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# Resilient Maryland

## A Collaborative Strategy for Promoting Statewide Resilience

**Governor** | Wes Moore
**Lt. Governor** | Aruna Miller
**MDEM Secretary** | Russell J. Strickland
**Chief Resilience Officer** | Mike Hinson

Maryland
DEPARTMENT OF EMERGENCY MANAGEMENT

MARYLAND OFFICE OF
RESILIENCE
*A Resilient Maryland, Rooted in Community*

Maryland
DEPARTMENT OF
EMERGENCY MANAGEMENT

***About the Maryland Department of Emergency Management***

*MDEM is a national leader in Emergency Management that provides Maryland residents, organizations, and emergency management partners with expert information, programmatic activities, and leadership in the delivery of financial, technical and physical resources "to shape a resilient Maryland where communities thrive." We do this by being Maryland's designated source of official risk reduction and consequence management information.*

MARYLAND OFFICE OF
RESILIENCE
*A Resilient Maryland, Rooted in Community*

***About the Maryland Office of Resilience***

*The Maryland Office of Resilience was created by law in 2022 and officially established in November 2023. The Office coordinates across state and local resilience efforts, provides strategic direction, and offers technical assistance to local governments. The office was created to do the following:*

- *Develop a statewide resilience strategy*
- *Conduct outreach and provide technical assistance to local jurisdictions to support the development of local resilience strategies*
- *Prioritize vulnerable communities and ensure that investments are made with a focus on environmental justice*
- *Identify flood risk assessment and other resilience-related risk assessment tools*
- *Coordinate and administer federal prevention, protection, mitigation, and recovery–focused programs*
- *Administer State mitigation grants and loans*

# Acknowledgements


*This strategy was developed by...*

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*And designed by...*

**Alan Lyons,** courtesy of the Mid-Atlantic Center for Emergency Management & Public Safety (MACEM&PS) at Frederick Community College (FCC).

*A complete list of acknowledgements, including all of the many partners that informed this document, is provided in Appendix A: Acknowledgements.*

# Letter from the Governor

Dear Marylanders,

Maryland stands at a crossroads. From the mountains of Western Maryland to the shores of the Chesapeake Bay, our communities are facing more intense disasters, compounded by climate change. We have already seen what happens when stronger storms, extreme temperatures, and increased flooding collide with aging infrastructure. Too often, our most vulnerable communities are hit the hardest. These are not distant threats. They are happening now.

As Maryland navigates mounting hazard risks and grapples with the impacts of climate change, we need a strategic, whole-of-government approach to build resilience. For this reason, the Maryland Office of Resilience was established to coordinate efforts across the state and develop a statewide resilience strategy.

Today, I am proud to release The Resilient Maryland Strategy. Developed through months of collaboration with all levels of government, community organizations, academic and technical experts, and private sector stakeholders, the strategy offers tangible actions to make Maryland more resilient to disasters and climate change. It also prioritizes actions that advance justice, equity, and community engagement.

At its core, this strategy is about protecting people – guaranteeing every Marylander the resources and support needed to stay safe and secure. It is about strengthening the systems we rely on before disasters strike while ensuring we are prepared for gray sky days. Whether by upgrading aging housing, preparing for extreme heat, or helping communities plan for future storms, resilience must be built into how we govern.

Through the Resilient Maryland Strategy, we are taking a clear and deliberate step to confront today's challenges and lay the groundwork for a stronger, more prepared tomorrow.

Sincerely,

***Wes Moore***
*Governor*

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# Executive Summary

*Purpose*

Across Maryland, disasters are becoming more commonplace. The State is grappling with everything from natural hazards like flooding and extreme heat to human-caused hazards like cyber attacks and policy decisions that lead to food insecurity.

Climate change acts as a threat multiplier. Rising sea levels cause sunny day flooding in coastal communities and higher storm surge during tropical storms. More intense precipitation brings flooding further inland, overwhelming creeks and stormwater systems. Higher temperatures can become deadly for vulnerable populations.

Though climate and disaster risks are growing, Maryland has the opportunity to lead the way on resilience. Recognizing the need for action, the Maryland General Assembly passed, and Governor Wes Moore signed into law Senate Bill 630, which established the Maryland Office of Resilience (MOR) and charged it with leading a unified, statewide approach to resilience.[1]

This includes the development of a statewide strategy that presents 2-, 5-, and 10-year recommendations to advance resilience.

With input from over 100 stakeholders across local government, state government, nonprofits, the private sector, and universities, MOR developed this strategy.

The recommended actions included in this document could protect lives, livelihoods, and property from disasters and climate impacts.

## *Defining Resilience*

MOR worked collaboratively with 37 different agencies and offices at the state and local level to define "resilience" for the State. Drawing from both survey data and national best practices, the following definition was adopted:

**"Resilience is the ability of communities to adapt to the challenges of changing conditions and disasters, including human-caused and natural hazards – and to build, advance, and maintain capacities related to quality of life, health and well-being, durable systems, economic vitality, human made and nature-based infrastructure, and sustainable environmental systems."**

## *Sectors & Focus Areas*

The strategy is organized around five sectors, each of which has a dedicated chapter. There is also a chapter that discusses the current state of Maryland's resilience efforts and provides cross-sectoral recommendations.

The inclusion of sectors allowed MOR to cover a broad range of issues, include diverse perspectives, and develop strategies that address the unique stressors and needs of each sector.

## *Five Sectors*

The five sectors were identified based on a survey of relevant Maryland plans, a review of resilience strategies from other states, and feedback from agency partners.

A summary of each sector is provided on the next page.

### Environment & Natural Systems

Restoring and protecting Maryland's environment and natural ecosystems to enhance ecosystem services in the face of environmental change and help communities harness benefits such as risk reduction, carbon sequestration, cleaner air and water, health, recreation, ecotourism, habitat diversity, and natural resource conservation. Maryland's natural resources play a critical role in lessening the impacts of natural hazards and climate change, while building overall community and ecological resilience.

### Critical Infrastructure

Ensuring that Maryland's critical infrastructure systems and assets - namely, core transportation assets, drinking water and wastewater systems, energy assets, communications systems, hazardous materials sector, safety and security assets, and military installations - can recover quickly or withstand hazards and changing conditions. Resilient critical infrastructure is fundamental and enables all other systems to function.

*Note: Critical infrastructure is an expansive category that has been defined in various ways. This definition was created with extensive input to capture core risks and set parameters for discussion.*

### Community & Local Government Capacity

Supplying local governments with tools, expertise, and resources that build their capacity to take equitable local resilience action through planning, stormwater management, land use, community engagement, partnerships with businesses, historic and cultural resource planning, and more. Greater local capacity not only catalyzes local action, but also unlocks dollars for resilience.

### Food Systems

Strengthening Maryland's food & farm systems by increasing the production and procurement of locally- and sustainably-grown foods and ensuring the availability and accessibility of nutritious & culturally appropriate food to all communities over time, even in the face of supply chain disruptions (e.g., natural hazards, economic shocks, public health emergencies). Long-term food system resilience depends on inclusivity and structural, distributional, and intergenerational equity for all consumers, producers, and food system workers in Maryland.

### Housing

Making the State of Maryland a desirable and affordable home for all residents by fostering attainable, resilient, and quality housing opportunities. Accessible housing that withstands and adapts to emerging hazards is vital to a functioning and growing economy, generational wealth planning, and economic justice.

*Focus Areas*

In addition to the sectoral structure, three cross-cutting focus areas guided both the development and prioritization of these recommendations:

1

### Justice & Equity

Supporting equitable community engagement and environmental justice, by considering the voices and experiences of marginalized communities and prioritizing investments that make underserved and overburdened communities resilient to climate change and other hazards.

Environmental justice requires a systems approach that strives to dismantle discriminatory policies and practices that result in disproportionate impacts on overburdened and underserved communities.

2

### Place-Based Resilience

Advancing community-led resilience projects in areas that are disproportionately affected by hazards and stressors, by fostering collaboration across local, regional, and state agencies and combining resources to optimize resilience benefits. A collaborative, place-based approach to resilience will lead to transformation instead of one-off projects.

3

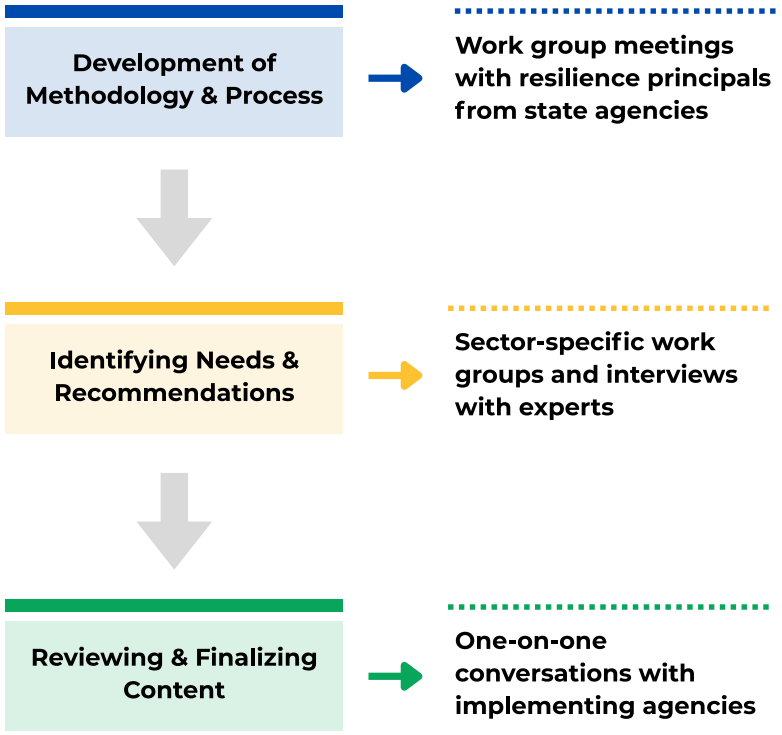
### Robust Economy & Job Creation

Promoting an equitable, robust and competitive economy while creating new jobs that support resilience & preparing the workforce for future hazards.

*Stakeholder Engagement*

MOR engaged over 100 stakeholders in the development of this strategy. These individuals brought a wide array of expertise representing all regions of the state, all levels of government, and various organization types.

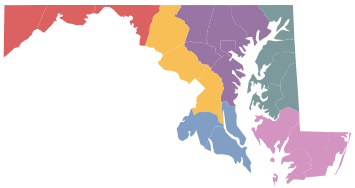
This multitude of perspectives helped MOR drill down into specific challenges and gaps, ultimately shaping the recommendations in this document. The major stages of this process, and the methodology for each, are diagrammed below:



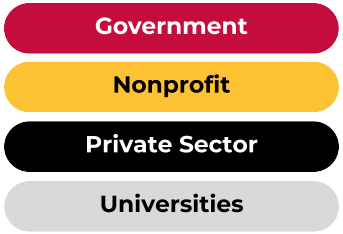
**120 Parters Engaged**

**5 Sector Work Groups**

**20+ Expert Interviews**



**All MD Regions Represented**




**Broad Cross-Section of Sectors**

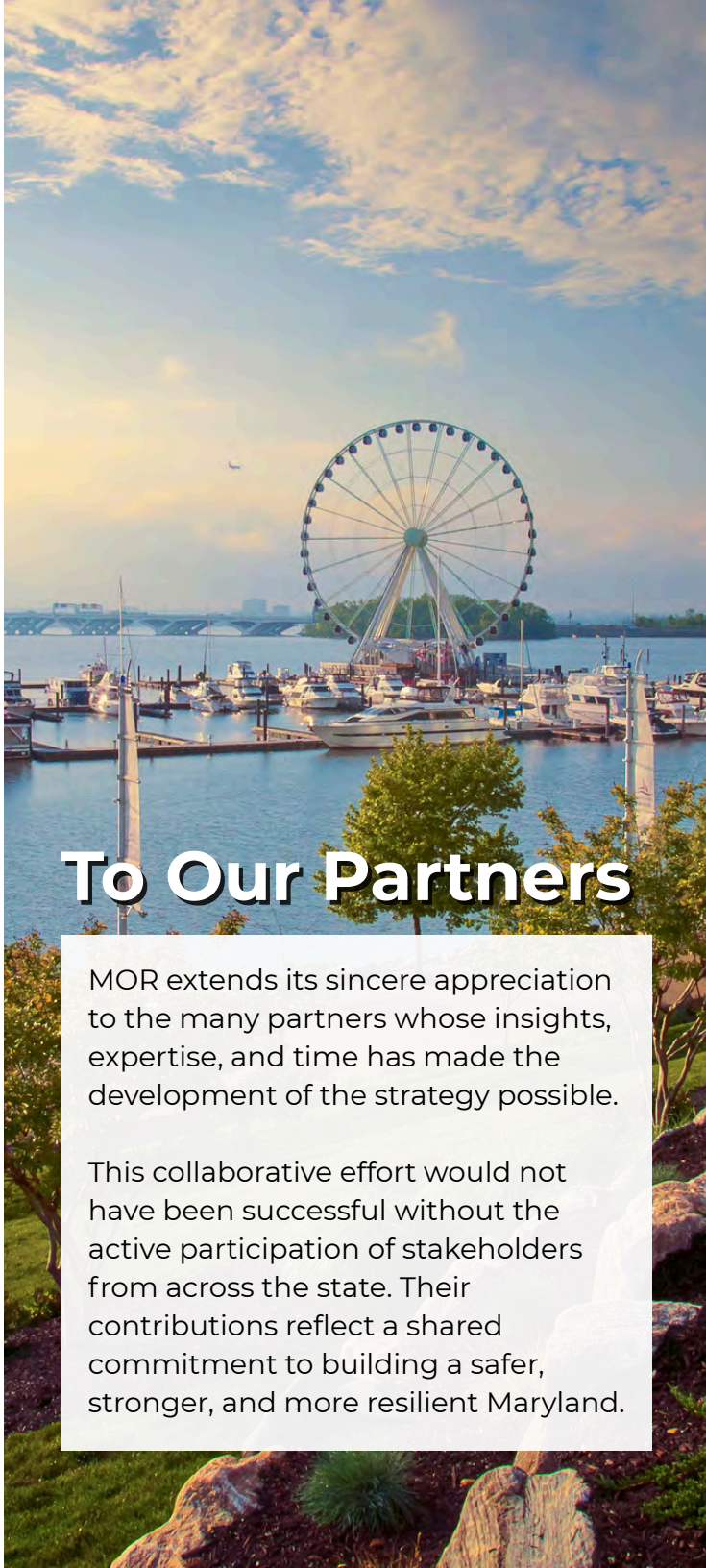
*Prioritization Criteria*

To ensure that this strategy is both impactful and actionable, recommendations were evaluated through a structured set of prioritization criteria. All recommendations were required to:

- Align with the Maryland Office of Resilience's definition of resilience
- Clearly fall within the State's purview
- Have an identified implementation lead

Beyond these baseline requirements, recommendations were evaluated based on their alignment with three key focus areas: advancing justice and equity, supporting place-based resilience, and contributing to a robust economy and job creation.

Additional considerations included a recommendation's ability to reduce hazard risk, its feasibility within 2, 5, or 10-year timelines, the strength of evidence supporting it, and its potential to be scaled or replicated.



# To Our Partners

MOR extends its sincere appreciation to the many partners whose insights, expertise, and time has made the development of the strategy possible.

This collaborative effort would not have been successful without the active participation of stakeholders from across the state. Their contributions reflect a shared commitment to building a safer, stronger, and more resilient Maryland.

*Summary of Hazards & Climate Impacts*

Maryland is no stranger to disasters. Past events have ranged from flooding in all regions of the State to deadly heatwaves to cyber attacks. Climate change acts as a risk multiplier for natural hazards, bringing higher temperatures, stronger storms, and more frequent flooding. As Maryland's risk profile evolves, so too should its approach to resilience.

MOR reviewed existing hazard plans and datasets from multiple agencies to determine the most pervasive hazards across the State. These are discussed briefly below. Each of the sector-specific chapters dives deeper into the hazards that are most pertinent to that sector, as well as the chronic stressors that make those hazards more severe.

**Flooding (Riverine, Coastal)**

Flooding is Maryland's most widespread and episodic hazard, affecting the entire state from the mountainous western region all the way to the Atlantic coast.

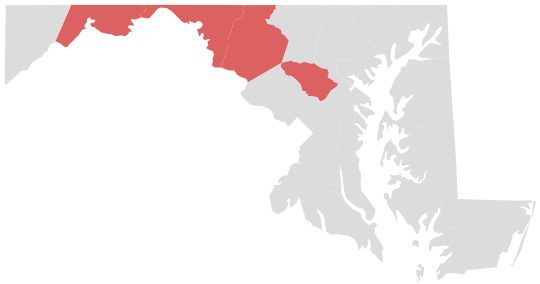
Floodwaters can disrupt transportation systems, damage agricultural and natural landscapes, degrade soil quality, and threaten homes, businesses, and public safety.

Many of the communities impacted by coastal and riverine flooding have historical and cultural assets which face risk, in addition to the aging and failing infrastructure which threatens local resources.

In 2020, roughly *133,700 properties in Maryland* faced a substantial risk of flooding.[2] Flooding affects approximately 15,000 lane miles of state-maintained roads.[3]

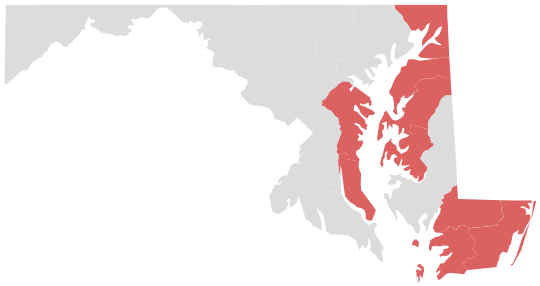
*Map at top right marks jurisdictions (red) with "moderate" to "very high" calculated risk from riverine flooding per FEMA NRI.*

*Map at middle right marks (red) jurisdictions with "moderate" to "very high" calculated risk from coastal flooding per FEMA NRI.*



*Jurisdictions Most At-Risk (alphabetically)*

- Allegany County
- Frederick County
- Howard County
- Washington County



*Jurisdictions Most At-Risk (alphabetically)*

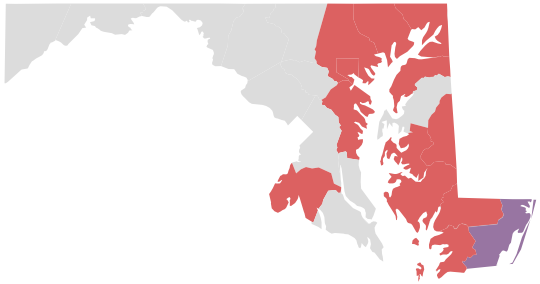
- Anne Arundel County
- Calvert County
- Cecil County
- Kent County
- Queen Anne's County
- Somerset County
- Talbot County
- Wicomico County
- Worcester County

## Sea Level Rise

Sea level rise is a chronic stressor that makes flooding worse, causes saltwater intrusion on natural and working lands, and alters ecosystems.

Sea levels are projected to rise *between 1 and 1.5 feet from 2000 to 2050* in Maryland, causing coastal flooding to occur more frequently and extend further inland.[4] In 2021, Crisfield faced 80 days of high tide flooding. Rising sea levels also threaten working lands and coastal forests on the Eastern Shore.[5] As one example, from 2011 and 2017, the number of visible salt patches on coastal Maryland farmland increased by 93%.[6]

*Map at right marks jurisdictions with >$400M total home value at risk of coastal flooding by 2050 due to sea level rise per Climate Central Surging Seas Risk Mapping initiative.* ***Red:*** *At least $400M total home value at risk.* ***Purple:*** *At least $2B total home value at risk.*



*Jurisdictions Most At-Risk (alphabetically)*

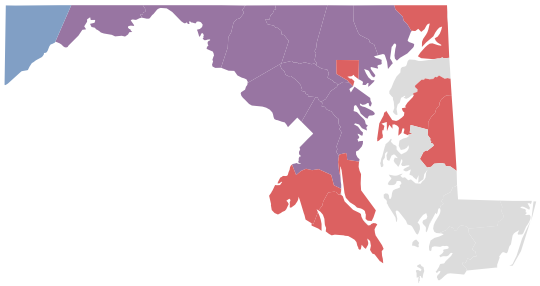
- Anne Arundel County
- Baltimore City
- Dorchester County
- Somerset County
- Worcester County

## Extreme Temperatures

By mid-century, Maryland is projected to experience *47.7 days above 90° F per year* under a high future climate scenario. This is 190% greater than the 16.5 days above 90° under a baseline scenario.[7] Urban areas with limited tree cover and dense development are especially vulnerable to the heat island effect, which traps heat and keeps temperatures high even at night.

The Maryland Department of Health (MDH) has recorded a sharp increase in heat-related illness, hospitalizations, and deaths since 2020, with the greatest impact felt by vulnerable communities, including children and seniors. Higher temperatures can also cause higher energy demand and lead to greater wear on roads, utilities, and building systems.

*Map at right marks jurisdictions with "moderate" to "very high" calculated risk from heat wave (red), cold wave (blue), or both (purple) per FEMA NRI.*



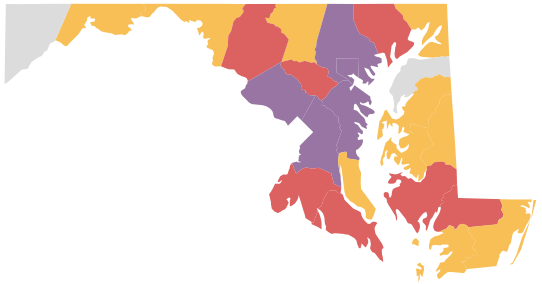
*Jurisdictions Most At-Risk (alphabetically)*

- Allegany County
- Anne Arundel County
- Baltimore County
- Carroll County
- Frederick County
- Harford County
- Howard County
- Montgomery County
- Prince George's County
- Washington County

### Severe Weather Events

With climate change, severe weather events – hurricanes, tropical systems, tornadoes, and winter storms – *are becoming more frequent*.[8] As observed in recent years, severe storms can have devastating impacts nationwide, causing rapid and unprecedented levels of damage.

*Map at right marks jurisdictions with "moderate" to "very high" calculated risk from hurricane, winter storm, or tornado, per FEMA National Risk Index (NRI).* ***Yellow:*** *Risk from 1 listed hazard.* ***Red:*** *Risk from 2 listed hazards.* ***Purple:*** *Risk from all 3 listed hazards.*



*Jurisdictions Most At-Risk (alphabetically)*

- Anne Arundel County
- Baltimore City
- Baltimore County
- Montgomery County
- Prince George's County

### Human-Caused Hazards

Human-caused hazards are entirely or predominantly caused by human activities. They may include acute shocks that are economic, social, or related to health emergencies. As one example, Maryland has experienced cyber attacks on its local governments, State government, healthcare system, and schools. Vulnerabilities in software programs can leave public and private sector entities open to attackers.

Not only can cyber attacks disrupt core constituent services, but when core technologies and infrastructure are attacked, the effects can ripple out across sectors. For instance, a cyberattack on a utility provider's control system may not just corrupt data; it can shut down water treatment plants, disrupt electricity flow to hospitals, or halt traffic management systems.

While Maryland is taking the initiative to shore up its cyber resilience and protect critical infrastructure, this remains a key area of concern. In addition to cyber attacks, other human-caused hazards can impact transportation systems and supply chains. Policy decisions can also have hazardous effects, such as increased food insecurity.

*Summary of Goal & Recommendations*

This strategy presents a focused set of recommendations designed to advance statewide resilience over the next 2, 5, and 10 years.

In total, there are **20 goals and 50 recommendations,** which are embedded throughout the document.

To view the Goals in the entirety of their details, please see the Roster of Goals & Recommendations.

A summary of each goal and its recommendations is provided below:

**GOAL 1 - Institutionalize resilience across Maryland's funding and regulations.**

**GOAL 2 - Coordinate state funding and direct it toward places with high hazard risk and social vulnerability.**

**GOAL 3 - Collaborate on and take action to address emerging climate challenges.**

**GOAL 4 - Strengthen emergency response in the face of federal changes by sharing resources with neighboring states and non-governmental partners.**

**GOAL 5 - Enhance the state's digital resilience through continued IT modernization and development of key cybersecurity governance and operations capabilities.**

**GOAL 1 - Prioritize resilience as a criteria for conservation & restoration investments.**

**GOAL 2 - Improve resilience data collection, governance, coordination, access, and usability for local governments and state agencies.**

**GOAL 3 - Identify innovative approaches and foster structures for working with private property owners & nongovernmental funders.**

## CRITICAL INFRASTRUCTURE

**GOAL 1 -** Enhance and support the power grid's reliability and resilience in the face of escalating community reliance and a developing threat landscape.

**GOAL 2 -** Support transportation system resilience.

**GOAL 3 -** Strengthen the resilience of additional critical infrastructure, such as military installations, water and wastewater, and dams.

## COMMUNITY & LOCAL GOV'T

**GOAL 1 -** Establish regionally-based technical assistance to help local jurisdictions advance resilience.

**GOAL 2 -** Provide tools and guidance that increase local capacity to plan, fund, and implement resilience efforts.

**GOAL 3 -** Protect and rapidly restore small business operations statewide.

## FOOD SYSTEMS

**GOAL 1 -** Increase adoption of climate-smart agricultural practices in Maryland.

**GOAL 2 -** Increase sustainable local food production and access.

**GOAL 3 -** Improve the ability of Maryland's food system to adapt to and recover from supply chain disruptions.

## HOUSING

**GOAL 1 -** Make existing housing stock more resilient while emphasizing affordability.

**GOAL 2 -** Support resilient and affordable growth.

**GOAL 3 -** Bolster Maryland's property insurance market in the face of climate change to protect homeowners and renters.

## *Measuring Success*

Measuring resilience is inherently complex. Understanding this requires distinguishing between two complementary types of measurement: process metrics and outcome metrics.

- **Process metrics** track the implementation of resilience-building activities, such as planning, coordination, capacity-building, or policy changes. These metrics reflect what has been done.

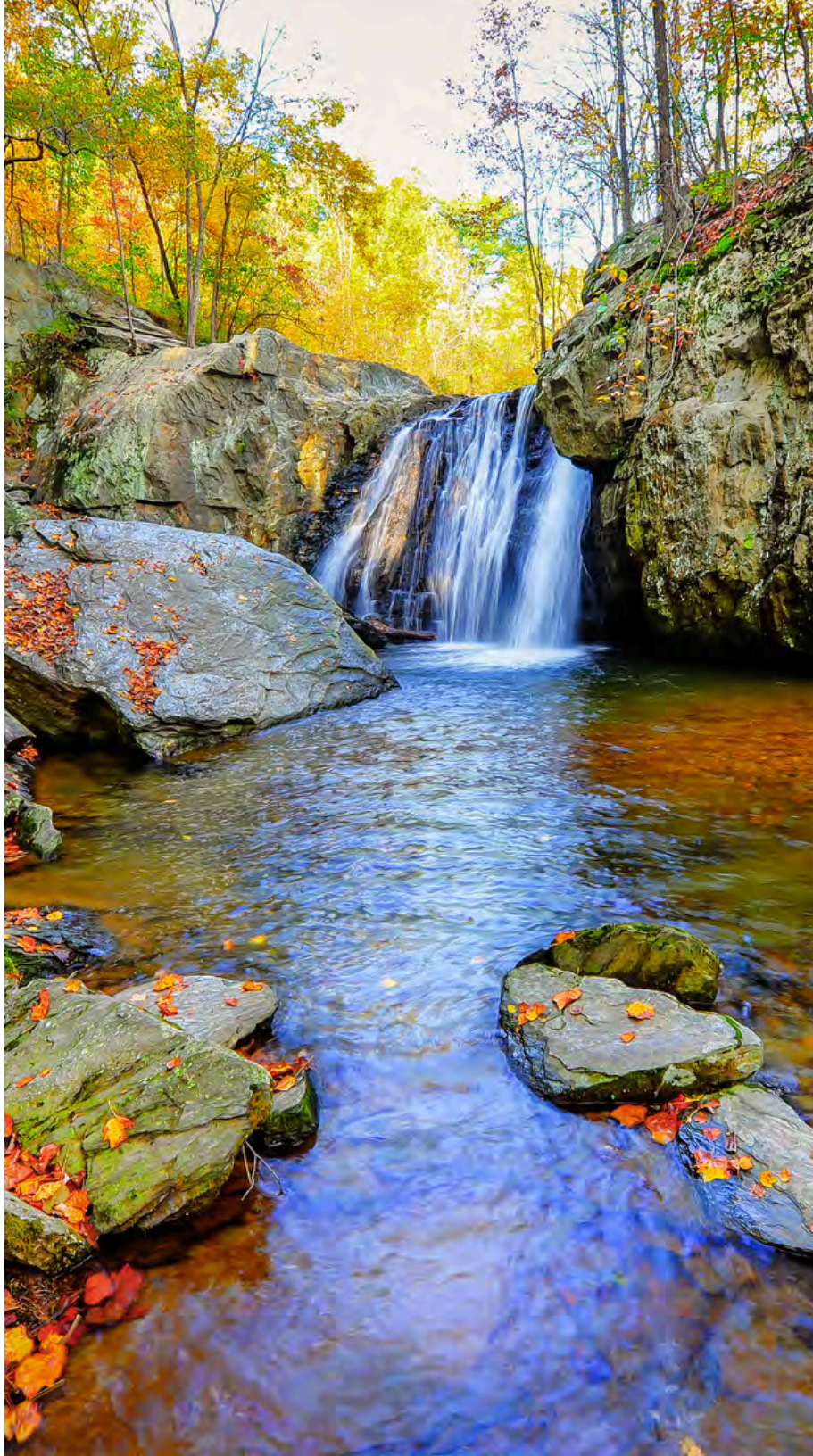
- **Outcome metrics** measure the actual effects of those activities and efforts, such as reduced vulnerability, faster recovery, or stronger community systems.

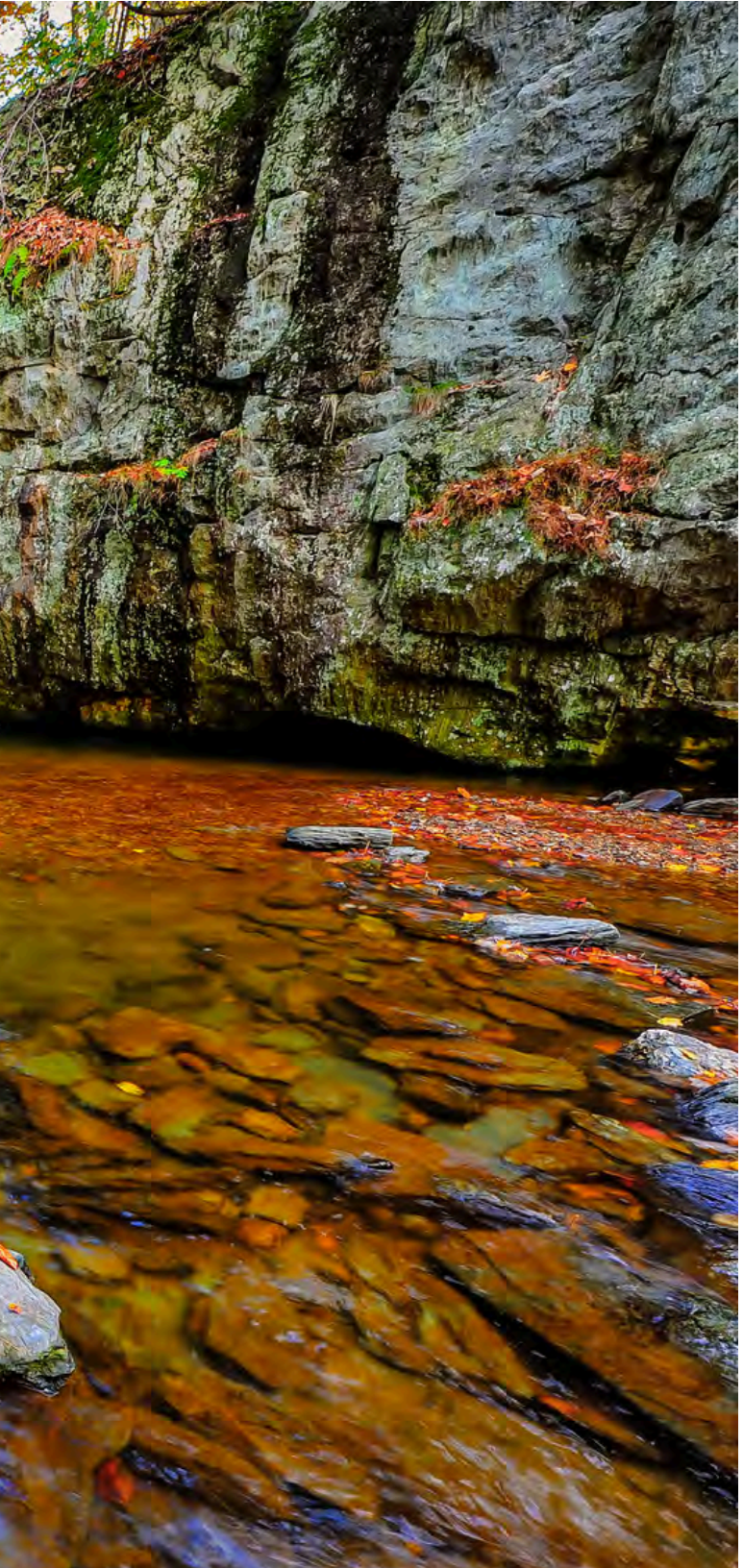
For this first iteration of the strategy, MOR will utilize process metrics, tracking the State's progress toward achieving recommendations laid out in this document. To do this, MOR will request updates from State agencies at least twice per year and develop an annual progress report to show the State's accomplishments.

This information will ultimately be used to create a dashboard. To complement this effort, MOR will also collect local stories and real-world examples of impact that illustrate how resilience projects are improving lives, strengthening systems, and addressing community needs.

At this time, MOR has not produced outcome metrics. Over time, Maryland could establish a dedicated, statewide initiative to develop a robust framework for resilience outcome metrics. Doing so will require collaboration across agencies, engagement with researchers and communities, and sustained investment in evaluation tools and data systems.

While complex, this work is essential to understanding whether current strategies are making a lasting impact and to guiding future decisions and investments.





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# Maryland's Hazards & Climate Impacts

Maryland takes an approach to resilience that considers all hazards and climate impacts, recognizing that each region and community faces unique risks. In order to target resilience actions toward the greatest risks and needs, it is essential to understand which hazards and climate impacts are particularly consequential to the State. This chapter discusses Maryland's overall risk profile, while each sector-specific chapter breaks down risks even further.

## *Existing Tools & Processes to Assess Risks*

Maryland has processes and tools to identify and prioritize threats and hazards, several of which are led by the Maryland Department of Emergency Management (MDEM).

### Threat & Hazard Identification and Risk Assessment

MDEM updates its Threat and Hazard Identification and Risk Assessment (THIRA) every three years in accordance with FEMA requirements.[1]

Through the THIRA process, Maryland's communities are asked three key questions:

- **What threats and hazards can affect our community?**
- **If they occurred, what impacts would those threats and hazards have on our community?**
- **Based on those impacts, what capabilities should our community have?**

The THIRA is used to rank the most significant threats and hazards based on their likelihood and consequence (see graphic on this page). It goes hand-in-hand with the Stakeholder Preparedness Review (SPR), an annually updated process in which local jurisdictions pinpoint gaps in their emergency response capabilities.

Through these processes, communities identify which threats and hazards would overwhelm their response capabilities and provide context for those threats and hazards by developing scenarios that describe how the community and assets would be impacted. This exercise allows communities to set capability targets that are specific, measurable, actionable, relevant to potential threats, and time-bound.

## Risk Assessment Calculation

| (Consequence) x (Likelihood) = (Risk) | |
|---|---|
| 1 | Very Low |
| 2 | Low |
| 3 | Medium |
| 4 | High |
| 5 | Very High |

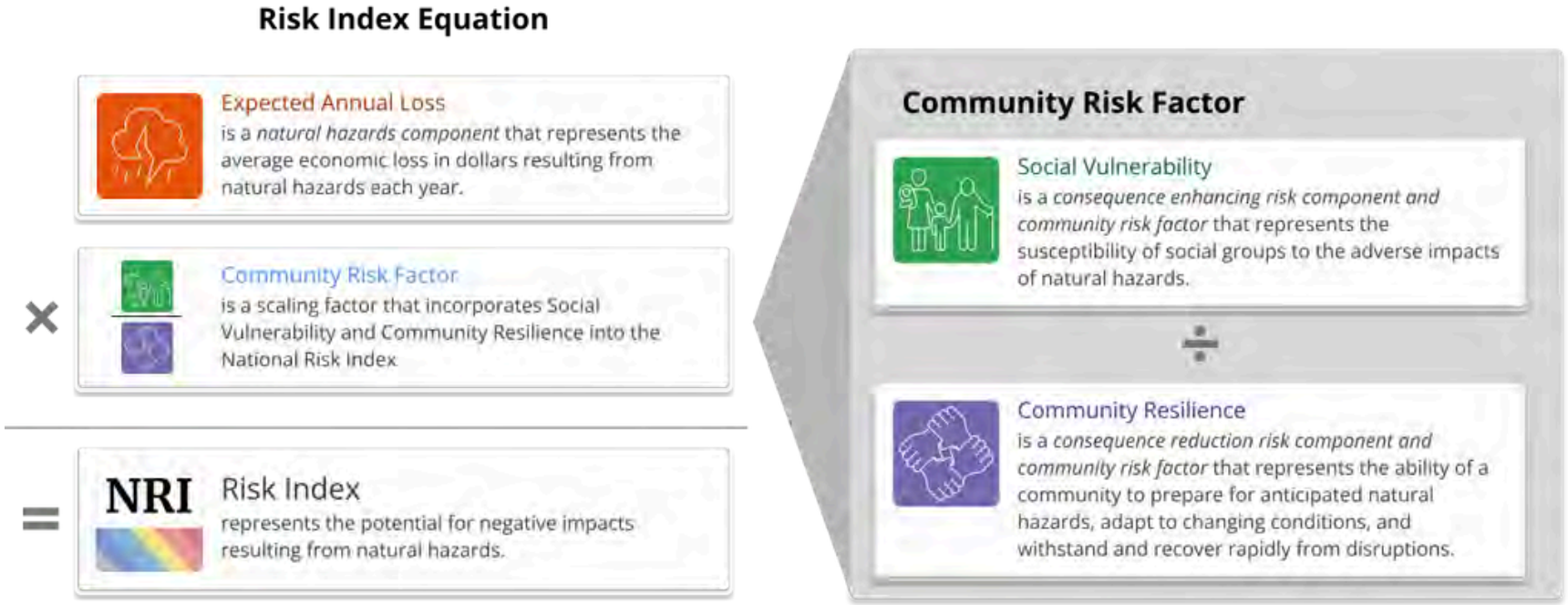
## Risk Assessment Components

### Likelihood Value

| | |
|---|---|
| 1 | This event is not expected to occur within this county. (Never) |
| 2 | There is the potential for this event to occur, but it is very unlikely in this county. |
| 3 | This event could occur, but it generally does not happen with regular frequency in this county (natural/accidental hazards) and current intelligence does not indicate that it is an imminent threat (terrorism, etc.) |
| 4 | It is likely that this event will occur in this county based on historical precedents (natural/accidental) or current intelligence reporting (terrorism, etc.) |
| 5 | This event is expected to occur, without question, based on historical precedence in this county (natural/accidental hazards) or current intelligence reporting (terrorism, etc.). (Always) |

### Consequence Value

| | |
|---|---|
| 1 | This event would cause virtually no impact on the people, responders, property and economy in this county. |
| 2 | The impact of this event would be minimal on the people, responders, property, and economy in this county; response could generally be done without mutual aid. |
| 3 | The impact of this event would be noticeable on the people, responders, property and economy in this county; mutual aid would likely be needed from other counties and/or the State. |
| 4 | The impact of this event would be very significant on the people, responders, property and economy in this county; significant mutual aid resources would be called in from surrounding counties, the State, and the Federal government. |
| 5 | This event would have a devastating (or potentially catastrophic) impact on the people, responders, property, and economy in this county; all mutual aid networks (local, State, and Federal) would be immediately utilized and government functions would severely or wholly be compromised. |




*via FEMA National Risk Index Overview Fact Sheet*

### *State Hazard Mitigation Plan*

MDEM also takes a quantitative, science-based approach when prioritizing hazards for the State Hazard Mitigation Plan (SHMP).[2] The SHMP serves as a roadmap for how Maryland prepares for and mitigates hazards and disruptions, and it is updated every five years in compliance with FEMA's State Mitigation Planning Policy Guide.[3] An approved SHMP is a condition of receiving certain FEMA Hazard Mitigation Assistance funding.

To inform the SHMP, MDEM utilizes the National Risk Index.[4] The National Risk Index is a dataset created by FEMA, which measures natural hazard and community risk factors for each U.S. county, territory, and Census tract. The National Risk Index's interactive map can be used to score risk indices, including community resilience, social vulnerability, and expected annual loss.[5] Risk Index scores are calculated using the equation below, and take into account composite scores for 18 hazard types, which were identified as the most prevalent hazards across state hazard mitigation plans.[6]

*The 18 hazard types included in the National Risk Index are avalanche, coastal flooding, cold wave, drought, earthquake, hail, heat wave, hurricane, ice storm, landslide, lightning, riverine flooding, strong wind, tornado, tsunami, volcanic activity, wildfire, and winter weather.*

## *Statewide Datasets*

Finally, Maryland is a data-rich state with many datasets and predictive models that inform resilience planning. A few key examples are highlighted in the graphic to the right.

For a more exhaustive list of tools and datasets related to flooding in particular, please see **Appendix D: Flood Risk Assessment Tools.**

## *Maryland's Hazards & Climate Impacts*

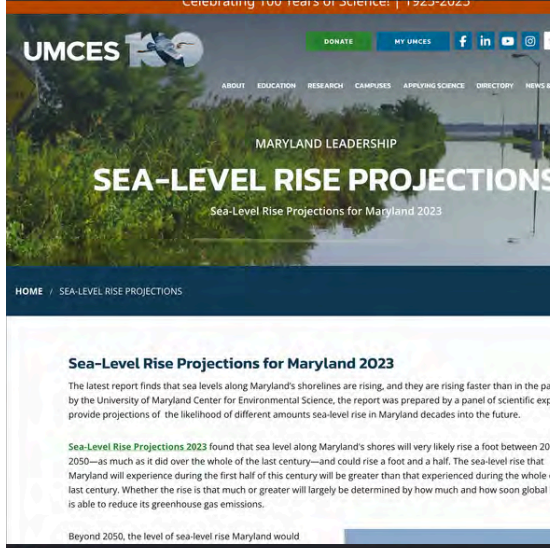
With information gleaned from the processes and datasets described above, MDEM's Risk Analysts, and other data sources, the Maryland Office of Resilience (MOR) identified several overarching hazards that affect all five sectors covered in this Strategy: Housing, Critical Infrastructure, Food Systems, Environment and Natural Systems, and Community and Local Government Capacity.

Several of these hazards would have consequences spanning across sectors, with both acute and statewide impacts.

As climate change causes extreme temperatures, stronger storms, and higher sea levels, disasters and climate change are increasingly linked.

### The University of Maryland Center for Environmental Science (UMCES)

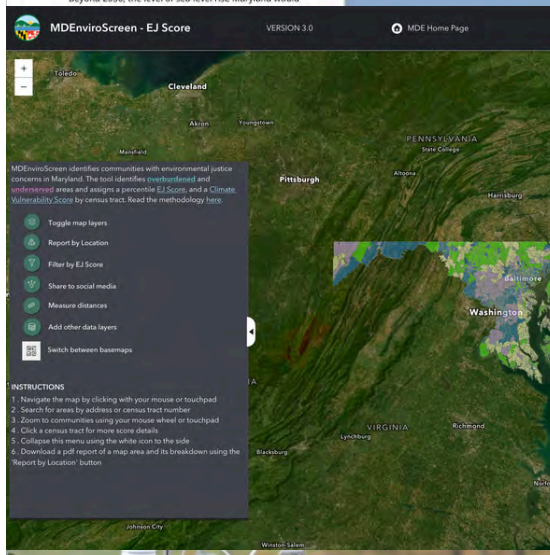
UMCES develops an updated report for Sea-Level Rise Projections for Maryland every five years.[7] The 2023 edition forecasted that the sea level will likely rise a foot between 2000 and 2050 along Maryland's shores. The report underscores that greenhouse gas emissions and our ability to reduce them will directly affect the pace and significance of sea level rise. These projections are utilized across a number of State programs.




### Maryland Department of the Environment (MDE)

MDE's MDEnviroScreen tool provides data on pollution and population vulnerability to the effects of pollution.[8] Areas of Maryland receive an Environmental Justice (EJ) Score, an overall assessment of that region's environment and environmental justice indicators, such as pollution burden exposure, pollution burden environmental effects, and sensitive populations (including socioeconomic factors).

The tool also includes a "Climate Vulnerability Score" to help identify communities disproportionately affected by climate impacts in Maryland.




### Maryland Mesonet

The University of Maryland and MDEM co-created Maryland Mesonet which utilizes a network of high-quality, closely spaced, rapid-sampling weather monitoring and data collection systems across the state to strengthen Maryland's emergency preparedness, accuracy of proximal weather forecasts, and expedite disaster assessment and recovery when needed.[9]

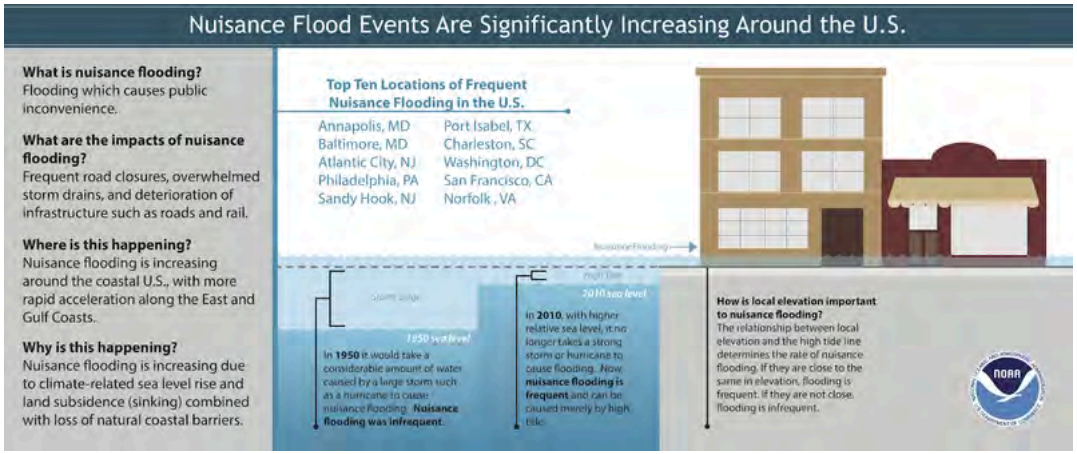
# FLOODING

Flooding is Maryland's most widespread and persistent hazard, affecting the entire state from the mountainous western region all the way to the Atlantic coast. Floodwaters can disrupt transportation systems, damage agricultural and natural landscapes, degrade soil quality, and threaten homes, businesses, and public safety. In 2020, roughly 133,700 properties in Maryland faced a substantial risk of flooding.[10] Flooding affects approximately 15,000 lane miles of state-maintained roads.[11]

Maryland's flooding can take many forms: nuisance flooding that occurs in coastal areas during high tides, pluvial flooding that occurs when heavy rainfall overwhelms local stormwater systems, fluvial flooding along rivers and streams, and storm surge inundation caused by tropical systems.

Nearly 70% of Marylanders live in jurisdictions bordering the Chesapeake Bay and the Atlantic Coast, which are at increasing risk of nuisance flooding due to high tides, sea level rise, land subsidence, and storm surge.[12] As pictured in the graphic below, Annapolis and Baltimore are in the top ten locations of frequent nuisance flooding in the United States.[13]

But flooding does not just affect coastal communities. Maryland's creeks and streams are susceptible to flash flooding, and urban and suburban areas across the state can experience flooding when aging or insufficient stormwater systems - often just not built to withstand modern flash flooding severity - become overwhelmed. Ellicott City faced devastating flash floods in 2016 and 2018 with flood waters taking lives and wreaking havoc on homes and businesses. In May 2025, western Maryland experienced severe flooding with damages estimated at $33.7 million.[14]




*via Florida Museum Thompson Earth Systems Institute*

# SEA LEVEL RISE

Sea levels are projected to rise between 1 and 1.5 feet from 2000 to 2050 in Maryland, causing coastal flooding to occur more frequently and extend further inland.[7] Maryland has 3,190 miles of shoreline, making sea level rise a significant hazard for residences, businesses, and critical infrastructure.[15] Sea level rise in Maryland is faster and more significant than the global average due to the compounding effects of subsidence, varying levels of sea surface height across the globe, and climate change.

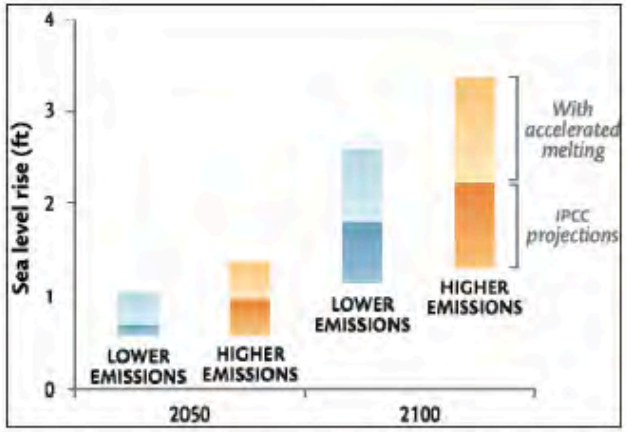



**Figure 3**: Sea level rise projections for the Chesapeake Bay based on greenhouse gas emission scenarios. By mid-century Maryland may experience up to 1.3 ft and, by the end of the century under accelerated melting relative sea-level may rise 2.7 ft under lower emission scenario to 3.4 ft under the higher emission scenario (MCCC, 2008).

*via Maryland Department of Natural Resources Coastal Land Conservation in Maryland: Targeting Tools and Techniques for Sea Level Rise Adaptation and Response*[16]

**Figure 4**: Rates of sea-level rise in Chesapeake and Delaware Bays region. Data are from tide gauges and the period of time they cover is in parentheses (MCCC, 2008).

As sea levels rise, saltwater intrusion threatens Maryland's farmland, much of which is clustered on the Eastern Shore. Maryland has lost more than 3,500 acres of farmland and 25,000 acres of forest to tidal marsh since 1984.[7] Certain species are particularly vulnerable to habitat loss from sea level rise, such as Loblolly Pines, which are turning into "ghost forests".[17] The loss of farmland and coastal forest on Maryland's Eastern Shore threatens the region's economy, communities, and ecological health.

# EXTREME TEMPERATURES

Temperatures are steadily reaching new extremes, heightening concern for occupational and public safety, straining the power grid, and creating new challenges for natural and agricultural systems.[18] The Maryland Department of Health (MDH) has recorded a sharp increase in heat-related illness, hospitalizations, and deaths since 2020, with the greatest impact felt by vulnerable communities, including children and older adults.

