Section 1.3, pg. 90-93, 106 & 107	Met
C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))		
C2-a. Does the plan contain a narrative description or a table/list of their participation activities?	Section 1.3, pg. 87 & 93-99 Section 1.3, pg. 106 (Table) Section 2.2.5, pg. 194, 195 & 201 Appendix 1 – Planning Process (Capability Survey Summary)	Met
C3. Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement 44 CFR § 201.6(c)(3)(i))		
C3-a. Does the plan include goals to reduce the risk from the hazards identified in the plan?	Section 3.1, pg. 345-347	Met
C4. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement 44 CFR § 201.6(c)(3)(ii))		

C4-a. Does the plan include an analysis of a comprehensive range of actions/projects that each jurisdiction considered to reduce the impacts of hazards identified in the risk assessment?	Section 3.2, pg. 356-368	Met
C4-b. Does the plan include one or more action(s) per jurisdiction for each of the hazards as identified within the plan's risk assessment?	Section 3.2, pg. 356-368 See jurisdiction-specific tables	Met

Element C Requirements	Location in Plan (section and/or page Met number)	Met / Not
C5. Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction? (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))		
C5-a. Does the plan describe the criteria used for prioritizing actions?	Section 3.2, pg. 352-354 Appendix 2 – Project Prioritization	Met
C5-b. Does the plan provide the position, office, department or agency responsible for implementing/administering the identified mitigation actions, as well as potential funding sources and expected time frame?	Section 3.2, pg. 356-368; see following columns <ul style="list-style-type: none"> • Project Coordinator • Funding Source • Estimated Timeframe 	Met

ELEMENT C REVISIONS

Required Revision:

FEMA:

C4-b: “Each plan participant must identify one or more mitigation actions the participant(s) intends to implement for each hazard addressed in the risk assessment” (2022 Local Mitigation Planning Policy Guide, page 27).

To meet this requirement:

1. Within the appropriate row of the 2023 Mitigation Action Plan Tables, list the specific hazards addressed by a broad mitigation action instead of stating that it addresses “multiple” hazards:
Garrett County:
Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Garrett County, Pgs. 360 – 363
Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Friendsville, Pg. 368
Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Grantsville, Pg. 369, 370
Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Kitzmiller, Pg. 372
Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Loch Lynn

Heights Pg. 374

FEMA: Addressed.

And

2. Add content to the plan (ideally in Section 3.2 Mitigation Actions) to ensure that there is at least one active (new or ongoing) mitigation action for each hazard and each participating jurisdiction, as indicated below.

Note: Keep in mind that each mitigation action added to the plan should be described in terms of its action title, project #, hazard type addressed, status, project type, funding source, estimated timeframe, project lead/coordinator, project priority, and any other information included in the 2023 Mitigation Action Plan.

Dense Fog:

- Town of Accident, Town of Friendsville, Town of Grantsville, Town of Kitzmiller, Town of Lock Lynn Heights, Town of Mountain Lake Park, and Town of Oakland.

Garrett County:

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Garrett County, Pg. 360, Project #13.1 & Pg. 363, Project #13.5

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Lock Lynn Heights, Pg. 373, Project #3.1

FEMA: Addressed.

Drought:

- Town of Accident, Town of Friendsville, Town of Grantsville, Town of Kitzmiller, Town of Mountain Lake Park, and Town of Oakland.

Garrett County:

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Garrett County, Pg. 360, Project #13.1 & Pg. 363, Project #13.5

FEMA: Addressed.

Landslide:

- Town of Accident, Town of Deer Park, Town of Lock Lynn Heights, Town of Mountain Lake Park, Town of Oakland.

Garrett County:

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Garrett County, Pg. 360, Project #13.1; Pg. 361, Project #13.2 & 13.3; Pg. 363, Project #13.5

FEMA: Addressed.

Public Health Emergencies:

- Town of Accident, Town of Deer Park, Town of Friendsville, Town of Grantsville, Town of Kitzmiller, Town of Lock Lynn Heights, Town of Oakland.

Garrett County:

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Garrett County, Pg. 360, Project #13.1 & Pg. 362, Project #13.4 & Pg. 363, Project #13.5

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Friendsville, Pg. 367, Project 8.1

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Grantsville, Pg. 369, Project 8.1, 8.2 & 8.3

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Kitzmiller, Pg. 371, Project 8.1 & 8.2

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Lock Lynn Heights, Pg. 374, Project 8.1

FEMA: Addressed.