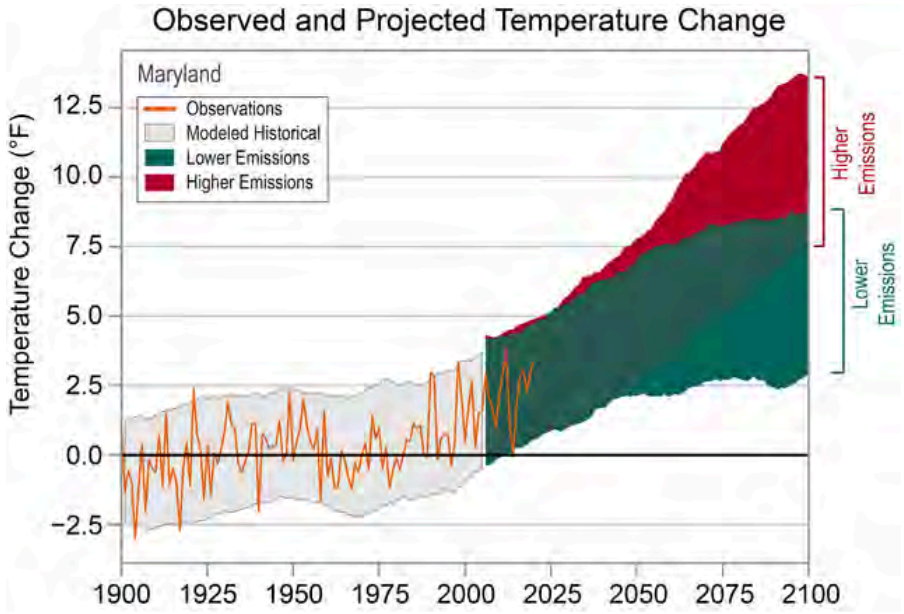
**Historic Total Reported Heat-Related Deaths in Maryland (2020-2025)**

**2020 Deaths:** 21 **2021 Deaths:** 18 **2022 Deaths:** 6 **2023 Deaths:** 9

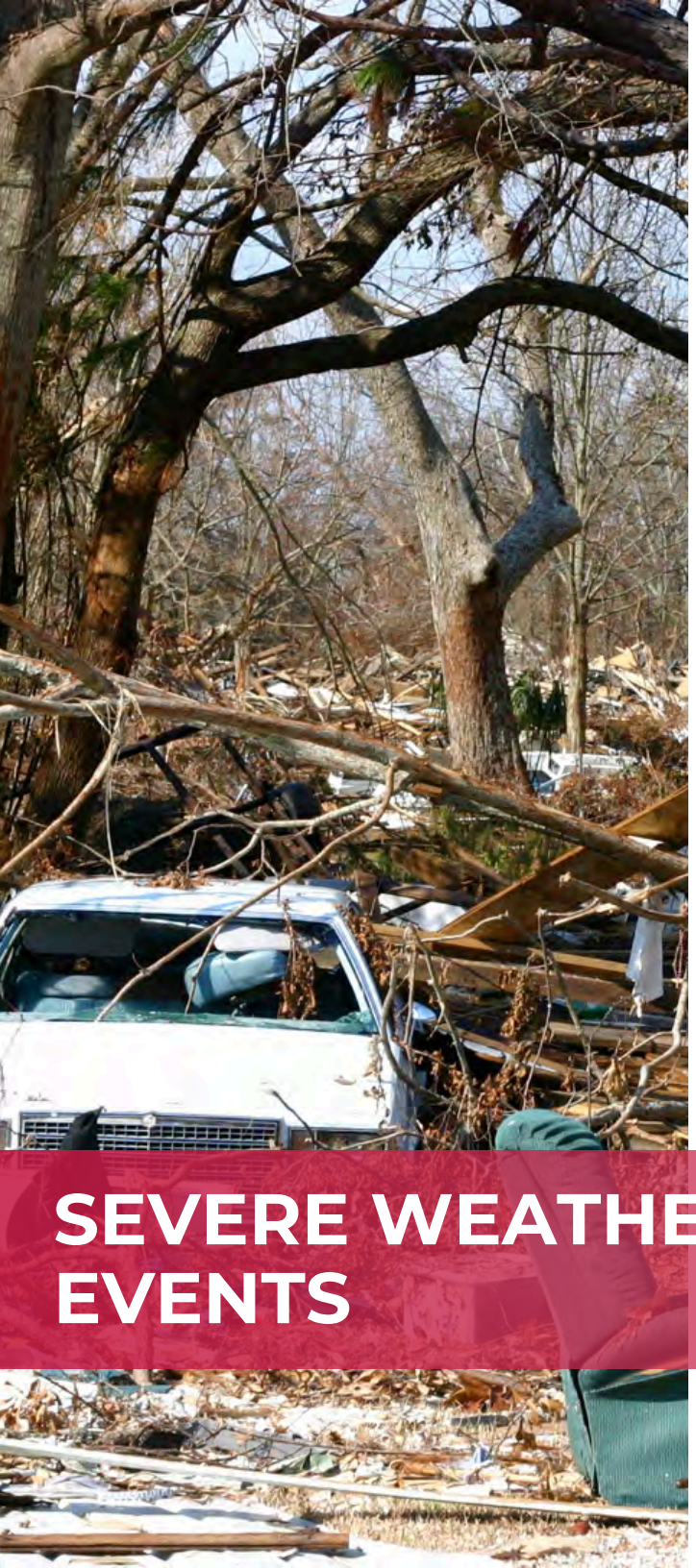
**2024 Deaths:** 27 **2025 Deaths:** **34** *(as of last available data)*

*(Source: MDH Heat-Related Illness Surveillance Report)*[19]

Rising temperatures have occurred in conjunction with increasing drought conditions in the state, and consequently, higher fire risk, diminished drinking water supplies, and reduced agricultural yields. Extreme cold and heat both impact ecological systems and natural aquatic and wildlife habitats in Maryland, especially around the Chesapeake Bay.




*Observed and projected changes in air temperature for Maryland (NOAA State Climate Summaries: Maryland and District of Columbia)*[20]



# SEVERE WEATHER EVENTS

With climate change, severe weather events – hurricanes, tropical systems, tornadoes, and winter storms – are becoming more frequent. As observed in recent years, severe storms can have devastating impacts nationwide, causing rapid and unprecedented levels of damage. But these events are unpredictable by nature, often evolving with little time for preparation.

### *Hurricanes, Tropical Systems, and Storm Surge*

The severity and impact of hurricanes and tropical systems can be difficult to predict, despite forecasting and emergency preparedness efforts. Coastal storms are less frequent but far more costly than inland storms, as they are more likely to involve flooding from heavy rainfall, storm surge, and strong winds.[21] Recent catastrophic weather events, like Hurricanes Helene and Milton, serve as reminders that hurricane preparedness and resilience efforts are critical.

Maryland has experienced numerous severe storms, including the following:

- **Hurricane Isabel:** Though Hurricane Isabel in 2003 did not bring significant rainfall to Maryland, an 8-foot storm surge was recorded on the Chesapeake Bay at Hooper's Island. 6-foot waves destroyed over 2,500 wharves and piers, the bridge to Saint George Island, and 20 homes on the coastline of St. Mary's County.[22] Many bayfront buildings and structures were damaged or destroyed, including those along Baltimore County's shoreline and in Baltimore City's Inner Harbor and Fells Point, as well as the boardwalk in Havre de Grace.

- **Hurricane Irene:** During Hurricane Irene in 2011, fallen trees damaged nearly 1,000 homes (primarily across southern Maryland), and 850,000 power outages were reported in Maryland and the District of Columbia.[23]

- **Hurricane Isaias:** In July 2023, Hurricane Isaias caused significant flooding and damage throughout Anne Arundel, St. Mary's, Charles, Harford, Montgomery, and Baltimore Counties, as well as Baltimore City.[24] Reports of downed trees and damaged power lines, homes, and buildings were widespread, with an estimated cost of $13.9M.[12]

*Tornadoes and Wind*

Maryland has a moderate risk of tornadoes and generally experiences several per year, leading to thousands or, often, millions of dollars in property damage each year. In general, high winds and tornadoes pose risks to Maryland's critical infrastructure, including transportation and electrical systems, as well as to residences and public safety.[25]

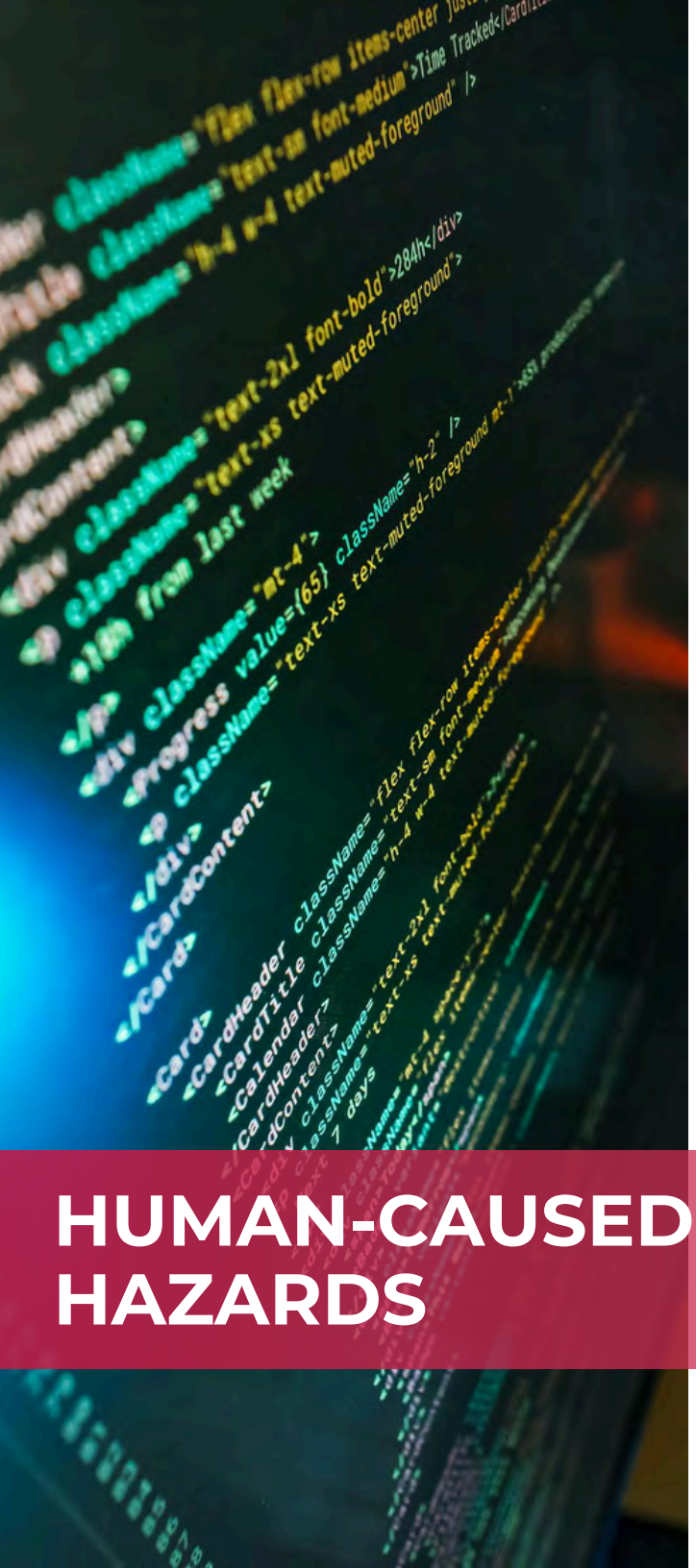
- On September 1, 2021, an EF2 tornado with wind speeds reaching 125 mph caused significant damage and destruction to homes and businesses in Anne Arundel County.[26,27]
- On June 5, 2024, thirteen tornadoes touched down in the Mid-Atlantic, nine of which occurred in Maryland. Marylanders grappled with significant tree damage, property damage, downed power lines, road closures, and personal injury as a result.[28]
- The Derecho that swept through Maryland on June 29, 2012 caused $19M in damages due to powerful winds and heavy rain, leading to a presidential major disaster declaration.[29] 9,200 power lines came down, leaving hundreds of thousands of Maryland residents and businesses without power across six jurisdictions.[30]
    - It took over eight days for power to be restored to all customers. Roadways were severely impacted by debris and intersections without power.[31] With temperatures in the upper 90s and low 100s during the days following the storm, health risks became especially pressing for Marylanders without access to electricity and air conditioning.

*Winter Storms*

Winter storms can also impact the State and cause disruptions. The 2016 Historic Nor'easter caused over 10,000 power outages, with snow accumulation exceeding two feet in the Baltimore metro area.[32,33] 2,398 flights at the three Washington, D.C. international airports were canceled during the height of the blizzard.

During this event, the Calvert Cliffs Clean Energy Center in Lusby, MD was forced to temporarily shut down some nuclear operations due to high winds and heavy snow accumulation.[34]

# SEVERE WEATHER EVENTS



# HUMAN-CAUSED HAZARDS

Human-caused hazards, whether resulting from human intent, negligence, or error, are a growing concern as new technologies emerge, supply chains become more complex, and political extremism permeates.

Cyber attacks are on the rise globally, and Maryland is no exception. As described throughout the strategy, Maryland has experienced cyber attacks on its local governments, healthcare system, and schools. These attacks can disrupt core constituent services and halt functions across key sectors. As one example, in August 2025, the Maryland Transit Authority (MTA) experienced a cybersecurity incident in which unauthorized users accessed MTA systems.[35]

Likewise, vulnerabilities in software programs like SharePoint have caused ripple effects across the public and private sectors.[36] Cyber attacks are evolving alongside new technologies, making cyber resilience essential. While Maryland is taking the initiative to shore up its cyber resilience and protect critical infrastructure, this remains a key area of concern.[37]

The supply chain and transportation systems are particularly vulnerable to human-caused hazards. In March 2024, a container ship struck and collapsed Baltimore City's Francis Scott Key Bridge, and killed six Marylanders. On January 29, 2025, a military helicopter collided with a passenger plane, American Airlines Flight 5342, 0.5 miles from Ronald Reagan Washington National Airport, killing two pilots, two flight attendants, sixty passengers, and three helicopter crew members. The FAA determined that the factors leading to this tragedy included understaffing of an air traffic control tower as well as multiple errors made by the helicopter's crew.[38]

Our government and social systems too are at risk. On November 1, 2025, funding for SNAP benefits nationwide lapsed due to the federal government shutdown, combined with the presidential decision not to fully fund the program using contingency funds. In response, Governor Moore, like many other state leaders, declared a State of Emergency and directed $72 million from state emergency funds to support emergency food assistance organizations and to partially backfill the SNAP program.[39,40] 680,000 Maryland SNAP participants were forced to grapple with new threats of food insecurity, and it took until November 18, 2025 for benefits to be fully restored after the shutdown ended.[41]

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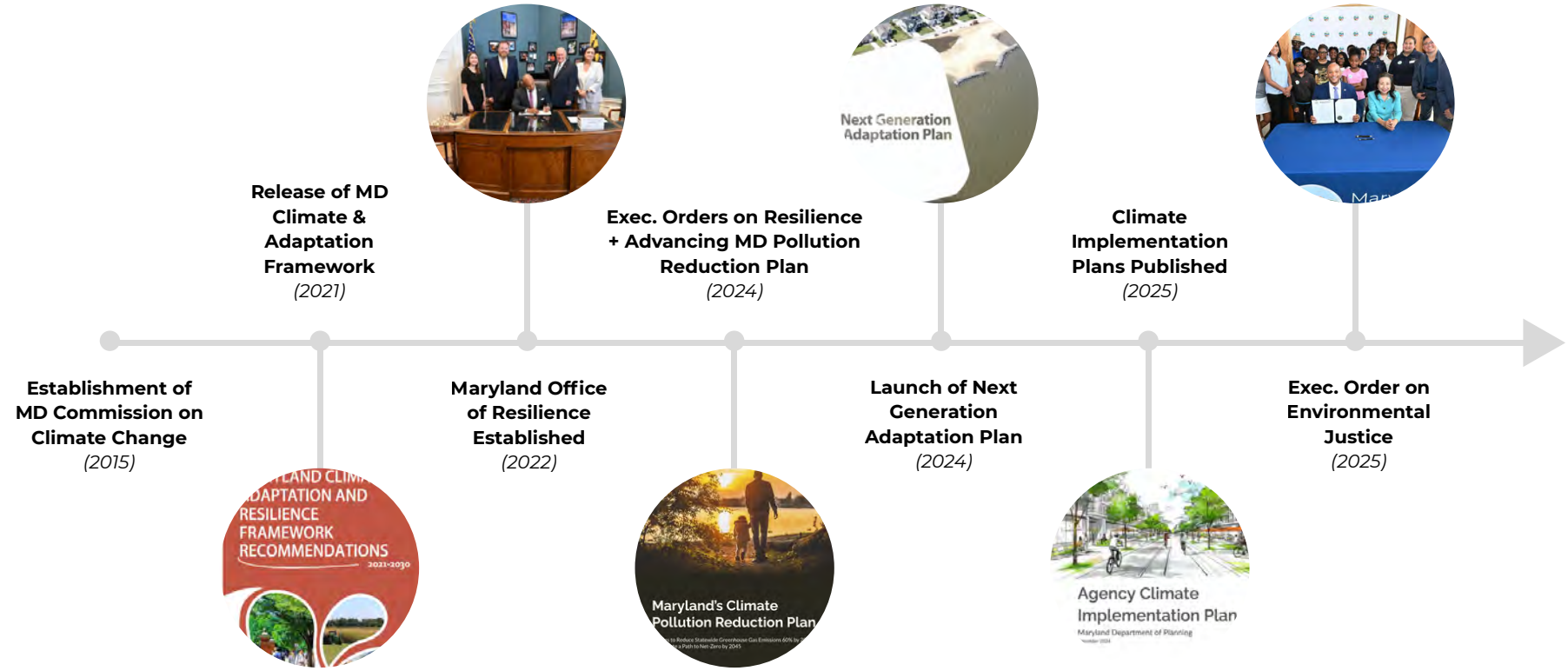
## ** End of Chapter References **

# The Current State of Maryland's Resilience

*Context & Recent History*

Given the central role of the Chesapeake Bay in Maryland's identity and geography, the State has been a pioneer of environmental stewardship for decades. In addition, Maryland has a standalone Department of Emergency Management – as opposed to including that function within another agency – underscoring the importance of disaster-related efforts. As climate change strains natural systems and intensifies disasters, Maryland can draw upon its strengths to meet new resilience challenges.




This chapter summarizes Maryland's current efforts to advance resilience; provides recommendations for the State to increase its resilience over the next 2, 5, and 10 years; and identifies open questions to be considered in the future. While this chapter provides an overarching view of resilience, later chapters drill down into specific sectors.

The State plays an important role in resilience, but it is only one piece of the puzzle, alongside local and federal counterparts.

## The Role of Local Governments in Resilience

It is often said that all disasters are local, and resilience starts locally too. Maryland has 23 counties and 157 municipalities, each of which plays a vital role in reducing disaster risk and adapting to climate change.

Local governments own and operate assets and infrastructure – like roads, schools, stormwater infrastructure, dams, and more – that face hazard risks. They implement regulations that reduce flooding, like those related to stormwater. They conduct comprehensive planning and zoning, determining what gets built where. And when disasters happen, local public safety officials and emergency managers respond.

As described elsewhere in this strategy, local governments can form resilience authorities to unlock financing and accelerate resilient infrastructure projects.

In order to access most state and federal funding sources, local governments must identify resilience projects and submit grant applications. This bottom-up approach to funding requires local governments to take the lead in identifying solutions.

## Local Success Story

### Ellicott City Safe & Sound Plan

The **Ellicott City Safe and Sound** plan is a leading example of Maryland's local resilience in action[1]. Developed after the 2016 and 2018 floods, this initiative combines major engineering projects with historical preservation and community preparedness. Central to the effort is the Ellicott City Watershed Master Plan, adopted in 2020, which provides a comprehensive blueprint for reducing flood risk while supporting economic vitality, transportation safety, and environmental health.[2]

Supported by local, state, and federal funding, including a $75 million Environmental Protection Agency (EPA) Water Infrastructure Finance & Innovation Act (WIFIA) loan, the initiative has already completed several major projects and integrated new safety tools like the Outdoor Tone Alert System.[3,4,5] Together, these efforts are protecting lives and preserving Ellicott City's historic core, transforming past disasters into a model of proactive, community-based resilience.

While local leaders and community members know their challenges intimately, they often lack the staff and expertise to secure funding and advance projects. State support is essential to fill this gap.

For a detailed write-up, including goals and recommendations for the State to support local government, see the Community and Local Government Capacity chapter of this document.

## The Role of State Government in Resilience

State governments advance resilience in myriad ways. The State can support communities directly by providing technical assistance with tasks like project identification, engineering, or grant writing, or by offering funding and financing for projects.

State government can also provide indirect support in the form of planning, data and modeling products, communications, and governance. And finally, in some cases the State can advance regulations or standards that set a floor for resilience. Maryland has utilized each of these tools to draw down its risk.

Maryland has committed to a whole-of-government approach to resilience, meaning that each agency addresses disaster risks and climate impacts across its portfolio. This is why the Maryland Office of Resilience (MOR) was established by legislation in 2022 to coordinate across State efforts and 'connect the dots' with local implementers.[6] MOR is located within the Maryland Department of Emergency Management (MDEM) and led by a Chief Resilience Officer.

In 2024, Governor Wes Moore expanded MOR's duties via Executive Order 01.01.2024.31, requiring all 22 principal state departments, as well as the Maryland Energy Administration and the Maryland Insurance Administration, to designate agency resilience liaisons that engage with MOR.[7]

The paragraphs that follow describe the roles that various state agencies and entities play in advancing resilience. This list is presented in no particular order and is not exhaustive. It highlights key agencies and entities that lead a significant amount of resilience work, with an emphasis on statutory responsibilities, funding, data, and coordination.

### Maryland Office of Resilience

The Maryland Office of Resilience (MOR) sits within MDEM and is charged with developing a statewide resilience strategy, helping local governments prepare resilience strategies, and coordinating across state agencies on resilience. MOR convenes agency resilience liaisons (ARLs) from across all 22 principal departments and two additional agencies.

### Maryland Department of Emergency Management (MDEM)

MDEM is a leader across all phases of emergency management from preparedness to consequence management to recovery to hazard mitigation to resilience. MDEM coordinates with local emergency management departments to address both natural and human-caused hazards.

MDEM's Consequence Management Directorate leads the agency's preparedness and response efforts. The Hazard Mitigation Office within MDEM administers FEMA's Hazard Mitigation funding, which includes the Building Resilient Infrastructure and Communities (BRIC) Program, the Flood Mitigation Assistance (FMA) Program, and the Hazard Mitigation Grant Program (HMGP).* The Hazard Mitigation Office also leads the development of the State Hazard Mitigation Plan, which is updated every five years, as described elsewhere in this document.

**While FEMA moved to terminate the BRIC program in April 2025, this action has been voided by a December 2025 ruling from the District Court of Massachusetts.*

### Maryland Department of Natural Resources (DNR)

DNR is charged with maintaining the state's natural resources and is a leading agency in the resilience space, especially in coastal areas. DNR houses an array of watershed and climate services related to resilience with a focus on restoration and nature-based solutions. DNR's Grants Gateway programs can be used to fund resilience projects and technical assistance.[8] DNR is the lead agency for the Whole Watershed Fund, which funds innovative watershed-scale restoration projects.[9] DNR coordinates the Adaptation and Resiliency Working Group, which released the NextGen Adaptation Plan in 2024.

DNR is integrating climate change considerations across programs and initiatives to enhance the state's resilience across communities and aquatic and land systems. DNR is a leader on topics like marsh migration, wetland adaptation, coastal resilience, and Chesapeake Bay health.

### Maryland Department of the Environment (MDE)

MDE is a regulatory agency that was created "to protect and preserve the state's air, water and land resources and safeguard the environmental health of Maryland's citizens."[10]

As it relates to resilience, MDE houses the state's stormwater program, administers the National Flood Insurance Program, includes the dam program, oversees water and wastewater facilities, administers the Comprehensive Flood Management Grant Program, houses the MDEnviroScreen Tool, coordinates implementation of the State's Climate Pollution Reduction Plan, and guides the development and execution of agency-specific climate implementation plans.

MDE hosts the Maryland Commission on Climate Change and chairs the Climate Subcabinet. Within MDE, there is an extensive Climate Change Program.[11]

### Maryland Department of Planning (MDP)

MDP provides assistance to support local government planning efforts. In 2025, Governor Wes Moore signed legislation creating the Sustainable Growth Planning Principles, which guide local comprehensive planning and in turn, land use.[12] One of those principles is resilience, and MDP is leading the charge to define and implement these principles to guide local comprehensive planning, which will inform land use.

MDP also chairs the Sustainable Growth Subcabinet, which convenes monthly on matters related to sustainable land use. Additionally, MDP houses the Maryland Historical Trust, which has developed resilience planning guidance for historic communities and operates grant and tax credit programs that may be helpful in resilience planning and disaster recovery.

### Maryland Department of Transportation (MDOT)

With funding from the USDOT Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Program, MDOT finalized the first Transportation Resilience Improvement Plan (TRIP) for the agency in 2024.[13]

The TRIP helps to guide strategic investments in critical infrastructure and proactively identify and address resilience needs across the enterprise.

### Maryland Department of Housing & Community Development (DHCD)

DHCD administers a number of funding and financing programs that can be utilized to make housing more resilient. These include federal Housing & Urban Development (HUD) Community Development Block Grant dollars, the Maryland Housing Rehabilitation Program, Energy Grant Programs for Homeowners and Renters, the Multifamily Energy Efficiency and Housing Affordability Program, and Rehabilitation Financing Programs.[14,15,16,17,18]

### Maryland Department of Labor (MDOL)

MDOL includes Maryland Occupational Health and Safety, which developed and oversees the State's heat stress standards.[19]

MDOL also includes the Building Codes Administration which supports the adoption of the latest building code in accordance with statute and provides assistance to local jurisdictions, industries, and the public.[20]

### Maryland Department of Commerce (COMM)

COMM supports several resilience initiatives, including providing support to small businesses with continuity planning.

Within COMM, the Office of Military and Federal Affairs (OMFA) leads the Resilient Maryland Defense Communities Project, which supports planning efforts between military installations and surrounding communities.[21]

### Maryland Energy Administration (MEA)

MEA's mission is to "promote clean, affordable, reliable energy and energy-related greenhouse gas emission reductions to benefit Marylanders in a just and equitable manner."[22]

One key program led by MEA is the Resilient Maryland Grant Program, which funds microgrids, resilience hubs, and resilient facility power systems. These combined solutions reduce energy use during normal conditions and provide backup power during outages.

### Maryland Department of Agriculture (MDA)

MDA includes the Office of Resource Conservation, and one of its priorities is Climate Resilience.[23]

One of MDA's newest programs is Leaders in Environmentally Engaged Farming (LEEF), a certification program that will recognize farmers that continue to adopt climate-smart agricultural practices and practice community stewardship.

### Public Service Commission (PSC)

The mission of PSC is to "ensure safe, reliable, and economic public utility and transportation service to the citizens of Maryland."[24]

As a regulator of utilities, PSC has oversight of their reliability and resilience. In addition, PSC recently facilitated an Electric Distribution Resiliency Work Group that included utilities and a few state entities. PSC has also led past grid resilience initiatives, such as the Grid Resiliency Task Force that was created in 2012.

### Maryland Department of Health (MDH)

MDH plays a number of roles within the resilience space, such as the creation of the Extreme Heat Emergency Plan and the Extreme Cold Emergency Plan.[25,26]

MDH also tracks heat-related illness and shares resources related to extreme heat.[27,28]

### Maryland Department of Disabilities (MDOD)

MDOD is the principal Executive Branch agency representing the perspective of people with disabilities in the development, implementation, and enforcement of statewide disability policies and standards throughout State government. In this capacity, MDOD advises the Governor on disability policy and collaborates with federal, regional, and local units of government to enhance the effectiveness of supports, services, and programs for individuals with disabilities.

Several MDOD programs are directly involved in the preparedness and resilience of people with disabilities, which in turn strengthens the community's overall capacity to successfully manage emergencies.

### Maryland Department of General Services (DGS)

DGS manages much of the State's building portfolio, including offices, complexes, and other critical facilities. DGS supports resilience by incorporating resilience considerations into capital projects, maintenance, and procurement.

DGS plays a key role in ensuring that State-owned facilities can withstand and recover from hazards while continuing to deliver essential services.

### Maryland Department of Aging (MDOA)

MDOA distributes federal and state funding to Maryland's 19 Area Agencies on Aging (AAAs), operated by local governments or nonprofits.

As part of the Older Americans Act requirements, AAAs provide information to MDOA detailing how they will coordinate activities, and develop long-range emergency preparedness plans, with local and state emergency response agencies, relief organizations, local and state governments, and any other institutions that have responsibility for disaster relief service delivery.[29]

Additionally, MDOA has implemented Longevity Ready Maryland (LRM), Maryland's multi sector plan on aging, that promotes coordination of efforts across state agencies, local governments, businesses, nonprofits, and community organizations to create a resilient approach to aging that makes efficient use of resources and builds a strong, integrated support system.[30]

### Maryland Department of Information Technology (DoIT)

The Department of Information Technology (DoIT) plays a pivotal role in cyber resilience. DoIT provides critical information technology solutions that help Maryland Government Agencies become more secure, productive, and accessible.

DoIT is responsible for the development and operation of the networkMaryland™ high-speed network and Maryland FiRST Public Safety Radio System. Within DoIT, the Office of Security Management (OSM) provides a common statewide strategy for secure, effective, and technically sound use of the State's information technology resources.

OSM is responsible for the establishment of security policies, security guidance, security awareness, privacy and development and delivery of Statewide centralized security services such as the Maryland Security Operations Center. OSM helps protect the State through detection, cyber threat, and incident response services and is a source of IT security information for State agencies.

### Maryland Insurance Administration (MIA)

MIA's goal is to "provide efficient, effective service to both the consumers of insurance products and the insurance industry."[31] MIA provides consumer education and advocacy about insurance products and analyzes insurance trends in Maryland.

MIA supports initiatives at the intersection of insurance and resilience, such as Maryland Flood Awareness Month.

### Critical Area Commission (CAC)

In Maryland, the Critical Area includes all land within 1,000 feet of Maryland's tidal waters and tidal wetlands. The Critical Area Commission consists of 29 Governor-appointed members that represent a broad set of interests and expertise.

Among other responsibilities, the CAC reviews and approves projects on State-owned land in the Critical Area and also reviews and approves State/local actions that result in major developments on private lands or those owned by local jurisdictions.[32]

In 2024, the CAC's program was amended to incorporate climate change.[33]

## *Existing State Efforts*

When developing this strategy, MOR reviewed over a dozen existing state resilience plans (as described in Appendix F: List of State Resilience Plans Crosswalked for this Plan), convened partners and experts, and met individually with State agencies to understand current and upcoming efforts.

This process uncovered a strong foundation of plans, coordinating mechanisms, funding programs, regulations, and datasets that can support resilience. A sampling of those are described below, while others are described throughout this strategy.

### State Plans Related to Resilience

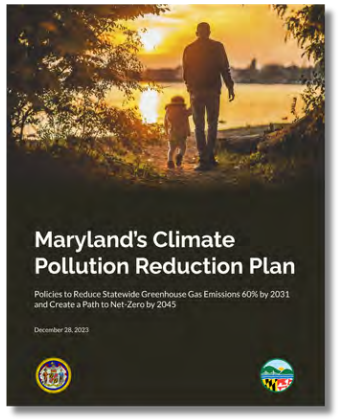
Maryland has over a dozen State-level plans related to resilience. Some focus solely on climate adaptation, while others dive into specific challenges like nuisance flooding or saltwater intrusion, and still others capture a single sector like energy. Each of these plans represents one part of the equation to reduce Maryland's disaster risk and prepare for climate change.

In recent years, Maryland has launched a trio of planning efforts *(details at right)* that work together to reduce emissions, strengthen resilience, and manage disaster risk. These plans are particularly relevant for a multi-sector approach to resilience.

The resilience strategy builds upon this foundation by lifting up common themes, filling in topical gaps, and providing a smaller number of strategic recommendations specifically focused on resilience.

#### State Hazard Mitigation Plan

The State Hazard Mitigation Plan, updated every five years under FEMA requirements, catalogs Maryland's disaster risks and identifies strategies to reduce losses before hazards strike.[34] This plan is not only a prerequisite for federal disaster funding but also guides local governments as they update their own hazard mitigation and adaptation plans.




#### Climate Implementation Plan

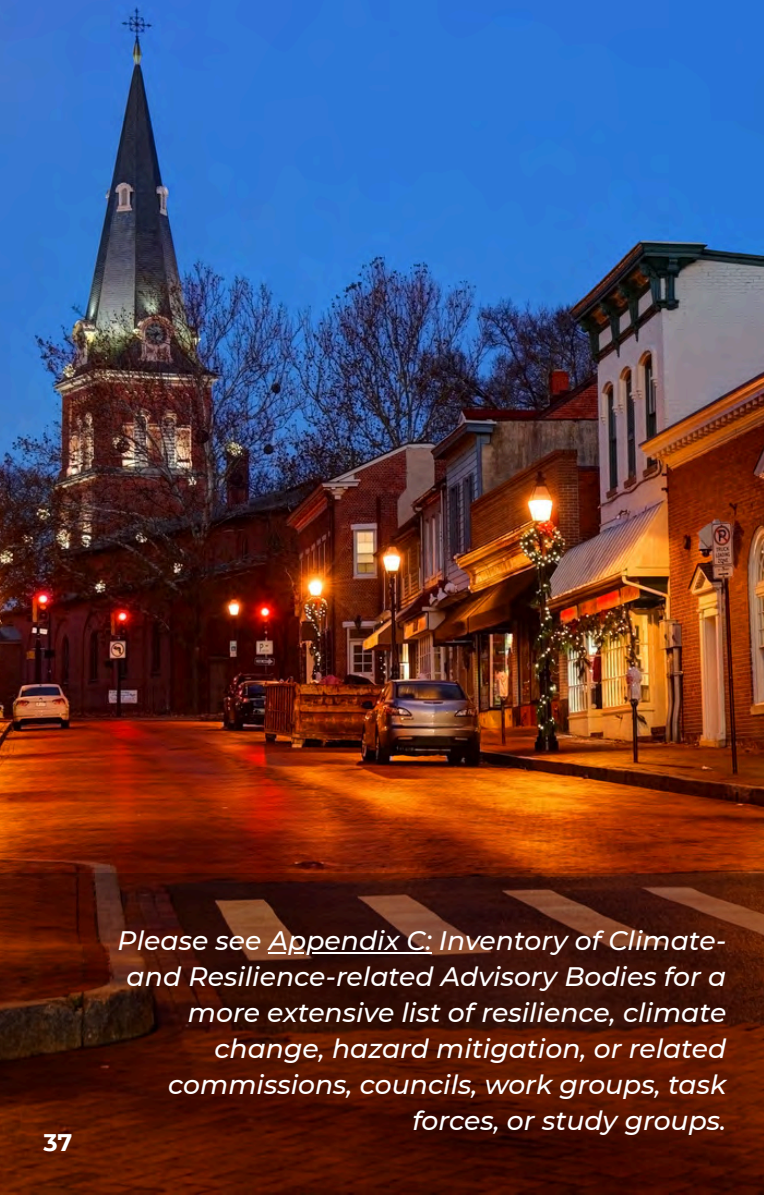
Following an executive order issued in 2024 by Governor Wes Moore, state agencies are now required to prepare Climate Implementation Plans that spell out how they will reduce emissions and align with the Climate Solutions Now Act's goal of cutting greenhouse gases 60 percent by 2031 and reaching net-zero by 2045.[37,38,39]

#### NextGen Adaptation Plan

On the climate adaptation side, the Next Generation Climate Adaptation Plan provides a roadmap of 175 actions to build resilience to flooding, sea level rise, heat, and drought.[35] Created by the Adaptation and Resiliency Working Group of the Maryland Commission on Climate Change, this plan emphasizes flexible, locally tailored strategies, with special focus on supporting the state's most vulnerable communities.[36]

## Mechanisms for State Coordination

State agencies and entities frequently coordinate on resilience, climate change, hazard mitigation, and related topics. A subset of coordinating mechanisms are described on this page:



*Please see Appendix C: Inventory of Climate- and Resilience-related Advisory Bodies for a more extensive list of resilience, climate change, hazard mitigation, or related commissions, councils, work groups, task forces, or study groups.*

### Agency Resilience Liaisons

Each Executive Branch department, along with the Maryland Energy Administration (MEA) and the Maryland Insurance Administration (MIA), must designate an Agency Resilience Liaison (ARL) to serve as the primary point of contact on resilience-related issues for MOR, helping to ensure that all State agencies remain aligned with Maryland's overarching resilience goals.[40] For the purposes of reporting on this strategy, the ARLs will provide their agency's updates. This group meets at least twice a year.

### Adaptation & Resiliency Working Group (ARWG)

The Adaptation and Resiliency Working Group (ARWG) supports the charge of the Maryland Commission on Climate Change by developing a comprehensive strategy for reducing Maryland's climate change vulnerability, providing state and local governments with tools to plan for and adapt to the more extreme weather and rise in sea levels anticipated as a consequence of climate change.[36] This group meets quarterly.

### Climate Subcabinet

Created by Executive Order 01.01.2024.19 in June of 2024, the Climate Subcabinet coordinates across agencies to drive a unified approach within state government to implement Maryland's Climate Pollution Reduction Plan.[37] This group meets quarterly.

### Maryland Resiliency Partnership

The Maryland Resiliency Partnership is an informal collaboration of public and private partners to leverage funding, personnel, and projects to support efforts that integrate hazard mitigation, floodplain management, and coastal and climate resilience.[41] This group meets quarterly.

### Maryland Sustainable Growth Subcabinet

The Maryland Sustainable Growth Subcabinet builds upon Maryland's successful smart growth initiatives and balances economic growth with environmental considerations.[42] The Maryland Sustainable Growth Subcabinet is chaired by the Secretary of the Maryland Department of Planning (MDP). The chair convenes monthly meetings and is responsible for the oversight, direction, and accountability of the work of the Subcabinet. MDP provides the primary staff for the Subcabinet.

# Success Stories

Maryland's resilience plans and governance structures have translated into ambitious actions, a selection of which are described on this page.

Each sector-specific chapter includes additional success stories and descriptions of existing programs.

### Climate Pollution Reduction Grants in Maryland

The Environmental Protection Agency (EPA) Climate Pollution Reduction Grants (CPRG) initiative makes nearly $5 billion available nationwide to help states, local governments, tribes, and territories reduce greenhouse gases and other air pollutants.[43]

Maryland has used this opportunity to full effect. The Maryland Department of the Environment (MDE), in partnership with other state agencies, produced a Priority Climate Action Plan (PCAP) that laid out strategies to support the state's legally mandated goals of reducing emissions 60% by 2031 and reaching net-zero by 2045.[44]

In 2024, Maryland was awarded nearly $130 million in implementation funding, which is being directed toward clean energy deployment, low-carbon transportation, and land-based climate solutions across the state.[45]

### Heat Stress Standards

Recognizing that workers face particular risks from extreme heat, the Maryland Department of Labor adopted a new Heat Stress Standard (COMAR 09.12.32), effective September 30, 2024, which requires monitoring, rest breaks, hydration, shade, acclimatization, training, and emergency planning whenever the heat index reaches 80 °F or higher.[19] This makes Maryland one of four states in the nation with occupational heat safety standards that cover both outdoor and indoor workers.[46]

### Climate-Ready Action Boundary

Established by Chapter 415 of the 2014 Laws of Maryland (HB 615), the Coast Smart Council within the Department of Natural Resources (DNR) was charged with creating siting and design standards to protect state-funded projects from sea level rise and flooding.[47,48] In 2020, the Council released the Coast Smart Construction Program and launched the Maryland Coast Smart Climate-Ready Action Boundary (CRAB), an interactive map that shows where criteria apply by modeling the reach and depth of flooding from a three-foot rise above the tidal 100-year floodplain.[49]

CRAB now gives state and local agencies a practical way to screen new capital projects for flood risk before construction. In recent years, multiple projects have been flagged within the CRAB zone and evaluated for compliance, with some incorporating resilience measures and others reviewed through waivers. The tool is also widely used in training, outreach, and planning, helping planners and engineers visualize future flood conditions.

**Understanding the Cost of Resilience**

Across stakeholder interviews and sector work groups, one question came up again and again: How much will resilience cost the State of Maryland?

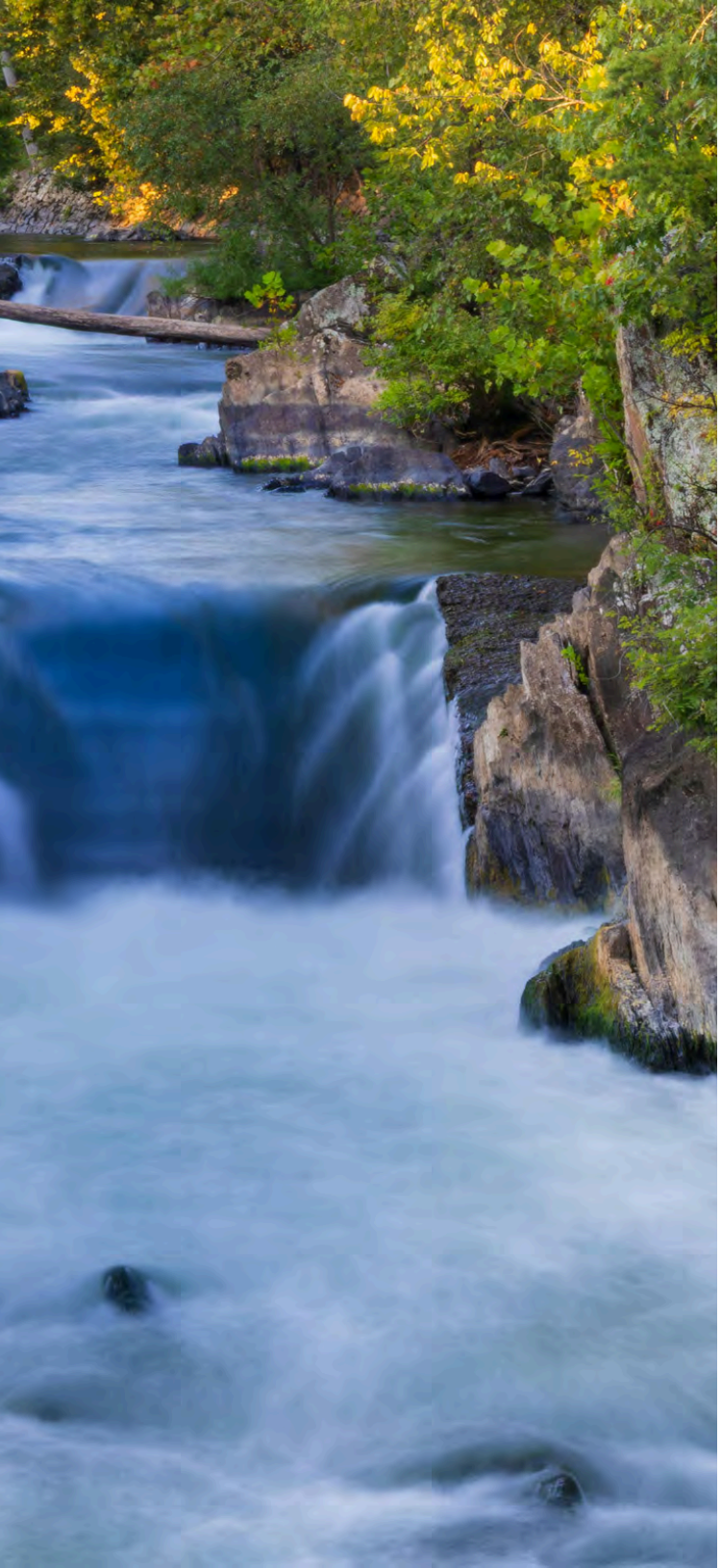
Since 1980, the U.S. has seen hundreds of billion-dollar climate disasters, and the pace of these events has accelerated dramatically. The Comptroller's Office estimates that Maryland has already absorbed more than $20 billion in damages and recovery costs over recent decades.[50] Looking ahead, chronic flooding alone could cost $27.4 billion by 2040.

The case for resilience is clear: every dollar invested saves multiple dollars in avoided damages.[51] Maryland could improve its awareness of resilience spending by tracking funding across agencies and disciplines. A process exists for tracking State agency expenditures on greenhouse gas reduction that could be replicated to estimate current resilience spending.[52]

An even more ambitious vision would involve incorporating resilience tagging into the State's financial management system. Looking toward the future, understanding the true cost of resilience for the State of Maryland over the next 30, 50, or 100 years would require significant climate and financial modeling to understand the damages Maryland would experience in a "do-nothing" scenario.

**Navigating Federal Uncertainty**

With the change in federal administration, the State of Maryland faces uncertainty on many fronts. As the State with the highest concentration of federal employees, Maryland's economy has been hit particularly hard by federal reductions in force.[53,54] As Marylanders face restrictions to their benefits, food and housing insecurity or lapses in healthcare coverage are serious concerns that reduce individuals' ability to recover from disasters.



State and local governments rely on federal dollars for a number of disaster and climate programs – everything from staffing for emergency response to funding for climate research to ambitious projects that mitigate disaster risk. As one example, the cancellation of FEMA's Building Resilient Infrastructure and Communities (BRIC) program in April 2025 has reduced pre-disaster mitigation opportunities.[55]

Advancing resilience with less available funding requires creativity. This includes finding opportunities to "stack" multiple funding programs, encouraging local governments to increase their own financing capacity, and fostering partnerships with the private and philanthropic sector.

### Tackling Extreme Heat

Maryland has spent years strengthening resilience to flooding by restoring wetlands, elevating infrastructure, improving stormwater management, and more. While there is still work to do, data, funding, coordination, and regulations already exist to reduce the State's flood risk. The growing challenge of extreme heat now demands equally urgent attention.

Extreme heat is a deadly hazard. Average temperatures in the state have already risen by about 2.5 °F since the early 20th century, and projections show a sharp increase in the number of days above 95 °F in the coming decades.[56,57] While individual efforts to address extreme heat exist across agencies, a more coordinated approach is needed. Several states, like New Jersey and Arizona, are leading the way when it comes to whole-of-government strategies for extreme heat.[58,59]

### Advancing Place-Based Resilience

**Place-Based Resilience can be defined as:** Supporting community-led resilience projects in areas that are disproportionately affected by hazards and stressors, by fostering collaboration across local, regional, and state agencies and combining resources to optimize resilience benefits. A collaborative, place-based approach to resilience will lead to transformation instead of one-off projects.

MOR recommends a whole-of-government approach that centers place-based resilience, as reflected in the Overarching Recommendations 2.1, 2.2, and 2.3. By selecting priority regions and stacking funding sources, the State could move the needle in communities that need resources the most.

This process would consist of 3 parts:

**1** **Identify Priority Regions**

**2** **Create an inventory of resilience project needs**

**3** **Convene state agencies to fund collaboratively**

**Why This Matters**

By taking a coordinated, strategic approach to place-based resilience, the State can drive investment in areas that have high hazard risk and social vulnerability. The first step is to identify geographies with the greatest need, taking into account environmental justice communities, as well as rural areas. The next step is to work with communities to inventory their resilience project needs. And finally, all of this can be combined with a collaborative State funding framework that stretches existing dollars further.

# Goals & Recommendations

*Overarching*

## GOAL 1 - Institutionalize resilience across Maryland's funding and regulations.

**Recommendation 1.1**

**Evaluate state funding programs and identify where hazard risk assessment could be incorporated into application scoring.**

**Owner:** MDEM/MOR **Timeline:** 5 years **Funding:** No additional funding needed **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- The State administers several funding programs that can pay for resilience projects such as stormwater upgrades, living shorelines, or resilience improvements to transportation assets.
- But there is a much larger opportunity to incorporate resilience into how the State funds construction projects in general – from roads, to schools to energy assets and more.
- As a first step, MOR would evaluate State funding programs to identify opportunities for agencies to incorporate hazard risk into application scoring. This would happen in concert with efforts to coordinate funding that are led by the State Clearinghouse.[60]
- This would allow the State to understand the risk profile of investments and better steward its funds.

**Recommendation 1.2**

**Screen environmental permits to identify opportunities to incorporate climate considerations in future permits and renewals.**

**Owner:** MDE **Timeline:** 5 years **Funding:** TBD

**Why This Matters:**

- The Maryland Department of the Environment has recently updated state stormwater regulation to incorporate climate-adjusted rainfall.[61]
- A similar process could be followed to future-proof other environmental regulations. MDE would evaluate environmental regulations and permits to identify places to incorporate climate projections. This would occur in alignment with other permitting goals like efficacy.

**Recommendation 1.3**

**Establish a statewide resilience authority or empower an existing entity to play that role.**

**Owner:** TBD **Timeline:** 5 years (TBC) **Funding:** TBD **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- At the local level, resilience authorities are entities that can issue bonds, receive government funding, and assess fees for their services in order to pay for resilience projects.[62]

**Why This Matters (cont.):**

- These structures can increase local financing capacity and unlock dollars for resilience.
- No comparable state entity exists. With a statewide resilience authority, Maryland could access a wider array of funding and financing to tackle large-scale resilience projects.

**Recommendation 1.4**

**Establish a resilience baseline for the State; develop a statewide resilience assessment to support local government benchmarking for use in a statewide resilience tracker to help identify investment needs; and develop indicators to monitor the effectiveness of resilience efforts and establish future goals.**

**Owner:** UMCES **Timeline:** 5 years **Funding:** TBD pending competitive bid. Estimates range from $250,000 to $1.7 million

**Why This Matters:**

- It is an emerging best practice for states to develop and utilize metrics to measure disaster and climate resilience.[63]
- In 2022, the Maryland General Assembly tasked the University of Maryland Center for Environmental Science (UMCES) with developing a resilience baseline, a benchmarking assessment for local governments, and metrics to track resilience over time.[64]
- This would help identify opportunities for investment and ensure that Maryland is directing spending where it can be most effective.

## GOAL 2 - Coordinate state funding and direct it toward places with high hazard risk and social vulnerability.

**Recommendation 2.1**

**Convene a funding table in which state agencies pool resources and stack funding to accomplish transformative resilience projects.**

**Owner:** MDEM/MOR **Timeline:** 2 years **Funding:** No additional funding needed **Focus Area:** Justice & Equity, Place-based Resilience

**Why This Matters:**

- One of Maryland's strengths is that so many of its agencies fund resilience work.
- But stakeholders frequently described situations where multiple agencies funded projects in the same location without foreknowledge or initial collaboration. They also expressed concern that some high-risk geographies may receive little to no resilience dollars.
- When resilience projects are submitted for certain types of State and Federal funding, they are sent to relevant agencies for review through the State Clearinghouse, creating an initial dataset of resilience projects.[65] However, no comprehensive view exists to show resilience projects and project ideas around the State.
- By utilizing the Clearinghouse data to develop a resilience project inventory and convening state agencies, MOR can help coordinate funding across agencies, enabling more efficient capital stacking, better visibility into statewide spending, and transformative resilience projects.
- This recommendation would advance the place-based resilience concepts described above.

**Recommendation 2.2**

**Identify focus geographies for agencies to coordinate place-based resilience using existing disaster data, environmental justice data, and other sources.**

**Owner:** MDEM/MOR **Timeline:** 2 years **Funding:** No additional funding needed

**Focus Area:** Justice & Equity, Place-based Resilience

**Why This Matters:**

- MOR is tasked by State law with "ensuring that investments prioritize vulnerable communities and environmental justice."[66]
- To achieve this and effectively coordinate funding, MOR would work with funding agencies to identify geographies with outsized hazard risk and social vulnerability where resilience dollars could significantly move the needle.
- This would build off of existing State law that defines overburdened and underserved communities, as well as Governor Moore's initiatives to advance environmental justice.[67]
- On the heels of the 2025 flooding in Western Maryland, additional rural datasets and indicators could be combined with existing environmental justice tools to determine under-resourced areas.

**Recommendation 2.3**

**Accelerate the number of resilience projects in under-resourced communities with high hazard risks.**

**Owner:** Multiple; MDEM/MOR will track results **Timeline:** 10 years **Funding:** No additional funding needed

**Focus Area:** Justice & Equity, Place-based Resilience

**Why This Matters:**

- Utilizing the funding table structure and the priority geographies as described above, Maryland's agencies could direct dollars and technical assistance resources to under-resourced communities with high hazard risks.
- MOR would measure success in terms of the number of resilience projects in under-resourced communities over time and would utilize resilience benchmarks that become available.

## GOAL 3 - Collaborate and take action to address emerging climate challenges.

**Recommendation 3.1**

**Convene a subset of Agency Resilience Liaisons to coordinate state-level strategy on extreme temperature.**

**Owner:** MDEM/MOR **Timeline:** 2 years **Funding:** No additional funding needed

**Why This Matters:**

- The effects of climate change are already here: in 2025, Maryland experienced its highest number of heat deaths in more than a decade.[68]
- By mid-century, Maryland is projected to experience 47.7 days above 90° F per year under a high future climate scenario. This is 190% greater than the 16.5 days above 90° under a baseline scenario.[69]

**Why This Matters (cont.):**

- Several of Maryland's agencies are already addressing this challenge. Maryland Occupational Safety and Health issues heat stress standards, the Maryland Department of Health monitors heat-related illness, and the Maryland Department of Transportation manages the impacts of heat on transportation.[19,25]
- Stakeholders frequently expressed that greater coordination around extreme heat would help with information sharing and strategic alignment.

**Recommendation 3.2**

**Convene a subset of Agency Resilience Liaisons to collaborate and share information about community-driven relocation.**

**Owner:** MDEM/MOR **Timeline:** 2 years **Funding:** No additional funding needed

**Why This Matters:**

- With sea level rise and worsening flooding, Maryland will look dramatically different in the next 50 years.[70]
- State agencies are grappling with questions of how to support voluntary relocation from high-risk areas.
- Community-driven relocation is a complex topic that requires serious consideration, and an initial step would be convening state agencies to share information and discuss this topic.
- After laying this groundwork, the State might work with interested communities to understand requirements for successful implementation.

## GOAL 4 - Strengthen emergency response in the face of federal changes by sharing resources with neighboring states and non-governmental partners.

**Recommendation 4.1**

**Establish resource sharing agreements with partners beyond Maryland State government to support preparedness, response, recovery, and mitigation activities.**

**Owner:** MDEM/DRR **Timeline:** 2 years **Funding:** No additional funding needed

**Why This Matters:**

- Mutual aid is a foundational part of emergency management, supported by structures like the Emergency Management Assistance Compact.[71]
- With changes to FEMA's funding and a move toward greater state responsibility, the Maryland Department of Emergency Management is exploring formalized agreements with other states and stakeholders in all phases of emergency management.
- This would allow for support across training, response, recovery, and mitigation. It would also decrease reliance on federal support.

## GOAL 5 - Enhance the state's digital resilience through continued IT modernization and development of key cybersecurity governance and operations capabilities.

**Recommendation 5.1**

**Improve digital availability and modernization initiatives to refresh critical and legacy digital infrastructure; integrate digital innovations like artificial intelligence; and implement zero trust architecture principles.**

**Owner:** Multiple (led by DoIT) **Timeline:** 10 years **Funding:** TBD **Focus Area:** Justice & Equity

**Why This Matters:**

- Many state and local entities operate on outdated or unsupported or digital infrastructure. Not only does this lead to high maintenance costs, but it also creates greater points of failure and higher cybersecurity threat risk.
- For those reasons, it is essential to modernize the State's digital infrastructure.
- By adopting and implementing digital innovations like artificial intelligence, the State could realize economies of scale and power.
- The State could also adopt zero trust architecture principles – "never trust, always verify" – to raise the floor of statewide cybersecurity.

**Recommendation 5.2**

**Establish statewide cybersecurity and privacy governance, policy, and standards / baseline; develop cybersecurity and privacy posture assessment processes and tools to assist state and local evaluation of security programs for compliance and cybersecurity resilience.**

**Owner:** DoIT Office of Security Management **Timeline:** 2 years **Funding:** TBD

**Why This Matters:**

- With global transformation and growing digital reliance, the digital threat landscape has evolved. Adversaries running the spectrum of socially or politically motivated hacktivists to financially driven criminals to state-sponsored espionage and sabotage units continually seek new vulnerabilities and methods to achieve their goals.
- The Maryland IT Security Manual and similar statewide cybersecurity guidance documents are outdated and no longer reflect the advanced cyber threat landscape the State faces.
- Updated statewide governance would provide a foundation on which state and local cybersecurity programs could be built. New policies would build on that foundation to create an effective cybersecurity program.
- Standards, baselines, assessments, and tools could be used to put enhanced cybersecurity and privacy into practice.

**Recommendation 5.3**

**Expand the availability and adoption of centralized IT and cybersecurity services to standardize defenses across the state; enhance state and local entities' access to enterprise-grade capabilities such as endpoint detection and response .**

**Owner:** DoIT Office of Security Management **Timeline:** 5 years **Funding:** TBD

**Why This Matters:**

- Many state entities lack the budget and personnel to procure and manage top-tier IT and cybersecurity tools, resulting in a fragmented landscape where well-defended agencies connect to vulnerable ones.
- A "Whole-of-State" approach to centralized services would bridge this gap, allowing less resourced entities to leverage the technical expertise of the state.
- Centralizing core IT and cybersecurity services would eliminate duplication of effort and ensure a consistent baseline of security. A centralized service model would also enhance visibility into the statewide threat environment, allowing the State to detect and neutralize coordinated attacks before they cascade across jurisdictional lines.

## ** End of Sector Recommendations **

### Preparing the Workforce for Climate Change

Maryland can build a climate-resilient workforce by expanding grants and accelerator programs that support core sectors such as agriculture, fisheries, and natural resources, while also creating pathways for mid-career retraining aligned with resilience goals. Maryland offers Workforce Training Grants through Maryland Business Express to help businesses upgrade employee skills.[72] The Department of Natural Resources supports vocational and internship pathways into conservation careers, including certification tracks outside traditional college routes.[74]

Building on these efforts, Governor Moore's announcement of more than $130 million in Climate Pollution Reduction Grants adds significant funding for workforce training, including in emerging technologies such as electric vehicle charging infrastructure.[75] To fully realize this opportunity, Maryland could scale and target such programs toward industry adaptation; for example, helping fisheries adopt climate-resilient harvest methods or farms transition to drought-tolerant crops, while embedding mid-career retraining that enables workers to transition into green, adaptive roles.[76]

### Managing the Risks of New Technologies

Artificial intelligence (AI) is rapidly reshaping Maryland's cybersecurity risk landscape. On one hand, AI can strengthen defenses through advanced detection and faster incident response. On the other hand, malicious actors are already using it to create highly targeted phishing campaigns, generate convincing deepfakes, and deploy automated attacks that adapt faster than traditional defenses can respond. In 2025, the Maryland Department of Information Technology (DoIT) released its *AI Enablement Strategy & Study Roadmap*, emphasizing both the promise of AI for state operations and the need to safeguard against its misuse.[77]

Maryland has already felt the impact of cyber incidents. The 2019 ransomware attack on Baltimore City disrupted municipal services for weeks, while the University of Maryland Medical System and the Maryland Department of Health both faced ransomware attacks that hindered hospital and public health operations.[78,79,80] In 2020, Baltimore County Public Schools also suffered a ransomware attack that shut down instruction. These incidents highlight why AI-enabled threats matter: core services, city government, health care, and schools, are already vulnerable.[81] As digital reliance increases for daily activities in all areas of life, including with AI-driven tools, the severity of cybersecurity risk will also increase for all Marylanders, affecting constituents, government entities, and critical infrastructure services.

# Big Ideas & Open Questions

**In the development of this strategy, many important topics surfaced that are not directly addressed by recommendations. These are included throughout the document as "Big Ideas and Open Questions" because they require additional information or discussion in the future.**

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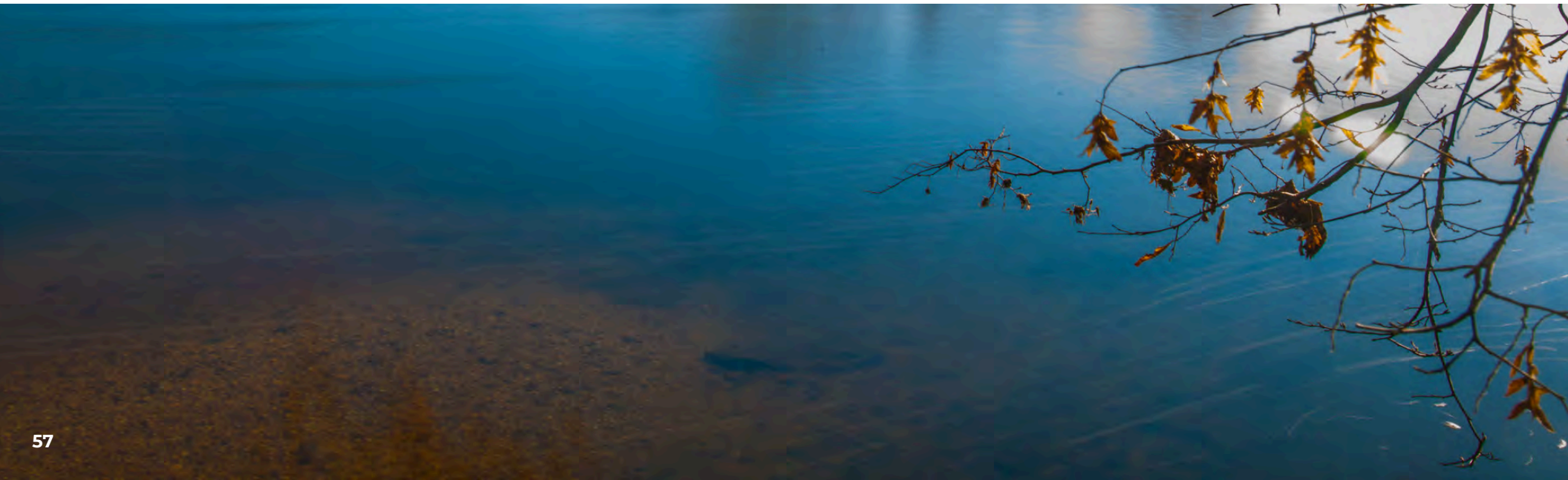
## ** End of Chapter References **

*Sector 1:*

# Environment & Natural Systems



## *Background*

Maryland's environment and natural systems are a vital asset for the State and include watersheds, coastal areas, streams, lakes, wetlands, forests, essential habitat, and protected lands. These systems face urgent threats from climate change, natural hazards, and encroachment, among other factors. Through conservation, restoration, and the spread of nature-based solutions, Maryland can not only protect its natural resources, but harness the benefits of these ecosystems like reduced hazard risks.

Environment and Natural Systems was chosen as one of the five sectors in this strategy based on a review of plans from Maryland and other states. Protecting Maryland's landscapes strengthens the distinct character of its regions, from the Chesapeake Bay all the way to Western Maryland's forests, while building resilience locally.

## *Definitions*

**Definition of the Sector:** Restoring and protecting Maryland's environment and natural ecosystems to enhance ecosystem services in the face of environmental change and help communities harness benefits such as risk reduction, carbon sequestration, cleaner air and water, health, recreation, ecotourism, habitat diversity, and natural resource conservation.

Maryland's natural resources play a critical role in lessening the impacts of natural hazards and climate change, while building overall community and ecological resilience.

**Definition of Hazard:** The Department of Homeland Security defines a hazard as "A source or cause of harm or difficulty".[1] This term is often used to capture **acute shocks** such as hurricanes or cyberattacks.

**Definition of Stressor:** Stressors are chronic challenges that harm communities on blue-sky days and can make hazards more severe. This term is used to capture **ongoing or structural challenges** like persistent poverty or sea level rise.

*Note that while this strategy distinguishes between hazards and stressors for the purpose of discussion, the two are deeply linked and interconnected.*

## *Hazards*

Maryland's environment and natural systems are on the front lines of natural hazards such as flooding, drought, and extreme temperatures. The hazards highlighted in this section are the ones most frequently identified by stakeholders through surveys, interviews, and workgroup discussions. The following pages will capture top examples of hazard impacts, but the list contained therein is not exhaustive.

## Flooding

- Maryland is projected to face a 50% increase in inland flooding by 2050 due to intensified heavy rainfall.[2] Rapid downpours, especially when stormwater systems are overwhelmed, result in flash flooding and severe soil erosion.

- Flooding intensifies stormwater runoff in Maryland, washing sediments into the Chesapeake Bay and its tributaries. These sediment surges cloud the water, block sunlight, and drive die-offs of submerged aquatic vegetation (SAV), which dropped to 36,794 acres in 2024 - less than half the state's 79,800-acre restoration goal.[3]

## Extreme Temperature

- Temperatures in Maryland's streams, rivers, and the Chesapeake Bay have been increasing over the past 30 years, reducing available oxygen in the water and causing ecosystems to shift.[4] The Bay is especially vulnerable since many species are already at the edge of their temperature range. Eelgrass, an underwater grass that dominates much of the lower Bay and provides critical habitat for fish, crabs, and other species, is expected to decline as waters warm. Unlike other species, it cannot simply shift northward, since it requires the saltier waters found in the southern Bay.

- During the colder winter of 2017–2018, 6.37% of Maryland's blue crabs died from overwinter mortality, compared to only 0.36% during the warmer winter of 2019–2020.[5]

- Invasive species such as the Chesapeake Channa, which tolerate a wide range of temperatures, salinity levels, and oxygen conditions, further threaten ecosystems by preying on native fish, crustaceans, and amphibians. Land-based invasives like kudzu and ticks can also thrive at higher temperatures and disrupt ecosystems.

- On the flipside, green space can reduce the effects of extreme heat. Trees, parks, green roofs, and other natural features can cool down neighborhoods and lessen the heat island effect.[6]

## Tropical Systems & Severe Storms

- Between 2007 and 2016, nearly 30% of Maryland's rainstorms would have ranked among the top 1% of storm intensity had they occurred in the 1950s, reflecting the increase in atmospheric water vapor.[2]

- Heavy rainfall, such as that seen in 2018, reduces the salinity of the Chesapeake Bay and makes it harder for oysters to spawn and reduces their ability to filter contaminants out of the water.[5]

**Drought**

- USDA has designated 18 of Maryland's 24 local jurisdictions as primary natural disaster areas for drought.[7]
- Extended dry spells deplete soil moisture, threaten forest health, reduce agricultural yields, and endanger public health.[8] Water shortages from drought lower streamflows and decrease groundwater levels, diminishing agricultural production, freshwater availability, and fish populations.[9]
- Drought increases the risk of wildfires, especially in forested areas already stressed by pests and disease. The Maryland Forest Service annually responds to an average of 123 wildfires, burning more than 1,780 acres of forest, brush, and grasses.[10] Local fire departments respond to over 5,000 wildfire incidents annually.

## The Wonders of Wetlands

Wetlands are transitional areas between land and water, where soil is saturated or covered by water at least part of the time.[11] They take many forms, including marshes, swamps, bogs, and wet prairies.

- Wetlands play a critical role in reducing flood risks. During storms, they store water and filter out sediment much like a sponge, with just one acre capable of holding up to 1.5 million gallons of floodwater.[12] This ability to capture and slow down water translates into real economic value.
- Studies show that every square kilometer of wetland provides roughly $1.8 million in storm protection annually (approximately $7,300 per acre per year).[13]
- Wetlands also act as natural barriers against waves. A strip only 15 feet wide can cut incoming wave energy by 50 percent, reducing the damage communities face from coastal storms.[14]

*Long-term Stressors*

In addition to the hazards described above, Maryland's environment and natural systems face a variety of ongoing stressors. Some of these include:

### Coastal Erosion & Saltwater Intrusion

Maryland's 7,700 miles of shoreline make it one of the most vulnerable states to the effects of coastal erosion.[15] Over the past century, the state has experienced more than a foot of sea level rise, leading to marsh loss, vegetation decline, and widespread saltwater intrusion.[16] Since the 1980s, approximately 25,600 acres of forests and 3,500 acres of farmland have been converted to tidal marsh.[17]

Dorchester and Somerset Counties face the greatest impacts, with the highest share of farmland affected by salinization while also ranking among the five counties with the highest poverty rates in Maryland.[18]

**Did You Know?**
Over 84,300 acres of Maryland's forests have been impacted by saltwater intrusion, resulting in "ghost forests," areas of standing dead trees where live trees are mostly absent.[19,20]

### Pollution & Runoff

When drought is followed by extreme rainfall, nutrient runoff intensifies because dry soils cannot effectively absorb applied fertilizers.[21] This leads to excess nitrogen and phosphorus entering waterways through topsoil erosion and flooding in urban, residential, and agricultural areas, which are the two leading sources of pollution in the Chesapeake Bay.

Nutrient pollution fuels harmful algal blooms, depletes oxygen in rivers and streams (including drinking water sources), and creates dead zones where aquatic life cannot survive.[22] Agriculture contributes an estimated 38% of the Bay's nitrogen, 45% of its phosphorus, and 60% of its sediment loads.[23] Maryland has been a leader in reducing these numbers. Since 2018, Maryland has been implementing its Phase 3 Watershed Implementation Plan (WIP), consistent with the Chesapeake Bay Total Maximum Daily Load (TMDL) to reduce nutrient and sediment loads to the Bay.[24]

**Did You Know?**
Roughly 42% of farms in the Chesapeake Bay watershed are devoted to livestock and poultry production. Addressing excess manure nutrients by moving them off these farms and applying them in areas where they can be managed safely and productively is expected to cost between $18 million and $30 million each year.[23]

### Development & Economic Pressures

Impervious land covers, including pavement, roofs, and highly compacted soils, diminish the landscape's ability to absorb stormwater, mitigate hazards (e.g. flash floods), and support biodiversity.[25]

Wetlands once covered 7% of Maryland's landscape, but now, over 2.8 million acres of wetlands have been converted to development or drained for agricultural use.

Western Maryland has lost over 8,600 acres of forests that were formerly contiguous, leading to habitat fragmentation.

**Did You Know?**
An acre of wetlands can store between 1 and 1.5 million gallons of floodwater, acting like a natural sponge that significantly reduces runoff and downstream flooding.[26]

## *Existing State Efforts*

In response to these hazards and stressors, Maryland has taken the following actions thus far:

### NextGen Adaptation Plan

The NextGen Adaptation Plan, led by the Maryland Commission on Climate Change, serves as the state's strategic framework for preparing for the impacts of climate change.[27] This plan outlines proactive measures to reduce risk and enhance resilience across sectors, with a strong emphasis on equity, environmental justice, and climate-smart infrastructure.

Key priorities include addressing flooding, extreme heat, sea level rise, and other hazards through coordinated, data-driven, and locally informed strategies.

## Whole Watershed Restoration Fund

The Whole Watershed Restoration Fund, established through the Whole Watershed Act (SB 969/HB 1165) and administered by the Maryland Department of Natural Resources (DNR) in coordination with a multi-department State Management Team, supports a more collaborative, science-based approach to watershed restoration.[28,29]

Utilizing existing state resources, the Fund supports integrated, community-driven projects that improve water quality, restore ecosystems, and strengthen resilience to climate change. This initiative emphasizes innovative, nature-based solutions and prioritizes investment in underserved communities through equitable, capacity-building efforts.

## 5 Million Trees for Maryland

Maryland's tree planting initiative, launched in 2021, aims to plant and maintain five million native trees by 2031, and over one and a half million are already in the ground - about 30% of the way there.[30] Beyond planting at scale, the program uses advanced monitoring tools to track survival rates and maximize long-term benefits for people and the environment.

A key focus of the effort is equity. More than 57,000 trees have been planted in urban and historically underserved neighborhoods, where they provide shade, improve air quality, and create greener, healthier community spaces. These plantings not only address environmental disparities but also help build neighborhood pride and resilience.

## Maryland the Beautiful Act

The Maryland the Beautiful Act of 2023 set ambitious land conservation goals: protecting 30 percent of the state's land by 2030 and 40 percent by 2040.[31] As of February 2024, more than 1.85 million acres have been conserved with the State six years ahead of schedule.[32] This progress reflects the combined efforts of state and local governments, nonprofit land trusts, and federal agencies.

State agencies are now focused on strategies to reach the 40 percent target, which will require conserving an additional 600,000 acres of land.[33]

**Critical Area Commission**

In Maryland, the Critical Area includes all land within 1,000 feet of Maryland's tidal waters and tidal wetlands. The Critical Area Commission consists of 29 Governor-appointed members that represent a broad set of interests and expertise.

Among other responsibilities, the CAC reviews and approves projects on State-owned land in the Critical Area and also reviews and approves state or local actions that result in major developments on private lands or those owned by local jurisdictions.[34] In 2024, the CAC's program was amended to incorporate climate change and environmental justice.[35]

*Challenges & Needs*

To appropriately respond to the hazards present in this sector, the following issues should be addressed:

**Private Landownership of Shoreline and Forests**

Implementing nature-based climate strategies, such as living shorelines, forest buffers, and restored wetlands, is complicated by patterns of land ownership.[36] Approximately 85 percent of Maryland's shoreline and 76 percent of Maryland's forests are privately owned, meaning that large-scale implementation depends heavily on individual landowner participation. Overcoming funding and knowledge gap challenges may require more flexible financing models, expanded technical assistance, and stronger public-private collaboration to encourage nature-based resilience investments on private land.

*Potential Tool Available:* The Maryland Department of Natural Resources (DNR) Shoreline Erosion Loan Program provides loans to homeowners, community groups, nonprofits, and counties to design and construct living shorelines.[37] With flexible repayment terms, minimal upfront costs, and county support, the program helps protect property and restore natural shorelines.

**Valuing Natural Systems in Decision Making**

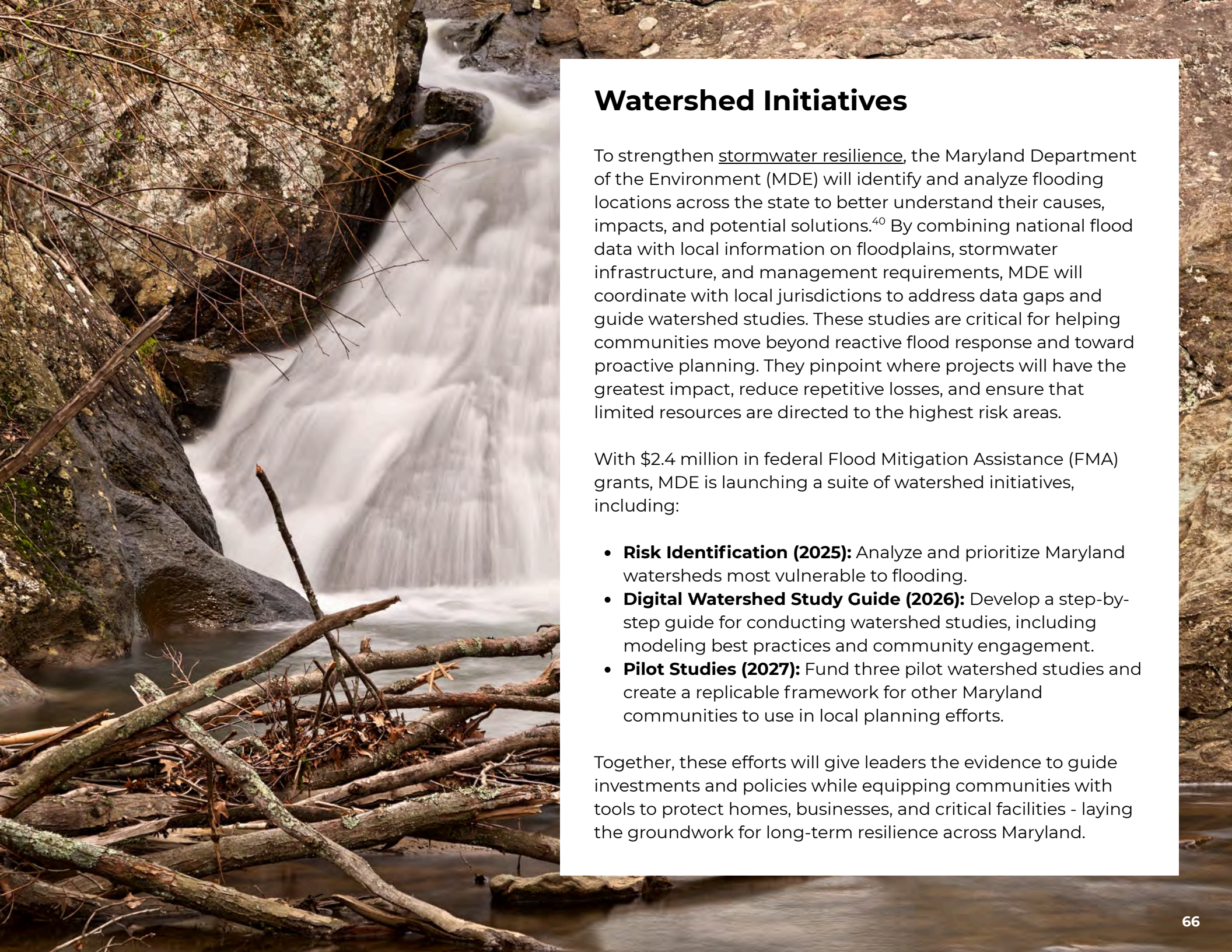
Natural systems are often undervalued in land-use decisions and infrastructure planning, as policies and professional practices have historically prioritized "grey" infrastructure like roads, pipes, and seawalls.

Green infrastructure and nature-based solutions are newer concepts, and the science of quantifying their co-benefits is still evolving. As a result, the resilience value of wetlands, forests, or living shorelines, such as reducing flood risks, cooling urban areas, and buffering storm surge, is frequently underestimated. This can lead capital investment decisions to prioritize short-term development over long-term conservation and restoration, even when natural systems could provide critical protections for Marylanders.

Maryland was the first state to prioritize living shorelines as the first form of coastal defense to consider when protecting shorelines.[38] By continuing to improve how we measure and communicate these benefits, and by integrating valuation tools into local and state planning processes, Maryland can better incorporate cost-effective nature-based strategies into future investments and deliver stronger, more sustainable resilience outcomes.

***Establishing Value with an "Eco-Price":*** Ecosystem services are the many ways nature supports people, from clean air and water to healthy soils and wildlife habitat. The idea of an "eco-price" captures the value of these benefits by comparing the dollars invested in protecting or restoring them (or the costs society avoids when they are maintained) with the improvements in ecosystem health.[39] In Maryland, the Department of Natural Resources estimates that natural lands provide seven major services: air quality improvement, carbon storage, nitrogen reduction, surface water protection, groundwater recharge, habitat for wildlife, and flood control/stormwater management. Together, these benefits are worth about $8 billion each year to Maryland residents.

## ** End of Sector Analysis **



## Watershed Initiatives

To strengthen stormwater resilience, the Maryland Department of the Environment (MDE) will identify and analyze flooding locations across the state to better understand their causes, impacts, and potential solutions.[40] By combining national flood data with local information on floodplains, stormwater infrastructure, and management requirements, MDE will coordinate with local jurisdictions to address data gaps and guide watershed studies. These studies are critical for helping communities move beyond reactive flood response and toward proactive planning. They pinpoint where projects will have the greatest impact, reduce repetitive losses, and ensure that limited resources are directed to the highest risk areas.

With $2.4 million in federal Flood Mitigation Assistance (FMA) grants, MDE is launching a suite of watershed initiatives, including:

- **Risk Identification (2025):** Analyze and prioritize Maryland watersheds most vulnerable to flooding.
- **Digital Watershed Study Guide (2026):** Develop a step-by-step guide for conducting watershed studies, including modeling best practices and community engagement.
- **Pilot Studies (2027):** Fund three pilot watershed studies and create a replicable framework for other Maryland communities to use in local planning efforts.

Together, these efforts will give leaders the evidence to guide investments and policies while equipping communities with tools to protect homes, businesses, and critical facilities - laying the groundwork for long-term resilience across Maryland.

# Goals & Recommendations

*Environment & Natural Systems*

## GOAL 1 - Prioritize resilience as a criteria for conservation & restoration investments.

**Recommendation 1.1**

**Develop methodology and case studies quantifying the costs and benefits, including ecosystem service value, of nature-based practices that increase resilience of human and natural systems.**

**Owner:** DNR **Timeline:** 2-3 years **Funding:** $100k+ for a study **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- While nature-based practices provide an array of ecosystem benefits, including hazard risk reduction, those benefits can be difficult to quantify and are not always incorporated into cost-benefit analyses.[41]
- DNR already quantifies many of the ecosystem benefits associated with restoration, but could expand its resilience benefit calculations to consider inland flooding, heat reduction, and more. This could be used to inform investments.

**Recommendation 1.2**

**Include quantified resilience benefits as criteria for investment across relevant conservation and restoration programs.**

**Owner:** DNR **Timeline:** 5 years **Funding:** TBD **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Once DNR has a more complete understanding of the resilience benefits of conservation and restoration approaches, this information can be used to drive decision making.
- When evaluating potential projects, DNR could evaluate resilience benefit as one of the criteria for selection.

## GOAL 2 - Improve resilience data collection, governance, coordination, access, and usability for local governments and state agencies.

**Recommendation 2.1**

**Identify data needs which may support local governments and the State of Maryland in advancing resilience.**

**Owner:** MDP **Timeline:** 2 years **Funding:** Funding secured - General Funds **Focus Area:** Justice & Equity

**Why This Matters:**

- During the stakeholder engagement process, the Maryland Office of Resilience repeatedly heard that local governments lack data to develop resilience projects, such as downscaled climate projections or basic mapping capabilities. These needs vary by community and region.
- Because MDP has regional planning staff, the Department is well-poised to identify local data needs that can be addressed at a later date.
- This is the first step, and once the data needs have been identified, MDEM will help coordinate across agencies to fill data needs.

## GOAL 3 - Identify innovative approaches and structures to increase nature-based solutions, by working with private property owners and nongovernmental funders.

### Recommendation 3.1

**Improve the accessibility of the living shoreline loan program to increase implementation by private property owners.**

**Owner:** DNR **Timeline:** 2 years **Funding:** No additional funding needed **Focus Area:** Justice & Equity

**Why This Matters:**

- More than 80% of Maryland's shoreline is privately owned, making collaboration between government and private landowners essential.[42]
- DNR administers the Shoreline Erosion Loan Program, offering no-interest loans to finance living shorelines on public, private, and community owned lands.[37] These projects not only protect against shoreline erosion but also reduce hazard risks.
- One option for improving utilization of this program is by updating its formula to reduce the financial burden for property owners.

### Recommendation 3.2

**Develop 100 Coastal Resilience Management Plans to help private landowners plan for and adapt to sea level rise.**

**Owner:** DNR **Timeline:** 5 years **Funding:** Climate Pollution Reduction Grant (CPRG) Funding Secured

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Sea level rise will dramatically change Maryland's landscape, especially on the lower eastern shore.[17]
- Through proactive planning, Maryland can help private landowners prepare for the impacts of sea level rise on their financial, social, and environmental systems.
- DNR has received funding through an EPA Climate Pollution Reduction Grant to advance marsh restoration, tidal connectivity, living shorelines and marsh migration corridor resilience by creating 100 Coastal Resilience Management Plans, which will support this goal.[43]

**Recommendation 3.3**

**Make nature-based solutions a mainstream and accessible resilience practice for private property owners.**

**Owner:** DNR **Timeline:** 10 years **Funding:** TBD

**Why This Matters:**

- Successful implementation of Recommendations 3.1 and 3.2 will help make nature-based solutions both mainstream and accessible.
- Nature-based solutions can be highly effective for reducing flood risk, providing storm protection, and minimizing erosion.[44]
- For instance, wetlands act like sponges, absorbing and slowly releasing water that would otherwise cause flooding.[45] Living shorelines can have a similar impact, breaking up wave energy and reducing storm damages.[46]
- But a variety of barriers prevent greater uptake of nature-based solutions.[47] By updating policy, engaging community members in planning, and continuing education efforts, DNR can make this practice mainstream and help draw down Maryland's hazard risk.

**Recommendation 3.4**

**Share information, best practices, and lessons learned in enhancing resilience through public-private-philanthropic partnerships and non-traditional financing structures.**

**Owner:** MDEM/MOR **Timeline:** 5 years **Funding:** No additional funding needed

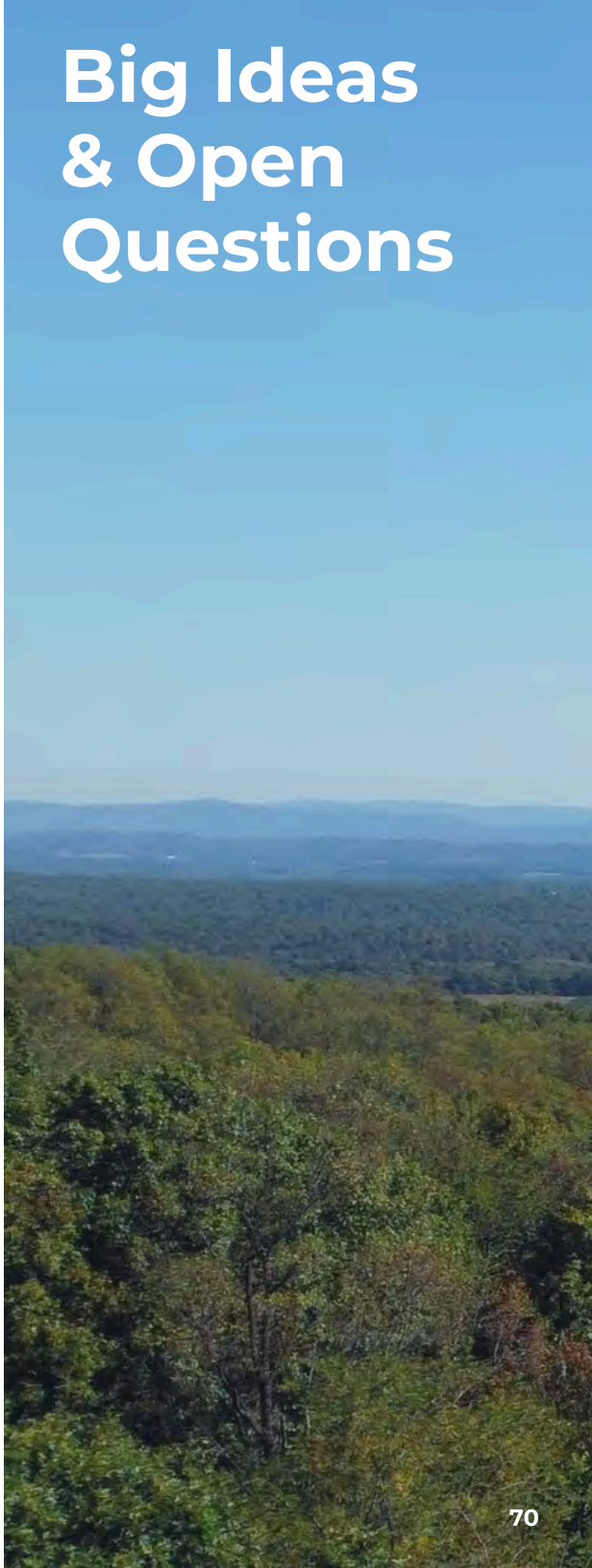
**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- To help ensure the spread of high-quality resilience projects, Maryland should explore innovative financing structures that can bring in private dollars.
- This could include partnering with MDE and DNR to explore ways to leverage Maryland's Conservation Finance Act for resilience outcomes using pay-for-success contracting methods.

## ** End of Sector Recommendations **

# Big Ideas & Open Questions



### Predictive Climate Change Modeling

Maryland's resilience planning depends on accurate, accessible climate projections, yet current data and modeling efforts are spread across agencies, universities, and research institutions. While these efforts provide valuable insights, they vary in scope, methodology, and geographic resolution, creating challenges for decision-makers trying to prioritize conservation, restoration, and infrastructure investments.

A systematic review of what already exists is needed to identify overlaps, inconsistencies, and critical gaps. A coordinated statewide framework would make climate data more consistent, actionable, and integrated with ecological and land-use trends. This approach would reduce duplication, fill gaps, and ensure resilience planning and investments are guided by reliable science.

### Innovative Financing Mechanism for Nature-Based Solutions

One of the persistent challenges in advancing nature-based solutions is financing. Unlike traditional infrastructure, these projects rarely generate direct revenue streams to repay private investments. This raises an open question for Maryland: What innovative approaches can be used to bring in private financing for resilience projects? Maryland already uses a mix of funding strategies for climate work, but expanding these tools could strengthen long-term investment in resilience.[48]

Several models could provide a path forward. Resilience Bonds, for example, a sub-set of green bonds, raise capital specifically for climate-resilient investment.[49] Environmental Impact Bonds go a step further by tying investor returns to measurable environmental or climate outcomes, broadening access to Environmental, Social, and Governance (ESG) focused capital while promoting transparency and accountability.[50] Green Revenue Bonds provide another option by financing projects through revenue generated by the project itself, rather than tax dollars, thereby preserving the state's general borrowing capacity.[48]

Beyond individual instruments, Maryland could also consider developing a State Resilience Finance Plan, as other states have done, to estimate long-term resilience costs, identify available funding sources, and prioritize the highest-return investments. Ultimately, investments in nature-based solutions can pay dividends, by reducing future damages from disasters.

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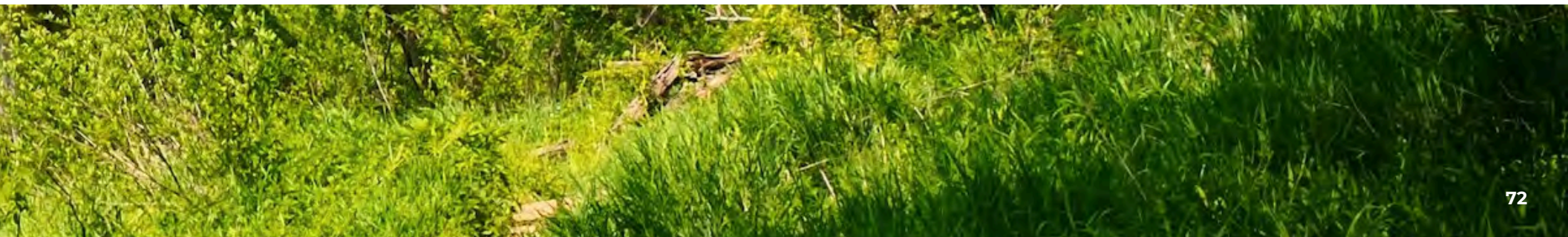

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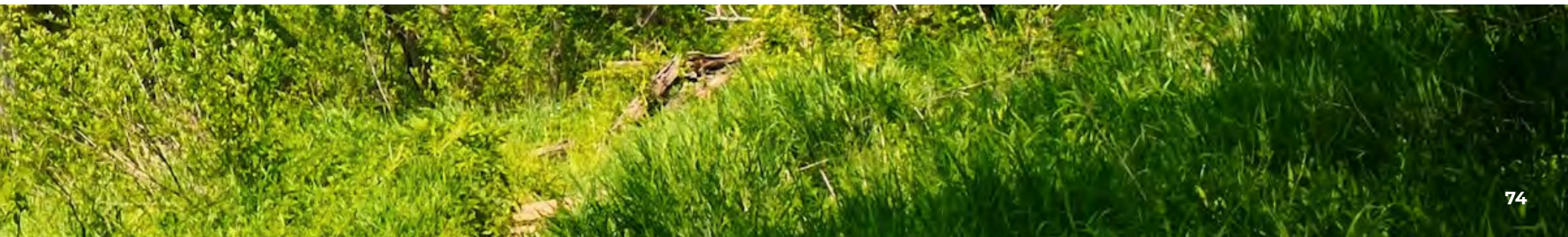

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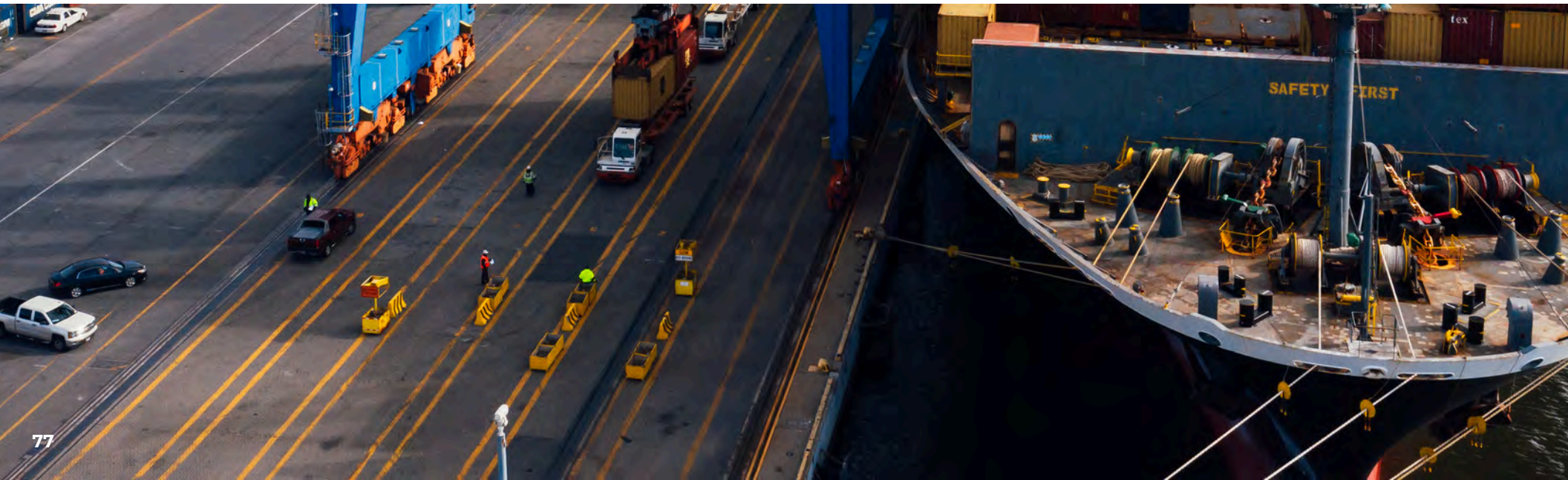
*Sector 2:*

# **Critical Infrastructure**



## *Background*

Critical infrastructure is essential for supporting everyday life and ensuring public health and safety. This sector focuses on enhancing Maryland's resilience by improving the power grid, planning for climate-ready transportation, and safeguarding critical facilities like water systems, military bases, and dams.

Critical infrastructure was chosen as one of the five sectors in this strategy based on a review of plans from Maryland and other states. As a priority of the Moore-Miller Administration, infrastructure efforts focus on building systems that better link residents across Maryland.[1] Safe, accessible, climate-resilient, and equitable infrastructure translates into expanded economic opportunity and stronger communities.

## *Definitions*

**Definition of the Sector:** Ensuring that Maryland's critical infrastructure systems and assets - namely, core transportation assets, drinking water and wastewater systems, energy assets, communications systems, hazardous materials sector, safety and security assets, and military installations - can recover quickly or withstand hazards and changing conditions.

Resilient critical infrastructure is fundamental and enables all other systems to function.

**Definition of Hazard:** The Department of Homeland Security defines a hazard as "A source or cause of harm or difficulty".[2] This term is often used to capture **acute shocks** such as hurricanes or cyberattacks.

**Definition of Stressor:** Stressors are chronic challenges that harm communities on blue-sky days and can make hazards more severe. This term is used to capture **ongoing or structural challenges** like persistent poverty or sea level rise.

*Note that while this strategy distinguishes between hazards and stressors for the purpose of discussion, the two are deeply linked and interconnected.*

## *Hazards*

Maryland's critical infrastructure is on the front lines of natural hazards like extreme temperatures and flooding as well as human-caused hazards like cyber attacks. The hazards highlighted in this section are the ones most frequently identified by stakeholders through surveys, interviews, and workgroup discussions. The following pages will capture top examples of hazard impacts, but the list contained therein is not exhaustive.

## Flooding

- Flooding is a leading hazard for the state's critical infrastructure, with the ability to damage and disrupt transportation systems, water and wastewater services, energy assets, schools, and military installations, while overburdening emergency and health services.
- Across Maryland's high hazard coastal areas, the State Hazard Mitigation Plan identifies 1,868 critical facilities at risk, representing more than $17.8 trillion of potential losses (including building and content values).[3]
- Approximately 2,658 critical facilities are located in FEMA-designated flood zones.
- From 2006 to 2020, Maryland experienced over 2,500 flood-related incidents on state-maintained roads, annually affecting over 480K Marylanders and costing $15M in lost work time and delayed deliveries.[4]

## Extreme Temperature

- In the next decade, Baltimore Gas & Electric (BGE) (Maryland's largest electric utility provider) is projected to see a 7.2 percent increase in peak summer energy load and a 10.5 percent increase in peak winter energy load.[5]
- Extreme heat strains Maryland's transportation systems, particularly rail infrastructure, causing travel delays and heightening safety risks.[6]
- In January 2025, Baltimore City's Department of Public Works responded to over 130 water main breaks due to a combination of cold weather and aging infrastructure.[7]

## Tropical Systems & Severe Storms

- Thunderstorms and associated hazards (including tornadoes, high winds, and flooding) are the state's leading cause for Presidentially Declared Disasters and Emergencies, with 33 percent more declarations than the second most common hazard, Coastal and Winter Storms.[3]
- During the 2012 Derecho storm, 33 percent of Maryland's electric utility customers lost power, and 30 percent lost power during Hurricane Irene.[8]
- Between 2011 and 2022, severe storms caused approximately $8.5 billion in damages and service restoration costs across the BGE service area.[9]

### Cyber-Attacks

- Digital technologies are embedded within critical infrastructure. The "smart grid" relies on digital systems to balance energy loads; Intelligent Transportation Systems synchronize traffic lights for evacuations; and automated sensors manage flow at water treatment plants.
- Cyber-attacks have the potential to disrupt supply chains, financial institutions, water systems, transportation networks, and other essential utilities. A large-scale computer breach could lead to billions in economic costs, including for the state, through disrupted operations and reduced productivity.[3]
- Over the past decade, cyber-attacks have repeatedly disrupted or shut down municipal services in Maryland, including incidents in St. Mary's County (Nov. 2016), Salisbury (Jan. 2019), Baltimore City (May 2019), Baltimore County (Nov. 2020), and Anne Arundel County (Feb. 2025).[10]
- Cyber-attacks targeting hospitals and healthcare systems are on the rise. Since 2024, Johns Hopkins Hospital, St. Agnes Ascension Hospital in Baltimore, and Frederick Health Medical Group have all experienced data breaches and ransomware incidents.[11,12,13]

## Cybersecurity Standards for Water & Wastewater Systems

In 2025, Maryland passed Senate Bill 871 – Department of the Environment – Community Water and Sewerage Systems – Cybersecurity Planning and Assessments to strengthen the resilience of community water and wastewater systems against cyber threats.[14] The law directs MDE, working with the Department of Information Technology (DoIT) and MDEM, to lead statewide cybersecurity planning and oversight in this sector. Key provisions include:

- **Incident reporting:** Providers serving over 3,300 customers must follow DoIT guidance when reporting cyber incidents.
- **Stronger standards:** Minimum cybersecurity standards for water and sewage systems must meet or exceed Cyber Security and Infrastructure Security Agency's (CISA) Cross-Sector Cybersecurity Performance Goals.[15]
- **Preparedness plans:** Water and sewage facilities must plan and be prepared for disruptions from ransomware or other cyber threats.
- **Staff training:** Establish a list of approved cybersecurity training programs for staff responsible for the maintenance and operations of the systems.
- **Secure records:** Safeguard the state's online list of certified operators while maintaining appropriate access for authorized entities.

*Long-term Stressors*

In addition to the hazards described above, Maryland's critical infrastructure faces a variety of ongoing stressors. Some of these include:

### Climate Change

Climate change is heightening vulnerabilities across Maryland, with rising sea levels and more intense precipitation intensifying flood risks that strain energy systems, coastal communities, and critical infrastructure, while driving up the costs of recovery and adaptation. More than 100 communities in Maryland may be at risk of chronic inundation from sea level rise and storm surges by the end of the century.[16]

These floodwaters increasingly disrupt daily life by blocking transportation routes, limiting access to healthcare, and forcing county schools to close or delay opening.[17] Flooding of state-maintained roadways causes about 66 days of traffic disruptions each year, affecting more than 480,000 people and costing roughly $15 million annually in user delays.[18] These figures do not include the added costs of repairs and emergency response.

**Did You Know?**
Flooding impacts nearly 15,000 lane miles of state-maintained roads, which represents about 20 percent of all roadways in Maryland.

### Aging Infrastructure

Many of Maryland's infrastructure systems, including those related to energy, water, wastewater, and transportation, were developed in the mid-20th century and are now operating beyond their intended design life. These aging critical facilities and systems are becoming more prone to failure, especially when stressed by changing environmental conditions.[19]

More than 40 percent of water mains in Montgomery and Prince George's counties are over 50 years old.[20] These cast iron and asbestos cement pipes are reaching the end of their expected lifespan, leading to more occurrences of water main breaks. Repeated sewage overflows in Baltimore City (e.g. 14M gallons in January 2024 and 45M gallons in July 2018) helped prompt a federal consent decree requiring the city to upgrade its sewer system by 2030 at an estimated cost of $1 billion.[21]

**Did You Know?**
According to the Washington Suburban Sanitary Commission (WSSC), replacing one mile of pipe costs about $1.4 million, and they currently replace around 20 miles each year.[20]

### System Interdependency

Building resilient infrastructure requires both targeted investment in vulnerable assets and coordinated planning that accounts for the interdependencies between energy, transportation, communications, and other critical systems.

BGE alone serves 1,827 critical facilities, ranging from hospitals and nursing homes to police and fire departments, military sites, and water and wastewater treatment plants, illustrating how disruptions in one sector can rapidly cascade across others.[9]

This interconnectedness was evident following the 2024 Key Bridge collapse, when the sudden loss of a major transportation corridor rerouted traffic through already burdened tunnel systems, straining energy use, delaying deliveries, and driving up regional costs.[22]

As emerging technologies continue to require more power across systems, Maryland will have to navigate the economic implications, environmental tradeoffs, and grid necessity of expanding data centers.[23]

Data centers are driving up current and future costs for electricity capacity and transmission, while straining electric-system reliability. PJM predicts that peak load on the electric grid will increase by 32 gigawatts from 2024 to 2030, with 30 gigawatts for data centers alone.[24]

To regulate temperature, most data centers pump water through tubing around equipment and run air conditioning systems to counteract heat generating equipment.[25]

While AI technologies have been at the forefront of increased need, data centers are also essential for basic residential and commercial needs like credit card transactions, remote work, streaming services, and electric vehicle charging.[26]

**Did You Know?**
In the aftermath of the Key Bridge Collapse, congestion along major corridors has grown by at least 25%, with northbound travel times increasing nearly 200% through the Baltimore Harbor Tunnel and 100% through the Fort McHenry Tunnel.

*Existing State Efforts*

In response to these hazards and stressors, Maryland has taken the following actions thus far:

**Electric Utility Resilience**

COMAR 20.50.12 contains several different requirements for electric companies to assess their vulnerabilities and develop resilience plans.[31] In particular, the following are spelled out in regulation:

- Electric service quality and reliability standards including items related to grid resilience and reliability, such as system-wide reliability, service interruptions, downed wires, customer communications, vegetation management, and more.
- Requirement for each electric company to provide an annual report that includes an assessment of system performance and outage events; corrective actions planned and taken; system reliability indices for the current and preceding years; and more.
- Requirement for each electric company to submit SAIDI (System Average Interruption Duration Index) and SAIFI (System Average Interruption Frequency Index) every four years.
- Requirement for electric companies to conduct vulnerability assessments and "have resilience plans to prepare for and recover from various utility-defined credible event threat scenarios."[31]

**Energy Security Plan**

The Maryland Energy Administration (MEA) is updating the state's Energy Security Plan to strengthen energy system resilience.[27]

Building on the Liquid Fuel Emergency Plan and the earlier Energy Assurance Plan (EAP), the State Energy Security Plan addresses extreme weather, cyber threats, and supply chain disruptions, while establishing a framework for statewide coordination during energy emergencies.[28,29,30]

### Military Installation Readiness Review (MIRR)

The Military Installation Readiness Review program is a needs-based grant program from the U.S. Department of Defense that enables communities and states to partner with nearby military installations to improve base readiness and prepare for potential risks.[33]

In Maryland, eight defense communities are engaged in MIRRs or similar efforts, including:

- Naval Support Facility Indian Head in partnership with Charles County
- Joint Base Andrews in partnership with Prince George's County
- Naval Support Activity Annapolis in partnership with City of Annapolis
- Naval Support Activity Bethesda in partnership with Montgomery County
- Naval Air Station Patuxent River in partnership with St. Mary's County
- Fort Meade in partnership with Anne Arundel County
- Fort Detrick in partnership with Frederick County
- Aberdeen Proving Ground in partnership with Harford County

To support these efforts, the Maryland Department of Commerce launched the Resilient Maryland Defense Communities Project (2024-2026).[34] This interagency initiative brings together local, state, and military stakeholders to assess human-caused and natural hazards, identify infrastructure interdependencies, and coordinate investments.