Severe Summer Weather:

- Town of Accident, Town of Deer Park, Town of Friendsville, Town of Grantsville, Town of Kitzmiller, Town of Lock Lynn Heights, Town of Mountain Lake Park, Town of Oakland.

Garrett County:

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Garrett County, Pg. 360, Project #13.1 & Pg. 361, Project #13.3 & Pg. 362, Project #13.4, & Pg. 363, Project #13.5

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Friendsville, Pg. 368, Project 13.1

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Grantsville, Pg. 369, Project 13.1 & Pg. 370, Projects 13.2, 13.3

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Kitzmiller, Pg. 372, Project 13.1

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Lock Lynn Heights, Pg. 374, Project 13.1

FEMA: Addressed.

Severe Winter Weather:

- Town of Accident, Town of Deer Park, Town of Grantsville, Town of Lock Lynn Heights, Town of Mountain Lake Park, Town of Oakland.

Garrett County:

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Garrett County, Pg. 360, Project #13.1 & Pg. 361, Project #13.3 & Pg. 362, Project #13.4, & Pg. 363, Project #13.5

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Grantsville, Pg. 369, Project 13.1 & Pg. 370, Projects 13.2, 13.3

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Lock Lynn Heights, Pg. 374, Project 13.1

FEMA: Addressed.

Tornado:

- Town of Accident, Town of Deer Park, Town of Grantsville, Town of Kitzmiller, Town of Lock Lynn Heights, Town of Mountain Lake Park, Town of Oakland.

Garrett County:

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Garrett County, Pg. 360, Project #13.1 & Pg. 361, Project #13.3 & Pg. 362, Project #13.4, & Pg. 363, Project #13.5

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Grantsville, Pg. 369, Project 13.1 & Pg. 370, Projects 13.2, 13.3

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Kitzmiller, Pg. 372, Project 13.1

Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Town of Lock Lynn Heights, Pg. 374, Project 13.1

FEMA: Addressed.

Wildfire:

- Town of Accident, Town of Deer Park, Town of Grantsville, Town of Kitzmiller, Town of Lock Lynn Heights, Town of Mountain Lake Park, Town of Oakland.

Garrett County: Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan – Garrett County, Pg. 360, Project #13.1 & Pg. 361, Project #13.2, 13.3, & Pg. 362, Project #13.4, & Pg. 363, Project #13.5

FEMA: Addressed.

C5-b: Update the 2023 Mitigation Action Plan to include the FEMA Community Lifelines and estimated cost associated with each active mitigation action.

Garrett County: Section 3.2 Mitigation Actions, 2023 Mitigation Action Plan, Pgs. 356 – 376

FEMA: Addressed.

Recommended Revisions

FEMA:

C1-a: Update the aggregated “technical specialists” capability information in Section 1 to display municipality-specific percentages:

FEMA: Not addressed.

C1-a: The 2023 Local Mitigation Planning Handbook encourages each plan participant to describe their mitigation-related planning and regulatory, administrative and technical, financial, and education and outreach capabilities within their local hazard mitigation plan. The plan thoroughly describes plan participant capabilities by category in dedicated subsections **except for** the education and outreach capability. Consider adding an education and outreach capability subsection to the plan that addresses this shortcoming.

Refer to section 5.2.4 of the 2023 Local Hazard Mitigation Planning Handbook for additional information.

C1-a: Add text to the plan specifying which jurisdictions have adopted specific building codes described in 1.0 introduction. Currently. Page 91 of the plan states that "[m]ost jurisdictions in Garrett County have adopted the *Maryland Performances Building Code Standards*, including the *2018 International Guideline Code (IBC)*, the *2018 International Residential Code (IRC)*, and the *2018 International Energy Conservation Code (IECC)*."

Garrett County: Section 1.3 – Planning & Regulatory Capability, Pg 92, text before table.

FEMA: Addressed.

C4-b: Add a note to section 3.2, ideally before the 2023 Mitigation Action Plan table, clarifying what the green text means.

Garrett County: Green text was to show where state corrections were made, this will be changed back to black on final.

FEMA: Noted.