The project promotes a "one community" approach, aligning state and local resilience planning to enhance hazard readiness and long-term adaptation.

### Transportation Resilience Improvement Plan (TRIP)

The Transportation Resilience Improvement Plan, created with funding the Maryland Department of Transportation (MDOT) received as part of the Bipartisan Infrastructure Law, provides strategic guidance to inform resilience-related decision making for transportation planning.[35]

Developed by MDOT, the plan identifies transportation assets at risk from climate-related hazards and sets out investment strategies to enhance resilience. TRIP integrates hazard mapping, risk assessments, and resilience criteria into long-range planning and capital programming for roads, bridges, transit systems, and other critical infrastructure.

### Resilient Maryland Grant Program

The Resilient Maryland Program, administered by the Maryland Energy Administration (MEA), funds the planning and installation of distributed energy systems such as microgrids, resilient facility power systems, and resiliency hubs.[32]

The program strengthens critical infrastructure against power outages while advancing sustainability, energy efficiency, and equity. By supporting innovative and scalable solutions, particularly in underserved and vulnerable communities, the program helps ensure essential services remain operational during emergencies.

### State Hazard Mitigation Plan (2021)

The Maryland State Hazard Mitigation Plan (SHMP), maintained by the Maryland Department of Emergency Management (MDEM), provides a comprehensive framework for reducing the state's vulnerability to natural and human-caused hazards.[3]

The plan identifies priority hazards, such as flooding, coastal storms, and extreme heat, and outlines strategies to minimize their impact on people, property, and infrastructure.

The SHMP is updated every five years to meet FEMA requirements and guide mitigation investments across state and local agencies.



*Challenges & Needs*

To appropriately respond to the hazards present in this sector, the following issues should be addressed:

### Need for Better Public-Private Coordination

Government agencies play a central role in resilience planning, but their authority over privately managed infrastructure is often limited, creating added vulnerability to hazards. In Maryland, much of the state's critical infrastructure is under private ownership or operation.

For example, 50 percent of the state's dams and 45 of its 85 permitted solid waste acceptance facilities are privately managed.[36,37]

Transportation infrastructure illustrates similar complexity. The Maryland Department of Transportation State Highway Administration (MDOT SHA) only maintains 5,243 centerline miles of roadway, or just 17.9 percent of the state's total; however, these roads carry nearly 70 percent of all vehicle miles traveled statewide.[38]

Local governments also own and operate significant assets, further adding to the complexity of management and resilience planning. Strengthening coordination across public and private sectors is therefore essential to ensure that resilience measures are effectively implemented and that critical services remain protected.

***Flashpoint:*** Since January 2023, Baltimore City has experienced more than 15 underground fires, driven by an aging electrical conduit system.[39] About 80 percent of the system is made of flammable terracotta or orangeburg and sits close to water, communications, and gas lines.[40] A key issue in addressing these aging systems is the shared responsibility between BGE and Baltimore City: Baltimore City owns the conduit system while BGE pays an occupancy fee and undertakes capital improvements in exchange for its use.[41]

**Need for Strategic Investments**

Investments in climate-resilient infrastructure provide measurable savings, with each dollar spent estimated to avoid about six dollars in future damage and recovery costs.[42] Maryland faces a significant challenge: Limited funding and capacity make it difficult to advance multiple projects at once. Maryland currently lacks a comprehensive understanding of critical infrastructure vulnerabilities, limiting the ability to direct investments where they will have the greatest return. To strengthen resilience, the State must develop a clearer picture of both infrastructure & social vulnerability, and ensure funding is directed toward communities with the highest needs.

**Return on Resilience:** In 2023, BGE published a report to guide its three-year Resilience Investment Plan.[9] The analysis showed that targeted grid hardening prioritized by risk, infrastructure condition, and community vulnerability would turn a $109M investment into $458M in benefits, while enhancing public health, safety, and livelihoods.

## ** End of Sector Analysis **

# Dundalk Marine Terminal Mitigation Project

The Maryland Port Administration (MPA) is using federal funding to strengthen flood protection at the Dundalk Marine Terminal. Built in 1929, the terminal's low-lying wharf and yard are highly vulnerable to storm surges, tidal river rise, and increasingly frequent high-intensity rainfall events. Existing storm drains sit below the water line, limiting the system's ability to manage runoff during extreme weather.

To address these vulnerabilities, MPA has developed a comprehensive plan to increase the terminal's resilience to sea level rise and extreme weather. The terminal will be protected by linked sea curbs around the perimeter, with mobile barriers placed at ship ramp landings during storm surges. A new flood wall along Broening Highway will keep floodwater from nearby properties and preserve critical terminal access. To handle stormwater, tidal gates will stop backflow, added pumps will enable drainage during storm surges and heavy rain, and a new 10' x 5' culvert with a pump station will expand the system's capacity during extreme conditions.

# Goals & Recommendations

*Critical Infrastructure*

## GOAL 1 - Enhance and support the power grid's reliability and resilience in the face of escalating community reliance and a developing threat landscape.

**Recommendation 1.1**

**Support resilient microgrid projects geared toward keeping critical infrastructure functional during outages.**

**Owner:** MEA **Timeline:** 2 years **Funding:** SEIF-Funded **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- The Maryland Energy Administration runs the Resilient Maryland Grant Program, which funds microgrids, resilience hubs, and resilient facility power systems.[43]
- These combined solutions reduce energy use during normal conditions and provide backup power during outages.
- The Resilient Maryland Program can be used to fund microgrid projects that support critical infrastructure and ensure its function during disasters. One example is a recent initiative by the WSSC.[44]

## GOAL 2 - Support transportation system resilience.

**Recommendation 2.1**

**Find the highest return on investment opportunities to implement priorities from the Transportation Resiliency Improvement Plan.**

**Owner:** MDOT **Timeline:** 2 years **Funding:** U.S. Dept. of Transportation PROTECT (Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Maryland's transportation system faces disruptions from hazards and changing climate conditions. For instance, a 2021 study by the Pew Charitable Trusts found that flooding impacts approximately 15,000 lane miles of state-maintained roads. This equates to roughly 20% of Maryland's roads.[18]
- As part of the PROTECT program, Maryland created its 2024 Transportation Resiliency Improvement Plan (TRIP), which lays out investment priorities to build transportation resilience.[45] In accordance with the TRIP, MDOT maintains a list of transportation resilience projects.[46]
- By updating the TRIP and identifying and executing projects with the highest return on investment, the Department can continue to build transportation resilience.

**Recommendation 2.2**

**Provide technical assistance and planning support to help local governments and transportation systems reduce risks associated with climate and evolving technologies.**

**Owner:** MDOT **Timeline:** 5 years **Funding:** U.S. Dept. of Transportation PROTECT Funding

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Most of Maryland's roads are locally owned and maintained, as are other transportation assets.[47]
- MDOT can provide technical assistance and planning support to ensure that local governments shore up their systems and assets against hazards.

## GOAL 3 - Strengthen the resilience of additional critical infrastructure, such as military installations, water and wastewater, and dams.

**Recommendation 3.1**

**Support efforts to improve military readiness through the Resilient Maryland Defense Communities Project.**

**Owner:** COMM-OMFA **Timeline:** 2 years **Funding:** Funding secured through Office of Local Defense Community Cooperation (OLDCC) MIRR Grant

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Maryland's military communities face evolving hazards that threaten community infrastructure and services needed to support military operations and mission assurance.
- As a result, eight military installations are engaging in a U.S. Department of Defense-funded Military Installation Readiness Review.[34] These reviews evaluate community assets and infrastructure across transportation, supply chain, energy, water and wastewater, medical services, and more.
- To knit together lessons from those installations and develop a collaborative framework to address shared resilience challenges on and off base, The Office of Military and Federal Affairs at the Maryland Department of Commerce is leading the Resilient Maryland Defense Communities Project.

**Recommendation 3.2**

**Identify and enable pathways for resilience planning assistance to support small and decentralized drinking water and wastewater systems vulnerable to flooding and drought.**

**Owner:** MDE **Timeline:** 5-10 years **Funding:** A version of this is possible with existing resources

**Focus Area:** Justice & Equity

**Why This Matters:**

- Across Maryland, wells and septic systems are vulnerable to flooding and drought.
- For instance, approximately 52,000 septic systems are located within the Critical Area (within 1,000 feet of tidal waters).[48] Heavy rains or coastal flooding could cause untreated wastewater to overflow into communities, posing public health risks.[49]
- MDE can support planning efforts to make these systems more resilient and help communities avoid building new systems in harm's way.

**Recommendation 3.3**

**Coordinate with dam owners and local emergency managers to maximize adoption of new state-of-the-art rainfall estimates, modeling tools, and technical guidance to improve the safety and resilience of dam infrastructure.**

**Owner:** MDE **Timeline:** 5 years **Funding:** No additional funding needed

**Why This Matters:**

- The Probable Maximum Precipitation (PMP) estimates the highest rainfall that could fall in a specific area and timeframe.[50] Engineers use these estimates to design infrastructure, including dams.
- The Maryland Dam Safety Program is releasing updated PMP data for use in the design of Significant and High Hazard dams.
- These updates reflect the latest climate science and are a critical step toward modernizing Maryland's dam design standards, making them more resilient.
- When combined with modeling tools and technical guidance, this suite of resources can make dams more resilient.

**Recommendation 3.4**

**Launch updated state stormwater regulations that incorporate climate-forecasted rainfall and establish a consistent level of flood protection across Maryland.**

**Owner:** MDE **Timeline:** 2 years **Funding:** No additional funding needed

**Why This Matters:**

- Maryland is modernizing its stormwater standards to address the increasing risks of flooding, erosion, and pollution driven by climate change.
- Per SB227 (2021), the Maryland Department of the Environment (MDE) is required to review and update certain stormwater regulations at least every five years.[51]
- MDE has collaborated with a broad array of stakeholders to identify areas for the latest update.[52]
- The updated regulations will require the incorporation of climate-forecasted rainfall data into stormwater design.
- This means that stormwater systems will be designed with future conditions in mind and better equipped for more intense storms.
- MDE will release the updated regulations and then transition into implementation, providing guidance to locals via the updated Stormwater Manual.

**Recommendation 3.5**

**Promulgate implementing regulations for water-sector cyber security and support water system cyber risk assessment, risk mitigation planning, and emergency response plan development.**

**Owner:** MDE **Timeline:** 2 years **Funding:** No additional funding needed

**Why This Matters:**

- In 2025, Maryland passed Senate Bill 871 – Department of the Environment – Community Water and Sewerage Systems – Cybersecurity Planning and Assessments to strengthen the resilience of community water and wastewater systems against cyber threats.[53]
- The law directs MDE, working with DoIT and MDEM, to lead statewide cybersecurity planning and oversight in this sector.
- Key provisions include incident reporting, stronger standards, preparedness plans, staff training, and secure records.

## ** End of Sector Recommendations **

**Climate Change Putting Strain on Hospitals**

Climate change is driving more frequent and severe heat waves, putting additional pressure on Maryland's health care system. Over the summer of 2024, nearly 1,000 Marylanders had visited emergency facilities for heat-related illness, and 14 heat-related deaths were recorded - both metrics marking a six-year high.[54] Between June 22 and June 28, emergency and urgent care visits for heat-related illnesses jumped from 93 to 472 statewide, and the State saw seven heat-related deaths during that single week.[55]

Rising temperatures are also worsening respiratory conditions: a Maryland study found that extreme heat events were linked to a 23 percent increase in asthma hospitalizations, while periods of extreme rainfall were associated with an 11 percent increase.[56]

Overcrowding creates ripple effects across hospital systems as wait times lengthen, intensive care beds fill up, and staff must triage under pressure. These challenges are made worse by fragile supply chains, meaning that disasters in other states can quickly affect Maryland hospitals.

For example, when Hurricane Helene disrupted the Baxter Plant in North Carolina, which produces 60 percent of the nation's IV solutions, hospitals across Maryland and the country faced severe shortages of critical IV fluids.[57]

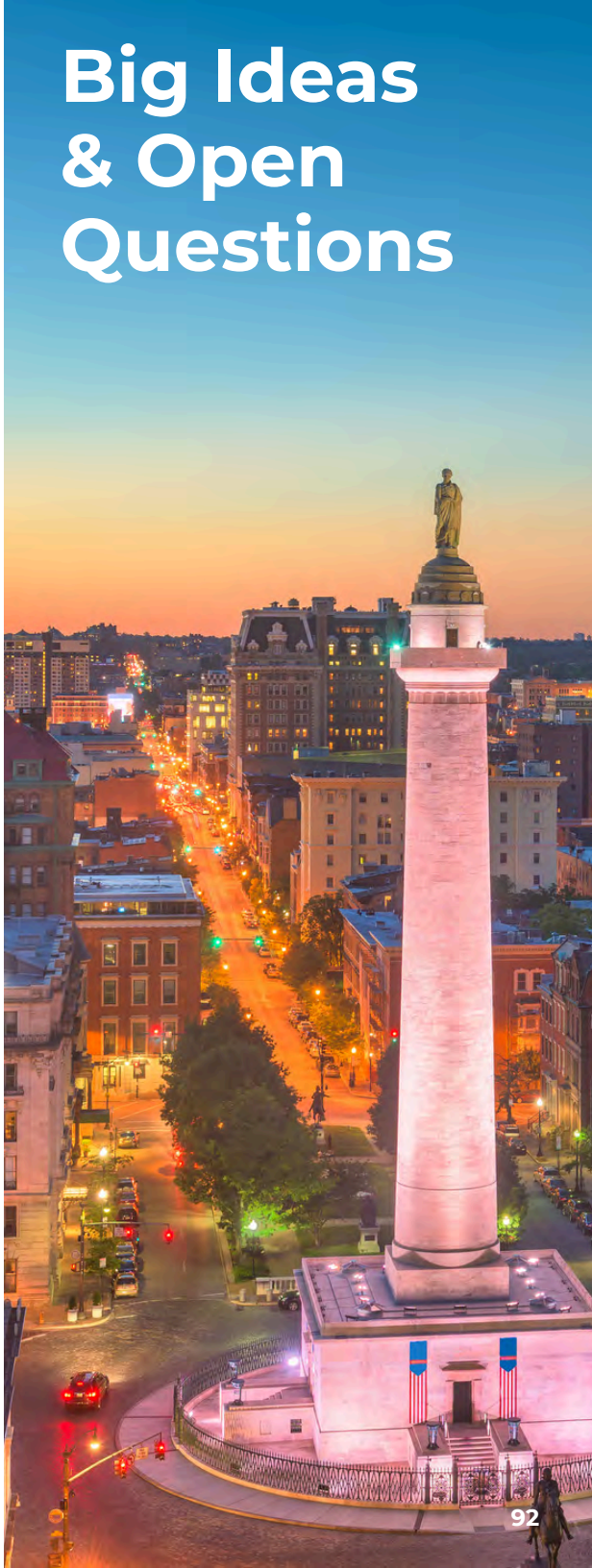
Climate change is worsening a range of health risks for Marylanders beyond extreme heat. Lyme disease, transmitted through the bite of an infected tick, is the most commonly reported tick-borne illness in the state, with just under 2,500 cases reported in 2023.[58]

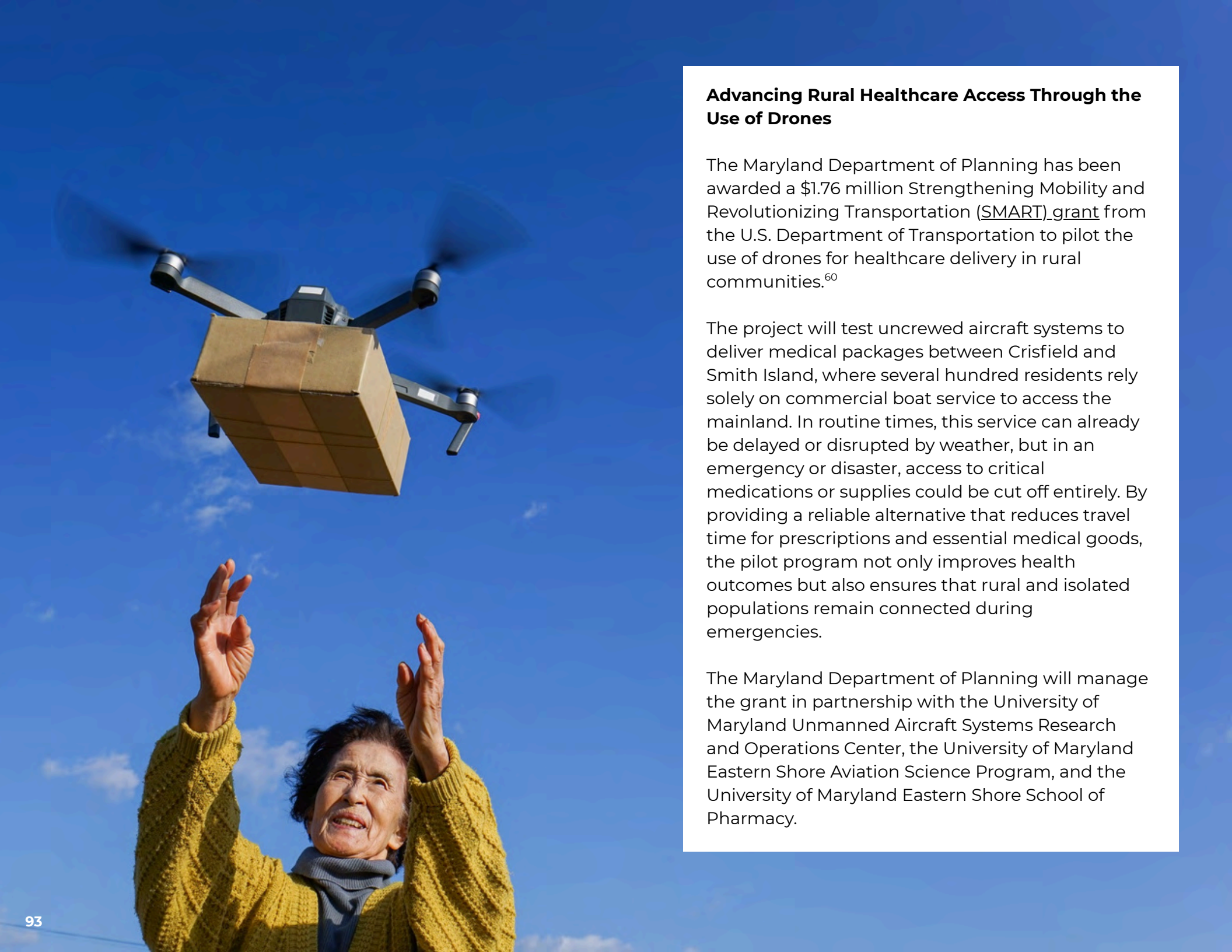
**Septic Systems in Maryland's Critical Area**

Maryland's coastal Critical Area, defined as the land within 1,000 feet of tidal waters, contains approximately 52,000 septic systems.[48] Across the state, wells and septic systems are susceptible to damage from flooding and drought.

Finding solutions to this vulnerability is a complex challenge, as extending sewer service to households in these areas is prohibitively expensive and often beyond the means of communities or counties. In Anne Arundel County, for example, the cost of converting just 20,000 systems was projected at more than $1.5 billion.[59]

# Big Ideas & Open Questions





**Advancing Rural Healthcare Access Through the Use of Drones**

The Maryland Department of Planning has been awarded a $1.76 million Strengthening Mobility and Revolutionizing Transportation (SMART) grant from the U.S. Department of Transportation to pilot the use of drones for healthcare delivery in rural communities.[60]

The project will test uncrewed aircraft systems to deliver medical packages between Crisfield and Smith Island, where several hundred residents rely solely on commercial boat service to access the mainland. In routine times, this service can already be delayed or disrupted by weather, but in an emergency or disaster, access to critical medications or supplies could be cut off entirely. By providing a reliable alternative that reduces travel time for prescriptions and essential medical goods, the pilot program not only improves health outcomes but also ensures that rural and isolated populations remain connected during emergencies.

The Maryland Department of Planning will manage the grant in partnership with the University of Maryland Unmanned Aircraft Systems Research and Operations Center, the University of Maryland Eastern Shore Aviation Science Program, and the University of Maryland Eastern Shore School of Pharmacy.

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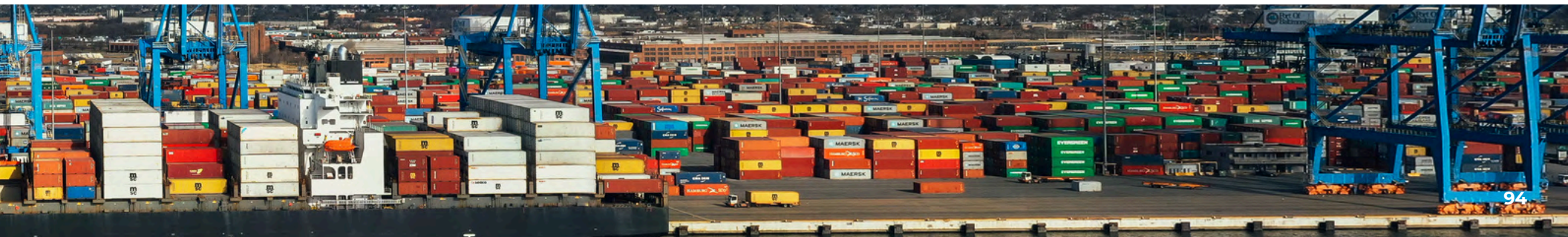

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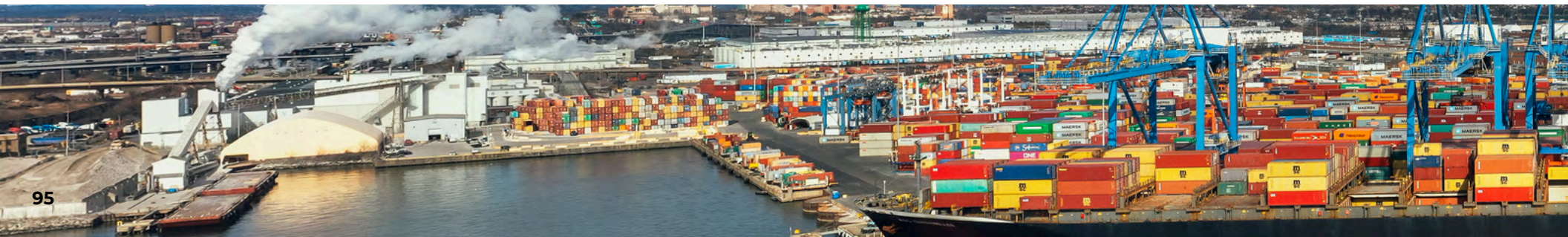

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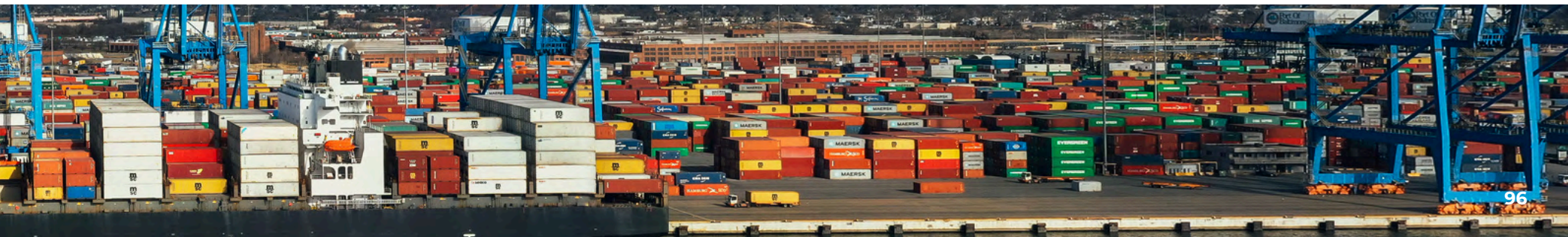

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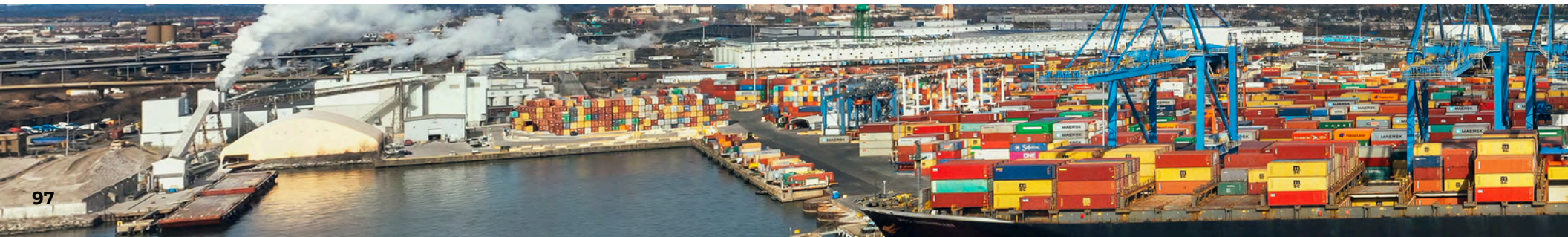

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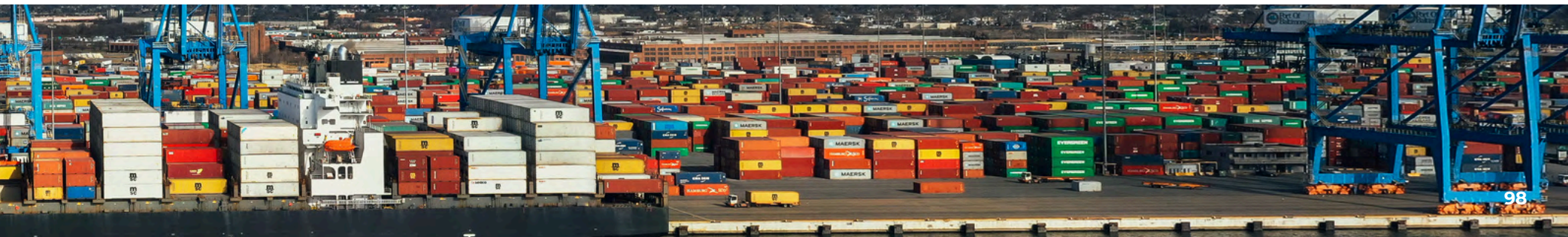

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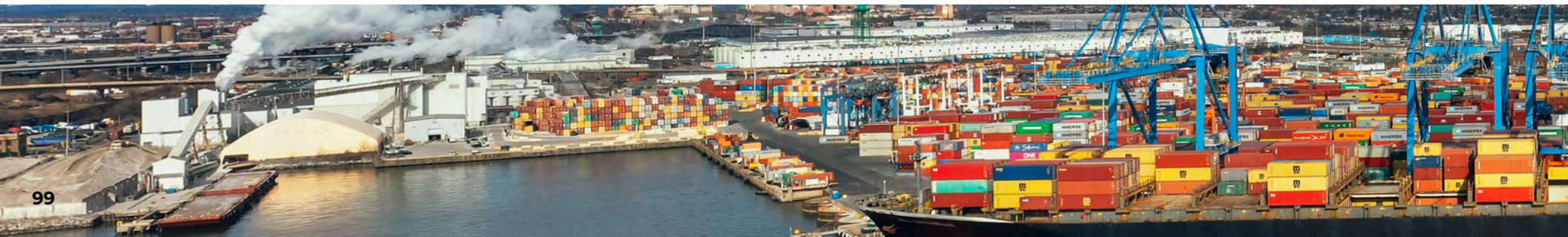
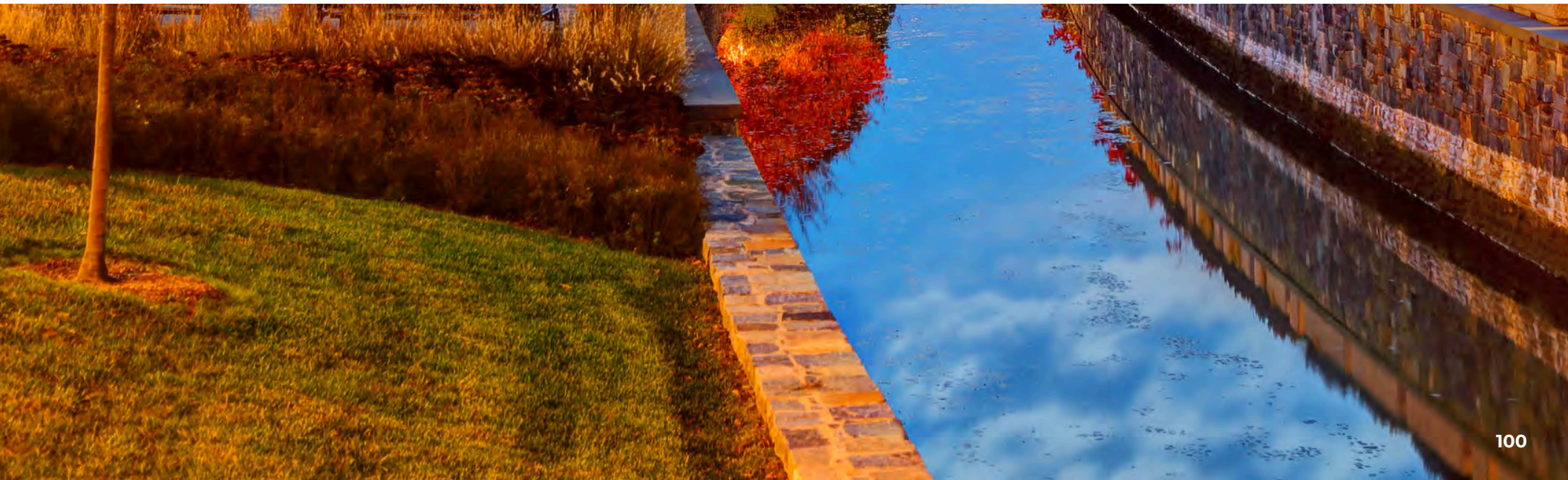


*Sector 3:*

# Community & Local Government Capacity



## *Background*

There is a common saying that "all disasters are local." In a similar vein, resilience efforts are most impactful when they begin locally and respond to the specific needs of communities. But not all local governments have the resources and capacity to understand their risks, scope out potential solutions, and break ground on resilience projects. Plus, disasters like flooding do not respect jurisdictional boundaries and are often best addressed through regional approaches. This sector focuses on building local capacity to support resilience efforts through local and regional collaborations that leverage shared resources and expertise.

Community and Local Government Capacity was chosen as one of the five sectors in this strategy based on a review of plans from Maryland and other states. One of the duties assigned to the Maryland Office of Resilience is to provide technical assistance, namely "assisting local agencies in their efforts to prepare and implement resilience strategies."[1] This chapter synthesizes the resilience needs shared by local governments and proposes technical assistance options.

## *Definitions*

**Definition of the Sector:** Supplying local governments with tools, expertise, and resources that build their capacity to take equitable local resilience action through planning, stormwater management, land use, community engagement, partnerships with businesses, historic and cultural resource planning, and more. Greater local capacity not only catalyzes local action, but also unlocks dollars for resilience.

**Definition of Hazard:** The Department of Homeland Security defines a hazard as "A source or cause of harm or difficulty."[2] This term is often used to capture **acute shocks** such as hurricanes or cyberattacks.

**Definition of Stressor:** Stressors are chronic challenges that harm communities on blue-sky days and can make hazards more severe. This term is used to capture **ongoing or structural challenges** like persistent poverty or sea level rise.

*Note that while this strategy distinguishes between hazards and stressors for the purpose of discussion, the two are deeply linked and interconnected.*

## *Hazards*

Maryland's local governments are on the front lines of natural hazards like flooding and extreme temperatures as well as human-caused hazards such as cyber attacks that can disrupt services and strain response efforts. The hazards highlighted in this section are the ones most frequently identified by stakeholders through surveys, interviews, and work group discussions. The following pages will capture top examples of hazard impacts, but the list contained therein is not exhaustive.

### Cyber-Attacks

- Local governments increasingly rely on digital infrastructure. Cloud-based platforms allow for continuity when town halls are inaccessible; digital 311 systems aggregate citizen data for rapid response; and interoperable networks let police & fire departments coordinate across jurisdictions. Likewise, cyber attacks targeting local governments are becoming increasingly common.

- Under the Personal Information Protection Act (PIPA), any breach involving certain types of protected personal data must be reported to the Attorney General's Office.[3] Prior to 2020, the office received between 50 and 100 such reports each month.[4] Since 2020, this number has increased to between 120 and 180 per month.

- In 2019, a ransomware attack on the Baltimore City Government cost the city an estimated 18 million dollars.[5] More recently, a February 22, 2025 ransomware attack on Anne Arundel County government resulted in the unauthorized access of files that included personal information such as names, addresses, and medical conditions.[6]

### Flooding

- Local governments often have difficulty securing funds for flood mitigation projects or risk having projects stalled due to sudden cancellation of funding on an ongoing project.[7]

- Historic flash flooding impacted Western Maryland in May 2025, especially in communities near Georges River in Allegany and Garrett counties. Governor Wes Moore declared a state of emergency during the response to this incident. Preliminary damage assessments found response costs and infrastructure damages estimated at $33.7 million, three times higher than the State of Maryland's disaster "threshold" for Federal aid.[8]

    - Although a state of emergency was issued, the Federal Government denied Maryland's request for a presidential major disaster declaration, meaning communities have not received Federal recovery aid eligible under the Stafford Act.[9]

### Extreme Temperature

- Counties across Maryland often experience increased demand for emergency services that puts strain on energy systems during long stretches of high-temperature events.[10] PJM, the regional grid operator, has stated that capacity shortage could affect the regional systems by 2026 or 2027, potentially leading to brownouts and blackouts.

- Due to increased extreme temperature events, especially the increase in days of extreme heat, where temperatures rise above 95 degrees Fahrenheit, local governments throughout the state have established cooling or warming centers that allow individuals to take temporary shelter.[11,12,13]

### Tropical Systems & Severe Storms

- From 2010 to 2020, Maryland experienced 31 extreme weather events causing up to $10 billion in damages, with costs often borne by local governments for cleanup and repairs.[14]
- In 2024, Tropical Storm Debbie caused major flooding in the City of Annapolis, resulting in $162,000 in damages and prompting the city's second state of emergency that year. The storm also spurred plans for a $50–$60 million natural park barrier project to protect against flooding from future storms.[15]

### Public Health Emergency

- Per the 2021 MD State Hazard Mitigation Plan, a public health emergency is defined as "an occurrence or imminent threat of a widespread illness or health conditions that pose a substantial risk of significant human fatalities or permanent/long-term disabilities."
- Public health emergencies can stem from an endemic, epidemic, pandemic, outbreak, or contamination linked to natural hazards, as well as from biological agents or toxins that create health safety risks. Their impacts vary across populations and demographics, often disproportionately affecting uninsured individuals and rural communities, where access to healthcare, treatment, and affordable services may be more limited.
- In May 2025, flooding in Allegany County severely damaged sewer systems in the Georges Creek area, affecting nearly 20 miles of infrastructure.[16] The damage caused raw sewage to flow into the water, prompting county officials to warn residents not to drink, fish, or have direct contact with the water until further notice, as exposure could lead to illness.

## *Long-term Stressors*

In addition to the hazards described above, Maryland's communities face ongoing stressors that limit the ability of local communities and governments to prepare for, respond to, and recover from disasters.

The list on the next page includes some chief examples of these stressors.

## Financial Constraints

Resilience costs money, often more than local budgets can cover on their own. For fiscal year 2024, Kent County, one of the least populated counties in the state, had an operating budget of about $60.3 million.[17] In contrast, Montgomery County, home to more than one million residents, had a recommended budget of $ 6.8 billion.[18]

When state dollars fluctuate, and federal grants, like FEMA's Building Resilient Infrastructure and Communities (BRIC) program, are cut, local governments face an even greater challenge justifying resilience expenditures.[19,20]

**Did You Know?**
In response to the damage caused by Hurricane Agnes in 1972, Maryland established the Comprehensive Flood Management Grant Program (CFMGP) to allow county and municipal governments to apply for funding that would limit their share of flood mitigation project costs to 25%.[21]

## Social Vulnerability

Social vulnerability refers to the "demographic and socioeconomic factors (such as poverty, lack of access to transportation, and crowded housing) that adversely affect communities that encounter hazards and other community-level stressors."[22] In Maryland, the counties & cities with the highest social vulnerability index are Wicomico, Somerset, and Baltimore City.[23] Vulnerability and resilience are often correlated in that socially vulnerable communities have fewer resources to recover.[24]

**Did You Know?**
Baltimore City scores within the 100th percentile of the social vulnerability index making it the most socially vulnerable jurisdiction in Maryland.[23] This is based on multiple factors: economic conditions, household makeup and disability, minority status and language barriers, and housing and transportation access.

## Environmental Justice

Under Maryland law, environmental justice is defined as, "equal protection from environmental and public health hazards for all people regardless of race, income, culture, and social status."[25] Yet the impacts of climate change and pollution are not shared equally, with vulnerable communities facing the greatest risks while having the least access to resources.[26]

Low-income neighborhoods and communities of color are disproportionately exposed to environmental hazards. For example, concentrated animal feeding operations (CAFOs) that release harmful air pollutants are more commonly located in lower-income counties.[27]

Public health concerns about the air quality impacts of CAFOs have been studied and monitored through a regional partnership in the Lower Eastern Shore.[28] Similarly, in Baltimore, formerly redlined neighborhoods also experience higher heat stress, up to 5.7°F hotter than the city average, largely due to limited tree canopy (canopy can reduce the urban heat island effect). A 2023 study found these neighborhoods are nine times less likely to have large tree canopies.[29]

**Did You Know?**
The Valuing Opportunity, Inclusion, and Community Equity (VOICE) executive order establishes a unified strategy across state agencies to address inequities in environmental pollution in historically overburdened communities.[30]

It directs Maryland agencies to expand opportunities for underrepresented farmers, advance environmental justice through agency-specific plans, and strengthen collaboration with local governments through the creation of an interagency council. VOICE also requires the use of the MDEnviroScreen tool to help agencies and communities to identify and address disparities in pollution, health, and environmental risks.[31]



## *Existing State Efforts*

In response to these hazards and stressors, Maryland has taken the following actions thus far:

### Local Hazard Mitigation Plans

Hazard mitigation planning "helps reduce the loss of life and property by minimizing the impact of disasters."[35] These plans help local governments identify the natural disaster risks in their area, prioritize those risks, and develop mitigation actions as part of long-term strategies to protect people and property. Every jurisdiction in Maryland has a hazard mitigation plan, as FEMA funding eligibility depends on their adoption & approval.[36] The plans are updated on a five-year cycle.

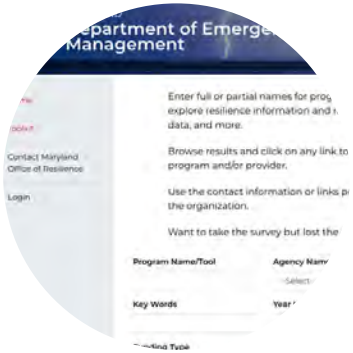
Check out some local hazard mitigation plans from each region across Maryland:

- Allegany County Hazard Mitigation Plan[37]
- Prince George's County Hazard Mitigation Plan[38]
- Charles County Hazard Mitigation Plan[39]
- Kent County Hazard Mitigation Plan[40]
- Dorchester County All-Hazard Mitigation Plan[41]
- Howard County Hazard Mitigation Plan[42]

## Resilience Authorities

- In Maryland, Senate Bill 457 authorizes local governments to establish and fund a Resilience Authority under local law. This state legislation defines a resilience authority as an "authority incorporated by one or more local governments in accordance with this title whose purpose is to undertake or support resilience infrastructure projects."[32]

- Two resilience authorities have been formally established: the Resilience Authority of Annapolis and Anne Arundel County and the Resilience Authority of Charles County.[33,34] Both are focused on addressing climate risks such as sea level rise, flooding, and stormwater management.




## Resilient Maryland Toolkit

The Maryland Office of Resilience, housed within the Maryland Department of Emergency Management, developed the Maryland Resilient Toolkit as a one-stop shop for resilience resources.[43] This searchable online database helps residents, local governments, and organizations quickly find information without being overwhelmed by scattered or hard-to-access sources. The Toolkit includes:

- Grant opportunities to fund resilience projects
- Planning initiatives that guide local action
- Mapping tools to visualize risks and solutions
- Technical assistance for implementing projects
- And much more

By reducing information barriers and centralizing resources, the Toolkit makes it easier for Maryland communities to advance resilience, equity, and preparedness.

## Resilience Authority of Annapolis & Anne Arundel County

The Resilience Authority of Annapolis and Anne Arundel County is the first multi-jurisdictional resilience authority in the United States.[33]

Key milestones:[44]

- Securing over $20 million in federal, state, local, and private funding in 2023 to protect Anne Arundel County's shorelines and communities

- Completing its first project in 2024 - the restoration of the Jabez III coastal floodplain

**Resilience Authority of Annapolis & Anne Arundel County (cont.)**

A full list of projects is available on their website, but some notable examples include:[45]

- *Resilient and Efficient Code Implementation* - This project aims to develop a model code and launch a pilot program to implement building and energy performance standards across the region.
- *Sea Level Rise Sensors (also known as Maryland Hydronet)* - This water level monitoring project will enhance data collection and improve flood monitoring to protect coastal communities. The data collected will help measure flooding impacts and support emergency management efforts, while informing broader resilience planning.
- Annapolis City Dock - This project will implement resilience strategies at City Dock. These improvements aim to safeguard the area's cultural heritage while also supporting its economic vitality.



*Challenges & Needs*

To appropriately respond to the hazards present in this sector, the following issues should be addressed:

**Overburdened Local Governments Lack Resilience Planning Support**

Local governments play a critical role in resilience planning and implementation, from updating building codes and land use policies, to maintaining public infrastructure and leading disaster recovery, to implementing resilience projects. However, capacity varies significantly across Maryland's 24 jurisdictions and 157 municipalities. Smaller towns, rural counties, and under-resourced communities often do not have dedicated resilience planning or grant-writing staff to complete requests for funding.[46] Many stakeholders have expressed that counties and municipalities often operate with limited personnel who manage multiple responsibilities, leaving little time or expertise for technical tasks.

*Some Technical Help Available:* The State offers grants for various types of technical assistance to help local governments and agencies. Examples include:

- Department of Housing and Community Development: Technical Assistance Grant (TAG) Program[47]
- Department of Budget and Management: Maryland Technical Assistance Program (MTAP)[48]
- Department of Environment: Maryland Local Government Climate Action Support Program[49]
- Department of Natural Resources: Watershed Assistance Grant Program[50]
- Department of Natural Resources: Shoreline Erosion Technical Assistance[51]
- Maryland Historical Trust: Weather It Together[52]

**Translating Available Tools & Data into Action**

While local governments have access to a wide array of federal and state tools, datasets, and planning guides for resilience, the sheer volume of resources can be overwhelming. More importantly, the availability of information does not always translate into actions that produce meaningful outcomes for communities. This disconnect raises two critical questions:

1. How do we bridge the gap between data and action?
2. And how do we identify when data needs remain unmet?

The answers to these questions may vary across jurisdictions. Some local governments may have access to relevant data but lack the staff capacity or technical expertise to interpret and apply it effectively in planning and decision-making. Other jurisdictions may instead find that the data available to them is not sufficiently localized to address their needs.

These observations underscore the importance of looking beyond the availability of data to ask what kinds of support, partnerships, and approaches are needed to help jurisdictions put information into practice.

***Beyond the Data - Coastal Preparedness:*** The CoastSmart Communities Initiative helps coastal jurisdictions prepare for and respond to threats such as coastal flooding, storm surge, and sea level rise.[53] A key resource used in this initiative is the Maryland Coastal Flood Explorer, which provides data on past, present, and projected flooding down to the ZIP code.[54]

More than just a data source, the initiative provides a structured process for turning information into action. It helps local governments use available data to identify at-risk assets, then translate this understanding into action by updating and adopting planning processes that better strengthen coastal resilience. DNRs's "understand, plan, and implement" strategy serves as an example of how providing planning and implementation support can help local governments better utilize data, tools, and resources to produce meaningful outcomes.

## ** End of Sector Analysis **

# Goals & Recommendations

*Community & Local Government Capacity*

## GOAL 1 - Establish regionally-based technical assistance to help local jurisdictions advance resilience.

**Recommendation 1.1**

**Establish a resilience technical assistance pilot in one or more regions of the state.**

**Owner:** MDEM-MOR **Timeline:** 2 years **Funding:** Funding needs TBD. MOR currently has multiple applications pending to fund this pilot.

**Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- Across Maryland's 23 counties, 157 municipalities, and one independent city, there are significant variations in budget, number of personnel, and expertise on staff.
- As a result, many local jurisdictions lack dedicated resilience planning and grant writing staff.[47]
- By creating a technical assistance program at the regional level, the Maryland Office of Resilience can fill these gaps and create better resilience outcomes.
- An initial pilot will establish a process that can be scaled to other geographies in the future.

**Recommendation 1.2**

**Expand regional technical assistance to all regions of the state to accelerate multi-jurisdictional collaboration, development of project pipelines, and establishment of resilience authorities.**

**Owner:** MDEM-MOR **Timeline:** 5 years **Funding:** Funding needs TBD, will be determined by the cost of the pilot.

**Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- Disasters do not respect jurisdictional boundaries. Regional approaches enable more effective large-scale projects, resource sharing, and economies of scale.
- Recognizing this, states are increasingly establishing regional technical assistance programs that help local governments assess risks and identify projects.[55]
- Technical assistance yields dividends by better positioning communities for future funding. New Jersey's Resilient NJ program led to $26.3 million in federal funding for project implementation.[56]

## GOAL 2 - Provide tools and guidance that increase local capacity to plan, fund, and implement resilience efforts.

### Recommendation 2.1

**Develop and share tools that support the creation of resilience authorities across the state and increase local financing capacity.**

**Owner:** MDEM-MOR **Timeline:** 2 years **Funding:** Funding needs TBD. A version is possible with existing resources; MOR also has an application pending to support this effort.

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- In Maryland, because of Senate Bill 457, local jurisdictions can establish resilience authorities, which can issue bonds, apply for and administer funding, and operate more nimbly than local governments.[57]
- The Resilience Authority of Anne Annapolis and Arundel County and Resiliency Authority of Charles County serve as two successful examples that have increased local financing capacity.[33,34]
- Because this is a novel governance structure, local jurisdictions would benefit from tools and templates to guide their decision process and aid in structuring these entities.

### Recommendation 2.2

**Develop best practices for local capital improvement planning that incorporate natural and human-caused hazards as well as climate projections.**

**Owner:** MDEM-MOR **Timeline:** 5 years **Funding:** TBD **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Local governments utilize capital improvement plans to manage long-term investments in public infrastructure.[58]
- It is an emerging best practice to link capital improvement plans with climate adaptation and disaster resilience, considering sea level rise, increased precipitation, and other future risks when siting and designing infrastructure.
- The City of Baltimore is a leader in this regard, linking its Capital Improvement Plan to its Disaster Preparedness Plan, Climate Action Plan, and Sustainability Plan.

### Recommendation 2.3

**Pilot mechanisms to compensate community liaisons for their time and expertise weighing in on resilience projects.**

**Owner:** DNR **Timeline:** 5 years **Funding:** No additional funding needed **Focus Area:** Justice & Equity

**Why This Matters:**

- Equitable community engagement is a cornerstone of environmental justice. To achieve that, it is essential to honor community knowledge.
- On Maryland's Eastern Shore, Envision the Choptank has successfully partnered with community ambassadors to more effectively engage with communities and understand local priorities.[59]
- To do this properly, the State needs mechanisms to compensate community liaisons.

**Recommendation 2.4**

**Scale the practice of compensating community liaisons across state agencies and resilience programs.**

**Owner:** TBD **Timeline:** 10 years **Funding:** TBD **Focus Area:** Justice & Equity

**Why This Matters:**

- Once DNR has established and piloted mechanisms to compensate community liaisons and engage them in resilience project development, this practice can be scaled across agencies and programs to institutionalize equitable co-governance and environmental justice.

## GOAL 3 - Protect and rapidly restore small business operations statewide.

**Recommendation 3.1**

**Provide technical assistance for small businesses to prepare for and respond to disruptions, including updates to and implementation of a robust Small Business Continuity and Resiliency Playbook.**

**Owner:** COMM **Timeline:** 2-5 years **Funding:** No additional funding needed

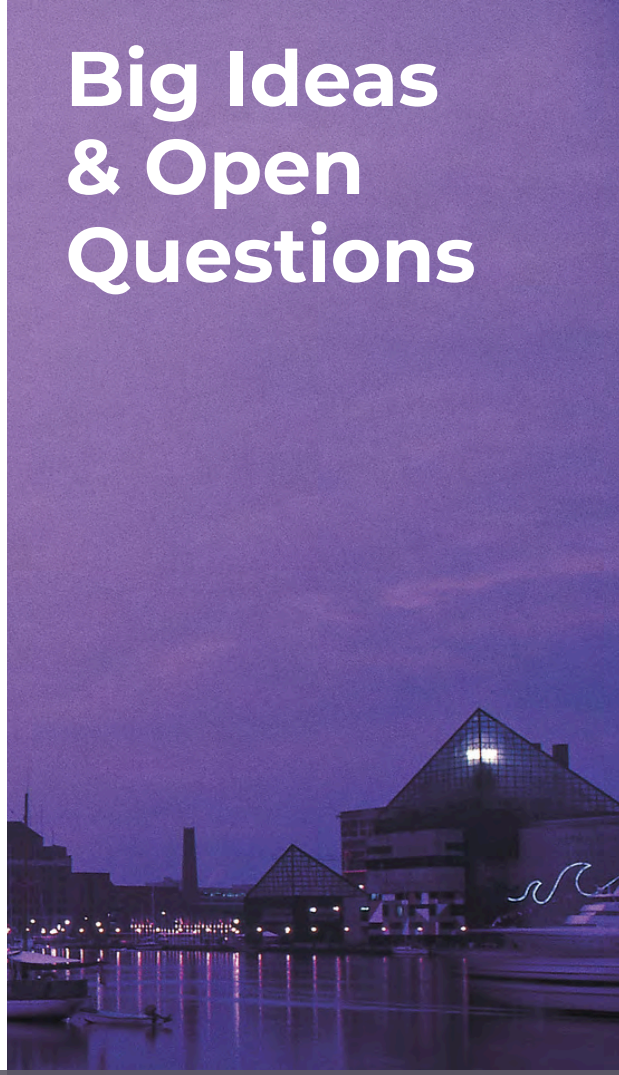
**Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- Small businesses are particularly vulnerable to disasters, and 99.6% of Maryland's businesses are small businesses.[60]
- An estimated 75% of businesses without a continuity plan fail within three years of being struck by a disaster.[61]
- The Maryland Department of Commerce has developed a Small Business Continuity and Resiliency Playbook to build the resilience of small businesses across the state.

# ** End of Sector Recommendations **

# Big Ideas & Open Questions



### Coordination Across Jurisdictional Boundaries

Watersheds, transportation networks, and energy systems frequently span multiple counties or municipalities, yet planning and investment decisions are often made independently at the local level. To bridge this gap, jurisdictions can be encouraged to pursue projects that address broader geographic areas through tools such as joint procurement vehicles, Memorandums of Understanding (MOUs), or other legal structures that enable cross-jurisdictional collaboration. For example, many Maryland state agencies use MOUs with the Department of Natural Resources (DNR) to carry out work in designated critical areas.[62,63]

In addition, existing regional entities provide valuable frameworks for coordination. The Tri-County Councils (TCCs), established to promote regional planning, economic development, and intergovernmental cooperation, are strong resources for facilitating collaboration.