Element D: Plan Maintenance

Element D Requirements	Location in Plan (section and/or page Met number)	Met / Not
D1. Is there discussion of how each community will continue public participation in the plan maintenance process? (Requirement 44 CFR § 201.6(c)(4)(iii))		
D1-a. Does the plan describe how communities will continue to seek future public participation after the plan has been approved?	Section 4.3, pg. 382 & 383	Met
D2. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a five-year cycle)? (Requirement 44 CFR § 201.6(c)(4)(i))		

D2-a. Does the plan describe the process that will be followed to track the progress/status of the mitigation actions identified within the Mitigation Strategy, along with when this process will occur and who will be responsible for the process?	Section 4.1, pg. 369-376	Met
D2-b. Does the plan describe the process that will be followed to evaluate the plan for effectiveness? This process must identify the criteria that will be used to evaluate the information in the plan, along with when this process will occur and who will be responsible.	Section 4.1, pg. 369-376	Met

Element D Requirements	Location in Plan (section and/or page Met number)	Met / Not
D2-c. Does the plan describe the process that will be followed to update the plan, along with when this process will occur and who will be responsible for the process?	Section 4.1, pg. 369-376	Met
D3. Does the plan describe a process by which each community will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement 44 CFR § 201.6(c)(4)(ii))		
D3-a. Does the plan describe the process the community will follow to integrate the ideas, information and strategy of the mitigation plan into other planning mechanisms?	Section 4.2, pg. 377-382 Section 3.1, pg. 347 (Goal 10)	Met
D3-b. Does the plan identify the planning mechanisms for each plan participant into which the ideas, information and strategy from the mitigation plan may be integrated?	Section 4.2, pg. 377-382	Met
D3-c. For multi-jurisdictional plans, does the plan describe each participant's individual process for integrating information from the mitigation strategy into their identified planning mechanisms?	Section 4.2, pg. 377-382 (to include samples)	Met
ELEMENT D REVISIONS		
Required Revisions: <u>FEMA:</u> D3-a and D3-c: “The plan must describe the community’s process to integrate the plan’s data, information, and hazard mitigation goals and actions into other planning mechanisms” (2022 Local Mitigation Planning Policy Guide, page 30). Additionally, a		

“...multi-jurisdictional plan must describe each participant's individual process for integrating information from the mitigation strategy into their identified planning mechanisms.” Section 4 highlights local planning mechanisms suitable for integration with the Garrett County Hazard Mitigation Plan and recommends how specific local planning mechanisms should be integrated with the plan. However, the plan does not clearly state what process will be used by the County and each of its jurisdictions to carry out plan integration going forward. In other words, the plan states that [s]ix existing mechanisms can support mitigation in Garrett County...” but does not explicitly describe the process used by each locality to ensure that this plan integration is occurring.

To meet this requirement, add at least narrative to the plan explicitly describing the **process** that **Garrett County** and **each participating jurisdiction** will use to integrate information from the Garrett County Hazard Mitigation Plan (such as delineated areas of high hazard risk, mitigation projects, and mitigation goals) into the local planning mechanisms highlighted in Section 4.

Garrett County: Section 4.2 starting on Pg. 378, continuing to Pg. 382, added a Plan Integration Process section for each identified planning mechanism).

FEMA: Addressed.

Recommended Revisions

FEMA:

D2-b: The plan includes a copy of the annual steering committee jurisdictional survey, maintenance meeting agenda with key questions, and mitigation project evaluation worksheets, but does not succinctly summarize how Garrett County will evaluate mitigation plan effectiveness. To address this, consider adding a list of specific evaluation criteria that the Garrett County Department of Emergency Management (GCDEM) will use during each annual plan review event to determine plan effectiveness.

Garrett County: Section 4.1 Monitoring, Evaluating and Updating the plan, Pg. 372

FEMA: Addressed.

Element E: Plan Update

Element E Requirements	Location in Plan (section and/or page Met number)	Met / Not
E1. Was the plan revised to reflect changes in development? (Requirement 44 CFR § 201.6(d)(3))		
E1-a. Does the plan describe the changes in development that have occurred in hazard-prone areas that have increased or decreased each community's vulnerability since the previous plan was approved?	Section 1.2.4, pg. 67-86 Section 2.4, pg. 328-342	Met
E2. Was the plan revised to reflect changes in priorities and progress in local mitigation efforts? (Requirement 44 CFR § 201.6(d)(3))		
E2-a. Does the plan describe how it was revised due to changes in community priorities?	Section 2.4, pg. 328-342	Met

Element E Requirements	Location in Plan (section and/or page Met number)	Met / Not
E2-b. Does the plan include a status update for all mitigation actions identified in the previous mitigation plan?	Section 3.2, pg. 356-368; in particular "Project Status" column and Notes. Appendix 3 – Inactive Projects	Met
E2-c. Does the plan describe how jurisdictions integrated the mitigation plan, when appropriate, into other planning mechanisms?	Section 4.2, pg. 377-382 Section 3.1, pg. 347 (Goal 10)	Met

ELEMENT E REVISIONS

Required Revision

FEMA:

E2-c:

To meet this requirement:

1. Add content to the plan explaining "how the jurisdiction(s) integrated information from the mitigation plan into other planning mechanisms, as a demonstration of progress in local hazard mitigation efforts" (2022 Local Mitigation Planning Policy Guide, page 31).

or

2. Add at least text to the plan explicitly stating that "the previous plan was not integrated into other planning mechanisms" (2022 Local Mitigation Planning

Policy Guide, page 31).

Garrett County: Section 4.2 Implementation through Existing Programs, Pg. 377

FEMA: Addressed. Moving forward, consider including excerpts from local planning mechanisms demonstrating what components of the Garrett County HMP were integrated.

Element F: Plan Adoption

Element F Requirements	Location in Plan (section and/or page Met number)	Met / Not
F1. For single-jurisdictional plans, has the governing body of the jurisdiction formally adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))		
F1-a. Does the participant include documentation of adoption?	Appendix 8 – Crosswalk & Resolutions (Upon receiving APA Status)	
F2. For multi-jurisdictional plans, has the governing body of each jurisdiction officially adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))		
F2-a. Did each participant adopt the plan and provide documentation of that adoption?	Appendix 8 – Crosswalk & Resolutions (Upon receiving APA Status)	
ELEMENT F REQUIRED REVISIONS		
Required Revision:		
N/A		

Element G: High Hazard Potential Dams (Optional)

HHPD Requirements	Location in Plan (section and/or page Met number)	Met / Not
HHPD1. Did the plan describe the incorporation of existing plans, studies, reports and technical information for HHPDs?		
HHPD1-a. Does the plan describe how the local government worked with local dam owners and/or the state dam safety agency?	Section 1.1.1, pg. 6 Section 2.2.2, pg. 142-148	Met
HHPD1-b. Does the plan incorporate information shared by the state and/or local dam owners?	Section 2.2.2, pg. 142-148	Met
HHPD2. Did the plan address HHPDs in the risk assessment?		
HHPD2-a. Does the plan describe the risks and vulnerabilities to and from HHPDs?	Section 2.2.2, pg. 137, 142-146, 153 (Table)	Met
HHPD2-b. Does the plan document the limitations and describe how to address deficiencies?	Section 2.2.2, pg. 147	Met
HHPD3-a. Does the plan address how to reduce vulnerabilities to and from HHPDs as part of its own goals or with other long- term strategies?	Section 3.1, pg. 346, Goal 5, objective 5.2 Section 3.2, pg. 356, Projects # 2.1 & 2.2	Met
HHPD3-b. Does the plan link proposed actions to reducing long- term vulnerabilities that are consistent with its goals?	Section 3.2, pg. 356, Projects # 2.1 & 2.2	Met
HHPD4. Did the plan include actions that address HHPDs and prioritize mitigation actions to reduce vulnerabilities from HHPDs?		
HHPD4-a. Does the plan describe specific actions to address HHPDs?	Section 3.2, pg. 356, Projects # 2.1 & 2.2	Met
HHPD4-b. Does the plan describe the criteria used to prioritize actions related to HHPDs?	Section 3.2, pg. 356 Appendix 2 – Project Prioritization, Numbers 2.1 & 2.2	Met
HHPD4-c. Does the plan identify the position, office, department or agency responsible for implementing and administering the action to mitigate hazards to or from HHPDs?	Section 2.2.2, pg. 147 Section 3.2, pg. 356, Project # 2.1 & 2.2, Project Coordinator column.	Met

HHPD Required Revisions

Required Revision:

FEMA:

HHPD3-b: To address this requirement, “[l]ink proposed actions for reducing long-term vulnerabilities from HHPDs to [at least 2] HMP goals” (2022 Local Mitigation Planning Policy Guide, page 34). This can be achieved by adding information to Section 3.2, 2023 Mitigation Actions Plan, and ensuring that at least actions that reduce the long-term vulnerabilities from HHPDs (i.e. the Dam Failure mitigation actions) are shown to advance 2 or more HMP goals. Alternatively, add narrative briefly explaining how specific mitigation actions in the plan reduce the long-term vulnerabilities from HHPDs.