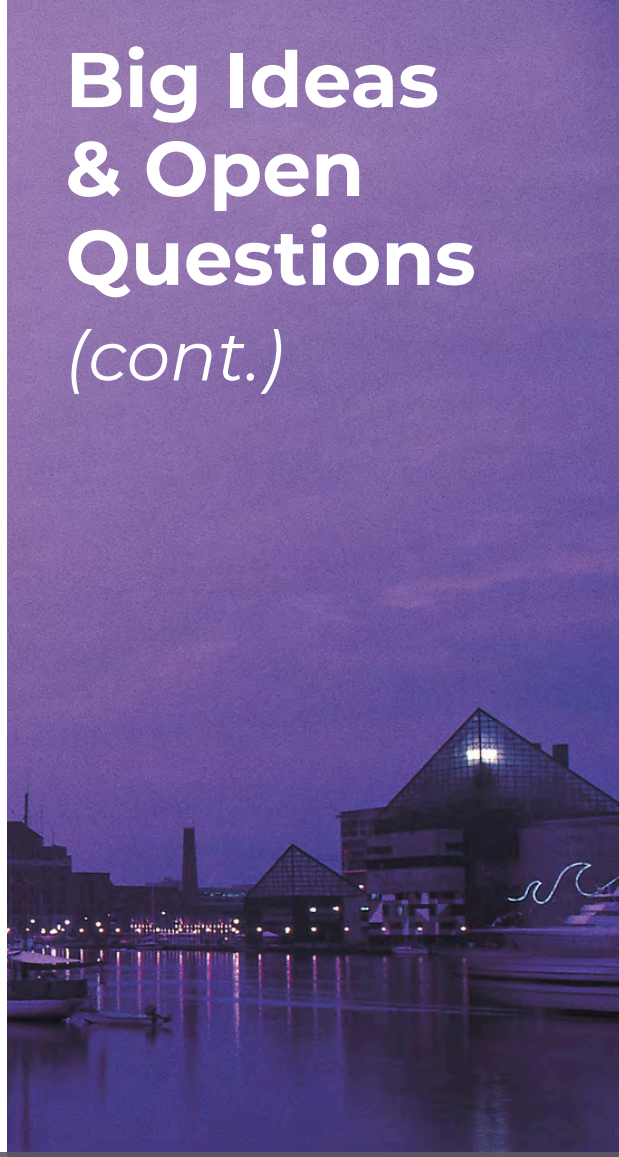
Maryland has active TCCs for the Lower Eastern Shore, Southern Maryland, and Western Maryland.[64,65,66] Other notable entities include the Metropolitan Washington Council of Governments (COG), which unites 24 jurisdictions across Maryland, Virginia, and Washington, D.C., as well as the Baltimore Metropolitan Council, which serves as the council of governments for six Maryland counties and Baltimore City.[67,68] These entities provide valuable infrastructure, capacity, and cross-jurisdictional coordination to support the advancement of planning and policy for local governments.

## Legislative Progress
## Whole Watershed Act

Addressing boundary-spanning issues such as water quality requires coordinated action across multiple scales. Regional initiatives that cross jurisdictional boundaries not only strengthen restoration efforts but also create opportunities for communities to share knowledge and learn from one another.

In 2024, the Maryland General Assembly passed the Whole Watershed Act, establishing a collaborative, science-based approach to watershed restoration.[69] The law created a five-year program targeting five watersheds that together represent Maryland's diverse land uses, geographies, and environmental challenges.[70] These projects bring together community organizations, local governments, private firms, and other partners to pilot innovative restoration strategies.

# Big Ideas & Open Questions *(cont.)*



**Need for Community & Public Involvement**

Meaningful community engagement goes beyond simply holding public meetings - it requires building trust and creating genuine opportunities for input. This means providing various feedback methods that are convenient and accessible, using clear and plain language, and offering honoraria to acknowledge the value of participants' time & expertise.

Equally important is timing. Input gathered only at the end of a process, when decisions are already made, has little impact. Engagement should begin early and continue throughout, allowing communities to shape outcomes rather than react to them. While residents may not need to weigh in on technical modeling details, they can play a critical role in validating model results with lived experience, identifying community priorities, and assessing policy alternatives.

In June 2023, the Maryland Department of the Environment (MDE) released Maryland's Climate Pathways Report. Ahead of completing the full plan, MDE actively sought robust public input over a six-month outreach period to gather community feedback.[71] Interested parties provided that feedback through multiple channels, including online comment forms, letters, phone calls, and direct conversations with MDE staff at public listening sessions. This feedback directly supported the development of the State's Climate Pollution Reduction Plan, published December 2023.

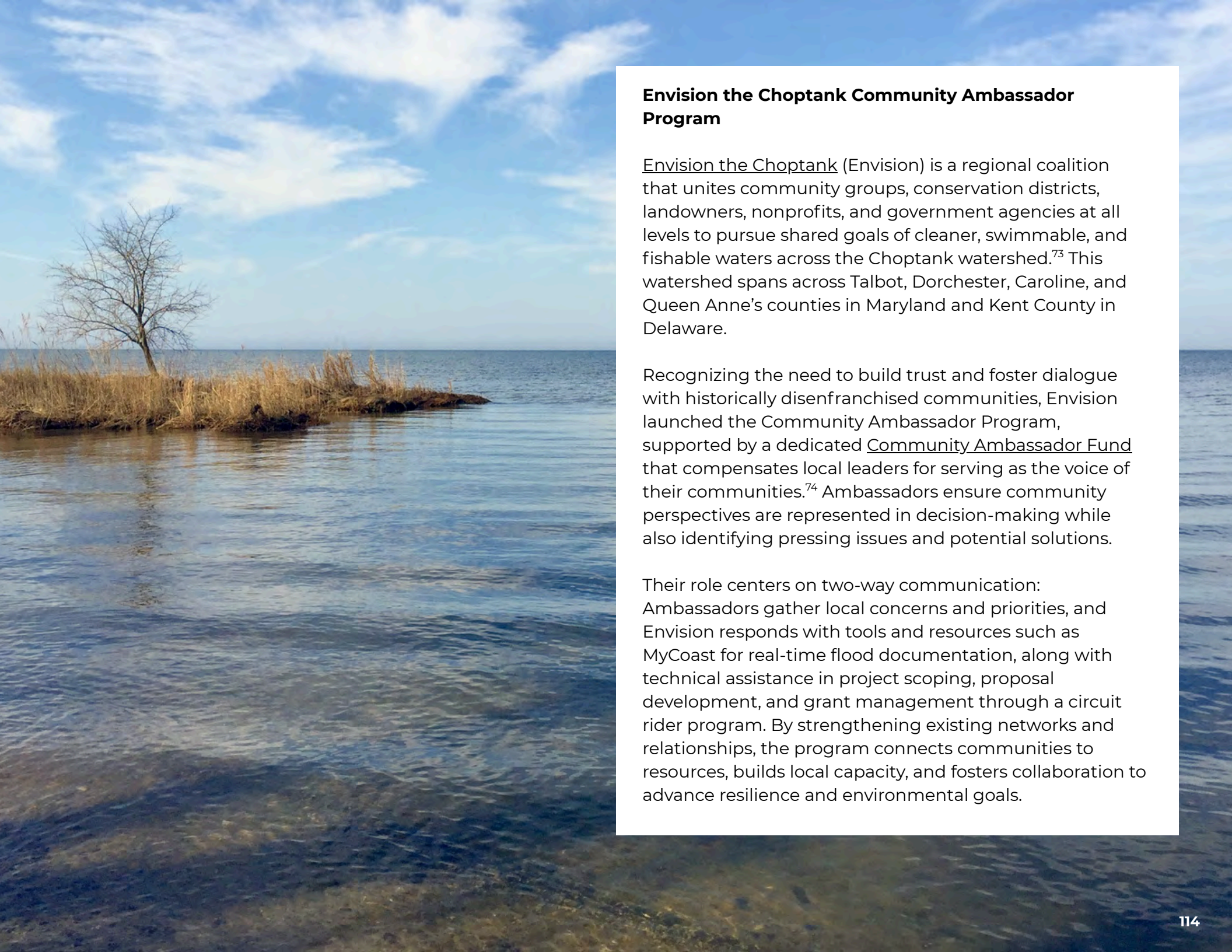
Developing policies and projects in partnership with those most affected by hazards, with accessible and timely opportunities for community input, ensures that resilience strategies are not only more relevant but also more trusted and effective.

## Local Success Story

### Baltimore City Community Resilience Hub Program

The Baltimore City Community Resiliency Hub Program serves as an example of where emergency preparedness meets resilience building efforts.[72] This program turns established and trusted community sites, where people already gather, into hubs where residents can not only find shelter during an emergency but also receive accurate, up-to-date information about their local community.

These hubs, along with other similar public-facing sites, provide valuable opportunities to share information and gather feedback on ongoing resilience planning and projects.



**Envision the Choptank Community Ambassador Program**

Envision the Choptank (Envision) is a regional coalition that unites community groups, conservation districts, landowners, nonprofits, and government agencies at all levels to pursue shared goals of cleaner, swimmable, and fishable waters across the Choptank watershed.[73] This watershed spans across Talbot, Dorchester, Caroline, and Queen Anne's counties in Maryland and Kent County in Delaware.

Recognizing the need to build trust and foster dialogue with historically disenfranchised communities, Envision launched the Community Ambassador Program, supported by a dedicated Community Ambassador Fund that compensates local leaders for serving as the voice of their communities.[74] Ambassadors ensure community perspectives are represented in decision-making while also identifying pressing issues and potential solutions.

Their role centers on two-way communication: Ambassadors gather local concerns and priorities, and Envision responds with tools and resources such as MyCoast for real-time flood documentation, along with technical assistance in project scoping, proposal development, and grant management through a circuit rider program. By strengthening existing networks and relationships, the program connects communities to resources, builds local capacity, and fosters collaboration to advance resilience and environmental goals.

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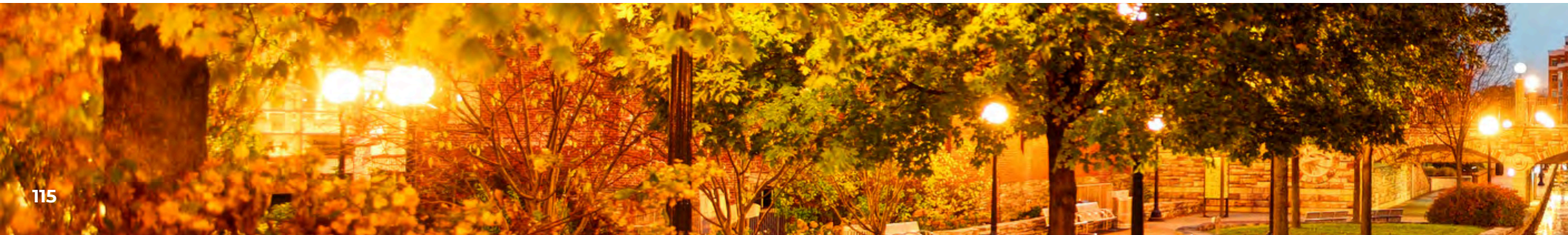

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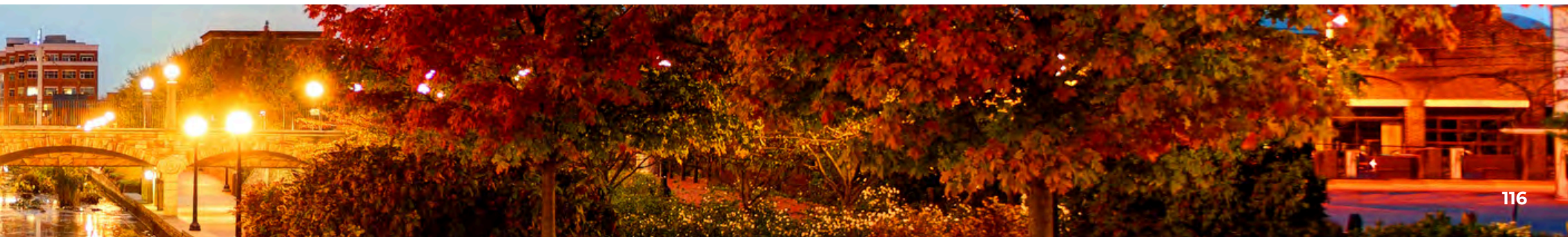

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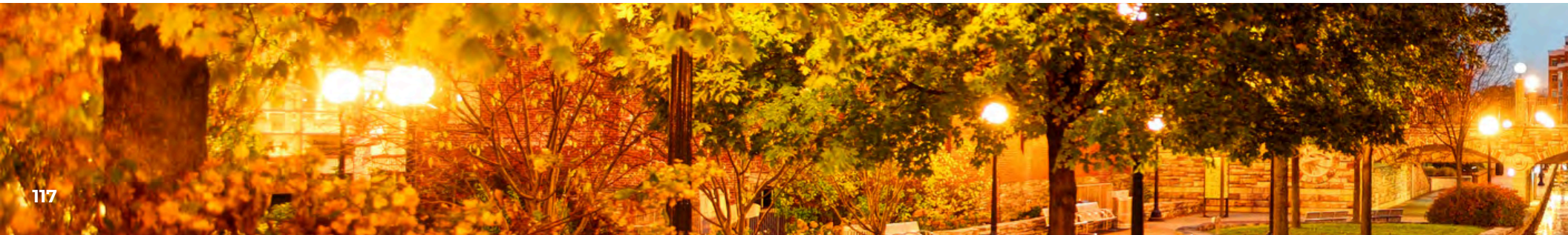

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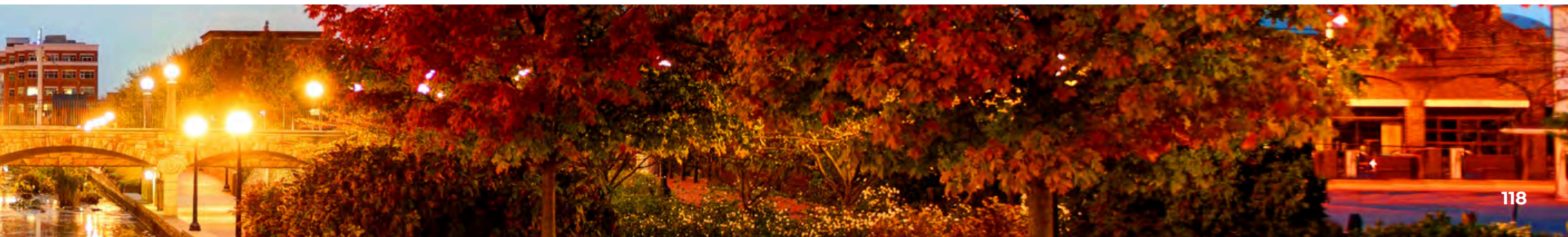

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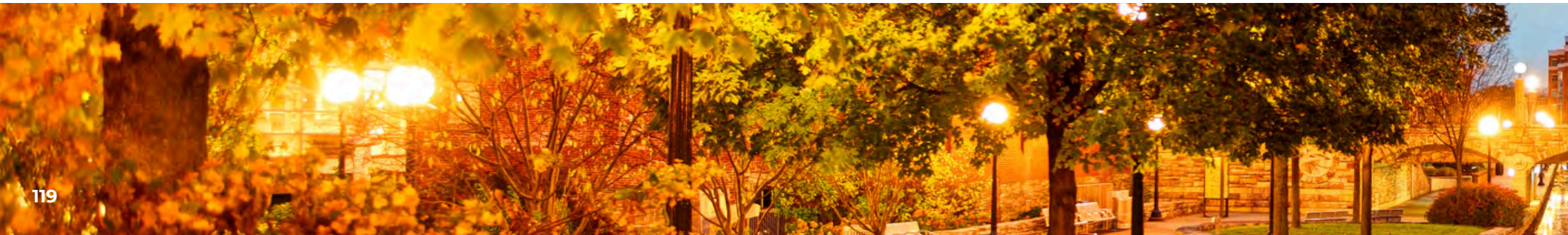

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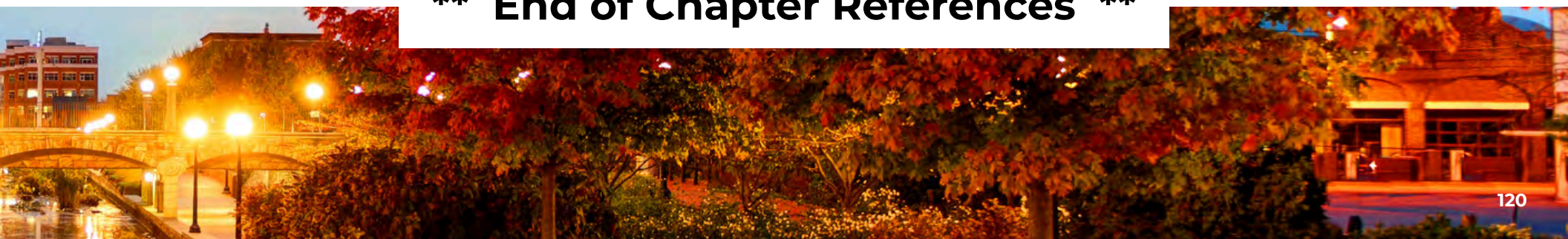
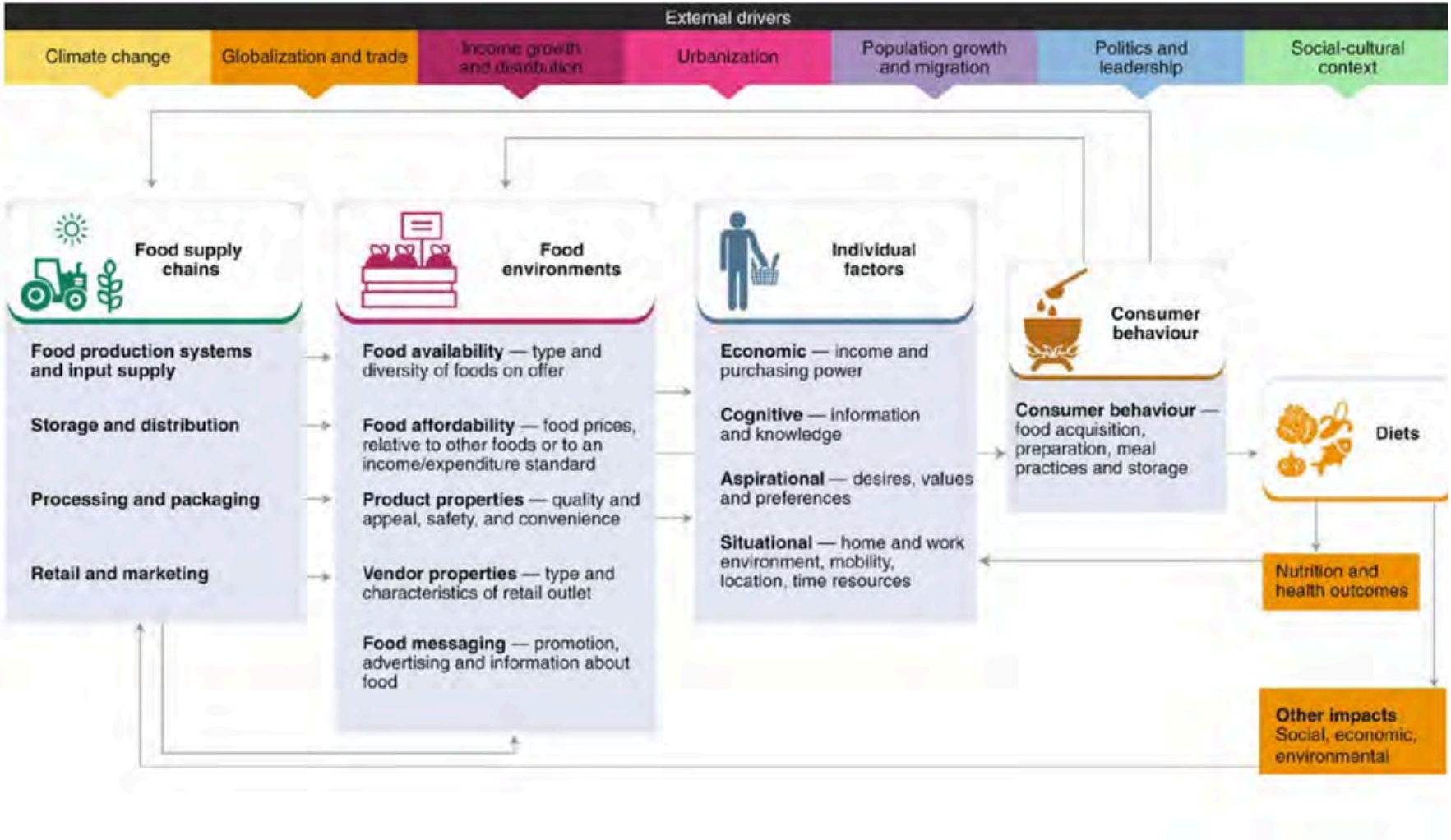


# *Sector 4:*
# **Food Systems**

*Background*

All Maryland residents participate in and rely on the resilience of our food system, including the infrastructure, equipment, and people involved in food production, processing, storage, distribution, retail, and consumption. The Food System was chosen as one of the five sectors in this strategy based on a review of plans from Maryland and other states. Not only is food essential for the daily life of all Marylanders, but agriculture is Maryland's largest commercial industry, with 12,600 farms employing roughly 350,000 people and contributing $8 billion to the state's economy each year.[1]




*Source: Food Systems Framework. Johns Hopkins Center for a Livable Future's Food System Resilience: A Planning Guide for Local Governments.*[2]

Climate change, natural hazards, and public health emergencies pose complex and evolving risks to Maryland's farmers and the reliability of our supply chains. This sector focuses on advancing climate-smart agriculture, strengthening local food systems, and enhancing food security through improved procurement practices, land use policies, and strategic partnerships.

## *Definitions*

**Definition of the Sector:** Strengthening Maryland's food and farm systems by increasing the production and procurement of locally- and sustainably-grown foods, and ensuring the availability & accessibility of nutritious and culturally appropriate food to all communities over time, even in the face of supply chain disruptions such as natural hazards, economic shocks, or public health emergencies.

Long-term food system resilience depends on inclusivity and structural, distributional, and intergenerational equity for all consumers, producers, and food system workers in Maryland.

**Definition of Hazard:** The Department of Homeland Security defines a hazard as "A source or cause of harm or difficulty."[3] This term is often used to capture **acute shocks** such as hurricanes or cyberattacks.

**Definition of Stressor:** Stressors are chronic challenges that harm communities on blue-sky days and can make hazards more severe. This term is used to capture **ongoing or structural challenges** like persistent poverty or sea level rise.

*Note that while this strategy distinguishes between hazards and stressors for the purpose of discussion, the two are deeply linked and interconnected.*

## *Hazards*

Maryland's food system is affected by a wide spectrum of hazards from flooding to extreme temperatures to drought. The hazards highlighted in this section are those most frequently identified by stakeholders through surveys, interviews, and workgroup discussions. The following pages will capture top examples of hazard impacts, but the list contained therein is not exhaustive.

### Drought

- Agricultural producers are at the forefront of drought risk. While annual precipitation is projected to rise, Maryland will face periods of seasonal drought, which can reduce crop yields and exacerbate economic pressure for farmers and ranchers.[4]
- The United States Department of Agriculture (USDA) has already designated three Maryland counties – Frederick, Harford, and Washington – as primary natural disaster areas due to drought.[5]

### Extreme Temperature

- Farmworkers face severe safety risks, including heat-related illness, dehydration, fatigue, and increased likelihood of workplace injuries, with mortality from heat-related illness 35 times higher for agricultural workers in the U.S. than people working in any other industry.[6,7]
- In Maryland, excessive heat made up 20% of USDA disaster designations between 2012 and 2024, endangering both crops and farmworker safety.[8]
- Temperature fluctuations of 20 to 30 degrees within a single week have become increasingly common in Maryland, disturbing vegetative life cycles, stressing crops, and reducing yields.[9]

### Tropical Systems, Severe Storms, and Flooding

- Severe storms can significantly disrupt food supply chains, cause power outages, compromise food safety, and make it harder for communities in both urban and rural areas to access essential resources.[10] Storm-related school closures, such as the ten-day closure of Baltimore City Public Schools during Winter Storm Jonas, can prevent families from accessing the food services they depend on for daily meals.[11]
- Flooding and stormwater runoff from tropical systems and severe storms, as seen during Hurricane Ida in 2021 and Hurricane Irene in 2011, can contaminate edible crops and seafood, severely depleting yields due to food safety requirements (Section 402(a)(4) of the Federal Food, Drug, and Cosmetic Act).[12,13,14]
- In 2024 alone, crop insurers paid farmers $42.6 million to offset storm-related damages.[15]

**Public Health Emergencies**

- Food safety is a key public health concern. Foodborne illness and contamination can create serious health consequences for Marylanders, pose liability risk for food and agriculture businesses, and disrupt the food supply chain.

- For families facing food insufficiency, school meals programs are critical for daily healthy food access.[16] When schools closed during the COVID-19 pandemic, state and local governments, as well as private organizations, launched alternative food access programs to help mitigate pervasive food insecurity.[17]

- In May 2021, researchers at the Johns Hopkins Bloomberg School of Public Health found that 28.8% of Marylanders were experiencing food insecurity – a 7% increase from pre-pandemic levels.[18]

- Other than in Baltimore City, food insecurity is most significant in Maryland's rural regions, including Western Maryland and the Eastern Shore, due to transportation and healthy food retail limitations.[19]

## Supply Chain Vulnerabilities

Supply chain disruptions are a pressing concern for Maryland's food system, as they can be triggered by myriad hazards, including disease outbreaks that hamper internal production; external disruptions from events like a pandemic (which may restrict transportation and harvesting schedules, as exemplified by COVID-19); and labor disputes, such as port strikes along the East and Gulf Coasts.[20,21]

Global food supply chains face significant vulnerabilities at every stage, from crop production to transportation. Labor shortages, shipping delays, and customs slowdowns illustrate how quickly disruptions can restrict access to essential foods worldwide.

In 2017, the Port of Baltimore ranked 29th in the nation for waterborne agricultural exports, moving more than 213,000 metric tons of agricultural products, and Maryland regularly exports agricultural goods to more than 35 countries.[22,23] As such, Maryland is especially susceptible to supply chain risks, which can drive up costs and reduce availability.

*Long-term Stressors*

In addition to the hazards described above, Maryland's food systems face ongoing stressors that limit the ability of local communities and governments to prepare for, respond to, and recover from disasters. Some of these include:

### Food Insecurity & Inequitable Access

Even as one of the nation's wealthiest states, food insecurity and inequitable access to healthy, affordable food in Maryland remain widespread. Recent data indicate a concerning rise in food insecurity throughout the state, with two million Marylanders experiencing food insecurity in 2025.[24]

In Prince George's County and Montgomery County, as much as 34-50% of the population was food insecure in 2024.[25] This is considerably higher than the national food insecurity rate, which sits at 13.5% of American households.[26]

Healthy food may be both physically and financially inaccessible for many communities. More than 70 census tracts in Maryland are designated as healthy food priority areas, or predominantly lower-income areas with limited access to retail outlets that sell affordable, healthy food.[27]

**Did You Know?**
In fiscal year 2024, 11.1% of Maryland residents (692,966 individuals) received SNAP benefits.[28,29] Of these households, more than a third (37.1%) had children.[30]

### Economic Instability

Maryland families are presently facing growing food insecurity pressures as tariffs & inflation drive up production costs and consumer prices, and more Marylanders face wage uncertainty, in part due to federal layoffs.[31,32]

The Francis Scott Key Bridge collapse illustrates how quickly infrastructure disruptions can ripple through supply chains and local economies, triggering increased reliance on emergency food assistance.[33]

Further, with more than 15,000 federal jobs lost in August 2025 and sharp increases in food prices, such as an 11% rise in beef, Marylanders are feeling the compounded strain of economic shocks and cost pressures.[34,35]

### Climate Change

Climate change is an overarching stressor that magnifies nearly every hazard in Maryland's food system. Rising temperatures, shifting rainfall patterns, saltwater intrusion, and more frequent heat waves and droughts are altering what crops can be grown and where.[36]

These changing conditions pose particular risks for corn, an important feed source for Maryland's poultry and livestock industries, which generated $245.3 million in 2024.[37,38] As climate impacts intensify, commodity crops like corn face declining yields, resulting in greater economic uncertainty for farmers and rural communities.

**Did You Know?**
Researchers using satellites recently discovered that Maryland has already lost about 9,700 acres of farmland as rising seas turn fields into salty ground and marshes.[39] Looking ahead, climate change could cause global corn harvests to shrink by almost a quarter by the end of this century.[40]



## *Existing State Efforts*

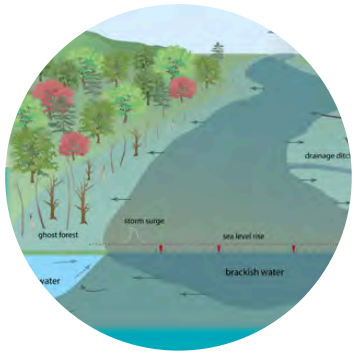
In response to these hazards and stressors, Maryland has taken the following actions thus far:

### Maryland Climate-Smart Agriculture Project

Led by the Harry R. Hughes Center for Agro-Ecology, the Maryland Climate-Smart Agriculture Project is a farmer-centered initiative to assess how climate change will impact agriculture in Maryland.[42] The project has two key components:

1. *Evaluating projected climate impacts on Maryland agriculture using tools such as climate modeling and environmental assessments*
2. *Outreach to farmers focused on understanding on-the-ground challenges and potential opportunities*

These efforts informed recommendations to support the agricultural sector's resilience to extreme weather events and other climate change impacts.




### Maryland's Plan to Adapt to Saltwater Intrusion and Salination (2024 Update)

Maryland's 2024 Plan to Adapt to Saltwater Intrusion and Salinization outlines the state's response to increasing salinity impacts driven by sea level rise and climate change, which are degrading farmland, forests, wetlands, aquifers, and infrastructure, especially on the Eastern Shore.[36]

Key priorities of the plan include supporting salt-tolerant crops, assessing vulnerable infrastructure, and addressing ecological and economic impacts to protect Maryland communities and the Chesapeake Bay.

This plan is developed by the Maryland Department of Planning and updated every five years.

### Maryland Food System Resiliency Council

The Maryland Food System Resiliency Council (FSRC), established by House Bill 831/Senate Bill 723 in 2021, is a thirty-three member interdisciplinary advisory body that makes recommendations to the Maryland General Assembly to address inequities in our food system and strengthen its resilience to potential disruptions.[41]

Led by the Maryland Secretary of Emergency Management, it is coordinated through the Maryland Office of Resilience.

### Leaders in Environmentally Engaged Farming (LEEF) Program

The LEEF Program (Leaders in Environmentally Engaged Farming) is a Maryland Department of Agriculture certification initiative to foster land and community stewardship.[43]

Farmers can advance certification levels (tiers) by adopting sustainable production practices, implementing conservation techniques, mentoring new and beginning farmers, and donating food to local communities, among other practices. Each tier achieved will unlock incentives for the farm such as priority access to programs and financing.

LEEF is designed to support the unique needs of farms of all sizes and enterprise models, encouraging environmentally responsible farming across the state.

*Challenges & Needs*

To appropriately respond to the hazards present in this sector, the following issues should be addressed:

**Challenges in Existing Food Processing & Distribution Landscape**

Small and mid-sized producers often lack the infrastructure needed for processing, preserving, or storing food. Among these gaps, cold storage stands out as a critical challenge across the food system. Without it, small food distributors are frequently forced to turn away donated or rescued food, leading to unnecessary waste and limiting the distribution of local, perishable food.[44]

The Code of Maryland Regulations (COMAR) 10.15.04 establishes the standards for the processing and transportation of food and drink.[47] While these regulations are essential for public health, smaller farms may face disproportionate challenges in meeting them due to high costs and administrative burden. For instance, laws designed for industrial food processors and distributors may not align with the conditions of small, on-farm processing enterprises.

Adjusting regulations to better meet the needs of Maryland's agricultural producers will enable increased production of value-added products and enhance food preservation capabilities.[48] This will not only benefit Maryland's local food supply but also strengthen local economies through expanded commerce opportunities.

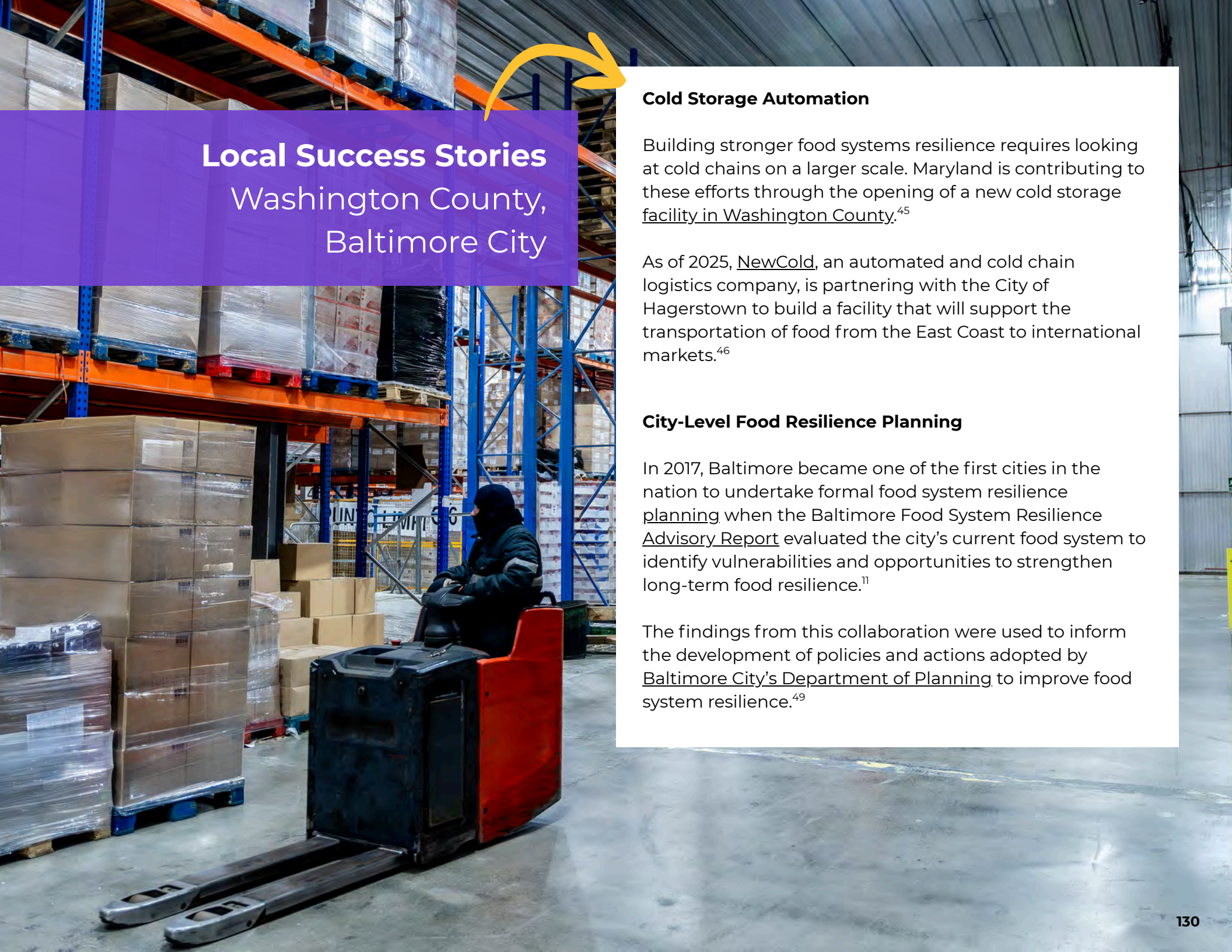
**Integrating Food Systems into Broader Planning Efforts**

Maryland's food system is deeply interconnected, yet planning efforts for food system resilience often occur in silos. A particular challenge is the lack of integration of certain food retailers, distributors, and other food system actors, especially small and mid-sized operations, into emergency planning efforts.

This exclusion may reduce their capacity to maintain operations, protect the supply chain, and support community food access during emergencies.

Effective planning involves taking into account the full scope of the food system, including production, processing, distribution, and consumption, and strengthening the supply chains that sustain it.[10]

## ** End of Sector Analysis **



# Local Success Stories
## Washington County, Baltimore City

### Cold Storage Automation

Building stronger food systems resilience requires looking at cold chains on a larger scale. Maryland is contributing to these efforts through the opening of a new cold storage facility in Washington County.[45]

As of 2025, NewCold, an automated and cold chain logistics company, is partnering with the City of Hagerstown to build a facility that will support the transportation of food from the East Coast to international markets.[46]

### City-Level Food Resilience Planning

In 2017, Baltimore became one of the first cities in the nation to undertake formal food system resilience planning when the Baltimore Food System Resilience Advisory Report evaluated the city's current food system to identify vulnerabilities and opportunities to strengthen long-term food resilience.[11]

The findings from this collaboration were used to inform the development of policies and actions adopted by Baltimore City's Department of Planning to improve food system resilience.[49]

# Goals & Recommendations

*Food System*

## GOAL 1 - Increase adoption of climate-smart agricultural practices in Maryland.

**Recommendation 1.1**

**Implement programs, such as the Leaders in Environmentally Engaged Farming (LEEF) Program, for the adaptation of agricultural practices in response to environmental changes. This may include increases in precipitation, temperature, or soil salinization.**

**Owner:** MDA **Timeline:** 5-10 years, ongoing **Funding:** Funding for LEEF is secured from the Governor's budget. Additional program implementation may require further funding (TBD).

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Maryland farmers have long played a critical role in adopting best practices, helping the State achieve conservation milestones, and protecting the Chesapeake Bay.[50]
- Through programs like LEEF, MDA will continue to incentivize environmentally engaged farming, making Maryland more resilient to environmental changes and bolstering local food systems.[43]

## GOAL 2 - Increase sustainable local food production and access.

**Recommendation 2.1**

**Establish and support public-private partnerships to increase local food processing and cold storage infrastructure throughout the state.**

**Owner:** MDA **Timeline:** 2-5 years, ongoing **Funding:** Additional infrastructure implementation may require further funding.

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Small and mid-sized producers often lack infrastructure to wash, freeze, can, package, or store food.
- Cold storage gaps are a particularly critical challenge. Without cold storage capability, small food distributors are frequently forced to turn away donated or rescued food, often locally grown, leading to waste and limiting distribution of perishable goods.[44]
- Through public-private partnerships, Maryland can address this challenge.

**Recommendation 2.2**

**Review and reevaluate regulations for on-farm food processing to support the expanded production of value-added agricultural products.**

**Owner:** MDA & MDH **Timeline:** 2-5 years **Funding:** No additional funding needed.

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- On-farm processing can generate new revenue for farmers, reduce food waste, and support local food system resilience.
- However, Maryland's "On-Farm Home Processing License" is unnecessarily restrictive, imposing a revenue cap lower than unlicensed Cottage Food Products.[51]
- While public health and safety are paramount, creative solutions exist to streamline on-farm processing and incentivize Maryland-grown products.

**Recommendation 2.3**

**Create a state-specific food procurement guidance document that seeks to help overcome challenges limiting institutional local food procurement.**

**Owner:** DGS **Timeline:** TBD **Funding:** TBD **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Institutional procurement of Maryland-produced foods is low. According to the December 2024 Maryland Certified Local Farm and Fish Program Report, just 0.25% of state agency and university food procurement budgets were spent on purchases from Certified Local Farm and Fish providers. This amounts to $238,920 out of a food budget of $97.6M.[52,53]
- By creating food procurement guidance, the Department of General Services (DGS) can better understand the barriers to local food procurement and provide actionable guidance to encourage producer and buyer participation in Maryland's local food system.

**Recommendation 2.4**

**Establish new opportunities and local markets for food accessibility on lands owned by the Department of Natural Resources.**

**Owner:** DNR **Timeline:** 5 years **Funding:** No add'l funding needed. **Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- Per DNR data provided 11/26/25, DNR owns, manages, and leases approximately 9,373 acres of farmland for crop production and grazing.
- The Department has observed two needs – support for regenerative practices and local access to food produced on these lands.
- For this reason, DNR and MDA are partnering on an initiative that will expand access and use of agricultural lands to environmental justice communities, establish new markets, and support local circular economies.
- This effort will support environmental best practices for farming and increase food production & access, while also mitigating climate impacts.

## GOAL 3 - Improve the ability of Maryland's food system to adapt to and recover from supply chain disruptions.

### Recommendation 3.1

**Build relationships with regional, state, and local food system players, including independent food retailers and charitable food service providers, and exercise their ability to get and stay open in a disaster.**

**Owner:** MDEM-WCI **Timeline:** 5 years, ongoing **Funding:** No additional funding needed.

**Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- MDEM's Whole Community Integration Branch's purpose is to "partner, engage, and coordinate with private sector, faith-based, and nonprofit organizations all across our State, ensuring they're integrated throughout all the phases of emergency management."[54]
- By expanding its network, WCI can help food system players better navigate disasters with minimal disruption.

### Recommendation 3.2

**Leverage the Maryland Food System Resiliency Council to educate state leaders on the role food plays and convene a broad group of food systems stakeholders.**

**Owner:** MDEM-MOR **Timeline:** 2 years **Funding:** No add'l funding needed. **Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- The Maryland Food System Resiliency Council is an advisory body that makes recommendations to the Maryland General Assembly that address food insecurity and build food system resilience.[41]
- The FSRC members and their broader network are a powerful force multiplier to share information and increase effectiveness of the food system recommendations described elsewhere.

### Recommendation 3.3

**Evaluate and establish emergency food buying processes aimed at stabilizing the food system during periods when food cannot be easily purchased, imported, or delivered.**

**Owner:** MDEM (collaborating with DGS) **Timeline:** 2 years **Funding:** No add'l funding needed.

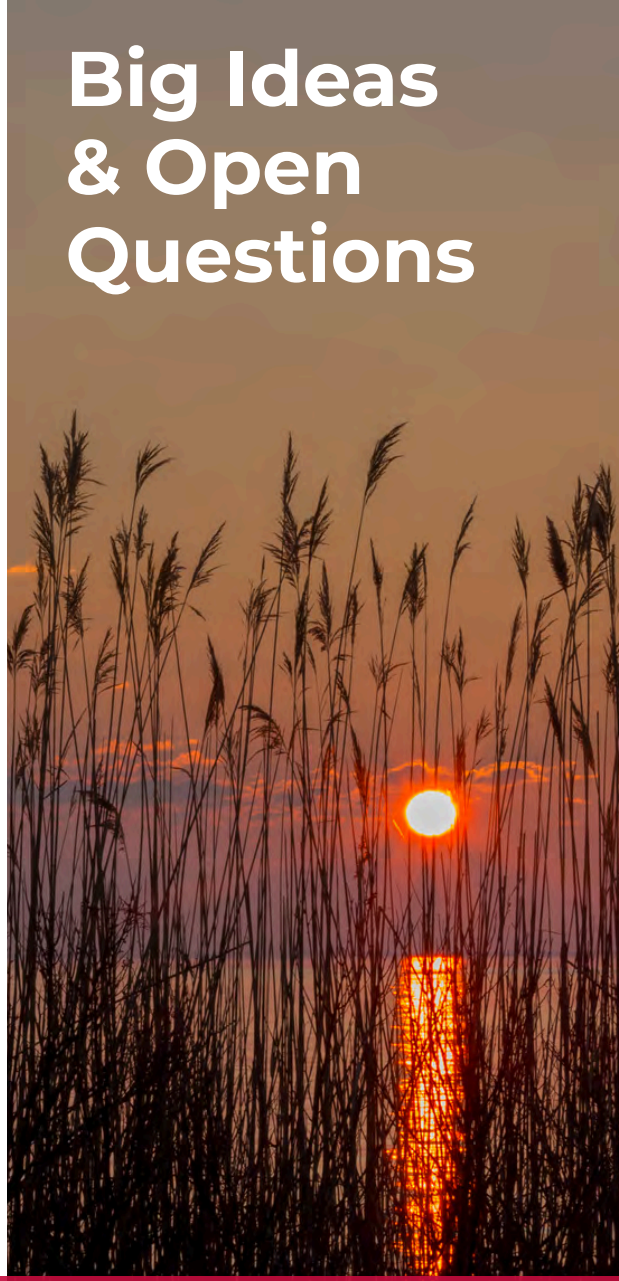
**Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- During the Covid-19 pandemic, Maryland's local jurisdictions were pushed to design and implement innovative food purchasing and distribution models to address food insecurity resulting from economic instability and supply chain shortages.
- Baltimore City's Department of Planning demonstrated that emergency funds could be invested to purchase healthy, locally grown food for Marylanders experiencing food insecurity.[55] In doing so, they helped direct funds to the local agricultural industry while addressing public health disparities in Baltimore City's under-resourced neighborhoods.
- The State can establish more emergency-contingent contracts with local food producers and distributors to help prevent future food insecurity crises during times of food supply instability or disruption.

## ** End of Sector Recommendations **

# Big Ideas & Open Questions



### Navigating the Realities of Rising Temperatures in Agriculture

Agricultural jobs often involve strenuous outdoor labor, leaving workers especially vulnerable to climate-related hazards such as extreme heat. The agricultural workforce is recognized as a high-risk occupational group that faces increasing potential for heat-related illness, among other hazards.[56]

Certain workplace conditions must be modified to adapt to climate change, including upgraded equipment and infrastructure to provide sufficient access to shade, air conditioning, and water, as well as breathable clothing and personal protective equipment (PPE).[57] Agricultural producers may benefit from financial and technical assistance to meet Maryland's Heat Stress Standard and prevent workplace illnesses and fatalities.[58]

### Expanding Research for Climate-Driven Crop Transitions

On Maryland's Eastern Shore, climate change is altering what farmers can grow due to saltwater intrusion and rising temperatures. Rising sea levels are pushing saltwater into underground freshwater supplies, degrading soil, and threatening staple crops like corn, wheat, and soybeans. However, there is limited research to guide farmers on the cultivars and growing practices that will remain viable under changing conditions.[36]

To address this need, the Harry R. Hughes Center for Agro-Ecology is leading the Maryland Agriculture Climate Vulnerability Assessment, an initiative that will evaluate how climate change is reshaping the state's agricultural landscape.[59] Crucially, the project will identify salt-tolerant crops with strong yield potential and viable markets, providing farmers with practical options to adapt and sustain their livelihoods as conditions evolve.

**New Research**

Options for Adapting to Rising Seas (OARS)

Researchers at the University of Maryland are developing a new tool to address the challenges of saltwater intrusion.[60] The tool, named Options for Adapting to Rising Seas (OARS), will help landowners make informed decisions when facing environmental and economic losses due to saltwater intrusion by providing a comprehensive database of programs, policies, and organizations that offer assistance with the impacts.

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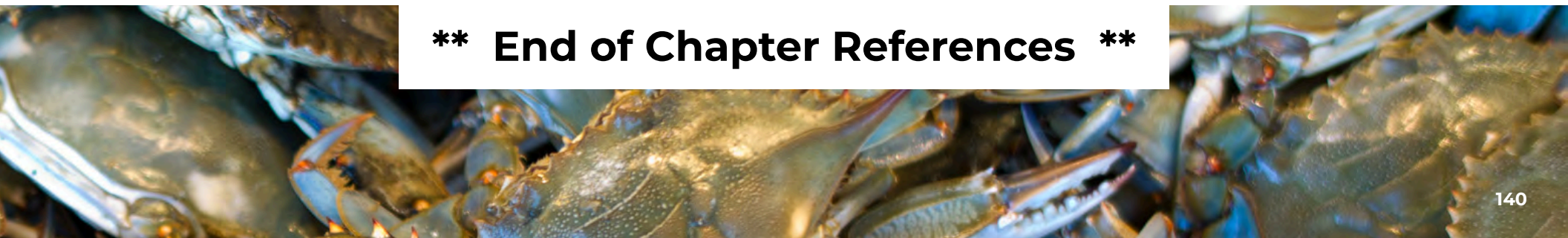


# *Sector 5:*
# **Housing**

## *Background*

Disasters meet people on their doorsteps. Floods can cause massive damage to homes and wreak financial havoc, especially for those who are uninsured or underinsured. During extreme temperatures, the way a home is constructed can determine how vulnerable its inhabitants are to heat and cold. To be truly resilient, Maryland must consider where and how homes are built and whether residents are adequately insured against risks. This sector focuses on strategies to improve housing resilience without sacrificing affordability.

Housing was chosen as one of the five sectors in this strategy based on a review of plans from Maryland and other states. While housing is a focus area for the Moore-Miller Administration and a fundamental issue for Maryland residents, it has not been emphasized in Maryland's past resilience and adaptation planning efforts.[1] This strategy aims to address that gap.

## *Definitions*

**Definition of the Sector:** Making the State of Maryland a desirable and affordable home for all residents by fostering attainable, resilient, and quality housing opportunities.

Accessible housing that withstands and adapts to emerging hazards is vital to a functioning and growing economy, generational wealth planning, and economic justice.

**Definition of Hazard:** The Department of Homeland Security defines a hazard as "A source or cause of harm or difficulty."[2] This term is often used to capture **acute shocks** such as hurricanes or cyberattacks.

**Definition of Stressor:** Stressors are chronic challenges that harm communities on blue-sky days and can make hazards more severe. This term is used to capture **ongoing or structural challenges** like persistent poverty or sea level rise.

*Note that while this strategy distinguishes between hazards and stressors for the purpose of discussion, the two are deeply linked and interconnected.*

## *Hazards*

Maryland's housing stock is affected by a wide spectrum of hazards - from flooding to extreme temperatures, to severe storms and tornadoes. The hazards highlighted in this section are the ones most frequently identified by stakeholders through surveys, interviews, and workgroup discussions. The following pages will capture top examples of hazard impact, but the list contained therein is not exhaustive.

## Flooding

- In 2020, about 133,700 properties in Maryland faced a substantial risk of flooding. That number is projected to grow by 14.8% over the next 30 years, reaching roughly 153,500 properties by 2050.[3]
- Just 1 inch of water can cause $25,000 of damage to a home.[4]

## Extreme Temperature

- By mid-century, the Mid-Atlantic region is projected to experience 47.7 days above 90° F per year under a high future climate scenario. This is 190% greater than the 16.5 days above 90° under a baseline scenario.[5]
- Research shows that extreme heat follows historic redlining patterns with low-income neighborhoods seeing temperatures 10 degrees hotter than more affluent areas.[6]
- Manufactured housing also faces outsized risk, since energy-inefficient mobile homes are harder to cool.[7]

## Tropical Systems & Severe Storms

- In 1972, Hurricane Agnes ranked among the most destructive hurricanes in U.S. history, causing more than $110 million in property damage across Maryland, including an estimated $10 million in Carroll County alone.[8,9]
- Approximately 125,000 homes along Maryland's coast are at risk of sustaining major damage from storm surges.[13] Experts estimate that a single severe hurricane could cause as much as $28 billion in property damage across communities in the state.[10]
- In 2012, Hurricane Sandy damaged an estimated 1,068 houses across Maryland.[11] Of these, 927 were in Somerset County, making it the only county declared eligible for federal Individual Assistance through FEMA.

### Tornadoes

- Since 1950 there have been 426 tornado events documented in Maryland, totaling over $380 million in property damage.[12]
- Mobile homes are far more likely to be damaged or destroyed than other types of housing during these events. There are 36,000 mobile homes in Maryland, primarily located in Western Maryland and the Eastern Shore.[13]



## *Long-term Stressors*

In addition to the hazards described above, persistent stressors leave Maryland's housing and households vulnerable to disasters. Some of these include:

### Climate Change

Climate change places significant and increasing stress on Maryland's housing system in several ways:

- Sea level rise threatens to inundate communities and the infrastructure that makes living there possible.[14]
- Rising temperatures increase the frequency and intensity of hurricanes and severe storms, raising the risk of catastrophic flooding.
- Increasing air temperatures can make older or poorly insulated residences unsafe in the absence of air conditioning, which housing-burdened or low income individuals struggle to afford.[15]

**Did You Know?**
In Ocean City, 25 percent of houses and structures are vulnerable to flooding.[16]

### Affordability

Absent any disaster or other stressor, Maryland faces a housing shortage of over 96,000 residences.[17] This shortage contributes to Maryland being one of the ten least affordable states to live in.

In addition to an absolute shortage of housing, Maryland has a shortage of over 130,000 affordable housing units.[18]

**Did You Know?**
Nearly half of renters in Maryland spend more than 30% of their income on housing. In many cases, these residents may also live in older or lower-quality housing stock that is more vulnerable to hazards.[19]

### Insurance Access

Limited uptake of insurance coverage, especially for flooding, makes households more financially vulnerable to hazard-related damages. More frequent and costly disasters are making home insurance increasingly unaffordable.[20]

As with other stressors, the most impoverished and marginalized communities are most likely to be affected. Already in Maryland, it is very difficult to insure mobile homes on the Eastern Shore.[21]

**Did You Know?**
Only an estimated 4% of Maryland homeowners have flood insurance, even though nearly one-third (32%) of all National Flood Insurance Program (NFIP) claims originate from properties outside designated high-risk flood areas.[22]



*Existing State Efforts*

See the next page for examples of existing initiatives Maryland has already undertaken to begin addressing the hazards and stressors listed above.

### Resilience Planning Principle

In 2025, Governor Wes Moore signed legislation into law creating the Sustainable Growth Planning Principles.[23] One of those principles is resilience.

The Maryland Department of Planning is responsible for implementing these principles to guide local comprehensive planning, which sets the vision and goals for land use and other local topics.

MDP recently published Sustainable Growth Principles Guidance, which addresses the Resilience Principle: "Integrate resiliency measures that will minimize the impacts of rapid and unexpected natural– and human–caused threats on communities."[24]

### Building Code Adoption

Building codes set the minimum standards for how buildings are designed and constructed, ensuring they are safe, energy-efficient, and better able to withstand hazards like flooding, wind, and fire.

The Maryland Building Performance Standards (MBPS) require the State to adopt the latest editions of the International Codes within 18 months of their release. Local governments must follow by adopting them within 12 months, with the option to make requirements stricter but not weaker. Codes include the International Building Code (IBC), International Residential Code (IRC), and International Energy Conservation Code (IECC).[25,26]

The Maryland Department of Labor's Building Codes Unit administers this three-year code cycle, ensuring that Maryland remains aligned with the most up-to-date safety and resilience practices while preserving eligibility for federal funding and insurance programs that depend on compliance with current standards.[27]

Regularly updating building codes reduces disaster risks, lowers long-term costs, and ensures that new and renovated buildings across the state are constructed to protect Marylanders now and in the future.

### Housing & Energy Programs - Maryland Department of Housing & Community Development (DHCD)

- Maryland Housing Rehabilitation Program – Provides affordable financing to repair health and safety issues and ensure homes meet building codes.[28] The program assists owner-occupied single-family homes through income-based loans, with repayment terms tailored to borrowers' ability to pay. Loans are managed by the Maryland Department of Housing and Community Development's Special Loan Program and delivered through a network of local housing agencies and nonprofit partners.

- Community Development Block Grant Program – Provides funding to local governments and nonprofits for housing rehabilitation, infrastructure, and community facilities.[29] These investments reduce vulnerability to hazards and improve long-term community resilience.

- Energy Grant Programs for Homeowners and Renters – Offers resources for households of all income levels to improve home energy efficiency.[30] Programs support insulation, hot water system improvements, furnace repair or replacement, renewable energy systems, and other health and safety enhancements. These measures reduce utility costs, protect households against extreme weather, and buffer residents from fluctuating energy rates.

- Multifamily Energy Efficiency and Housing Affordability Program – Promotes energy efficiency and affordability in affordable multifamily rental housing developments.[31] The program provides insulation, hot water system improvements, heating system replacements, renewable energy systems, and other upgrades that help properties withstand extreme temperatures and lower operating costs.

### Consumer Education on Insurance

The Maryland Insurance Administration (MIA) provides a range of resources to help residents understand flood risks and insurance options, emphasizing that most standard homeowners and renters policies do not cover flood damage.[32]

Its consumer education efforts include clear explanations of the National Flood Insurance Program (NFIP), guidance on purchasing policies and filing claims, promotion of preparedness tools such as the Home Inventory App to help document possessions, and educational webinars to engage directly with consumers.[33,34,35]

To further raise awareness, MIA partners with other state and local agencies each year for Flood Awareness Month, a cross-agency campaign featuring webinars, Q&A sessions, and informational presentations on flooding impacts and available resources.[36] Together, these initiatives aim to reduce confusion, empower informed decision-making, and strengthen both individual and community resilience to flooding.

*Challenges & Needs*

To appropriately respond to the hazards present in this sector, the following issues should be addressed:

**Local Governments Determine Zoning & Land Use**

Through zoning processes, local governments regulate land use, determining what types of buildings and uses are allowable in given areas, as well as other parameters of construction. Zoning can be a driver of resilience, limiting development in flood-prone areas or requiring more permeable surfaces and open space that can absorb water.[37]

However, because local governments take the lead on land use, these practices vary by jurisdiction, zoning data is decentralized, and the state has limited levers to support best practices.

**Building Code Enforcement is Lacking**

Although Maryland regularly adopts the latest I-Code, that is only the first step toward ensuring resilient home construction. Practitioners, such as architects, designers, contractors, and engineers must understand and follow the codes in order for them to be effective. Code officials are another vital piece of the puzzle, because they enforce the codes and keep their communities safe.[38]

Through stakeholder conversations, concerns emerged that code officials are retiring more rapidly than they are being replaced. Experts also expressed that continuing education is lacking, given that the codes are updated every three years.

**Manufactured & Modular Housing Have Unique Vulnerabilities**

Manufactured and modular housing are more affordable housing types that make homeownership attainable to a greater number of Maryland residents.[39] The Maryland General Assembly recognized this by passing the Housing Expansion and Affordability Act (HB 538), which "prohibits jurisdictions from denying the construction of manufactured and modular home construction types in single family zones."[40,41]

Yet manufactured and modular housing also present distinct hazard and climate vulnerabilities.[42]

Manufactured homes are more likely to be constructed in floodplains and other hazard areas, can sustain significant wind damage (especially if anchored improperly), and are harder to heat and cool. Modular housing is often indistinguishable from traditional stick-built homes and is not inherently less resilient.

However, modular homes must be anchored properly in order to avoid damage during disasters.[43] While modular housing follows the state-adopted code, manufactured housing is constructed to the requirements of the less stringent HUD code.[44]

**Older Homes Lack Resilience Measures**

While building codes make new and remodeled buildings safer, older homes often lack resilience features. A home built in the 1970s or even the early 2000s may not have the same protections from flooding, wind, or extreme temperatures.

## ** End of Sector Analysis **

**Mobile Home**

**Construction Standards:**
Pre-1976 HUD Code

**Foundation Type:**
Permanently attached chassis

**Build Process:**
Factory construction, anchored to site

**Legal Status:**
Personal property

**Typical Financing:**
Limited options

**Manufactured Home**

**Construction Standards:**
Current HUD Code

**Foundation Type:**
Various (permanent chassis is typical)

**Build Process:**
Factory construction, assembled at site

**Legal Status:**
Personal property

**Typical Financing:**
Manufactured home loans

**Modular Home**

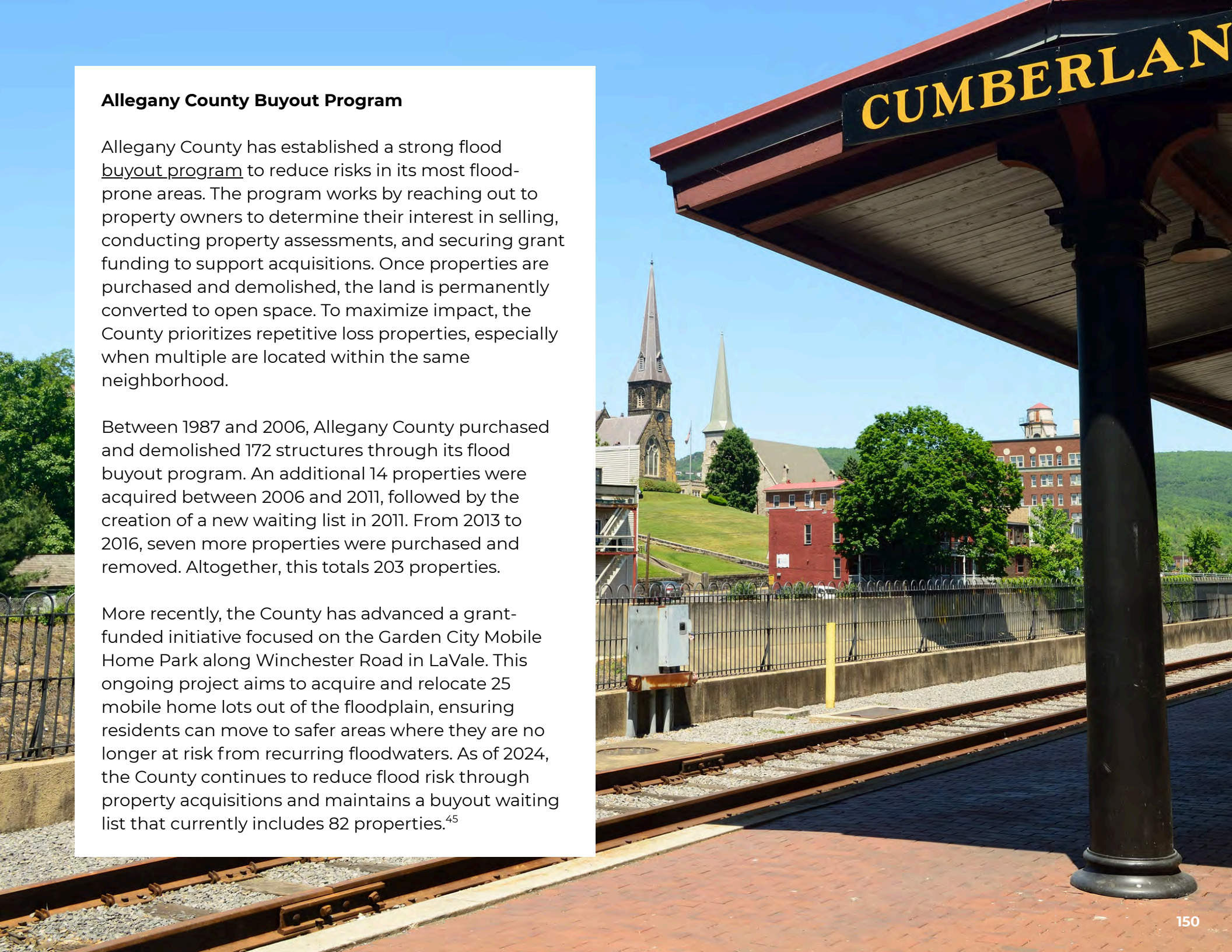
**Construction Standards:**
Current IRC Code

**Foundation Type:**
Permanent foundation

**Build Process:**
Factory construction, assembled at site w/permanent foundation

**Legal Status:**
Real estate

**Typical Financing:**
Conventional mortgages




**Allegany County Buyout Program**

Allegany County has established a strong flood buyout program to reduce risks in its most flood-prone areas. The program works by reaching out to property owners to determine their interest in selling, conducting property assessments, and securing grant funding to support acquisitions. Once properties are purchased and demolished, the land is permanently converted to open space. To maximize impact, the County prioritizes repetitive loss properties, especially when multiple are located within the same neighborhood.

Between 1987 and 2006, Allegany County purchased and demolished 172 structures through its flood buyout program. An additional 14 properties were acquired between 2006 and 2011, followed by the creation of a new waiting list in 2011. From 2013 to 2016, seven more properties were purchased and removed. Altogether, this totals 203 properties.

More recently, the County has advanced a grant-funded initiative focused on the Garden City Mobile Home Park along Winchester Road in LaVale. This ongoing project aims to acquire and relocate 25 mobile home lots out of the floodplain, ensuring residents can move to safer areas where they are no longer at risk from recurring floodwaters. As of 2024, the County continues to reduce flood risk through property acquisitions and maintains a buyout waiting list that currently includes 82 properties.[45]

# Goals & Recommendations

*Housing*

## GOAL 1 - Make existing housing stock more resilient while emphasizing affordability.

**Recommendation 1.1**

**Increase training and continuing education for building code officials and design professionals to improve the resilience of housing and other structures.**

**Owner:** MDOL **Timeline:** 2 years, ongoing **Funding:** No additional funding needed **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Adopting the latest model code has a benefit cost ratio of 11:1 and can save lives and prevent injuries during disasters.[46]
- While Maryland has already adopted the latest model International Code, building and design professionals must understand the code, and local building officials must enforce it in order for it to be effective.[47]
- When Maryland was assessed on the Building Code Effectiveness Grading Schedule (BCEGS), the state received a rating of 4 out of 10.[48]
- A lack of continuing education and limited training is an identified gap for Maryland's building codes. By addressing this, the state can build more resilient housing and other structures.

**Recommendation 1.2**

**Support local and community-level initiatives to improve the resilience of existing housing stock through grants, financing, and public-private partnerships.**

**Owner:** DHCD **Timeline:** 5 years, ongoing **Funding:** No additional funding needed

**Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- While building codes help make new buildings or remodeled homes more resilient, existing housing stock is also vulnerable to hazards.
- Grants, financing, and other assistance can help homeowners mitigate flood risks, create energy efficiencies, and cool their homes during heat waves.
- In particular, the Department of Housing and Community Development administers US Housing and Urban Development Community Development Block Grants as well as Maryland Housing Rehabilitation loans that can be used for this purpose.[29,28]

**Recommendation 1.3**

**Establish and fund a buyout program for homes in flood-prone areas.**

**Owner:** TBD **Timeline:** 10 years **Funding:** TBD **Focus Area:** Justice & Equity

**Why This Matters:**

- In areas that are prone to flooding, voluntary home buyouts are an important tool to move individuals out of harm's way.[49]
- States around the country – like New Jersey and South Carolina –- have established buyout programs to advance resilience and draw down flood risk.[50,51]

## GOAL 2 - Support resilient and affordable growth.

**Recommendation 2.1**

**Provide guidance, data, and technical assistance to promote resilient and safe development of affordable modular and traditional housing.**

**Owner:** MDOL **Timeline:** 2 years, ongoing **Funding:** No additional funding needed **Focus Area:** Justice & Equity

**Why This Matters:**

- Modular housing is an important part of Maryland's housing supply that makes homeownership more affordable and attainable.
- To maintain affordability and advance hazard resilience, the state needs programs that make both modular and traditional housing construction safer.

**Recommendation 2.2**

**Develop model ordinances that incorporate resilience to support risk-informed development and land use.**

**Owner:** MDP **Timeline:** 5 years **Funding:** Potential HUD PRO Housing Grant **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- In Maryland, local governments are responsible for zoning and land use decisions that dictate where development happens.
- Local stakeholders expressed a need for model ordinances that incorporate resilience in development.
- The State of Maryland has recently received a HUD PRO Housing Grant that is funding model ordinance development.[52] Future HUD PRO Housing funding could be utilized to fund this effort.

**Recommendation 2.3**

**Work with local governments to implement the State's Resilience Planning Principle in comprehensive planning.**

**Owner:** MDP **Timeline:** 5 years **Funding:** Funding Secured - General Funds

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- In 2025, Governor Wes Moore signed legislation into law creating the Sustainable Growth Planning Principles. One of those principles is resilience.[23]
- MDP is implementing these principles to guide local comprehensive planning, which will inform land use.

## GOAL 3 - Bolster Maryland's property insurance market in the face of climate change to protect homeowners and renters.

**Recommendation 3.1**

**Convene relevant state partners to understand the impact of climate change on the property insurance market in Maryland, and inform future strategies that promote market stability and insurance affordability.**

**Owner:** Office of the Comptroller & MIA **Timeline:** 2 years **Funding:** No additional funding needed

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Across the country, climate change is impacting homeowners' insurance with premiums rising and private insurers withdrawing from hazard-prone areas.[53]
- Renters are also at-risk of financial damages from disasters.
- Many homeowners and renters do not realize that flood insurance policies must be purchased separately.[54]
- While Maryland insurance markets are in a strong position, it is essential for relevant state parties to monitor this challenge and consider proactive strategies.

# ** End of Sector Recommendations **

## Future of the National Flood Insurance Program

In the event of a flood, the National Flood Insurance Program (NFIP) provides coverage for direct physical damage to both structures and personal belongings.[55] The NFIP is the primary source of flood insurance for residential properties across the United States.[56]

More than 22,000 communities in 56 states and jurisdictions participate, with over 4.7 million active policies providing more than $1.3 trillion in coverage.[57] Notably, about 32% of all NFIP claims come from homes located outside of high-risk flood zones.[58]

Despite its importance, the NFIP faces ongoing challenges. Rising costs, program uncertainties, and federal and FEMA-level changes have raised concerns about the program's long-term stability.

Recent FEMA actions and announcements have emphasized an overall shift of emergency management responsibilities to states. This has raised questions about whether NFIP responsibilities might also shift to the states and the private insurance industry.

## Community-driven Relocation

Community-driven relocation, often referred to as "managed retreat," involves individuals or entire communities moving away from high-risk areas to reduce exposure to hazards. These efforts are typically coordinated and voluntary, with residents receiving compensation for their properties.

This is an area that requires further research to establish best practices and ensure relocation is both effective and equitable. Successful relocation efforts must remain voluntary and provide robust support for communities considering or preparing for such transitions.

A leading example is New Jersey's Blue Acres Program, launched in 1995.[59] Administered by the Department of Environmental Protection, Blue Acres reduces risks to public safety and the environment by relocating families from repeatedly flooded homes and repurposing the land for natural flood storage, parks, and community open space. Since its inception, the program has acquired approximately 1,100 homes.[60]

# Big Ideas & Open Questions

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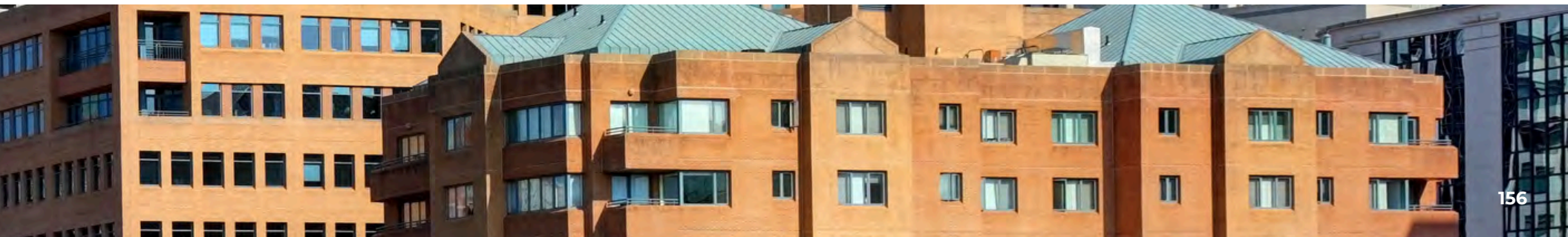

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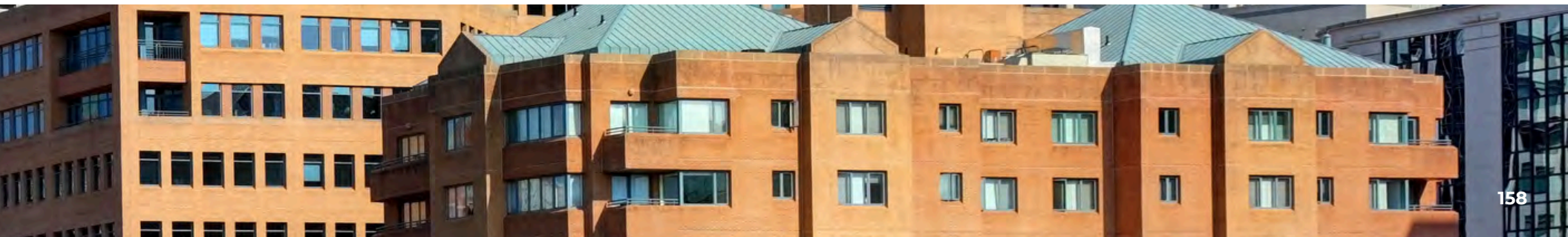

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## ** End of Chapter References **

# Consolidated Roster of Goals & Recommendations

# Goals & Recommendations

*Overarching*

## GOAL 1 - Institutionalize resilience across Maryland's funding and regulations.

**Recommendation 1.1**

**Evaluate state funding programs and identify where hazard risk assessment could be incorporated into application scoring.**

**Owner:** MDEM/MOR **Timeline:** 5 years **Funding:** No additional funding needed **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- The State administers several funding programs that can pay for resilience projects such as stormwater upgrades, living shorelines, or resilience improvements to transportation assets.
- But there is a much larger opportunity to incorporate resilience into how the State funds construction projects in general – from roads, to schools to energy assets and more.
- As a first step, MOR would evaluate State funding programs to identify opportunities for agencies to incorporate hazard risk into application scoring. This would happen in concert with efforts to coordinate funding that are led by the State Clearinghouse.[60]
- This would allow the State to understand the risk profile of investments and better steward its funds.

**Recommendation 1.2**

**Screen environmental permits to identify opportunities to incorporate climate considerations in future permits and renewals.**

**Owner:** MDE **Timeline:** 5 years **Funding:** TBD

**Why This Matters:**

- The Maryland Department of the Environment has recently updated state stormwater regulation to incorporate climate-adjusted rainfall.[61]
- A similar process could be followed to future-proof other environmental regulations. MDE would evaluate environmental regulations and permits to identify places to incorporate climate projections. This would occur in alignment with other permitting goals like efficacy.

**Recommendation 1.3**

**Establish a statewide resilience authority or empower an existing entity to play that role.**

**Owner:** TBD **Timeline:** 5 years (TBC) **Funding:** TBD **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- At the local level, resilience authorities are entities that can issue bonds, receive government funding, and assess fees for their services in order to pay for resilience projects.[62]

**Why This Matters (cont.):**

- These structures can increase local financing capacity and unlock dollars for resilience.
- No comparable state entity exists. With a statewide resilience authority, Maryland could access a wider array of funding and financing to tackle large-scale resilience projects.

**Recommendation 1.4**

**Establish a resilience baseline for the State; develop a statewide resilience assessment to support local government benchmarking for use in a statewide resilience tracker to help identify investment needs; and develop indicators to monitor the effectiveness of resilience efforts and establish future goals.**

**Owner:** UMCES **Timeline:** 5 years **Funding:** TBD pending competitive bid. Estimates range from $250,000 to $1.7 million

**Why This Matters:**

- It is an emerging best practice for states to develop and utilize metrics to measure disaster and climate resilience.[63]
- In 2022, the Maryland General Assembly tasked the University of Maryland Center for Environmental Science (UMCES) with developing a resilience baseline, a benchmarking assessment for local governments, and metrics to track resilience over time.[64]
- This would help identify opportunities for investment and ensure that Maryland is directing spending where it can be most effective.

## GOAL 2 - Coordinate state funding and direct it toward places with high hazard risk and social vulnerability.

**Recommendation 2.1**

**Convene a funding table in which state agencies pool resources and stack funding to accomplish transformative resilience projects.**

**Owner:** MDEM/MOR **Timeline:** 2 years **Funding:** No additional funding needed **Focus Area:** Justice & Equity, Place-based Resilience

**Why This Matters:**

- One of Maryland's strengths is that so many of its agencies fund resilience work.
- But stakeholders frequently described situations where multiple agencies funded projects in the same location without foreknowledge or initial collaboration. They also expressed concern that some high-risk geographies may receive little to no resilience dollars.
- When resilience projects are submitted for certain types of State and Federal funding, they are sent to relevant agencies for review through the State Clearinghouse, creating an initial dataset of resilience projects.[65] However, no comprehensive view exists to show resilience projects and project ideas around the State.
- By utilizing the Clearinghouse data to develop a resilience project inventory and convening state agencies, MOR can help coordinate funding across agencies, enabling more efficient capital stacking, better visibility into statewide spending, and transformative resilience projects.
- This recommendation would advance the place-based resilience concepts described above.

**Recommendation 2.2**

**Identify focus geographies for agencies to coordinate place-based resilience using existing disaster data, environmental justice data, and other sources.**

**Owner:** MDEM/MOR **Timeline:** 2 years **Funding:** No additional funding needed

**Focus Area:** Justice & Equity, Place-based Resilience

**Why This Matters:**

- MOR is tasked by State law with "ensuring that investments prioritize vulnerable communities and environmental justice."[66]
- To achieve this and effectively coordinate funding, MOR would work with funding agencies to identify geographies with outsized hazard risk and social vulnerability where resilience dollars could significantly move the needle.
- This would build off of existing State law that defines overburdened and underserved communities, as well as Governor Moore's initiatives to advance environmental justice.[67]
- On the heels of the 2025 flooding in Western Maryland, additional rural datasets and indicators could be combined with existing environmental justice tools to determine under-resourced areas.

**Recommendation 2.3**

**Accelerate the number of resilience projects in under-resourced communities with high hazard risks.**

**Owner:** Multiple; MDEM/MOR will track results **Timeline:** 10 years **Funding:** No additional funding needed

**Focus Area:** Justice & Equity, Place-based Resilience

**Why This Matters:**

- Utilizing the funding table structure and the priority geographies as described above, Maryland's agencies could direct dollars and technical assistance resources to under-resourced communities with high hazard risks.
- MOR would measure success in terms of the number of resilience projects in under-resourced communities over time and would utilize resilience benchmarks that become available.

## GOAL 3 - Collaborate and take action to address emerging climate challenges.

**Recommendation 3.1**

**Convene a subset of Agency Resilience Liaisons to coordinate state-level strategy on extreme temperature.**

**Owner:** MDEM/MOR **Timeline:** 2 years **Funding:** No additional funding needed

**Why This Matters:**

- The effects of climate change are already here: in 2025, Maryland experienced its highest number of heat deaths in more than a decade.[68]
- By mid-century, Maryland is projected to experience 47.7 days above 90° F per year under a high future climate scenario. This is 190% greater than the 16.5 days above 90° under a baseline scenario.[69]

**Why This Matters (cont.):**

- Several of Maryland's agencies are already addressing this challenge. Maryland Occupational Safety and Health issues heat stress standards, the Maryland Department of Health monitors heat-related illness, and the Maryland Department of Transportation manages the impacts of heat on transportation.[19,25]
- Stakeholders frequently expressed that greater coordination around extreme heat would help with information sharing and strategic alignment.

**Recommendation 3.2**

**Convene a subset of Agency Resilience Liaisons to collaborate and share information about community-driven relocation.**

**Owner:** MDEM/MOR **Timeline:** 2 years **Funding:** No additional funding needed

**Why This Matters:**

- With sea level rise and worsening flooding, Maryland will look dramatically different in the next 50 years.[70]
- State agencies are grappling with questions of how to support voluntary relocation from high-risk areas.
- Community-driven relocation is a complex topic that requires serious consideration, and an initial step would be convening state agencies to share information and discuss this topic.
- After laying this groundwork, the State might work with interested communities to understand requirements for successful implementation.

## GOAL 4 - Strengthen emergency response in the face of federal changes by sharing resources with neighboring states and non-governmental partners.

**Recommendation 4.1**

**Establish resource sharing agreements with partners beyond Maryland State government to support preparedness, response, recovery, and mitigation activities.**

**Owner:** MDEM/DRR **Timeline:** 2 years **Funding:** No additional funding needed

**Why This Matters:**

- Mutual aid is a foundational part of emergency management, supported by structures like the Emergency Management Assistance Compact.[71]
- With changes to FEMA's funding and a move toward greater state responsibility, the Maryland Department of Emergency Management is exploring formalized agreements with other states and stakeholders in all phases of emergency management.
- This would allow for support across training, response, recovery, and mitigation. It would also decrease reliance on federal support.

## GOAL 5 - Enhance the state's digital resilience through continued IT modernization and development of key cybersecurity governance and operations capabilities.

### Recommendation 5.1

**Improve digital availability and modernization initiatives to refresh critical and legacy digital infrastructure; integrate digital innovations like artificial intelligence; and implement zero trust architecture principles.**

**Owner:** Multiple (led by DoIT) **Timeline:** 10 years **Funding:** TBD **Focus Area:** Justice & Equity

**Why This Matters:**

- Many state and local entities operate on outdated or unsupported or digital infrastructure. Not only does this lead to high maintenance costs, but it also creates greater points of failure and higher cybersecurity threat risk.
- For those reasons, it is essential to modernize the State's digital infrastructure.
- By adopting and implementing digital innovations like artificial intelligence, the State could realize economies of scale and power.
- The State could also adopt zero trust architecture principles – "never trust, always verify" – to raise the floor of statewide cybersecurity.

### Recommendation 5.2

**Establish statewide cybersecurity and privacy governance, policy, and standards / baseline; develop cybersecurity and privacy posture assessment processes and tools to assist state and local evaluation of security programs for compliance and cybersecurity resilience.**

**Owner:** DoIT Office of Security Management **Timeline:** 2 years **Funding:** TBD

**Why This Matters:**

- With global transformation and growing digital reliance, the digital threat landscape has evolved. Adversaries running the spectrum of socially or politically motivated hacktivists to financially driven criminals to state-sponsored espionage and sabotage units continually seek new vulnerabilities and methods to achieve their goals.
- The Maryland IT Security Manual and similar statewide cybersecurity guidance documents are outdated and no longer reflect the advanced cyber threat landscape the State faces.
- Updated statewide governance would provide a foundation on which state and local cybersecurity programs could be built. New policies would build on that foundation to create an effective cybersecurity program.
- Standards, baselines, assessments, and tools could be used to put enhanced cybersecurity and privacy into practice.

### Recommendation 5.3

**Expand the availability and adoption of centralized IT and cybersecurity services to standardize defenses across the state; enhance state and local entities' access to enterprise-grade capabilities such as endpoint detection and response .**

**Owner:** DoIT Office of Security Management **Timeline:** 5 years **Funding:** TBD

**Why This Matters:**

- Many state entities lack the budget and personnel to procure and manage top-tier IT and cybersecurity tools, resulting in a fragmented landscape where well-defended agencies connect to vulnerable ones.
- A "Whole-of-State" approach to centralized services would bridge this gap, allowing less resourced entities to leverage the technical expertise of the state.
- Centralizing core IT and cybersecurity services would eliminate duplication of effort and ensure a consistent baseline of security. A centralized service model would also enhance visibility into the statewide threat environment, allowing the State to detect and neutralize coordinated attacks before they cascade across jurisdictional lines.

## ** End of Sector Recommendations **

# Goals & Recommendations

*Environment & Natural Systems*

## GOAL 1 - Prioritize resilience as a criteria for conservation & restoration investments.

**Recommendation 1.1**

**Develop methodology and case studies quantifying the costs and benefits, including ecosystem service value, of nature-based practices that increase resilience of human and natural systems.**

**Owner:** DNR **Timeline:** 2-3 years **Funding:** $100k+ for a study **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- While nature-based practices provide an array of ecosystem benefits, including hazard risk reduction, those benefits can be difficult to quantify and are not always incorporated into cost-benefit analyses.[41]
- DNR already quantifies many of the ecosystem benefits associated with restoration, but could expand its resilience benefit calculations to consider inland flooding, heat reduction, and more. This could be used to inform investments.

**Recommendation 1.2**

**Include quantified resilience benefits as criteria for investment across relevant conservation and restoration programs.**

**Owner:** DNR **Timeline:** 5 years **Funding:** TBD **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Once DNR has a more complete understanding of the resilience benefits of conservation and restoration approaches, this information can be used to drive decision making.
- When evaluating potential projects, DNR could evaluate resilience benefit as one of the criteria for selection.

## GOAL 2 - Improve resilience data collection, governance, coordination, access, and usability for local governments and state agencies.

**Recommendation 2.1**

**Identify data needs which may support local governments and the State of Maryland in advancing resilience.**

**Owner:** MDP **Timeline:** 2 years **Funding:** Funding secured - General Funds **Focus Area:** Justice & Equity

**Why This Matters:**

- During the stakeholder engagement process, the Maryland Office of Resilience repeatedly heard that local governments lack data to develop resilience projects, such as downscaled climate projections or basic mapping capabilities. These needs vary by community and region.
- Because MDP has regional planning staff, the Department is well-poised to identify local data needs that can be addressed at a later date.
- This is the first step, and once the data needs have been identified, MDEM will help coordinate across agencies to fill data needs.

## GOAL 3 - Identify innovative approaches and structures to increase nature-based solutions, by working with private property owners and nongovernmental funders.

### Recommendation 3.1

**Improve the accessibility of the living shoreline loan program to increase implementation by private property owners.**

**Owner:** DNR **Timeline:** 2 years **Funding:** No additional funding needed **Focus Area:** Justice & Equity

**Why This Matters:**

- More than 80 percent of Maryland's shoreline is privately owned, making collaboration between government and private landowners essential.[42]
- DNR administers the Shoreline Erosion Loan Program, offering no-interest loans to finance living shorelines on public, private, and community owned lands.[37] These projects not only protect against shoreline erosion but also reduce hazard risks.
- One option for improving utilization of this program is by updating its formula to reduce the financial burden for property owners.

### Recommendation 3.2

**Develop 100 Coastal Resilience Management Plans to help private landowners plan for and adapt to sea level rise.**

**Owner:** DNR **Timeline:** 5 years **Funding:** Climate Pollution Reduction Grant (CPRG) Funding Secured

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Sea level rise will dramatically change Maryland's landscape, especially on the lower eastern shore.[17]
- Through proactive planning, Maryland can help private landowners prepare for the impacts of sea level rise on their financial, social, and environmental systems.
- DNR has received funding through an EPA Climate Pollution Reduction Grant to advance marsh restoration, tidal connectivity, living shorelines and marsh migration corridor resilience by creating 100 Coastal Resilience Management Plans, which will support this goal.[43]

**Recommendation 3.3**

**Make nature-based solutions a mainstream and accessible resilience practice for private property owners.**

**Owner:** DNR **Timeline:** 10 years **Funding:** TBD

**Why This Matters:**

- Successful implementation of Recommendations 3.1 and 3.2 will help make nature-based solutions both mainstream and accessible.
- Nature-based solutions can be highly effective for reducing flood risk, providing storm protection, and minimizing erosion.[44]
- For instance, wetlands act like sponges, absorbing and slowly releasing water that would otherwise cause flooding.[45] Living shorelines can have a similar impact, breaking up wave energy and reducing storm damages.[46]
- But a variety of barriers prevent greater uptake of nature-based solutions.[47] By updating policy, engaging community members in planning, and continuing education efforts, DNR can make this practice mainstream and help draw down Maryland's hazard risk.

**Recommendation 3.4**

**Share information, best practices, and lessons learned in enhancing resilience through public-private-philanthropic partnerships and non-traditional financing structures.**

**Owner:** MDEM/MOR

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:** **Timeline:** 5 years **Funding:** No additional funding needed

- To help ensure the spread of high-quality resilience projects, Maryland should explore innovative financing structures that can bring in private dollars.
- This could include partnering with MDE and DNR to explore ways to leverage Maryland's Conservation Finance Act for resilience outcomes using pay-for-success contracting methods.

## ** End of Sector Recommendations **

# Goals & Recommendations

*Critical Infrastructure*

## GOAL 1 - Enhance and support the power grid's reliability and resilience in the face of escalating community reliance and a developing threat landscape.

**Recommendation 1.1**

**Support resilient microgrid projects geared toward keeping critical infrastructure functional during outages.**

**Owner:** MEA **Timeline:** 2 years **Funding:** SEIF-Funded **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- The Maryland Energy Administration runs the Resilient Maryland Grant Program, which funds microgrids, resilience hubs, and resilient facility power systems.[43]
- These combined solutions reduce energy use during normal conditions and provide backup power during outages.
- The Resilient Maryland Program can be used to fund microgrid projects that support critical infrastructure and ensure its function during disasters. One example is a recent initiative by the WSSC.[44]

## GOAL 2 - Support transportation system resilience.

**Recommendation 2.1**

**Find the highest return on investment opportunities to implement priorities from the Transportation Resiliency Improvement Plan.**

**Owner:** MDOT **Timeline:** 2 years **Funding:** U.S. Dept. of Transportation PROTECT (Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Maryland's transportation system faces disruptions from hazards and changing climate conditions. For instance, a 2021 study by the Pew Charitable Trusts found that flooding impacts approximately 15,000 lane miles of state-maintained roads. This equates to roughly 20% of Maryland's roads.[18]
- As part of the PROTECT program, Maryland created its 2024 Transportation Resiliency Improvement Plan (TRIP), which lays out investment priorities to build transportation resilience.[45] In accordance with the TRIP, MDOT maintains a list of transportation resilience projects.[46]
- By updating the TRIP and identifying and executing projects with the highest return on investment, the Department can continue to build transportation resilience.

**Recommendation 2.2**

**Provide technical assistance and planning support to help local governments and transportation systems reduce risks associated with climate and evolving technologies.**

**Owner:** MDOT **Timeline:** 5 years **Funding:** U.S. Dept. of Transportation PROTECT Funding

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Most of Maryland's roads are locally owned and maintained, as are other transportation assets.[47]
- MDOT can provide technical assistance and planning support to ensure that local governments shore up their systems and assets against hazards.

## GOAL 3 - Strengthen the resilience of additional critical infrastructure, such as military installations, water and wastewater, and dams.

**Recommendation 3.1**

**Support efforts to improve military readiness through the Resilient Maryland Defense Communities Project.**

**Owner:** COMM-OMFA **Timeline:** 2 years **Funding:** Funding secured through Office of Local Defense Community Cooperation (OLDCC) MIRR Grant

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Maryland's military communities face evolving hazards that threaten community infrastructure and services needed to support military operations and mission assurance.
- As a result, eight military installations are engaging in a U.S. Department of Defense-funded Military Installation Readiness Review.[34] These reviews evaluate community assets and infrastructure across transportation, supply chain, energy, water and wastewater, medical services, and more.
- To knit together lessons from those installations and develop a collaborative framework to address shared resilience challenges on and off base, The Office of Military and Federal Affairs at the Maryland Department of Commerce is leading the Resilient Maryland Defense Communities Project.

**Recommendation 3.2**

**Identify and enable pathways for resilience planning assistance to support small and decentralized drinking water and wastewater systems vulnerable to flooding and drought.**

**Owner:** MDE **Timeline:** 5-10 years **Funding:** A version of this is possible with existing resources

**Focus Area:** Justice & Equity

**Why This Matters:**

- Across Maryland, wells and septic systems are vulnerable to flooding and drought.
- For instance, approximately 52,000 septic systems are located within the Critical Area (within 1,000 feet of tidal waters).[48] Heavy rains or coastal flooding could cause untreated wastewater to overflow into communities, posing public health risks.[49]
- MDE can support planning efforts to make these systems more resilient and help communities avoid building new systems in harm's way.

**Recommendation 3.3**

**Coordinate with dam owners and local emergency managers to maximize adoption of new state-of-the-art rainfall estimates, modeling tools, and technical guidance to improve the safety and resilience of dam infrastructure.**

**Owner:** MDE **Timeline:** 5 years **Funding:** No additional funding needed

**Why This Matters:**

- The Probable Maximum Precipitation (PMP) estimates the highest rainfall that could fall in a specific area and timeframe.[50] Engineers use these estimates to design infrastructure, including dams.
- The Maryland Dam Safety Program is releasing updated PMP data for use in the design of Significant and High Hazard dams.
- These updates reflect the latest climate science and are a critical step toward modernizing Maryland's dam design standards, making them more resilient.
- When combined with modeling tools and technical guidance, this suite of resources can make dams more resilient.

**Recommendation 3.4**

**Launch updated state stormwater regulations that incorporate climate-forecasted rainfall and establish a consistent level of flood protection across Maryland.**

**Owner:** MDE **Timeline:** 2 years **Funding:** No additional funding needed

**Why This Matters:**

- Maryland is modernizing its stormwater standards to address the increasing risks of flooding, erosion, and pollution driven by climate change.
- Per SB227 (2021), the Maryland Department of the Environment (MDE) is required to review and update certain stormwater regulations at least every five years.[51]
- MDE has collaborated with a broad array of stakeholders to identify areas for the latest update.[52]
- The updated regulations will require the incorporation of climate-forecasted rainfall data into stormwater design.
- This means that stormwater systems will be designed with future conditions in mind and better equipped for more intense storms.
- MDE will release the updated regulations and then transition into implementation, providing guidance to locals via the updated Stormwater Manual.

**Recommendation 3.5**

**Promulgate implementing regulations for water-sector cyber security and support water system cyber risk assessment, risk mitigation planning, and emergency response plan development.**

**Owner:** MDE **Timeline:** 2 years **Funding:** No additional funding needed

**Why This Matters:**

- In 2025, Maryland passed Senate Bill 871 – Department of the Environment – Community Water and Sewerage Systems – Cybersecurity Planning and Assessments to strengthen the resilience of community water and wastewater systems against cyber threats.[53]
- The law directs MDE, working with DoIT and MDEM, to lead statewide cybersecurity planning and oversight in this sector.
- Key provisions include incident reporting, stronger standards, preparedness plans, staff training, and secure records.

## ** End of Sector Recommendations **

# Goals & Recommendations

*Community & Local Government Capacity*

## GOAL 1 - Establish regionally-based technical assistance to help local jurisdictions advance resilience.

**Recommendation 1.1**

**Establish a resilience technical assistance pilot in one or more regions of the state.**

**Owner:** MDEM-MOR **Timeline:** 2 years **Funding:** Funding needs TBD. MOR currently has multiple applications pending to fund this pilot.

**Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- Across Maryland's 23 counties, 157 municipalities, and one independent city, there are significant variations in budget, number of personnel, and expertise on staff.
- As a result, many local jurisdictions lack dedicated resilience planning and grant writing staff.[47]
- By creating a technical assistance program at the regional level, the Maryland Office of Resilience can fill these gaps and create better resilience outcomes.
- An initial pilot will establish a process that can be scaled to other geographies in the future.

**Recommendation 1.2**

**Expand regional technical assistance to all regions of the state to accelerate multi-jurisdictional collaboration, development of project pipelines, and establishment of resilience authorities.**

**Owner:** MDEM-MOR **Timeline:** 5 years **Funding:** Funding needs TBD, will be determined by the cost of the pilot.

**Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- Disasters do not respect jurisdictional boundaries. Regional approaches enable more effective large-scale projects, resource sharing, and economies of scale.
- Recognizing this, states are increasingly establishing regional technical assistance programs that help local governments assess risks and identify projects.[55]
- Technical assistance yields dividends by better positioning communities for future funding. New Jersey's Resilient NJ program led to $26.3 million in federal funding for project implementation.[56]

## GOAL 2 - Provide tools and guidance that increase local capacity to plan, fund, and implement resilience efforts.

### Recommendation 2.1

**Develop and share tools that support the creation of resilience authorities across the state and increase local financing capacity.**

**Owner:** MDEM-MOR **Timeline:** 2 years **Funding:** Funding needs TBD. A version is possible with existing resources; MOR also has an application pending to support this effort.

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- In Maryland, because of Senate Bill 457, local jurisdictions can establish resilience authorities, which can issue bonds, apply for and administer funding, and operate more nimbly than local governments.[57]
- The Resilience Authority of Anne Annapolis and Arundel County and Resiliency Authority of Charles County serve as two successful examples that have increased local financing capacity.[33,34]
- Because this is a novel governance structure, local jurisdictions would benefit from tools and templates to guide their decision process and aid in structuring these entities.

### Recommendation 2.2

**Develop best practices for local capital improvement planning that incorporate natural and human-caused hazards as well as climate projections.**

**Owner:** MDEM-MOR **Timeline:** 5 years **Funding:** TBD **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Local governments utilize capital improvement plans to manage long-term investments in public infrastructure.[58]
- It is an emerging best practice to link capital improvement plans with climate adaptation and disaster resilience, considering sea level rise, increased precipitation, and other future risks when siting and designing infrastructure.
- The City of Baltimore is a leader in this regard, linking its Capital Improvement Plan to its Disaster Preparedness Plan, Climate Action Plan, and Sustainability Plan.

### Recommendation 2.3

**Pilot mechanisms to compensate community liaisons for their time and expertise weighing in on resilience projects.**

**Owner:** DNR **Timeline:** 5 years **Funding:** No additional funding needed **Focus Area:** Justice & Equity

**Why This Matters:**

- Equitable community engagement is a cornerstone of environmental justice. To achieve that, it is essential to honor community knowledge.
- On Maryland's Eastern Shore, Envision the Choptank has successfully partnered with community ambassadors to more effectively engage with communities and understand local priorities.[59]
- To do this properly, the State needs mechanisms to compensate community liaisons.

**Recommendation 2.4**

**Scale the practice of compensating community liaisons across state agencies and resilience programs.**

**Owner:** TBD **Timeline:** 10 years **Funding:** TBD **Focus Area:** Justice & Equity

**Why This Matters:**

- Once DNR has established and piloted mechanisms to compensate community liaisons and engage them in resilience project development, this practice can be scaled across agencies and programs to institutionalize equitable co-governance and environmental justice.

## GOAL 3 - Protect and rapidly restore small business operations statewide.

**Recommendation 3.1**

**Provide technical assistance for small businesses to prepare for and respond to disruptions, including updates to and implementation of a robust Small Business Continuity and Resiliency Playbook.**

**Owner:** COMM **Timeline:** 2-5 years **Funding:** No additional funding needed

**Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- Small businesses are particularly vulnerable to disasters, and 99.6% of Maryland's businesses are small businesses.[60]
- An estimated 75% of businesses without a continuity plan fail within three years of being struck by a disaster.[61]
- The Maryland Department of Commerce has developed a Small Business Continuity and Resiliency Playbook to build the resilience of small businesses across the state.

# ** End of Sector Recommendations **

# Goals & Recommendations

*Food System*

## GOAL 1 - Increase adoption of climate-smart agricultural practices in Maryland.

**Recommendation 1.1**

**Implement programs, such as the Leaders in Environmentally Engaged Farming (LEEF) Program, for the adaptation of agricultural practices in response to environmental changes. This may include increases in precipitation, temperature, or soil salinization.**

**Owner:** MDA **Timeline:** 5-10 years, ongoing **Funding:** Funding for LEEF is secured from the Governor's budget. Additional program implementation may require further funding (TBD).

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Maryland farmers have long played a critical role in adopting best practices, helping the State achieve conservation milestones, and protecting the Chesapeake Bay.[50]
- Through programs like LEEF, MDA will continue to incentivize environmentally engaged farming, making Maryland more resilient to environmental changes and bolstering local food systems.[43]

## GOAL 2 - Increase sustainable local food production and access.

**Recommendation 2.1**

**Establish and support public-private partnerships to increase local food processing and cold storage infrastructure throughout the state.**

**Owner:** MDA **Timeline:** 2-5 years, ongoing **Funding:** Additional infrastructure implementation may require further funding.

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Small and mid-sized producers often lack infrastructure to wash, freeze, can, package, or store food.
- Cold storage gaps are a particularly critical challenge. Without cold storage capability, small food distributors are frequently forced to turn away donated or rescued food, often locally grown, leading to waste and limiting distribution of perishable goods.[44]
- Through public-private partnerships, Maryland can address this challenge.

**Recommendation 2.2**

**Review and reevaluate regulations for on-farm food processing to support the expanded production of value-added agricultural products.**

**Owner:** MDA & MDH **Timeline:** 2-5 years **Funding:** No additional funding needed.

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- On-farm processing can generate new revenue for farmers, reduce food waste, and support local food system resilience.
- However, Maryland's "On-Farm Home Processing License" is unnecessarily restrictive, imposing a revenue cap lower than unlicensed Cottage Food Products.[51]
- While public health and safety are paramount, creative solutions exist to streamline on-farm processing and incentivize Maryland-grown products.

**Recommendation 2.3**

**Create a state-specific food procurement guidance document that seeks to help overcome challenges limiting institutional local food procurement.**

**Owner:** DGS **Timeline:** TBD **Funding:** TBD **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Institutional procurement of Maryland-produced foods is low. According to the December 2024 Maryland Certified Local Farm and Fish Program Report, just 0.25% of state agency and university food procurement budgets were spent on purchases from Certified Local Farm and Fish providers. This amounts to $238,920 out of a food budget of $97.6M.[52,53]
- By creating food procurement guidance, the Department of General Services (DGS) can better understand the barriers to local food procurement and provide actionable guidance to encourage producer and buyer participation in Maryland's local food system.

**Recommendation 2.4**

**Establish new opportunities and local markets for food accessibility on lands owned by the Department of Natural Resources.**

**Owner:** DNR **Timeline:** 5 years **Funding:** No add'l funding needed. **Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- Per DNR data provided 11/26/25, DNR owns, manages, and leases approximately 9,373 acres of farmland for crop production and grazing.
- The Department has observed two needs – support for regenerative practices and local access to food produced on these lands.
- For this reason, DNR and MDA are partnering on an initiative that will expand access and use of agricultural lands to environmental justice communities, establish new markets, and support local circular economies.
- This effort will support environmental best practices for farming and increase food production & access, while also mitigating climate impacts.

## GOAL 3 - Improve the ability of Maryland's food system to adapt to and recover from supply chain disruptions.

### Recommendation 3.1

**Build relationships with regional, state, and local food system players, including independent food retailers and charitable food service providers, and exercise their ability to get and stay open in a disaster.**

**Owner:** MDEM-WCI **Timeline:** 5 years, ongoing **Funding:** No additional funding needed.

**Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- MDEM's Whole Community Integration Branch's purpose is to "partner, engage, and coordinate with private sector, faith-based, and nonprofit organizations all across our State, ensuring they're integrated throughout all the phases of emergency management."[54]
- By expanding its network, WCI can help food system players better navigate disasters with minimal disruption.

### Recommendation 3.2

**Leverage the Maryland Food System Resiliency Council to educate state leaders on the role food plays and convene a broad group of food systems stakeholders.**

**Owner:** MDEM-MOR **Timeline:** 2 years **Funding:** No add'l funding needed. **Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- The Maryland Food System Resiliency Council is an advisory body that makes recommendations to the Maryland General Assembly that address food insecurity and build food system resilience.[41]
- The FSRC members and their broader network are a powerful force multiplier to share information and increase effectiveness of the food system recommendations described elsewhere.

### Recommendation 3.3

**Evaluate and establish emergency food buying processes aimed at stabilizing the food system during periods when food cannot be easily purchased, imported, or delivered.**

**Owner:** MDEM (collaborating with DGS) **Timeline:** 2 years **Funding:** No add'l funding needed.

**Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- During the Covid-19 pandemic, Maryland's local jurisdictions were pushed to design and implement innovative food purchasing and distribution models to address food insecurity resulting from economic instability and supply chain shortages.
- Baltimore City's Department of Planning demonstrated that emergency funds could be invested to purchase healthy, locally grown food for Marylanders experiencing food insecurity.[55] In doing so, they helped direct funds to the local agricultural industry while addressing public health disparities in Baltimore City's under-resourced neighborhoods.
- The State can establish more emergency-contingent contracts with local food producers and distributors to help prevent future food insecurity crises during times of food supply instability or disruption.

## ** End of Sector Recommendations **

# Goals & Recommendations

*Housing*

## GOAL 1 - Make existing housing stock more resilient while emphasizing affordability.

**Recommendation 1.1**

**Increase training and continuing education for building code officials and design professionals to improve the resilience of housing and other structures.**

**Owner:** MDOL **Timeline:** 2 years, ongoing **Funding:** No additional funding needed **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Adopting the latest model code has a benefit cost ratio of 11:1 and can save lives and prevent injuries during disasters.[46]
- While Maryland has already adopted the latest model International Code, building and design professionals must understand the code, and local building officials must enforce it in order for it to be effective.[47]
- When Maryland was assessed on the Building Code Effectiveness Grading Schedule (BCEGS), the state received a rating of 4 out of 10.[48]
- A lack of continuing education and limited training is an identified gap for Maryland's building codes. By addressing this, the state can build more resilient housing and other structures.