Garrett County: Section 3.1 – Mitigation Goals and Objectives, Pg. 348, text and table HHPD Mitigation Actions & Associated Mitigation Goals.

FEMA: Addressed.

Recommended Revisions:

Garrett County: We will most certainly utilize this resource more moving forward, thank you.

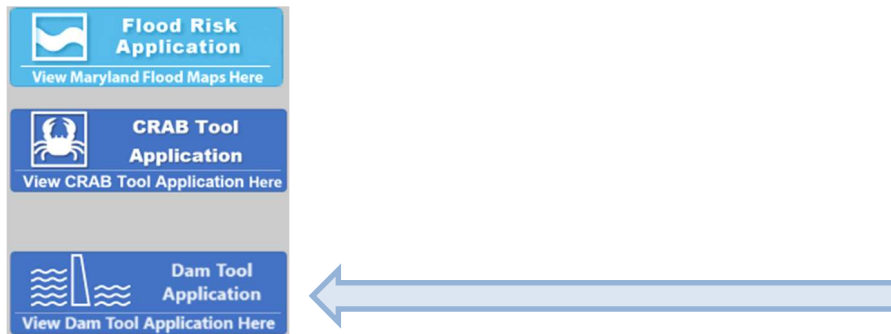
FEMA: Noted.

FEMA:

HHPD2: The plan includes informative dam inundation and risk data from local dam owners, Garrett Soil Conservation District, Garrett County Department of Planning and Land Development, and the Maryland Department of Assessments and Taxation. However, MDE's new and publicly available dam inundating mapping for MD's state dam inventory (using [DSS-WISE Lite](#)) does not appear to have been integrated into the plan. Garrett County is strongly encouraged to view the data [here](#), reach out to **John Roche, Chief, MDE Dam Safety and Permitting Division at john.roche@maryland.gov** to obtain non-public human consequences (dam hazard impacts) data and inundation area mapping or address any related MDE dam data questions, then integrate this information into the plan.

Note:

As announced during the 3/24/2024 nationwide FEMA Region 3 “Elevating Dam Safety Through Hazard Mitigation Planning Mitigation” Coffee Break Webinar, the Maryland Department of the Environment (MDE) utilized FEMA Hazard Mitigation Grant Program (HMGP) funding to run dam breach analyses (using [DSS-WISE Lite](#)) for virtually the entire Maryland inventory of dams (roughly 550 dams of all hazard potential classifications). This data is now accessible via MDE's Flood Maps viewer as shown below. For more details regarding how to address each HHPD local mitigation planning requirement, refer to the [FEMA Region 3 High Hazard Potential Dams: Local and Tribal Mitigation Planning Tips](#) resource.



Coffee Break Webinar Information Presented by John Roche, MDE:

Present use of DSS-WISE Lite Products

- Spring 2019 – Apply to FEMA Hazard Mitigation Grant Program funds to run DSS-WISE Lite simulations on all ~550 inventory dams
 - Sunny Day and Brim-Full failures
 - High resolution terrain data
- September 2020 – Grant awarded
 - FEMA-DR-4376-MD-0010
- Project kick-off in December 2021
- Analysis complete Oct 2023, mapping March 2024



HHPD4-a: Consider elaborating on existing dam failure mitigation actions or including additional dam failure mitigation actions in the Garrett County Hazard Mitigation Plan that integrate the eligible HHPD activities language below from the latest FEMA HHPD grant notice of funding opportunity (NOFO).