**Recommendation 1.2**

**Support local and community-level initiatives to improve the resilience of existing housing stock through grants, financing, and public-private partnerships.**

**Owner:** DHCD **Timeline:** 5 years, ongoing **Funding:** No additional funding needed

**Focus Area:** Justice & Equity, Robust Economy & Job Creation

**Why This Matters:**

- While building codes help make new buildings or remodeled homes more resilient, existing housing stock is also vulnerable to hazards.
- Grants, financing, and other assistance can help homeowners mitigate flood risks, create energy efficiencies, and cool their homes during heat waves.
- In particular, the Department of Housing and Community Development administers US Housing and Urban Development Community Development Block Grants as well as Maryland Housing Rehabilitation loans that can be used for this purpose.[29,28]

**Recommendation 1.3**

**Establish and fund a buyout program for homes in flood-prone areas.**

**Owner:** TBD **Timeline:** 10 years **Funding:** TBD **Focus Area:** Justice & Equity

**Why This Matters:**

- In areas that are prone to flooding, voluntary home buyouts are an important tool to move individuals out of harm's way.[49]
- States around the country – like New Jersey and South Carolina –- have established buyout programs to advance resilience and draw down flood risk.[50,51]

## GOAL 2 - Support resilient and affordable growth.

**Recommendation 2.1**

**Provide guidance, data, and technical assistance to promote resilient and safe development of affordable modular and traditional housing.**

**Owner:** MDOL **Timeline:** 2 years, ongoing **Funding:** No additional funding needed **Focus Area:** Justice & Equity

**Why This Matters:**

- Modular housing is an important part of Maryland's housing supply that makes homeownership more affordable and attainable.
- To maintain affordability and advance hazard resilience, the state needs programs that make both modular and traditional housing construction safer.

**Recommendation 2.2**

**Develop model ordinances that incorporate resilience to support risk-informed development and land use.**

**Owner:** MDP **Timeline:** 5 years **Funding:** Potential HUD PRO Housing Grant **Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- In Maryland, local governments are responsible for zoning and land use decisions that dictate where development happens.
- Local stakeholders expressed a need for model ordinances that incorporate resilience in development.
- The State of Maryland has recently received a HUD PRO Housing Grant that is funding model ordinance development.[52] Future HUD PRO Housing funding could be utilized to fund this effort.

**Recommendation 2.3**

**Work with local governments to implement the State's Resilience Planning Principle in comprehensive planning.**

**Owner:** MDP **Timeline:** 5 years **Funding:** Funding Secured - General Funds

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- In 2025, Governor Wes Moore signed legislation into law creating the Sustainable Growth Planning Principles. One of those principles is resilience.[23]
- MDP is implementing these principles to guide local comprehensive planning, which will inform land use.

## GOAL 3 - Bolster Maryland's property insurance market in the face of climate change to protect homeowners and renters.

**Recommendation 3.1**

**Convene relevant state partners to understand the impact of climate change on the property insurance market in Maryland, and inform future strategies that promote market stability and insurance affordability.**

**Owner:** Office of the Comptroller & MIA **Timeline:** 2 years **Funding:** No additional funding needed

**Focus Area:** Robust Economy & Job Creation

**Why This Matters:**

- Across the country, climate change is impacting homeowners' insurance with premiums rising and private insurers withdrawing from hazard-prone areas.[53]
- Renters are also at-risk of financial damages from disasters.
- Many homeowners and renters do not realize that flood insurance policies must be purchased separately.[54]
- While Maryland insurance markets are in a strong position, it is essential for relevant state parties to monitor this challenge and consider proactive strategies.

# ** End of Sector Recommendations **

# APPENDIX A: ACKNOWLEDGEMENTS

## *Sector Work Group - Housing*

*Those who worked to support this facet of the plan included:*

**Allison Gost -** *Maryland Department of Transportation (MDOT)*
**Andy Winkler -** *Bipartisan Policy Center*
**Avi Smith-Rose -** *International Code Council*
**Carter Reitman -** *Maryland Department of Planning (MDP)*
**Chris Gillis -** *Montgomery Housing Partnership*
**Dana Johnson -** *Homes for America, Inc.*
**Dr. Meleny Thomas -** *South Baltimore Community Land Trust*
**Joy Hatchette -** *Maryland Insurance Administration (MIA)*
**Kathryn (Kate) Howell -** *National Center for Smart Growth*
**Kathryn Callahan -** *Maryland Insurance Administration (MIA)*
**Laura Mondragon -** *Montgomery County Green Bank*
**Melissa Bondi -** *Enterprise Community Partners Mid-Atlantic Rep*
**Mischelle Vanreusel -** *Maryland Department of Labor (MDOL)*
**Nicola Tran -** *Maryland Dept. of Housing & Community Development*
**Rob Emard -** *Maryland Building Officials Association*
**Sara McTarnaghan -** *Urban Institute*
**Scott Bowen -** *The American Institute of Architects MD Chapter*
**Terwana Brown -** *Kent Attainable Housing*
**Tom Walz -** *Maryland Dept. of Housing & Community Development*
**Walkiria Pool -** *Centro de Apoyo Familiar*

## *Sector Work Group - Community & Local Government Capacity*

*Those who worked to support this facet of the plan included:*

***Brandon Bowser -*** *Maryland Energy Administration*
***Brandy Espinola -*** *University of Maryland Environmental Finance Center*
***Catie Malone -*** *American Flood Coalition*
***Clyde Drayton -*** *Maryland Department of Planning*
***Dave Guignet -*** *Maryland Dept. of the Environment (former role)*
***Deborah Carpenter -*** *Division of Planning & Permitting*
***Dona Sorce -*** *Maryland Dept. of Housing & Community Development*
***Eileen Singleton -*** *Baltimore Metropolitan Council*
***Elizabeth Stahlman -*** *Tri-County Council for Western Maryland*
***Emily Thorpe -*** *Envision the Choptank*
***Erik Fisher -*** *Critical Area Commission*
***Joe Griffiths -*** *Maryland Department of Planning*

***Katherine Rainone -*** *Metropolitan Washington Council of Governments*
***Kevin Kinnally -*** *Maryland Association of Counties*
***Kim Pezza -*** *Office of the Comptroller*
***Laura Mondragon -*** *Montgomery County Green Bank*
***Marcia Barben -*** *Maryland Dept. of Emergency Management*
***Matt Fleming -*** *Resilience Authority of Annapolis & Anne Arundel County*
***Owen Bailey -*** *Eastern Shore Land Conservancy*
***Ryland Taylor -*** *Maryland Department of Natural Resources*
***Stacey M. Underwood -*** *Silver Jackets (former role)*
***Stacy Schaefer -*** *Resilience Authority of Charles County*
***Tessa Lovro -*** *Maryland Dept. of Emergency Management*
***Tim Lattimer -*** *Office of Community Sustainability, Howard County*
***Will Holman -*** *Open Works Baltimore*

## *Sector Work Group - Critical Infrastructure*

*Those who worked to support this facet of the plan included:*

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**Allison Reilly -** *University of Maryland Center for Risk & Reliability*
**Brandon Bowser -** *Maryland Energy Administration (former role)*
**Bridget Cantwell -** *Maryland Dept. of Emergency Management*
**Chris Krawiec -** *Maryland Department of Information Technology*
**Dave Guignet -** *Maryland Department of the Environment (former role)*
**David McDonough -** *Washington Suburban Sanitary Commission*
**Eileen Singleton -** *Baltimore Metropolitan Council*
**Jeff Henrikson -** *Maryland Mesonet*
**Jennifer Chiasson -** *Maryland Department of Commerce*
**Jon Caudle -** *Maryland Dept. of Emergency Management*
**Lee Edgar -** *County Engineers Association of Maryland*
**Lisa Ochsenhirt -** *Maryland Association of Municipal Wastewater Agencies*
**Marcia Barben -** *Maryland Dept. of Emergency Management*
**Mathew Sanders -** *Pew Charitable Trusts*
**Roger Austin -** *Maryland Public Service Commission*
**Sara Barra -** *Maryland Department of Health*
**Taylor Munir -** *Maryland Dept. of Emergency Management*
**Todd Tracey -** *Maryland Institute for Emergency Medical Services Systems*

## *Sector Work Group - Food Systems*

*Those who worked to support this facet of the plan included:*

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**Anne Wallerstedt -** *Maryland Food Bank*
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**Dr. David Love -** *Johns Hopkins Bloomberg School of Public Health*
**Dr. Virginie Zoumenou -** *University of Maryland Eastern Shore*
**Emily Bauer -** *Maryland Department of Human Services*
**Emma Jagoz -** *Moon Valley Farm*
**Heather Bois Bruskin -** *Montgomery Cty. Office of Food System Resilience*
**Heather Hulsey -** *Southern MD Agricultural Dev. Commission (former role)*
**Joe Milone -** *Maryland Department of Commerce*
**Julia Gross -** *Maryland Hunger Solutions*
**Katie Murphy -** *C & S Wholesale Grocers*
**Kyle Shannon -** *Maryland Department of Health*
**Leslie Sessom Parks -** *Maryland State Department of Education*
**Matthew Scales -** *MDA, Seafood Marketing Advisory Commission*
**Mike Thielke -** *F3 Tech, Eastern Shore Entrepreneur Center*
**Nadya Chehab -** *Maryland Department of Agriculture (MDA)*
**Stacy Kubofcik -** *MD Ag. & Resource-Based Industry Dev. Corp. (MARBIDCO)*
**Steve Ernst -** *Ernst Grain & Livestock*
**Willie Lantz -** *University of Maryland Extension*

## *Sector Work Group - Environment & Natural Systems*

*Those who worked to support this facet of the plan included:*

**Alisha Mulkey -** *Maryland Department of Agriculture*
**Alison Prost -** *Chesapeake Bay Foundation*
**Allison Gost -** *Maryland Department of Transportation*
**Dave Guignet -** *Maryland Department of the Environment (former role)*
**Debbie Herr Cornwell -** *Maryland Department of Planning*
**Fredrika Moser -** *Maryland Sea Grant*
**Gary Allen -** *Maryland Forestry Foundation*
**Gian Tavares -** *American Flood Coalition*
**Humna Sharif -** *The Nature Conservancy*
**Isabel Hardesty -** *Shore Rivers*
**Jim Brown -** *Audubon Mid-Atlantic*
**Josh Smith -** *Western MD Resource Conservation & Dev. Council (former role)*
**Kate Charbonneau -** *Critical Area Commission (former role)*
**Kate Vogel -** *National Wildlife Foundation*
**Katie May Laumann -** *Universty of MD Center for Environmental Sciences*
**Megan Milliken McPherson -** *Chesapeake Bay Funders Network*

**Meghan Conklin -** *Governor's Office*
**Rachel Marks -** *Maryland Department of Natural Resources*
**Tori Tomiczek, Ph.D. -** *United States Naval Academy*
**Wuillam Urvina -** *Choose Clean Water Coalition*

# *Interviews*

*Additional interviews in support of this plan included:*

**Anne Miller -** *Director, Colorado Resiliency Office*
**Ava Richardson -** *Baltimore City Office of Sustainability*
**Elizabeth Andrews -** *University of Virginia*
**Elizabeth Stahlman -** *Tri-County Council for Western Maryland*
**Gian Tavares -** *American Flood Coalition*
**Jennifer Laszlo Mizrahi -** *Mizrahi Family Charitable Fund / MD Climate Commission*
**Julie Reichart-Nguyen -** *National Oceanic & Atmospheric Administration (NOAA), Chesapeake Bay Office*
**Kevin Simmons -** *City of Annapolis*
**Kimberly Zeuli -** *The Feeding Cities Group*
**Kristiane Huber -** *Pew Charitable Trusts*
**Matt Fleming -** *Resilience Authority of Annapolis & Anne Arundel County (RAAAAC)*
**Pastor Phil Hubert -** *Maryland Voluntary Organizations Active in Disaster (VOAD)*
**Preeti Emrick -** *Anne Arundel County Office of Emergency Management / RAAAAC*
**Shayle Saboe -** *Resiliency Program Manager, Colorado Resiliency Office*
**Stacey M. Underwood -** *Silver Jackets (former role)*
**Delegate Dana Stein -** *MD House of Delegates, Environment & Transportation Committee*
**Delegate David Moon -** *MD House of Delegates, House Majority Leader*
**Delegate Marc Korman -** *MD House of Delegates, Environment & Transportation Committee*
**Delegate Regina T. Boyce -** *MD House of Delegates, Environment & Transportation Committee*
**Senator Brian J. Feldman -** *MD Senate, Education, Energy, and the Environment Committee*

**Senator Cheryl C. Kagan -** *MD Senate, Education, Energy, and the Environment Committee*

**Senator Jim Rosapepe -** *MD Senate, Budget and Taxation Committee*

**Senator Katie Fry Hester -** *MD Senate, Education, Energy, and the Environment Committee*

**Senator Malcolm Augustine -** *MD Senate, Education, Energy, and the Environment Committee*

## ** End of Appendix A **

# APPENDIX B:
# AGENCY RESILIENCE LIAISONS

# *Agency Resilience Liaisons*

**Alisha Mulkey -** Manager, Program Planning & Evaluation
**Agency:** Maryland Department of Agriculture

**Alison Gost -** Program Manager - Climate Risk
**Agency:** Maryland Department of Transportation

**Barbara Sigler -** Communications and Marketing Director
**Agency:** Maryland Department of Aging

**Brandon Bowser -** Section Chief, Clean Energy and Resilience
**Agency:** Maryland Energy Administration

**Cecilia Warren -** Director of Emergency Preparedness Policy
**Agency:** Maryland Department of Disabilities

**Chris Krawiec -** Senior Director of Cyber Resilience
**Agency:** Maryland Department of Information Technology

**Clyde Drayton -** Lead Resilience Planner
**Agency:** Maryland Department of Planning

**Deborah Herr Cornwell -** Resource Conservation Planner
**Agency:** Maryland Department of Planning

**Dona Sorce -** Assistant Director, Community Development Programs
**Agency:** Maryland Department of Housing & Community Development

**Geoff Newman -** Assistant Secretary of Finance & Administration
**Agency:** Maryland Higher Education Commission

**Jackie Specht -** Resilient Systems Officer
**Agency:** Maryland Department of Natural Resources

**John Sierakowski**
**Agency:** Maryland Department of Public Safety & Correctional Services

**Joseph Griffiths -** Local Assistance and Planning Manager
**Agency:** Maryland Department of Planning

**Joy Hatchette -** Associate Commissioner, Consumer Education & Advocacy
**Agency:** Maryland Insurance Administration

**Erin Valentine -** Director of Emergency Management
**Agency:** Maryland Department of General Services

**Mark Corbin -** Dir. of Operations, Gen. Services Admin. & Customer Services
**Agency:** Maryland Department of Commerce

**Mike Hinson -** Chief Resilience Officer
**Agency:** Maryland Department of Emergency Management

**Natalie Snider -** Director, Chesapeake and Coastal Services
**Agency:** Maryland Department of Natural Resources

**Rachel Lamb -** Assistant Secretary for Climate Policy & International Affairs
**Agency:** Maryland Department of the Environment

**Rolando Delgado -** Deputy Chief of the Office of Emergency Operations
**Agency:** Maryland Department of Human Services

**Russell Ware -** Director, Cemetery and Memorial Programs
**Agency:** Maryland Department of Veterans & Military Families

**Sara Barra -** Director, Office of Preparedness & Response
**Agency:** Maryland Department of Health

**Stephen Decerbo -** Commander, Special Ops. & Transportation Safety
**Agency:** Maryland Department of State Police

**Zach Carey -** Director of Science
**Agency:** Maryland State Department of Education

# APPENDIX C:
## INVENTORY OF STATE CLIMATE- AND RESILIENCE-RELATED ADVISORY BODIES

# *Inventory of State Climate- and Resilience-Related Advisory Bodies*

### Agency Resilience Liaisons (ARLs)

**Mission:** Formerly the Resilient MD Leadership Council work group, the ARL group provides high-level input and feedback to the Maryland Office of Resilience (MOR) about our major initiatives, including the statewide resilience strategy.

**Lead Agency:** Maryland Office of Resilience **Meeting Frequency:** At least twice per year (aims to meet quarterly)

**Summary of Responsibilities:** Weigh in on big picture items, elevate key pieces to Department Secretaries if/when needed, and maintain cross-agency visibility and coordination. Participants in the leadership group can offer input and help shape key initiatives led by MOR, including the Resilient Maryland Strategy. This group sees early drafts and ideas and offers their commentary.

### Adaptation and Resiliency Working Group (ARWG)

**Mission:** The ARWG supports the MD Commission on Climate Change (MCCC) by developing a comprehensive strategy for reducing climate change vulnerability, providing state and local governments with tools to plan for and adapt to the more extreme weather and rise in sea levels anticipated as a consequence of climate change.

**Lead Agency:** Maryland Department of Natural Resources **Meeting Frequency:** Quarterly

**Summary of Responsibilities:** Recommend adaptation and resilience related actions to be incorporated into the annual MCCC annual report. These actions are intended to guide the state's priorities both legislatively and otherwise.

**Website:** https://mde.maryland.gov/programs/air/climatechange/mccc/pages/arwg.aspx

### Agricultural Advisory Committee (AAC) to Chesapeake Bay Program (CBP)

**Mission:** The AAC focuses on high-level policy issues, ensuring its scope complements, but does not overlap, the technical work conducted by other groups within the CBP partnership. Consisting of farmers, urban farmers, agribusiness representatives, and technical professionals who help farmers fund and implement conservation practices, the AAC is a voice for producers and industry.

**Lead Agency:** Chesapeake Bay Program **Meeting Frequency:** Quarterly

**Summary of Responsibilities:** Advise the Executive Council, Principals' Staff Committee, and Management Board on strategies and opportunities for agricultural operations to more effectively meet the Chesapeake Bay watershed's restoration and conservation goals.

**Website:** https://www.chesapeakebay.net/who/group/agricultural-advisory-committee#members

### Chesapeake and Atlantic Coastal Bays Watershed Council

**Mission:** The council coordinates and accelerates the restoration of the state's waterways with a collective goal to create healthy watersheds that benefit the environment, economy, and communities.

**Lead Agency:** Maryland Department of Natural Resources **Meeting Frequency:** Quarterly

**Summary of Responsibilities:** Provide regular recommendations to the Governor on watershed management. Promote interagency coordination and program integration. Promote equity by connecting healthy watersheds to the overall health of Maryland's environment, economy, and people. Ensure that restoration investments also contribute to climate resiliency. Develop strategies to manage the environmental impact of population growth on Bay restoration. Develop and oversee environmental, cultural, and natural resources infrastructure, seeking innovative partnerships and funding. Solicit input from Maryland citizens and stakeholders with a focus on underserved and overburdened communities.

**Website:** https://governor.maryland.gov/Lists/ExecutiveOrders/Attachments/15/EO_01.01.2023.11_accessible_7-21-23.pdf

### CBP Principals' Staff Committee

**Mission:** The Principals' Staff Committee works on behalf of the Chesapeake Executive Council to translate their vision into policy and action.

**Lead Agency:** Chesapeake Bay Program **Meeting Frequency:** Monthly/Bi-Monthly

**Summary of Responsibilities:** Accept items for Executive Council consideration and approval, set agendas for Executive Council meetings, provide briefings to the signatories of the Chesapeake Bay Watershed Agreement, and provide policy and program direction to the Management Board.

**Website:** https://www.chesapeakebay.net/who/group/principals-staff-committee

### Climate Subcabinet

**Mission:** Created by Executive Order in June of 2024, the Subcabinet was formed to address climate change and coordinate State agency efforts to reduce greenhouse gas emissions, in accordance with Maryland's Climate Pollution Reduction Plan.

**Lead Agency:** Maryland Department of the Environment **Meeting Frequency:** Quarterly

**Summary of Responsibilities:** Pursue federal funding opportunities for State climate programs and ensure application of the federal Justice40 Initiative through federal funds. To flow to disadvantaged communities, the Justice40 Initiative directs 40 percent of the overall benefits of certain federal investments. Opportunities include investments in clean energy and energy efficiency; clean transit; affordable and sustainable housing; training and workforce development; remediation and reduction of legacy pollution; and development of clean water infrastructure.

**Website:** https://msa.maryland.gov/msa/mdmanual/08conoff/cabinet/html/climate.html

### CoastSmart Council

**Mission:** The CoastSmart initiative is dedicated to assisting Maryland's coastal communities address short- and long-term coastal hazards. The Council adopts CoastSmart siting and design criteria that address impacts of sea level rise and coastal flooding on future capital projects.

**Lead Agency:** Maryland Department of Natural Resources **Meeting Frequency:** Quarterly

**Summary of Responsibilities:** Refine the CoastSmart Construction Program, which includes guidelines and other directives applicable to the planning and construction of proposed capital projects to anticipate and avoid sea level rise and coastal flood impacts. The program currently applies to state and local capital projects that meet the minimum funding and structural standards triggering a CoastSmart review. Recommend regulations for adoption.

**Website:** https://dnr.maryland.gov/climateresilience/pages/cs_council.aspx

### Commission on Environmental Justice & Sustainable Communities (CEJSC)

**Mission:** The CEJSC is a twenty member body that is tasked with advising State government on environmental justice and analyzing the effectiveness of State and local government laws and policies to address issues of environmental justice (EJ) and sustainable communities.

**Lead Agency:** Maryland Department of Planning

**Summary of Responsibilities:** Advise State government agencies on EJ and analyze the effectiveness of State and local government laws and policies to address issues of EJ and sustainable communities. Develop criteria to assess what communities in MD may be experiencing EJ issues. Recommend options for addressing EJ issues to the Governor and the General Assembly; include prioritized areas of the State that need immediate attention.

**Website:** https://planning.maryland.gov/Pages/OurWork/CommissionEnvJustice.aspx

### Comptroller's Climate Advisory Council

**Mission:** Climate Advisory Council is charged with helping the Office of the Comptroller to position Maryland as a national leader on climate resilience and sustainability.

**Lead Agency:** Comptroller of Maryland

**Summary of Responsibilities:** Provide advice about strategies for Maryland to increase consideration of climate change and sustainability in state procurement, to assess and reflect the true cost of climate change to Maryland, and to best align the state's economic and fiscal policies with climate change considerations. The council will include subject matter experts, professionals, and advocates in the climate, sustainability, environmental justice, and resilience fields.

**Website:** https://www.marylandcomptroller.gov/about/get-involved/work-groups.html

### Critical Area Commission for the Chesapeake and Atlantic Coastal Bays

**Mission:** The Critical Area Commission meets to formally consider State and local development projects in the Critical Area, local Critical Area Program changes, regulatory updates and other items of business.

**Lead Agency:** Maryland Department of Natural Resources **Meeting Frequency:** Every 6 weeks

**Summary of Responsibilities:** Provide oversight to the local critical area management programs which are administered by the 64 local governments whose jurisdictions are partially or entirely within the Critical Area. Develop regulations and guidance to address development in the Critical Area. Review projects proposed by state and federal agencies as well as local governments to assure consistency with the Critical Area law and regulations. Provide technical assistance and education to local governments, state agencies, and the general public regarding the Critical Area program.

**Website:** https://dnr.maryland.gov/criticalarea/Pages/Commission.aspx#roles

### Statewide Digital Infrastructure Group (DIG)

**Mission:** The Maryland Digital Infrastructure Group (DIG) was established through an Executive Order to enhance collaboration among Maryland state, county, and local entities, ensuring a strategic approach to broadband expansion and digital connectivity.

**Lead Agency:** Maryland Department of Information Technology

**Summary of Responsibilities:** Eliminate silos and reduce financial inefficiencies in broadband expansion, ensure best management practices for state resources and assets, develop Maryland's first unified "Single View" GIS platform to display public sector broadband assets for proactive planning, and identify opportunities for public-private partnerships.

**Website:** https://doit.maryland.gov/About-DoIT/Boards-Committees-Commissions/Pages/Maryland-Digital-Infrastructure-Group.aspx

### Energy Resilience and Efficiency Working Group

**Mission:** The Energy Resilience and Efficiency Working Group is primarily composed of representatives of electric energy companies. Members will focus on energy infrastructure improvements, transmission efficiency, and battery backups.

**Lead Agency:** Maryland Department of the Environment **Meeting Frequency:** Monthly

**Summary of Responsibilities:** Advise the commission on issues and opportunities related to energy infrastructure improvements, transmission efficiency improvement, and battery backup viability. Conduct a study to examine state-level methods to boost electricity storage research and grid security. This includes finding ways to support distributed renewable energy projects and energy storage so they can power critical facilities during major outages. It also aims to explore potential electric grid transformation projects, the viability of developing clean energy on previously used project sites, and the lifespan of non-greenhouse gas-emitting energy facilities in the state.

**Website:** https://mde.maryland.gov/programs/air/ClimateChange/MCCC/Pages/EREWG.aspx

### Governor's Emergency Management Advisory Council (GEMAC)

**Mission:** The GEMAC is created by statute and is charged with advising the Governor on all matters that relate to emergency management in Maryland.

**Lead Agency:** Maryland Department of Emergency Management **Meeting Frequency:** Quarterly

**Summary of Responsibilities:** The GEMAC serves as an independent advisory body, comprised of subject matter experts from a wide range of disciplines, backgrounds, and geographic areas, including local emergency responders and individuals broadly representative of business interests, public utilities, and other communities throughout Maryland.

**Website:** https://mdem.maryland.gov/pages/gemac.aspx

### Governor's Interagency Commission on Agriculture (GICA)

**Mission:** The Commission shall work to promote the economic profitability of agriculture in the State by ensuring that all appropriate State agencies work in a cooperative, coordinated manner with local government and industry groups in planning, implementing, overseeing and evaluating intergovernmental initiatives related to agricultural affairs of the State.

**Lead Agency:** Maryland Department of Agriculture **Meeting Frequency:** Semiannually

**Summary of Responsibilities:** Promote a clear and consistent business-friendly climate for agriculture in the State by serving as a liaison between the Governor and local governments and industry organizations. Develop an annual, coordinated intergovernmental plan for services and functions dealing with the agricultural affairs of the State. Develop procedures for identifying and assessing agricultural developments with a potential for impact on the State and on local governments. Make recommendations for programs and policies, if appropriate, in order to ensure that the needs and goals of the State's agricultural strategy are met and accomplished. Undertake the establishment of an "agricultural affairs information center" that serves as the first point of contact regarding agricultural issues impacting farmers in the State.

**Website:** https://mda.maryland.gov/about_mda/pages/gica.aspx

### Grid Resiliency Task Force

**Mission:** The mission of the Grid Resiliency Task Force is to solicit input and recommendations from experts on how to improve the resiliency and reliability of the Maryland electric distribution system.

**Lead Agency:** Maryland Energy Administration

**Summary of Responsibilities:** Evaluate the effectiveness & feasibility of undergrounding supply and distribution lines, other options for infrastructure investments to improve resiliency of the grid and options for financing and cost recovery for capital investment. Develop a report with a set of specific technology, infrastructure, regulatory, & process recommendations to improve the resiliency of Maryland's distribution grid.

**Website:** https://energy.maryland.gov/pages/gridresiliencytf.aspx

### MARBIDCO Monday

**Mission:** Maryland Agricultural and Resource-Based Industry Development Corporation (MARBIDCO) Monday allows attendees to network, share programmatic updates, and to discuss new ideas that relate to assisting Maryland's farm, forestry, and seafood businesses.

**Lead Agency:** MARBIDCO **Meeting Frequency:** Quarterly

**Summary of Responsibilities:** Support the sustainability of the state's agricultural, forestry, and seafood businesses, most of which are family-run enterprises. Help to ensure the viability of the rural working landscape that Marylanders so greatly cherish. Help sustain a safe and healthy local food supply, clean air and water, thriving rural communities, and productive pastoral scenic vistas for future generations.

**Website:** https://www.marbidco.org/

### Maryland Agricultural Commission (MAC)

**Mission:** Formulate and make proposals for the advancement of Maryland agriculture by serving as an advisory body to the Secretary on matters pertaining to agriculture.

**Lead Agency:** Maryland Department of Agriculture **Meeting Frequency:** Bi-monthly

**Summary of Responsibilities:** Serve as an advisory body to the secretary and deputy secretary of agriculture. Encourage the agricultural community to be more pro-active on issues affecting agriculture and rural life. Evaluate farm/agriculture industry labor and regulations. Increase public awareness of food safety. Support the department's efforts to promote agriculture.

**Website:** https://mda.maryland.gov/about_mda/pages/md-ag-commission.aspx

### Maryland Clean Energy Center (MCEC) Advisory Council

**Mission:** The Maryland Clean Energy Center is a corporate instrumentality of the state, which serves as Maryland's green bank. The MCEC Advisory Council assists in developing strategic objectives for the MCEC, advises the Executive Director, and informs the Board of Directors.

**Lead Agency:** Maryland Clean Energy Center **Meeting Frequency:** Annually

**Summary of Responsibilities:** Guide the Maryland Clean Energy Center by advising the Executive Director and Board of Directors. Help set strategic goals, review policies, build key relationships, and raise awareness of our mission. Identify and remove barriers in the energy sector, driving progress toward a cleaner, more sustainable future.

**Website:** https://www.mdcleanenergy.org/about/advisory-council/roles-responsibilities-and-committee-charges/?_gl=1*lkg06m*_ga*MjE0MTUwMzMwNi4xNzU5Nzc0MDQy*_ga_WN5HY36VYH*czE3NjA2NDUzNzYkbzQkZzEkdDE3NjA2NDU0NDgkajYwJGwwJGgw

### Maryland Commission on Climate Change (MCCC)

**Mission:** MCCC is charged with advising the Governor and General Assembly on ways to mitigate the causes of, prepare for, and adapt to the consequences of climate change.

**Lead Agency:** Maryland Department of the Environment **Meeting Frequency:** Quarterly

**Summary of Responsibilities:** Represent various groups in advising the Governor and General Assembly. Produce several new reports and create four additional working groups, which add an extensive list of required representatives.

**Website:** https://mde.maryland.gov/programs/air/ClimateChange/MCCC/Pages/index.aspx

### Maryland Commission on Disabilities (MCOD)

**Mission:** MCOD serves as the advisory body for the Maryland Department of Disabilities, which is charged with unifying and improving the delivery of services to people with disabilities.

**Lead Agency:** Maryland Department of Disabilities **Meeting Frequency:** Quarterly

**Summary of Responsibilities:** MCOD plays an instrumental role in the development of the State Disabilities Plan, a comprehensive multi-year strategic plan that sets performance goals for all agencies in Maryland which serve people with disabilities. The Commission includes 19 members appointed by the Governor and representatives from the Maryland Senate and House of Delegates.

**Website:** https://mdod.maryland.gov/mcod/Pages/MCOD-Home.aspx

### Maryland Cybersecurity Coordinating Council

**Mission:** To advise on and oversee a consistent cybersecurity strategy for Maryland State government agencies and institutions under the higher education governing board.

**Lead Agency:** Maryland Department of Information Technology **Meeting Frequency:** Quarterly

**Summary of Responsibilities:** Advise and consult with the Legislative and Judicial branches of State government to improve the state's cybersecurity strategy. In consultation with the Attorney General, MCC develop guidance for consistent cybersecurity strategies for counties, municipal corporations, school systems, and all other political subdivisions of the State. Advise the State Chief Information Security Officer regarding the strategy and implementation of cybersecurity initiatives and recommendations. Provide advice and recommendations for building and sustaining the State's capability to identify, mitigate, and detect cybersecurity risk and how to respond to and recover from cybersecurity-related incidents.

**Website:** https://doit.maryland.gov/About-DoIT/Boards-Committees-Commissions/Pages/Maryland-Cybersecurity-Coordinating-Council.aspx

### Maryland Cybersecurity Council (MCC)

**Mission:** The commission was charged with conducting an overview of federal and state cybersecurity laws and policies. It considered Maryland's role in promoting cyber innovation and recommended strategies for cybersecurity innovation and excellence, including recovery from cyber attack.

**Lead Agency:** University of Maryland Global Campus (UMGC)

**Meeting Frequency:** Quarterly

**Summary of Responsibilities:** The MCC works with the National Institute of Standards and Technology and other federal agencies, private sector businesses, and private cybersecurity experts to assess cyber attack risk, identify categories of damage, assist infrastructure to comply with federal cybersecurity guidance, examine inconsistencies, recommend a State strategic plan, and recommend legislative changes.

**Website:** https://www.umgc.edu/administration/leadership-and-governance/boards-and-committees/maryland-cybersecurity-council

### Maryland Food Systems Resiliency Council (FSRC)

**Mission:** Established by Maryland H.B. 831/S.B. 723, the FSRC is a formally appointed body that meets regularly to spearhead a multiagency, collaborative initiative: engaging experts in food resiliency across Maryland in better addressing food insecurity and food resilience issues across the state.

**Lead Agency:** Maryland Department of Emergency Management

**Summary of Responsibilities:** Address the food insecurity crisis in the State of Maryland resulting from the COVID-19 pandemic and resulting economic crisis. Develop equity and sustainability policy recommendations to increase the long-term resiliency of the food system. Expand the impact of existing food council stakeholder organizations. Develop a strategic plan to increase the production and procurement of Maryland certified food.

**Website:** https://mdem.maryland.gov/pages/food-resilience.aspx

### Maryland Resiliency Partnership

**Mission:** The Maryland Resiliency Partnership is an informal collaboration of public and private partners to leverage funding, personnel, and projects to support efforts that integrate hazard mitigation, floodplain management, and coastal and climate resilience.

**Lead Agency:** Rotating Lead Agencies

**Meeting Frequency:** Quarterly

**Summary of Responsibilities:** The Maryland Resiliency Partnership leverages funding, personnel, and projects among member agencies, integrates floodplain management, hazard mitigation, and coastal resiliency efforts, conducts outreach workshops, and provides information on grant programs and mitigation best practices.

**Website:** https://md-resiliency-partnership-maryland.hub.arcgis.com/pages/about

### Maryland Urban and Community Forest Committee (MUCFC)

**Mission:** The Maryland Forest Service administers the MUCFC to promote the health, growth, and sustainability of urban and community forests throughout the state. MUCFC serves as a coordinating body for programs that support tree planting, forest education, and public recognition of community forestry efforts.

**Lead Agency:** Forest Service, Maryland Department of Natural Resources

**Summary of Responsibilities:** Award grants for tree planting and forest education projects on public lands such as parks, school campuses, and streetscapes. In partnership with the Maryland Department of Transportation (MDOT), provide reforestation grants to support tree replanting in areas where canopy was lost due to transportation infrastructure projects. Eligible areas include communities impacted by the Purple Line construction, urban heat islands, or environmental justice concerns. Managing the PLANT Award Program for communities that demonstrate exceptional tree care and stewardship.

**Website:** https://dnr.maryland.gov/forests/pages/programs/urban/mcfc.aspx

### Maryland Zero-Emission Electric Vehicle Infrastructure Council (ZEEVIC)

**Mission:** The ZEEVIC priorities includes installing more Electric Vehicle Supply Equipment (EVSE) and ensuring EV readiness through strategic infrastructure planning, maximizing the use of grant and alternative funding opportunities for EV/EVSE in Maryland, and continuing ZEV education and outreach with a focus on diversity and equity.

**Lead Agency:** Maryland Department of Transportation

**Meeting Frequency:** Monthly

**Summary of Responsibilities:** Develop policies, recommendations, and incentives that increase awareness of ZEVs, support the ownership of ZEVs, and promote investment by the private sector in ZEVs. Develop recommendations for a statewide EV charging and hydrogen refueling infrastructure plan. Develop other potential policies to promote and facilitate the successful integration of ZEVs into Maryland's transportation network.

**Website:** https://www.mdot.maryland.gov/tso/pages/Index.aspx?PageId=81

### MDOT Resiliency Task Force

**Mission:** The Resiliency Task Force functions as a community of practice dedicated to enhancing resilience, performance, and collaboration within and between the modal administrations. The Resiliency Task Force supports MDOT's ongoing resilience improvement program.

**Lead Agency:** Maryland Department of Transportation

**Meeting Frequency:** Monthly

**Summary of Responsibilities:** Support MDOT's ongoing resilience improvement program by providing a structured platform for identifying efficiencies, interdependencies, documenting vulnerability, and identifying resource gaps. Recommend strategies and projects for improving resilience and promote enhanced collaboration to facilitate quicker implementation of resilience measures.

**Website:** https://www.mdot.maryland.gov/OPCP/MDOT_TRIP_Report_2024_Final.pdf

### Food and Agriculture Regional Member (FARM) Policy Committee

**Mission:** The mission is to support the development of a resilient, secure, equitable, and connected food and farm economy across the metropolitan Washington region.

**Lead Agency:** Metropolitan Washington Council of Governments

**Summary of Responsibilities:** Advocate for policy changes such as in the federal Farm Bill, develop strategic plans, work programs, and budgets for regional food system initiatives, and address or discuss food security and healthy food access issues.

**Website:** https://www.mwcog.org/committees/food-and-agriculture-regional-member-policy-committee-farm-/

### Military Installation Resilience Review (MIRR)

**Mission:** The MIRR's goal is to work on the Resilient MD Defense Communities project. This project will engage Maryland's local, state, military, and other stakeholders to develop a framework that outlines how stakeholders can collaborate on preserving military assets off base through the lens of "one community" to address shared resilience challenges.

**Lead Agency:** Maryland Department of Commerce **Meeting Frequency:** Bi-weekly

**Summary of Responsibilities:** Facilitate cooperative strategic planning among military installations, local communities, and state agencies. Identify resilience challenges such as coastal flooding, aging infrastructure, lack of affordable off-base housing units for military personnel, and transit safety issues threatening the readiness and emergency response capabilities. Develop recommendations and implementation plans to enhance military installation resilience.

**Website:** https://commerce.maryland.gov/media/federal-funding-supports-military-installation-resilience-in-maryland

### Outdoor Learning Partnership (OLP)

**Mission:** OLP is tasked with empowering all of Maryland's youth to grow as environmental stewards that access, conserve, and restore our natural resources to ensure a climate-ready Maryland.

**Lead Agency:** Maryland State Department of Education **Meeting Frequency:** Bi-monthly

**Summary of Responsibilities:** Conduct a review of current environmental and climate change education efforts in Maryland. Foster collaboration, coordinate resources, and deliver equitable recommendations to decision makers. Engage with networks to ensure that environmental education is equitably implemented and sustainably funded across Maryland. Support state leadership in the implementation and tracking of relevant Chesapeake Bay Program priorities. Report to and advise the Governor on the status of the Partnership's work.

**Website:** https://marylandpublicschools.org/programs/Pages/Environmental-Education/Outdoor-Learning-Partnership.aspx

### Public Conference 44 (PC44)

**Mission:** With a goal of ensuring that Maryland's electric grid is customer-centered, affordable, reliable and environmentally sustainable, the Public Service Commission (PSC) initiated Public Conference 44 (PC44) to launch a targeted review of electric distribution systems in Maryland.

**Lead Agency:** Public Service Commission

**Summary of Responsibilities:** Explore issues that will maximize benefits and choice to Maryland electric customers and, in particular, assess how the evolving electric grid impacts low- and moderate-income ratepayers. Establish guiding principles and amend topics to better align with possible long-term outcomes.

**Website:** https://www.psc.state.md.us/transforming-marylands-electric-grid-pc44/#

### Resilient MD Executive Stakeholders

**Mission:** The Resilient MD Executive Stakeholders work group provides high-level direction to key resilience initiatives as laid out in the work plan. They will review the previous year's work plan and approve direction for the following year.

**Lead Agency:** Maryland Office of Resilience

**Meeting Frequency:** Annually

**Summary of Responsibilities:** Secretaries or Executive Stakeholders from key resilience-related state agencies and the Governor's office will be in attendance and responsible for decisions made in the meeting.

### Resilient MD Operations & Planning

**Mission:** The Resilient MD Operations & Planning work group meets monthly and provides input and feedback to the MOR about our major initiatives, including the statewide resilience strategy. Convened by MOR.

**Lead Agency:** Maryland Office of Resilience

**Meeting Frequency:** Monthly

**Summary of Responsibilities:** This group will have the opportunity to share data, give input, and work hand-in-hand with MOR on its projects. Because the RMOP will meet on a monthly basis, its participants will be looped into MOR's drafting process and will help ground the work in the needs and realities of communities.

### Rural Legacy Board and Rural Legacy Advisory Committee

**Mission:** The purpose of the Rural Legacy Program is to preserve large, contiguous tracts of land and to enhance natural resource, agricultural, forestry and environmental protection while supporting a sustainable land base for natural resource based industries. The Board and Advisory Committee make recommendations on grant funding to protect working farms and forests throughout the state.

**Lead Agency:** Maryland Department of Natural Resources **Meeting Frequency:** Annually

**Summary of Responsibilities:** Oversee the administration of the Rural Legacy Program with assistance and advice from the Rural Legacy Advisory Committee. Annually recommend Rural Legacy Area designations and recommends annual grant award allocations to the Board of Public Works for approval. Review the annual Rural Legacy Sponsor applications in a fair and consistent manner and make recommendations for funding to the Rural Legacy Board.

**Website:** https://dnr.maryland.gov/land/Pages/RuralLegacy/Rural-Legacy-Board.aspx

### Soil Health Advisory Committee (SHAC)

**Mission:** The SHAC is charged with providing any recommendations to MDA for the continued development of the Maryland Healthy Soils Program, including activities and potential incentives necessary to increase the adoption of health soils practices.

**Lead Agency:** Maryland Department of Agriculture

**Summary of Responsibilities:** Provide recommendations for the development and implementation of the Healthy Soils Program, including identifying activities and potential incentives to increase the adoption of healthy soil practices by farmers. Evaluate and prioritize the specific conservation practices to be included in the program. Make recommendations to help improve the health, yield, and profitability of state soils, increase biological activity and carbon sequestration, and promote education on healthy soil practices.

**Website:** https://mda.maryland.gov/resource_conservation/counties/Final_SHACReport-%20Accessible.pdf

### State Agency Saltwater Intrusion Team

**Mission:** An informal workgroup composed of multiple Maryland state agencies and subject matter experts, which was convened by the MDP to address the complex problem of saltwater intrusion and salinization in the state.

**Lead Agency:** Maryland Department of Planning

**Summary of Responsibilities:** Develop and update Maryland's Plan to Adapt to Saltwater Intrusion and Salinization. Implementation of this plan, including assessments of vulnerability, monitoring of environmental change, the development of forecasting tools, and adoption of effective adaptation measures, is essential to minimize the economic, social, and environmental disruption to Maryland’s economy, coastal communities, and ecological health.

**Website:** https://planning.maryland.gov/Documents/OurWork/RRP/envr-planning/Marylands-plan-to-adapt-to-saltwater-intrusion-and-salinization.pdf

### State Soil Conservation Committee (SSCC)

**Mission:** To provide leadership statewide, guide and direct the Maryland Department of Agriculture and coordinate among represented

agencies and others in matters related to soil conservation and water quality policy and program development to ensure environmental goals are met with programs that are economically, technically and socially feasible.

**Lead Agency:** Maryland Department of Agriculture

**Summary of Responsibilities:** Adopt regulations, manage and dispose of federal grants, provide funds and staff to Soil Conservation Districts (SCD), advise SCDs and MDA, and provide information and education. Make recommendations to MDA on programs and policies related to soil conservation and water quality, provide information, and facilitate interchange and coordination among a network of local, state, and federal agencies.

**Website:** https://mda.maryland.gov/about_mda/pages/md-soil-conservation-committee.aspx

### Sustainable Forestry Council

**Mission:** The Sustainable Forestry Council advises the Department of Natural Resources on timely forest conservation issues and appropriate actions to help Maryland implement a no net loss of forest policy (as of 2023, now a "net gain" policy).

**Lead Agency:** Maryland Department of Natural Resources

**Summary of Responsibilities:** Advise the Department on all matters related to sustainable forestry management in the State, the expenditure of funds from the Woodland Incentive Fund, existing regulatory and statutory policies that are perceived as economic barriers to a viable forest products industry, new markets to enhance forest health, including renewable energy development through biomass energy, to offset fossil fuel consumption and reduce greenhouse gas emissions, creative strategies to help privately owned forest lands better compete with real estate market values that are driving forest conversion and fragmentation, the means to promote forest-based economies and processing capability that contribute to economic and employment growth, and assigning a nutrient benefit to forest stewardship plans and other forest conservation management plans.

**Website:** https://dnr.maryland.gov/forests/pages/sfcouncil.aspx

### Sustainable Growth Principles - Technical Advisory Group (TAG) for Resilience

**Mission:** MDP serves as the leads and technical advisors for this work. The TAG group effort will develop an implementation guide for planners to identify and incorporate resilience best practices themselves.

**Lead Agency:** Maryland Department of Planning **Meeting Frequency:** Bi-weekly

**Summary of Responsibilities:** Develop guidance and metrics for measuring the proposed eight (8) sustainable growth principles, including Resilience. The intent of the TAG is to promote the integration of resilience measures which minimize the impacts of rapid and unexpected natural- and human-caused threats on communities.

### Sustainable Growth Subcabinet

**Mission:** This subcabinet advances sustainable growth and development practices. Monthly meetings.

**Lead Agency:** Maryland Department of Planning **Meeting Frequency:** Monthly

**Summary of Responsibilities:** The Subcabinet helped implement the state's Smart Growth Policy, making recommended changes in state law, regulations, and procedures to the governor needed to support the policy. The Sustainable Growth cabinet continues this implementation effort and work to create, enhance, support, and revitalize sustainable communities across Maryland.

**Website:** https://planning.maryland.gov/Pages/OurEngagement/SGSubcabinet/smart-growth-subcabinet.aspx

### Urban Agriculture Advisory Committee

**Mission:** The purpose of this initiative is to increase the viability of urban farming and improve access to urban grown foods.

**Lead Agency:** Maryland Department of Agriculture

**Summary of Responsibilities:** The advisory committee focused on MDA's Urban Agriculture program. Tasked with recommending guidelines, policies, and practices for the implementation of the Urban Agriculture Grant grant program.

**Website:** https://news.maryland.gov/mda/press-release/2023/10/16/maryland-department-of-agriculture-seeks-urban-agriculture-grant-advisory-committee-members/

### US Army Corps of Engineers (USACE) Silver Jackets

**Mission:** Silver Jackets teams are collaborative state-led interagency teams, continuously working together to reduce flood risk at the state level. Through the Silver Jackets program, the USACE, FEMA, additional federal, state and sometimes local and Tribal agencies provide a unified approach to addressing a state's priorities.

**Lead Agency:** U.S. Army Corp of Engineers

**Summary of Responsibilities:** Facilitate strategic life-cycle flood risk reduction. Create or supplement a continuous mechanism to collaboratively solve state-prioritized issues and implement or recommend those solutions. Improve processes, identifying and resolving gaps and counteractive programs. Leverage and optimize resources. Improve and increase flood risk communication and present a unified interagency message. Establish close relationships to facilitate integrated post-disaster recovery solutions.

**Website:** https://www.sac.usace.army.mil/Portals/43/docs/partnering%20opportunities/CW%20Silver%20Jackets%20Program.pdf?ver=Vkr6hoKGMrzNciIgr5vGeQ%3D%3D

### Whole Watershed State Management Team

**Mission:** This group implements the Whole Watershed Act. Its intent is to foster innovative and collaborative approaches to watershed restoration.

**Lead Agency:** Maryland Department of Natural Resources **Meeting Frequency:** Bi-weekly

**Summary of Responsibilities:** The management team selects the five watersheds for the pilot program, provides technical and financial assistance to program sponsors, helps develop implementation and finance plans for restoration projects, works to find efficiencies in project permitting and funding, and measures project results and supports monitoring.

**Website:** https://dnr.maryland.gov/Pages/whole-watershed-fund.aspx

## ** End of Appendix C **

# APPENDIX D:
# FLOOD RISK ASSESSMENT TOOLS

# *Flood Risk Assessment Tools*

## MD Floodmaps

**Owner:** Maryland Department of the Environment (MDE)

**Used For:** Flood risk

**Brief Description:** The State of Maryland, in conjunction with the Federal Emergency Management Agency (FEMA), has been systematically updating Flood Insurance Rate Maps for communities over the past several years. This site is designed to guide homeowners/renters as well as communities through the process of determining their current flood risk as well as future flood risk based on the preliminary Digital Flood Insurance Rate Maps.

## Coast Smart Climate Ready Action Boundary (CRAB)

**Owner:** Maryland Department of the Environment (MDE)

**Used For:** Flood risk, planning

**Brief Description:** Maryland Coast Smart CRAB Coastal Flood Depth Grid consists of a grid image service depicting the CRAB for coastal areas throughout the State of Maryland. Certain State Agency construction projects and local projects that will be using State funding will be required to address the impacts of the higher and wider coastal floodplain as defined in the CRAB.

## Flood Factor

**Owner:** First Street

**Used For:** Flood risk, preparedness, outreach

**Brief Description:** Past floods, current risks, and future projections based on peer-reviewed research. For informational purposes only; the Flood Factor model is designed to approximate flood risk and not intended to include all possible risks or mitigations of floods.

## MyCoast (Maryland)

**Owner:** National Oceanic & Atmospheric Administration (NOAA) & Maryland Department of Natural Resources

**Used For:** Flood risk, planning

**Brief Description:** MyCoast: Maryland allows you to communicate flooding and storm damage in your community. It is a portal to collect and analyze photos which are linked to precipitation, riverine, and tidal data to create reports that help government agencies, business owners, and residents understand impacts in your community and encourage action to reduce localized flooding.

## Coastal Flood Exposure Mapper

**Owner:** National Oceanic & Atmospheric Administration (NOAA)

**Used For:** Coastal flood risk, planning

**Brief Description:** Interactive mapping tool to start community discussion about hazard impacts with maps of your area that show people, places, and natural resources exposed to coastal flooding.

### Surging Seas

**Owner:** Climate Central

**Used For:** Flood risk, planning, outreach

**Brief Description:** A collection of maps and tools that demonstrate the effects of sea level rise and the associated increased flood risk.

### Watershed Resources Registry (WRR)

**Owner:** Multiple federal and state agencies

**Used For:** Planning, NPEA compliance

**Brief Description:** WRRs are state-specific preservation and restoration models displayed on an interactive online mapping tool that also features a large number of high-quality datasets for regulatory and other environmental planning goals.

### FEMA Mobile App

**Owner:** Federal Emergency Management Agency (FEMA)

**Used For:** Preparedness

**Brief Description:** FEMA's Mobile app (available in English and Spanish) allows you to receive real-time weather alerts, locate emergency shelters in your area, prepare for common hazards, and more.

### iMap

**Owner:** Maryland Department of Information Technology

**Used For:** Statewide data

**Brief Description:** MD iMAP is Maryland's Enterprise Geographic Information System (GIS). The platform includes core infrastructure, access to GIS software, and delivery of authoritative data and services to support the GIS community. The platform was created to improve the quality and lower the cost of government services through collective investment in and effective application of geospatial data and systems and to reach beyond government by making data freely and publicly available to the fullest extent possible in consideration of privacy and security.

### Know Your Zone

**Owner:** Maryland Department of Emergency Management

**Used For:** Statewide data, flood risk, hurricane risk

**Brief Description:** The Know Your Zone GIS application is an interactive map that MD citizens can use to determine their storm evacuation zone based on their address. The application can help MD citizens determine the best evacuation route in the event of a storm or flood event.

## Maryland Coastal Atlas

**Owner:** Maryland Department of Natural Resources

**Used For:** Coastal data

**Brief Description:** The Coastal Atlas is a mapping tool that allows state and local decision-makers to visually analyze and explore coastal and ocean data layers for project and planning purposes. Using the built-in tools, the user can query, map, and analyze spatial data to better understand Maryland's marine resources. The map layers include everything from recreational use and species habitat areas, to shoreline erosion rates and sea level rise vulnerability.

## Climate Change Vulnerability Viewer (CCVV)

**Owner:** State Highway Administration (SHA), Maryland Department of Transportation (MDOT)

**Used For:** Flood risk, planning

**Brief Description:** The MDOT SHA CCVV is a web application that showcases a variety of climate related data layers and infrastructure to view, interpret, and utilize for analysis related to climate change, extreme weather, and transportation. The purpose of the CCVV is to support internal and external transportation professionals throughout Maryland in utilizing data to mitigate against, avert, and adapt to potential impacts of climate change related hazards.

## Sea Level Rise and Historic Properties App

**Owner:** Maryland Department of Planning (MDP) and Maryland Historical Trust (MHT)

**Used For:** Coastal flood risk, historic places, historic properties

**Brief Description:** The app allows users to explore the impact continued sea level rise will have on historic landmarks in Maryland. The coastal areas of the Chesapeake contain a high concentration of vulnerable historic architecture and archeological sites. The Lower Eastern Shore is particularly threatened.

## Medusa

**Owner:** Maryland Historical Trust (MHT)

**Used For:** Architectural and archaeological sites

**Brief Description:** Medusa is MHT’s online database of architectural and archaeological sites and standing structures. The database includes records for the National Register of Historic Places (NRHP) properties in Maryland, determinations of eligibility (DOE) records, and records for properties in the Maryland Historic Preservation Easement program.