Eligible Rehabilitation of HHPD Grant Program Activities

- Construction activities such as:
 - Repair or rehabilitation of the dam
 - Dam removal
 - Construction monitoring
 - Installation of early warning systems associated with the eligible dam project
- Planning activities such as:
 - Activities and studies that determine risks associated with eligible dams
 - Environmental studies for NEPA compliance
 - Development of operation and maintenance plans
 - Public education and awareness of flood risks associated with the eligible dam project
 - Dam risk and consequence assessments Feasibility studies
 - Preliminary engineering studies Alternatives analysis
 - Mapping, engineering survey, and inundation modeling
 - Development of evacuation plans, plans for flood fighting, or community response plans to include in the floodplain management plan

- Coordination of EAP and EOPs for different release conditions
- Design activities such as:
 - Engineering design
 - Development of specifications

Source: Fiscal Year (FY) 2024 Rehabilitation of High Hazard Potential Dams (HHPD) Notice of Funding Opportunity (NOFO)

Plan Assessment

These comments can be used to help guide your annual/regularly scheduled updates and the next plan update.

Element A. Planning Process

Strengths

- **[Best Practice]** The plan includes clear summary tables that breakdown how each jurisdiction was represented and contributed to the planning process.
- **[Best Practice]** Appendix 1 includes each Hazard Mitigation Planning Committee member's name, organization/agency, position title, email, cell phone, and work phone number.
- The plan is well organized.
- Population change, demographic, development, and open space data by jurisdiction is introduced at the outset of the plan.

Opportunities for Improvement

- Add a clear executive summary summarizing key content from the introduction, risk assessment, capability assessment, and mitigation strategy sections.
- Address any remaining recommended revisions for this Element.

Element B. Risk Assessment

Strengths

- The plan summarizes the hazard related vulnerabilities associated with specific categories of socially vulnerable populations (as grouped and defined by the CDC SVI).
- Plan clearly summarizes which hazards were and were not profiled and why, while integrating relevant information from the Garrett County and Maryland State Hazard Mitigation Plan.
- The Dam and Levee, Dense Fog, Flooding, Public Health Emergency, Landslide, Severe Summer Weather, Severe Winter Weather, Tornado, Wildfire, and Hazardous Materials sections include a table clearly summarizing and comparing hazard impacts on plan participant populations.

Opportunities for Improvement

- Add at least an appendix that describes all critical (physical and environmental) assets within the planning area within a single table or set of tables. The asset types that should be within this appendix include structures, systems, as well as environmental, historic, and cultural resources.
- During the next update, consider including completed copies or all information from the FEMA Region 3 Checking In on the NFIP capability assessment worksheets in the Garrett County Hazard Mitigation Plan. Much but not all of the information expressed in these worksheets was addressed in the plan.
- Address any remaining recommended revisions for this Element.

Element C. Mitigation Strategy

Strengths

- The plan clearly summarized the ability of each plan participant to expand on and improve their mitigation planning capabilities and provides recommendations for enhancing specific capabilities.
- The plan includes detailed and measurable objectives to operationalize 10 clearly stated mitigation goals.

Opportunities for Improvement

- Address any remaining recommended revisions for this Element.

Element D. Plan Maintenance

Strengths

- The plan clearly details the actions that the lead agency for maintaining the Garrett County HMP will take during each of the 5 years following FEMA approval of the plan. Section 4 of the plan includes worksheets and template agendas to support plan evaluation, implementation, and maintain responsibilities including the annual plan review events.

Opportunities for Improvement

- Address any remaining recommended revisions for this Element.

Element E. Plan Update

Strengths

- N/A

Opportunities for Improvement

- N/A

Element G. HHPD Requirements (Optional)

Strengths

- N/A

Opportunities for Improvement

- Address any remaining recommended revisions for this Element.

Element H. Additional State Requirements (Optional)

Strengths

- N/A

Opportunities for Improvement

- N/A

MDEM REVIEW COMMENTS

New to our review process, we have added notes to the PDF version of the HMP. Here you will see grammar type recommendations and smaller suggestions.

HMP Strengths

- Garrett County's Hazard Mitigation Plan flows with FEMA's best practices to establish Mitigation Goals and Actions.
- Steering committee consists of a large group of diverse stakeholders
- Tables and maps are easy to read.
- Narrative noting the interchangeable definitions of Critical Infrastructure and Critical Facility

HMP Recommended revisions

- Perform risk assessment for both landslides and soil movement. Both are prominent in the area. Also, the National Risk Index lists landslide

<https://hazards.fema.gov/nri/natural-hazards>