## Maryland Park Equity Mapper

**Owner:** Maryland Department of Natural Resources

**Used For:** Planning

**Brief Description:** This Park Equity Mapper is a decision-support tool to determine which communities that are in need of park space and those that may be underserved or underutilized by existing park space.

## Mid-Atlantic Regional Integrated Sciences and Assessments (MARISA)

**Owner:** National Oceanic & Atmospheric Administration (NOAA)

**Used For:** Planning

**Brief Description:** MARISA focuses on building more resilient Chesapeake Bay and Mid-Atlantic communities through improved understanding of and response to climate variability and change. The website serves as a medium of information regarding MARISA's ongoing stakeholder interactions and dataset creations.

## Watershed Mapping and Assessment

**Owner:** Maryland Department of the Environment

**Used For:** Flood risk

**Brief Description:** The map is a GIS web application developed to help understand where flooding has occurred in the past and recognize where watershed studies are needed.

## Precipitation Frequency Data Server (PFDS)

**Owner:** National Oceanic & Atmospheric Administration (NOAA)

**Used For:** Flood risk

**Brief Description:** PFDS is a point-and-click interface developed to deliver NOAA Atlas 14 precipitation frequency estimates and associated information. Upon clicking a state on the map above or selecting a state name from the drop-down menu, an interactive map of that state will be displayed. From there, a user can identify a location for which precipitation frequency estimates are needed. Links to supplementary information (ASCII grids of estimates, associated temporal distributions of heavy rainfall, time series data at observation sites, cartographic maps, etc.) can also be found.

## Coastal Risk Screening Tool

**Owner:** Climate Central

**Used For:** Flood risk, planning

**Brief Description:** The Coastal Risk Screening Tool is an interactive map showing areas threatened by sea level rise and coastal flooding. The map combines the most advanced global model of coastal elevations with the latest projections for future flood levels. View areas at risk through filters including water level, affordable housing, temperature, and more.

### Maryland Flood Explorer

**Owner:** Maryland Department of Natural Resources

**Used For:** Flood risk, planning, outreach

**Brief Description:** The Maryland Coastal Flood Explorer is a valuable tool for visualizing predicted flood levels in Maryland's coastal zone. This explorer presents higher resolution predicted, historic, and current flood depths created from locally collected LiDAR-derived elevation data. The goal of developing this tool is to help coastal decision makers at the state and local level understand current conditions and future vulnerability to flooding and serve as a basis for short, mid, and long term planning.

### Climate Data and Tools

**Owner:** Maryland Department of Natural Resources

**Used For:** Flood risk, planning, outreach

**Brief Description:** The DNR Climate Data and Tools website is a categorized hub of climate data and tools that can be used to support coastal resilience, environmental resilience, restoration and land-use planning, and climate education. For those uncertain where to start, this webpage provides a user-friendly entry point to find the maps, tools, reports, and other data needed.

## ** End of Appendix D **

# APPENDIX E:
# STATE FUNDING FOR RESILIENCE

# *State Funding for Resilience*

*The programs below reflect current funding sources for resilience, though this list is not exhaustive. Please refer to ResilientMaryland.com to find a searchable database of resilience resources.*

**African American Heritage Preservation Program Grants for Capital Projects**

**Administered by:** Maryland Commission on African American History and Culture

**Website:** https://africanamerican.maryland.gov/grantsprogram/

**Agricultural Water Quality Cost-Share (MACS Program)**

**Administered by:** Maryland Department of Agriculture (MDA)

**Website:** https://mda.maryland.gov/resource_conservation/Pages/macs.aspx

**Aquatic Resources Education Grant Program**

**Administered by:** Maryland Department of Natural Resources (DNR)

**Website:** https://dnr.maryland.gov/ccs/pages/are.aspx

**Baltimore Regional Neighborhood Initiative**

**Administered by:** Maryland Department of Housing and Community Development (DHCD)

**Website:** https://dhcd.maryland.gov/Communities/Pages/programs/BRNI.aspx

**Maryland Water Infrastructure Financing Administration (MWIFA)**

**Administered by:** Maryland Department of the Environment (MDE)

**Website:** https://mde.maryland.gov/programs/water/wqfa/pages/index.aspx

**Certified Local Government (CLG) Program**

**Administered by:** Maryland Historical Trust (MHT)

**Website:** https://mht.maryland.gov/Pages/funding/grants-clg.aspx

**Chesapeake and Atlantic Coastal Bays Trust Fund (CCS)**

**Administered by:** DNR

**Website:** https://dnr.maryland.gov/ccs/pages/funding/trust-fund.aspx

**Chesapeake & Coastal Grants Gateway/Grants Gateway**

**Administered by:** DNR

**Website:** https://dnr.maryland.gov/ccs/pages/funding/grantsgateway.aspx

**Community Legacy Program**

**Administered by:** DHCD

**Website:** https://dhcd.maryland.gov/Communities/Pages/programs/CL.aspx

**Community Development Block Grant Program**

**Administered by:** DHCD

**Website:** https://dhcd.maryland.gov/Communities/Pages/programs/CDBG.aspx

**Community Parks & Playgrounds Program**

**Administered by:** DNR

**Website:** https://dnr.maryland.gov/land/Pages/ProgramOpenSpace/CPP-Grant-Process.aspx

**Comprehensive Flood Management Grant Program (CFMGP)**

**Administered by:** MDE

**Website:** https://mde.maryland.gov/programs/Water/StormwaterManagementProgram/Pages/floodmgmt.aspx

**Maryland Environmental Trust (MET) Easement Program**

**Administered by:** DNR

**Website:** https://dnr.maryland.gov/met/pages/land_conservation.aspx

**Critical Area Commission Project**

**Administered by:** DNR

**Website:** https://dnr.maryland.gov/criticalarea/Pages/CAC-Project-Submission.aspx

**Emergency Management Performance Grant**

**Administered by:** FEMA

**Website:** https://www.fema.gov/grants/preparedness/emergency-management-performance

**Flood Mitigation Assistance Grant Program**

**Administered by:** FEMA

**Website:** https://www.fema.gov/grants/mitigation/learn/flood-mitigation-assistance

**Forest Conservation and Management Program**

**Administered by:** DNR

**Website:** https://dnr.maryland.gov/forests/pages/programapps/fcmp.aspx

**Hazard Mitigation Assistance Grants**

**Administered by:** FEMA

**Website:** https://www.fema.gov/grants/mitigation

**Historic Preservation Capital Grant Program**

**Administered by:** MHT

**Website:** https://mht.maryland.gov/Pages/funding/grants-capital.aspx

**Investments Supporting Partnerships in Recovery Ecosystems Initiative (INSPIRE)**

**Administered by:** Appalachian Regional Commission (ARC)

**Website:** https://www.arc.gov/grants-and-opportunities/sud/

**Keep Maryland Beautiful**

**Administered by:** DNR and MET

**Website:** https://dnr.maryland.gov/met/pages/grant_programs.aspx

**Land and Water Conservation Fund (LWCF) State and Local Assistance Program**

**Administered by:** LWCF

**Website:** https://lwcfcoalition.org/state-and-local-assistance

**Local Government Infrastructure Financing**

**Administered by:** DHCD

**Website:** https://dhcd.maryland.gov/Communities/Pages/lgif/default.aspx

**Maryland Association for Environmental and Outdoor Education**

**Administered by:** Maryland State Department of Education

**Website:** https://marylandpublicschools.org/about/Pages/OFPOS/GAC/MAEOEFY25/index.aspx

**Maryland Heritage Areas Program Grant**

**Administered by:** MHT

**Website:** https://mht.maryland.gov/Pages/MHAA/heritage-areas-financial.aspx

**Maryland Resilient Infrastructure for Sustainable Energy (RISE) Program**

**Administered by:** MEA

**Website:** https://energy.maryland.gov/business/Pages/Maryland-RISE.aspx

**Maryland Sea Grant Program Development Funds**

**Administered by:** Maryland Sea Grant

**Website:** https://www.mdsg.umd.edu/program-development-funds

**Mid-Atlantic Climate Action Hub (MATCH) Mini-Grant Program**

**Administered by:** University of Maryland, School of Public Health

**Website:** https://sph.umd.edu/MATCH/grants

**Neighborhood BusinessWorks Program**

**Administered by:** DHCD

**Website:** https://dhcd.maryland.gov/Business/Pages/NBW.aspx

**Historic Preservation Non-Capital Grant Program**

**Administered by:** MHT

**Website:** https://mht.maryland.gov/Pages/funding/grants-noncapital.aspx

**Partnerships for Opportunity and Workforce Revitalization (POWER) Initiative**

**Administered by:** ARC

**Website:** https://www.arc.gov/grants-and-opportunities/power/

**Program Open Space, Land Acquisition and Planning**

**Administered by:** DNR

**Website:** https://dnr.maryland.gov/land/pages/programopenspace/home.aspx

**Public Assistance (PA) Grant Program**

**Administered by:** FEMA

**Website:** https://www.epa.gov/fedfunds/fema-public-assistance-grant-program-available-water-and-wastewater-utilities

**Public Facilities Solar Grant Program**

**Administered by:** MEA

**Website:** https://energy.maryland.gov/govt/pages/publicfacilitysolargrantprogram.aspx

**Resiliency through Restoration Initiative**

**Administered by:** DNR

**Website:** https://dnr.maryland.gov/ccs/pages/resiliency-through-restoration.aspx#:~:text=The%20Resiliency%20through%20Restoration%20Initiative,and%20other%20climate%20change%20impacts.

**Resilient Maryland Program**

**Administered by:** MEA

**Website:** https://energy.maryland.gov/business/pages/ResilientMaryland.aspx

**Resilient Maryland Revolving Loan Fund**

**Administered by:** Maryland Department of Emergency Management

**Website:** https://mdem.maryland.gov/pages/rlf-fund.aspx

**Rural Legacy Program, Land Acquisition and Planning**

**Administered by:** DNR

**Website:** https://dnr.maryland.gov/land/pages/rurallegacy/home.aspx

**Shoreline Erosion Loan Program**

**Administered by:** DNR

**Website:** https://dnr.maryland.gov/ccs/Pages/livingshorelines/Shoreline-Erosion-Loan-Program.aspx

**Watershed Assistance Grant Program**

**Administered by:** Chesapeake Bay Trust

**Website:** https://cbtrust.org/grants/watershed-assistance/

**Waterways Improvement Fund**

**Administered by:** DNR

**Website:** https://dnr.maryland.gov/boating/pages/grants.aspx

# ** End of Appendix E **

# APPENDIX F:
## LIST OF STATE RESILIENCE PLANS CROSSWALKED FOR THIS PLAN

# *List of State Resilience Plans Crosswalked for this Plan*

**Maryland Climate Adaptation and Resilience Framework: 2021-2030**

**Lead Agency:** Maryland Department of the Environment (MDE) **Year:** 2021

**Description:** The Framework was created to establish the vision, goals, strategies, and activities that will guide the next decade of adaptation implementation across the state.

**Moore-Miller Administration 2024 State Plan**

**Lead Agency:** Office of Governor Wes Moore **Year:** 2024

**Description:** This is a state plan brought forth by the Moore-Miller administration in 2024. The plan contains ten goals, with the themes of the goals falling within: Improving the economy and infrastructure, improving the quality of life for Maryland residents, and transitioning to being a green state. Each of the ten goals has laid out steps and a list of key performance indicators to see the progression.

**Nuisance Flood Plan Guidance**

**Lead Agency:** Department of Natural Resources (DNR) **Year:** 2024

**Description:** This document offers guidance to local governments as they complete nuisance flood plans. The focus is providing context, resources, and templates to help localities do this.

**Maryland's Plan to Adapt to Saltwater Intrusion and Salinization**

**Lead Agency:** Maryland Department of Planning (MDP) **Year:** 2024

**Description:** Required by legislation in 2018, this plan lays out research priorities and adaptation measures that the state should take to address saltwater intrusion and salinization. The first plan was produced in 2019, and this is the 5-year update.

**State Hazard Mitigation Plan (SHMP)**

**Lead Agency:** Maryland Department of Emergency Management (MDEM) **Year:** 2021

**Description:** The State Hazard Mitigation Plan is a Federal Emergency Management Agency (FEMA) required mitigation planning document that identifies and prioritizes the hazards faced in Maryland. In addition to identification and prioritization, the SHMP lists mitigation best practices for each hazard and identifies the State's critical infrastructure and assets along with mitigation recommendations to protect them.

*At the time of writing, MDEM was in the process of updating its SHMP for 2026.*

## Climate Pollution Reduction Plan

**Lead Agency:** MDE **Year:** 2023

**Description:** This plan is designed to help the State meet greenhouse gas reduction goals through clean energy solutions. This plan focuses on near-term goals that put the state on the path to net zero emissions by 2045.

## MDE Water Administration Climate Adaptation Plan

**Lead Agency:** MDE **Year:** 2023

**Description:** The MDE Water and Science Administration (WSA) is committed to account for the impacts of climate change within its routine regulatory functions. They have come up with 4 priority areas, actions that address each, and a dashboard to track progress.

## A Better Maryland State Development Plan

**Lead Agency:** MDP **Year:** 2019

**Description:** A Better Maryland is a dynamic, evolving plan that provides a framework supporting a thriving economy and environmental stewardship. The work plan for A Better Maryland was designed to engage and connect with the public, local governments, state agencies and other stakeholders across the state of Maryland and solicit their feedback on what should be included in the Plan.

## Maryland Extreme Heat Emergency Plan 2023

**Lead Agency:** Maryland Department of Health **Year:** 2023

**Description:** The Maryland Extreme Heat Emergency Plan, developed by MDH, guides the state's actions during an Extreme Heat Event, as well as those of partner agencies and organizations. This plan also provides guidance for the local health departments (LHDs) as they fulfill their roles; however, it does not mandate that LHDs perform the actions described.

## Heritage2031

**Lead Agency:** MDP and Maryland Historical Trust (MHT) **Year:** 2023

**Description:** Heritage2031 is an eight-year guidance document for government agencies, nonprofit advocates, and others involved in historic preservation, archaeology, and cultural heritage throughout the state. To develop the plan and make recommendations for the future, MHT solicited feedback via open public meetings, focus groups, surveys, stakeholder interviews, and public comments.

Based on this feedback and input from partner agencies and organizations, Heritage2031 puts forward a new set of goals, objectives, and strategies for preservation professionals in Maryland.

## Transportation Resilience Improvement Plan (TRIP)

**Lead Agency:** Maryland Department of Transportation **Year:** 2024

**Description:** This plan is designed to help the State meet greenhouse gas reduction goals through clean energy solutions. This plan focuses on near-term goals that put the state on the path to net zero emissions by 2045.

## Energy Security Plan

**Lead Agency:** Maryland Energy Administration (MEA) **Year:** 2023

**Description:** This Maryland State Energy Security Plan was developed to both fulfill the Infrastructure Investment and Jobs Act (IIJA) requirements and to provide Maryland with an updated and accurate assessment of the state's energy profile, risks to our energy supply chains, and possible preventative and mitigative measures the State has and will continue to take to ensure that Maryland's energy is reliable, sustainable, and resilient. The purpose of this Plan is to provide actionable next steps for energy emergency planning, response, hazard mitigation, and resilience within the state.

## NextGen Adaptation Plan

**Lead Agency:** DNR **Year:** 2024

**Description:** Developed by the Adaptation and Resiliency Working Group of the Maryland Commission on Climate Change, the NextGen Adaptation Plan is a roadmap of strategies and policies that will help different sectors within Maryland build resilience and adaptation plans. Each sector was given goals to reach, with each goal having short term (0-2 years), mid terms (2-5 years), and long terms (5+ years) recommended actions. The roadmap has a strong focus on collaboration between different state agencies, involvement of local governments, and prioritization of underserved communities.

## Climate Implementation Plans

**Lead Agency:** MDE **Year:** 2024

**Description:** Following an executive order issued in 2024 by Governor Wes Moore, state agencies are now required to prepare Climate Implementation Plans that spell out how they will reduce emissions and align with the Climate Solutions Now Act's goal of cutting greenhouse gases 60 percent by 2031 and reaching net-zero by 2045.

## Maryland Department of Information Technology 2025 IT Master Plan

**Lead Agency:** Maryland Department of Information Technology (DoIT) **Year:** 2025

**Description:** This plan represents DoIT's strategic roadmap to modernize technology services across Maryland State government. It includes numerous cyber and digital resilience initiatives, including adoption of zero trust architecture, modernization initiatives, and cybersecurity and privacy standards.

# APPENDIX G:
## LOCAL RESILIENCE GROUPS
*(MUNICIPALITIES)*

# *Local Resilience Groups (Municipalities)*

*This list reflects local groups identified by the Maryland Office of Resilience, but it may not be exhaustive.*

## *Jurisdiction:* ***Annapolis***

### Resilience and Sustainability position

**Description:** The Deputy City Manager for Resilience and Sustainability works from the City Manager's Office to enhance the natural environment within the City of Annapolis through policies and programs.

**Website:** https://www.annapolis.gov/395/Resilience-and-Sustainability

### Office of Emergency Management (OEM)

**Description:** At the City of Annapolis OEM, our mission is to enhance the safety, resilience, and preparedness of Annapolis through leadership in emergency response, recovery, mitigation, continuity planning, and partnership building. OEM works in close partnership with local, state, and federal agencies to equip our community for diverse hazards, including severe weather, natural disasters, human-caused incidents, and technological emergencies.

**Website:** https://www.annapolis.gov/260/Office-of-Emergency-Management

### Sustainable Annapolis program

**Description:** Program designed to reduce energy usage and curb emissions from the city itself, such as the water treatment building.

**Website:** https://www.annapolis.gov/399/Sustainable-Annapolis

### Environmental Commission

**Description:** The Commission shall be concerned with the protection and improvement of the environmental quality of the City and environs. It shall study the pollution of the land, air and waters, noise levels, recycling and reuse of discarded materials.

**Website:** https://www.annapolis.gov/617/Environmental-Commission

### Environmental Matters Committee

**Description:** The Environmental Matters Committee shall consider matters affecting the natural environment of the City. The Environmental Matters Committee shall review all proposed amendments to Title 14 (streets, sidewalks and public places), Title 15 (harbors and waterfront areas), and Title 16 (public services) of this City Code.

**Website:** https://www.annapolis.gov/791/Environmental-Matters-Committee

## *Jurisdiction:* ***Baltimore City***

### Office of Sustainability

**Description:** The Office of Sustainability is a resource, catalyst, and advocate for a sustainable and resilient Baltimore. The Office integrates the principles of environmental integrity, social equity, and economic prosperity into plans, practices, policies, and partnerships. Our goal is to provide innovative solutions to our City's challenges while engaging, educating, and motivating all sectors of Baltimore.

**Website:** https://www.baltimoresustainability.org/

### Office of Emergency Management

**Description:** The Office of Emergency Management protects Baltimore City from emergencies and disasters through comprehensive planning, strong partnerships, and coordinated response efforts. The mission is to maintain the highest level of preparedness to safeguard the city's residents, workforce, visitors, and environment from the impacts of natural and man-made hazards.

**Website:** https://emergency.baltimorecity.gov/

## *Jurisdiction:* ***Boonsboro***

### Environmental Commission

**Description:** The purpose of the Commission is to develop and promote a healthy environment through sound conservation and sustainable practices; encourage responsible waste management; and energy and resource conservation; and study other issues that affect the health and well-being of the citizens of Boonsboro.

**Website:** https://www.town.boonsboro.md.us/bec

## *Jurisdiction:* ***Bowie***

### Stormwater management project

**Description:** This project aims to reduce pollution into Chesapeake Bay by reducing pollutant runoff from stormwater.

**Website:** https://www.cityofbowie.org/2785/Stormwater

### Emergency Management office

**Description:** TThe job of Bowie's Office of Emergency Management is to prepare for, respond to, recover from and mitigate against disasters and emergencies. The mission is accomplished in a number of ways, including developing emergency preparedness programs and response plans, as well as working within the community to promote preparedness and build community resilience.

**Website:** https://www.cityofbowie.org/2476/Emergency-Management

**Department of Planning & Sustainability**

**Description:** This department is home to two divisions - Planning and Sustainability - that together focus on development and the environment. The Sustainability Division focuses on environmental initiatives and policies geared towards energy efficiency, renewable energy, waste reduction, and other sustainable practices. It collaborates with community stakeholders and implements programs to raise awareness and educate residents on the three pillars of sustainability.

**Website:** https://www.cityofbowie.org/149/Planning-and-Sustainability

## *Jurisdiction:* ***Charlestown***

**Green Team**

**Description:** The mission of the Green Team is to promote a vibrant and sustainable community that fosters long-term environmental and individual health, social well-being, and economic prosperity for its residents, businesses, and government.

## *Jurisdiction:* ***Chesapeake Beach***

**Green Team**

**Description:** The Green Team is a committee of volunteers that work to create priorities for sustainable improvements with the Town of Chesapeake Beach. The Team seeks to engage the community and provide easy tips for residents to contribute to the cleanliness of the Chesapeake Bay and the environment.

**Website:** https://www.chesapeakebeachmd.gov/chesapeake-beach-green-team

## *Jurisdiction:* ***Chevy Chase Village***

**Environment and Energy Committee**

**Description:** This committee focuses on community outreach, showing environmentally friendly ways to do daily living.

**Website:** https://www.chevychasevillagemd.gov/258/Environment-Energy-Committee

## *Jurisdiction:* ***Chevy Chase, Town of***

**Climate and Environment Committee**

**Description:** TThe mission of the Climate and Environment Committee is to inspire and facilitate energy conservation and environmental stewardship by the Town and its residents through education, government policies, and incentives.

**Website:** https://www.townofchevychase.org/180/Climate-Environment

## *Jurisdiction:* ***Elkton***

### Stormwater Management program

**Description:** The main goal of the Town of Elkton Storm Water Management Program is to protect the quality of our surface waters - ponds, creeks and the Elk River.

**Website:** https://www.elkton.org/public-works/pages/stormwater

## *Jurisdiction:* ***Forest Heights***

### Town of Forest Heights Green Team

**Description:** This program represents a cooperative effort between the Town of Forest Heights, local businesses, and regulatory agencies to enhance environmental stewardship throughout the community. Its primary goal is to assist companies in understanding and navigating the complex web of federal, state, and local environmental regulations and to provide the tools and guidance necessary to achieve full compliance.

**Website:** https://forestheightsmd.gov/191/Town-of-Forest-Heights-Green-Team

## *Jurisdiction:* ***Frederick***

### Stormwater Management Division

**Description:** The Stormwater Management Division reviews land development plans for adherence to applicable federal, state, and local codes. The SWM Division also coordinates with other DPW departments to ensure compliance with NPDES general permits for storm water discharges.

**Website:** https://www.cityoffrederickmd.gov/1455/Stormwater-Management

### Sustainability Department

**Description:** The mission of the Sustainability Manager and Sustainability Committee is to provide guidance on and lead projects that maintain balance between economic, social, and ecological needs of residents and businesses for today and future generations.

**Website:** https://www.cityoffrederickmd.gov/891/Sustainability

## *Jurisdiction:* ***Frostburg***

**Green Team**

**Description:** A City council-appointed community board, the Green Team guides Frostburg's long-term efforts to be a vibrant, environmentally sustainable community of choice. Going green saves our small town both valuable natural and financial resources while creating unique opportunities for community engagement and inclusivity.

**Website:** https://www.frostburgcity.org/bc-greenteam

## *Jurisdiction:* ***Gaithersburg***

**Environmental Services program**

**Description:** The role of Gaithersburg's environmental program is to understand environmental concerns, develop strategies, and make decisions consistent with the City's Mission & Strategic Plan that protect & enhance our environmental resources.

**Website:** https://www.gaithersburgmd.gov/services/environmental-services

## *Jurisdiction:* ***Havre de Grace***

**Stormwater Management (SWM) project**

**Description:** As part of the City's ongoing compliance with the State's SWM and MS4 requirements, the City conducts inspections on every stormwater pond or practice within the City limits at least once a year (between July 1st and June 30th).

**Website:** https://havredegracemd.gov/departments/department-public-works/stormwater-management/

## *Jurisdiction:* ***Laurel***

**Emergency Preparedness Division**

**Description:** The division plans and prepares for emergencies, educates the public about preparedness, coordinates emergency response and recovery efforts, and disseminates information during emergencies and disasters. As a part of its complex activities, the division helps the community by assisting in the coordination of emergency management efforts and providing support to various City Departments.

**Website:** https://www.cityoflaurel.org/221/Emergency-Management

## *Jurisdiction:* ***Mount Rainier***

### Green Team

**Description:** The Mount Rainier Green Team works to create a healthier, more livable and sustainable city for the residents, businesses, and the community. We believe we can achieve sustainable outcomes through community participation. The Team works to leverage the energy and leadership of the residents of the City to decrease their environmental footprint and create a better future for all.

**Website:** https://www.mountrainiermd.org/231/Green-Team

## *Jurisdiction:* ***New Carrollton***

### Green Team

**Description:** The Green Team was formed by the City Council in 2018 with a mission to guide the City on a path toward greater environmental responsibility and sustainability by working with the Mayor and the City Council to adopt green initiatives that improve municipal operations, promote a sustainable community, and cultivate the long-term environmental health of the City.

**Website:** https://newcarrollton.hosted.civiclive.com/cms/One.aspx?portalId=10876797&pageId=15636765

## *Jurisdiction:* ***North Beach***

### Stormwater and Flood Mitigation Advisory Committee

**Description:** The mission of the Flood Committee is to provide advice and counsel to the Town government regarding how to address short- and long-term hazards and impacts related to coastal and stormwater flooding throughout the Town and help ensure that the concerns and experiences of all residents are shared and understood.

**Website:** https://www.northbeachmd.org/flood-committee

### Environmental Committee

**Description:** AThe mission of the North Beach Environmental Committee is to ensure the ongoing preservation of the town's wetlands, natural shoreline, and green spaces so that residents and visitors may enjoy them now and in the future. We promote a healthy, attractive, sustainable North Beach through green initiatives and public education.

**Website:** https://www.northbeachmd.org/environmental-committee

## *Jurisdiction:* ***Perryville***

### Stormwater Management Division

**Description:** The Stormwater Management Division operates under the Cecil County Department of Public Works and is responsible for the development, management and execution of the Cecil County Stormwater Management programs. This division ensures the effective administration of and compliance with the Cecil County Code and other applicable laws, regulations and standards.

**Website:** https://www.ccgov.org/government/public-works/public-works-divisions/stormwater-management-division

### Green Team

**Description:** The Perryville Green Team is a community and municipal initiative in Perryville, Maryland, focused on coordinating environmental efforts, promoting sustainability, and working toward achieving Sustainable Maryland Certification. Its primary activities involve local action such as organizing the annual River Sweep cleanup and managing the Community Garden.

**Website:** https://www.perryvillemd.org/community-garden

## *Jurisdiction:* ***Riverdale Park***

### Green Team

**Description:** TThe Riverdale Park Sustainability Committee (RPSC) is working to improve Riverdale Park's sustainability by improving the local economy, reducing impacts on environmental resources, and encouraging community involvement. The team is comprised of residents concerned with making Riverdale Park a more sustainable community.

**Website:** https://www.riverdaleparkmd.gov/our_town/explore_town_of_riverdale_park/green_team/index.php

## *Jurisdiction:* ***Rockville***

### Stormwater

**Description:** The City of Rockville manages stormwater to reduce flooding and protect private property, protect the environment and contribute to happier, healthier communities.

**Website:** https://www.rockvillemd.gov/569/Stormwater

### Environmental Commission

**Description:** The purpose of the Commission is to recommend policies and programs to the Mayor and Council and city staff relating to the environment and sustainability. Core to this mission is promoting a sustainable community through initiatives relating to natural resource management development, energy efficiency, watershed stewardship and protection, pollution prevention and public education.

**Website:** https://www.rockvillemd.gov/106/Environment-Commission

## *Jurisdiction:* ***Seat Pleasant***

### Environmental Justice Department

**Description:** The Environmental Justice Department will work toward developing programming and systems of broad range strategic, scientific, technological, regulatory, community engagement, and economic issues related to the environment.

**Website:** https://seatpleasantmd.gov/189/Environmental-Justice

## *Jurisdiction:* ***Somerset***

### Environment Committee

**Description:** The Environment Committee is dedicated to ensuring Somerset is serving as a responsible steward of our natural environment. The Committee accomplishes this by ensuring environmental goals are represented in the budget, by making recommendations on environmental policy, and by providing educational opportunities to the public.

**Website:** https://www.townofsomersetmd.gov/business_detail_T35_R96.php

## *Jurisdiction:* ***Takoma Park***

### Division of Sustainability

**Description:** The Sustainability Division oversees the City's Sustainability Program including implementing the priority strategies and concepts in the Climate Action Plan and Climate Emergency Response Framework.

**Website:** https://takomaparkmd.gov/309/Sustainability

## *Jurisdiction:* ***Thurmont***

### Green Team

**Description:** The mission of Thurmont's Green Team is to provide the residents of Thurmont with the necessary tools to increase sustainability efforts throughout the community.

**Website:** https://www.thurmont.com/2245/Thurmont-Green-Team

## *Jurisdiction:* ***Town of New Market***

**Green Team**

**Description:** The Team's mission is to work together with the Town of New Market and local community members to offer resources to a more sustainable future through green living now.

**Website:** https://www.townofnewmarket.org/green-team

## *Jurisdiction:* ***Washington Grove***

*Dormant and Former Committees:* **Emergency Preparedness and Safety Committee**

**Description:** The Emergency Preparedness Committee improves the Town's readiness in cases of local and regional emergency situations, and raises awareness of Town residents about how to be prepared for emergencies and contribute to an emergency response.

**Website:** https://washingtongrovemd.gov/community/committees/emergency-preparedness-committee/

# ** End of Appendix G **

# APPENDIX H:
## LOCAL RESILIENCE EFFORTS
*(COUNTIES)*

# *Local Resilience Efforts (Counties)*

*This list reflects local groups identified by the Maryland Office of Resilience, but it may not be exhaustive.*

## *Jurisdiction:* ***Allegany***

**Emergency Services Department**

**Description:** The Department of Emergency Services strives to achieve and sustain core capabilities in support of emergency communications, preparedness, response and recovery initiatives. Our mission is to provide critical emergency services to our residents and visitors.

**Website:** https://www.alleganygov.org/168/Emergency-Services

## *Jurisdiction:* ***Anne Arundel***

**Bureau of Watershed Protection & Restoration**

**Description:** Within the Anne Arundel County Department of Public Works, the Bureau of Watershed Protection and Restoration is responsible for the environmental assessment, restoration implementation, and ecological evaluation work associated with the County's clean water obligations under the Municipal Separate Storm Sewer System (MS4) Permit and Chesapeake Bay Total Maximum Daily Load (TMDL).

**Website:** https://www.aacounty.org/public-works/bwpr

**Emergency Management Office**

**Description:** The Office of Emergency Management ensures that the County Government and the general public are prepared for any emergency. We manage the County's response to major emergencies and coordinate with all relevant County, State and Federal departments, offices and leadership and maintain strong partnerships with other jurisdictions.

**Website:** http://www.aacounty.org/emergency-management

## *Jurisdiction:* ***Baltimore***

**Environmental Protection and Sustainability Department**

**Description:** The Department of Environmental Protection and Sustainability oversees programs to promote environmental stewardship, sustainable growth, water quality and pollution prevention.

**Website:** http://www.baltimorecountymd.gov/departments/environment

**Homeland Security and Emergency Management Office**

**Description:** Baltimore County maintains a high level of readiness for natural and man-made disasters and a variety of hazards.

**Website:** http://www.baltimorecountymd.gov/departments/emergency-management

## *Jurisdiction:* ***Calvert***

**Emergency Management Division**

**Description:** The mission of the Division of Emergency Management is to reduce risk to life and property before, during, and after a disaster and to create a more resilient Calvert County.

**Website:** http://www.calvertcountymd.gov/101/Emergency-Management

**Environmental Section, Comprehensive Plan**

**Description:** The natural resources and sensitive areas section of the Comprehensive Plan states that the County should encourage preservation, protection, and conservation of natural resources.

**Website:** http://www.calvertcountymd.gov/550/Environmental

## *Jurisdiction:* ***Caroline***

**Emergency Services Department**

**Description:** As a rural Maryland community with limited access to definitive care, we are committed to providing the highest level of pre-hospital medical care available through Advanced Life Support protocols, quality improvement, training, and education.

**Website:** http://www.carolinemd.org/181/Emergency-Services

## *Jurisdiction:* ***Carroll***

**Risk Management Administration**

**Description:** AThe Risk Manager and staff strive to provide a safe and healthy environment for employees as well as the public using County facilities by identifying safety training programs, continuously identifying potential loss exposures, and by implementing loss control measures.

**Website:** https://www.carrollcountymd.gov/government/directory/management-budget/risk-management/

## *Jurisdiction:* ***Cecil***

### Emergency Services Department

**Description:** The Cecil County Department of Emergency Services is committed to excellence by providing effective emergency response, a dedicated 911 center, comprehensive emergency management, and community outreach that enhances the quality of life for the community we serve.

**Website:** https://www.ccgov.org/government/emergency-services

## *Jurisdiction:* ***Charles***

### Emergency Services Department

**Description:** The mission is to join with the public safety response partners to provide critical life impacting services to the community.

**Website:** https://www.charlescountymd.gov/services/emergency-services

### Office of Climate Resilience & Sustainability

**Description:** The Office of Climate Resilience and Sustainability works with government and community partners to reduce our greenhouse gas emissions, protect our natural environment, and safeguard our community against the effects of climate change.

**Website:** https://www.charlescountymd.gov/government/climate-action

## *Jurisdiction:* ***Dorchester***

### Department of Emergency Services

**Description:** The mission of the Department of Emergency Services (DES) is to provide high quality, timely, and effective emergency services to all residents and visitors to Dorchester County. DES has three divisions: Emergency Communications, Emergency Medical Services (EMS), and Emergency Management.

**Website:** https://www.dorchestercountymd.com/emergency-services-main/

## *Jurisdiction:* ***Frederick***

### Emergency Services Division

**Description:** The division administers and coordinates the County's emergency management programs including interagency coordination, development of plans, hazard mitigation, and preparedness through training and education.

**Website:** https://www.frederickcountymd.gov/2001/Emergency-Management

## *Jurisdiction:* ***Garrett***

### Emergency Management Office

**Description:** The Garrett County Department of Emergency Management is responsible for Emergency Management, Interoperable Communication, and Emergency Medical Services for Garrett County. The Department coordinates with other public safety entities to ensure a timely and appropriate response to all emergencies.

**Website:** https://www.garrettcountymd.gov/emergency-management

## *Jurisdiction:* ***Harford***

### Emergency Services Department

**Description:** The office provides professional emergency support services; emergency preparedness education for the public; coordination of emergency response and recovery efforts; and collecting and disseminating emergency information.

**Website:** http://www.harfordcountymd.gov/165/Emergency-Services

## *Jurisdiction:* ***Howard***

### Office of Community Sustainability

**Description:** The Howard County Office of Community Sustainability aims to protect and enhance the quality of life in our communities by addressing environmental and economic issues affecting County citizens and future generations. Guided by principles of science, ingenuity, sustainability and stewardship, the Office engages in water quality, economic development, energy and education initiatives.

**Website:** https://www.howardcountymd.gov/community-sustainability

### Office of Emergency Management (OEM)

**Description:** OEM's mission is to provide centralization, coordination, and facilitation of multi-agency emergency planning, training, and exercise, and to holistically minimize and reduce the impacts of natural and human-caused disasters through proactive prevention, mitigation, preparedness, response, and recovery.

**Website:** https://www.howardcountymd.gov/emergency-management

## *Jurisdiction:* ***Kent***

### Office of Emergency Services (OES)

**Description:** The OES staff is responsible for the development and maintenance of the County Emergency Operations Plan. The OES is also responsible for staffing and operating the County's Emergency Operations Center (EOC).

**Website:** http://www.kentcounty.com/oes

## *Jurisdiction:* ***Montgomery***

### Office of Emergency Management and Homeland Security (OEMHS)

**Description:** It is the mission of Montgomery County OEMHS to plan, prevent, prepare, and protect against natural and man-made hazards that may threaten, disrupt, or harm our communities, commerce, and institutions and to effectively manage and coordinate the County's unified response and recovery from the consequences of such disasters.

**Website:** https://www.montgomerycountymd.gov/oemhs/

### Office of Energy and Sustainability

**Description:** The Montgomery County Office of Energy and Sustainability oversees the overall greening of government operations across all County departments.

**Website:** https://www.montgomerycountymd.gov/DGS-OES/Home.html

### Environmental Protection Department

**Description:** The mission is to enhance the quality of life in the community by protecting and improving Montgomery County's air, water, and land in a sustainable, innovative, inclusive, and industry-leading way while fostering smart growth, a thriving more sustainable economy and healthy communities.

**Website:** https://www.montgomerycountymd.gov/dep/

## *Jurisdiction:* ***Prince George's***

### Environmental Department

**Description:** The Department of the Environment works for a healthy, beautiful, and sustainable county through programs that provide clean water, flood control, recycling and waste management, litter prevention, sustainable animal management, and pet adoption in partnership with residents and other stakeholders.

**Website:** https://www.princegeorgescountymd.gov/179/Environment

**Office of Emergency Management**

**Description:** The Office of Emergency Management (OEM) coordinates the Prince George's County emergency management program to prepare, prevent, plan, respond and recover from all-hazard events. The OEM develops, maintains, and implements the ability to manage and coordinate emergency operations in cooperation with local, State, and Federal governmental and private sector agencies.

**Website:** https://www.princegeorgescountymd.gov/departments-offices/homeland-security/emergency-management

## *Jurisdiction:* ***Queen Anne's***

**Emergency Management Division**

**Description:** The Emergency Management Division, through the provision of planning, education, and coordination will coordinate with our stakeholders to aid Queen Anne's County citizens and their possessions to avoid, prepare, respond, and recover in the event of environmental or human causes.

**Website:** http://www.qac.org/377/Emergency-Management

## *Jurisdiction:* ***St. Mary's***

**Emergency Management Division**

**Description:** The Emergency Management Division is responsible for helping the community before, during, and after disasters. The four phases of Emergency Management are Preparedness, Response, Mitigation, and Recovery. The Emergency Management Division works to prepare for hazards that may impact the St. Mary's County community, respond to ongoing or anticipated events, develop projects that will mitigate the risks and impacts of potential hazards, and recover from any disaster that strikes the community.

**Website:** https://www.stmaryscountymd.gov/ES/EMA/

## *Jurisdiction:* ***Somerset***

**Emergency Services Department**

**Description:** The Department focuses on community education and tools, such as hurricane preparedness and emergency alert systems.

**Website:** https://www.somersetmd.us/departments/departments_-_a_-_m/emergency_services.php

## *Jurisdiction:* ***Talbot***

### Emergency Management Division

**Description:** TThe Emergency Management Division is responsible for the planning, assignment, and coordination of all available resources in an integrated program of mitigation, preparedness, response and recovery for all emergencies and disasters whether from a terrorist attack, man-made, or natural disaster.

**Website:** https://www.talbotdes.org/emergency_management.asp

## *Jurisdiction:* ***Washington***

### Emergency Services Division

**Description:** To protect the lives and improve the safety of all citizens and visitors in Washington County by collaborating with our dedicated volunteer and emergency service providers.

**Website:** https://www.washco-md.net/emergency-services/

### Environmental Management Division

**Description:** Supporting and strengthening individual and community self-reliance and responsibility; promoting education, economic development opportunities, public health, safety and welfare; protecting the environment and cultural resources we share; and planning for future urbanization and a culturally diverse population.

**Website:** https://www.washco-md.net/environmental-management/

## *Jurisdiction:* ***Wicomico***

### Emergency Management Division

**Description:** The division is responsible for updating and maintaining emergency plans to deal with mitigation, preparedness, response, and recovery for natural and man-made disasters along with the county risk management/safety program. The division also maintains the Wicomico County Emergency Mobile Command Unit for all response agencies in the County.

**Website:** https://www.wicomicocounty.org/214/Emergency-Management-Division

### Office of Emergency Management

**Description:** The office is charged with preparing Worcester County and the public to manage activities before, during and after the impact of natural and technological disaster agents to protect lives and property within the County.

**Website:** https://www.co.worcester.md.us/departments/emergencyservices/management

### Department of Environmental Programs

**Description:** The Department of Environmental Programs works in a regulatory and planning capacity to protect the health of the citizens of Worcester County from diseases and hazards found in the environment and to ensure sanitary construction and natural resource protection are provided in a way that protects public health and the environment.

The Department and its divisions have complimentary areas of focus and are responsible for implementing and enforcing a wide variety of regulations and programs primarily pertaining to environmental and natural resource management for land use activities.

**Website:** https://www.co.worcester.md.us/departments/env

## ** End of Appendix H **

# APPENDIX I: ACRONYMS

# *Acronyms*

*The following acronyms are used in this document. Each acronym is listed individually, followed by a hypen and then its meaning.*

**AI -** Artificial Intelligence
**ARL -** Agency Resilience Liaison
**ARWG -** Adaptation and Resiliency Working Group
**BCEGS -** Building Code Effectiveness Grading Schedule
**BGE -** Baltimore Gas and Electric
**BRIC -** Building Resilient Infrastructure and Communities
**CAC -** Critical Area Commission
**CAFO -** Concentrated animal feeding operation
**CFMGP -** Comprehensive Flood Management Grant Program
**CISA -** Cybersecurity and Infrastructure Security Agency
**COG -** Council of Government
**COMAR -** Code of Maryland Regulations
**COMM -** Maryland Department of Commerce
**COMP -** Office of the Comptroller
**CPRG -** Climate Pollution Reduction Grants
**CRAB -** Climate-Ready Action Boundary
**DGS -** Maryland Department of General Services
**DHCD -** Maryland Department of Housing and Community Development
**DNR -** Maryland Department of Natural Resources
**DoIT -** Maryland Department of Information Technology
**DRR -** Disaster Risk Reduction
**EAP -** Energy Assurance Plan
**EF/EF2 tornado -** Enhanced Fujita
**EJ -** Environmental Justice
**EPA -** Environmental Protection Agency
**ESG -** Environmental, social, and governance
**FEMA -** Federal Emergency Management Agency
**FMA -** Flood Mitigation Assistance
**FSRC -** Food System Resiliency Council
**HB -** House Bill
**HMGP -** Hazard Mitigation Grant Program
**HUD -** U.S. Department of Housing and Urban Development
**HUD PRO -** U.S. Dept. of Housing & Urban Dev. Pathways to Removing Obstacles
**I-Code -** International Code
**IBC -** International Building Code
**IECC -** International Energy Conservation Code
**IIRC -** International Residential Code
**LEEF -** Leaders in Environmentally Engaged Farming
**MBPS -** Maryland Building Performance Standards
**MDA -** Maryland Department of Agriculture
**MDE -** Maryland Department of the Environment
**MDEM -** Maryland Department of Emergency Management
**MDH -** Maryland Department of Health
**MDOL -** Maryland Department of Labor
**MDOT -** Maryland Department of Transportation
**MDOT SHA -** Maryland Dept. of Transportation State Highway Administration
**MDP -** Maryland Department of Planning
**MEA -** Maryland Energy Administration
**MIA -** Maryland Insurance Administration
**MIRR -** Military Installation Readiness Review
**MOR -** Maryland Office of Resilience
**MOU -** Memorandum of Understanding
**MPA -** Maryland Port Administration
**MTA -** Maryland Transit Authority
**MTAP -** Maryland Technical Assistance Program
**NFIP -** National Flood Insurance Program
**NOAA -** National Oceanic and Atmospheric Administration
**OARS -** Options for Adapting to Rising Seas
**OLDCC -** Office of Local Defense Community Cooperation
**OMFA -** Office of Military and Federal Affairs
**PCAP -** Priority Climate Action Plan
**PIPA -** Personal Information Protection Act
**PJM -** Pennsylvania-New Jersey-Maryland Interconnection
**PMP -** Probable Maximum Precipitation
**PPE -** Personal Protective Equipment
**PSC -** Public Service Commission
**SAIDI -** System Average Interruption Duration Index
**SAIFI -** System Average Interruption Frequency Index
**SAV -** Submerged Aquatic Vegetation
**SB -** Senate Bill
**SEIF -** Strategic Energy Investment Fund
**SHMP -** State Hazard Mitigation Plan

**SMART -** Strengthening Mobility and Revolutionizing Transportation
**SPR -** Stakeholder Preparedness Review
**TAG -** Technical Assistance Grant
**TCC -** Tri-County Council
**THIRA -** Threat and Hazard Identification and Risk Assessment
**TRIP -** Transportation Resilience Improvement Plan
**UMCES -** University of Maryland Center for Environmental Science
**USDA -** U.S. Department of Agriculture
**USDOT PROTECT -** Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program
**VOICE -** Valuing Opportunity, Inclusion, and Community Equity
**WCI -** Whole Community Integration
**WIFIA -** Water Infrastructure Finance and Innovation Act
**WSSC -** Washington Suburban Sanitary Commission

# ** End of Appendix I **

# APPENDIX J: DEFINITIONS

# *Definitions*

**Acute**
*Definition:* Conditions that are severe and sudden in onset. Used in this document in reference to hazards.

**Source:** Resilient Maryland Strategy

**Chronic**
*Definition:* Longer-term conditions that weaken a community or system over time and can cause disruption to community or system functions and well-being. Used in this document in reference to stressors.

**Source:** https://www.fema.gov/sites/default/files/documents/fema_national-resilience-guidance-project-background_2023.pdf

**Community and Local Government Capacity**
*Definition:* Supplying local governments with tools, expertise, and resources that build their capacity to take equitable local resilience action through planning, stormwater management, land use, community engagement, partnerships with businesses, historic and cultural resource planning, and more. Greater local capacity not only catalyzes local action, but also unlocks dollars for resilience.

**Source:** Refers to a sector of the Resilient Maryland Strategy. Definition developed collaboratively.

**Critical Area**
*Definition:* All land within 1,000 feet of Maryland's tidal waters and tidal wetlands.

**Source:** https://dsd.maryland.gov/regulations/Pages/26.23.01.01.aspx

**Critical Infrastructure**
*Definition:* Ensuring that Maryland's critical infrastructure systems and assets – namely, core transportation assets, drinking water and wastewater systems, energy assets, communications systems, hazardous materials sector, safety and security assets, and military installations – can recover quickly or withstand hazards and changing conditions. Resilient critical infrastructure is fundamental and enables all other systems to function.

**Source:** Refers to a sector of the Resilient Maryland Strategy. Definition developed collaboratively.

**Disaster Risk**
*Definition:* The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity. Disaster risks can ensue from any type of hazard.

**Source:** https://www.undrr.org/terminology/disaster-risk#:~:text=The%20potential%20loss%20of%20life,%2C%20exposure%2C%20vulnerability%20and%20capacity.

**Economic Stressor**
*Definition:* Aspects of economic life that create strain and negatively impact the ability of individuals and households to withstand, recover, and bounce back from disasters. For instance, the closure of a major employer could be a community-wide economic stressor.

**Source:** Resilient Maryland Strategy

**Environment and Natural Systems**
*Definition:* Restoring and protecting Maryland's environment and natural ecosystems to enhance ecosystem services in the face of environmental change and help communities harness benefits such as risk reduction, carbon sequestration, cleaner air and water, health, recreation, ecotourism, habitat diversity, and natural resource conservation. Maryland's natural resources play a critical role in lessening the impacts of natural hazards and climate change, while building overall community and ecological resilience.

**Source:** Refers to a sector of the Resilient Maryland Strategy. Definition developed collaboratively.

**Environmental Impact Bonds**
*Definition:* An Environmental Impact Bond (EIB) is a type of municipal bond label which signals to investors that the issuer has market-leading ESG transparency and accountability in their bond.

**Source:** https://www.quantifiedventures.com/what-is-an-environmental-impact-bond

**Environmental justice**
*Definition:* Equal protection from environmental and public health hazards for all people regardless of race, income, culture, and social status.

**Source:** Climate Solutions Now Act of 2022

**Fluvial flooding**
*Definition:* Flooding along rivers and streams.

**Source:** Resilient Maryland Strategy

**Food Systems**
*Definition:* Strengthening Maryland's food and farm systems by increasing the production and procurement of locally- and sustainably-grown foods and ensuring the availability and accessibility of nutritious and culturally appropriate food to all communities over time, even in the face of supply chain disruptions such as natural hazards, economic shocks, or public health emergencies. Long-term food system resilience depends on inclusivity and structural, distributional, and intergenerational equity for all consumers, producers, and food system workers in Maryland.

**Source:** Refers to a sector of the Resilient Maryland Strategy. Definition developed collaboratively.

**Ghost forests**
*Definition:* Areas of standing dead trees where live trees are mostly absent.

**Source:** https://www.fs.usda.gov/inside-fs/delivering-mission/sustain/ghost-forests-haunt-atlantic-coast

**Green infrastructure**
*Definition:* The range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspirate stormwater and reduce flows to sewer systems or to surface waters.

**Source:** https://www.congress.gov/115/plaws/publ436/PLAW-115publ436.pdf

**Green bonds**
*Definition:* Green bonds are financial instruments that finance green projects and provide investors with regular or fixed income payments.

**Source:** https://www.worldbank.org/en/news/feature/2021/12/08/what-you-need-to-know-about-ifc-s-green-bonds

**Grey infrastructure**
*Definition:* Traditional infrastructure in the built environment such as gutters, drains, pipes, and retention basins. Also used to refer to coastal hardening infrastructure, such as seawalls.

**Source:** https://www.epa.gov/water-research/green-and-gray-infrastructure-research#:~:text=Gray%20infrastructure%20is%20traditional%20stormwater,%2C%20pipes%2C%20and%20retention%20basins.

**Groundwater recharge**
*Definition:* Water derived from precipitation and other sources, such as irrigation and leakage from surface reservoirs, that moves through or bypasses the plant-soil system and replenishes aquifers.

**Source:** https://www.usgs.gov/centers/pacific-islands-water-science-center/science/science-topics/groundwater-recharge

**Hazard**
*Definition:* A source or cause of harm or difficulty.

**Source:** Resilient Maryland Strategy

**Hazard Risk**
*Definition:* The potential for consequences where something of value is at stake and where the outcome is uncertain. This term can be used in reference to all types of hazards.

**Source:** https://www.usgs.gov/media/images/what-difference-between-hazard-and-risk#:~:text=Detailed%20Description,disruption%2C%20or%20environmental%20damage.%E2%80%8B

**Heat island effect/Urban heat island effect**
*Definition:* The phenomenon that occurs when buildings, roads, and other infrastructure absorb and re–emit heat from the sun, causing urban areas to experience higher temperatures than surrounding areas.

**Source:** https://mgaleg.maryland.gov/mgawebsite/Laws/StatuteText?article=gtr§ion=2-103.8&enactments=false

**Housing**
*Definition:* Making the State of Maryland a desirable and affordable home for all residents by fostering attainable, resilient, and quality housing opportunities. Accessible housing that withstands and adapts to emerging hazards is vital to a functioning and growing economy, generational wealth planning, and economic justice.

**Source:** Refers to a sector of the Resilient Maryland Strategy. Definition developed collaboratively.

**Human-caused**
*Definition:* Human-caused hazards include technological hazards (caused by the tools, machines, and substances used in everyday life) and intentional acts (caused by people attacking or damaging what is valuable in a society). Examples include hazardous materials releases, major computer system failures (e.g., 911 system), terrorist attacks, and riots.

**Source:** https://emilms.fema.gov/is_0559/groups/108.html

**Impervious land cover**
*Definition:* Areas resistant to water infiltration such as roads, buildings, and other urban structures, diminishing the landscape's ability to absorb stormwater, mitigate hazards (e.g. flash floods), and support biodiversity.

**Source:** https://pmc.ncbi.nlm.nih.gov/articles/PMC12078637/

**Justice and Equity**
*Definition:* Supporting equitable community engagement and environmental justice, by considering the voices and experiences of marginalized communities and prioritizing investments that make underserved and overburdened communities resilient to climate change and other hazards. Environmental justice requires a systems approach that strives to dismantle discriminatory policies and practices that result in disproportionate impacts on overburdened and underserved communities.

**Source:** Refers to a focus area of the Resilient Maryland Strategy. Definition developed collaboratively.

**Living shorelines**
*Definition:* A nature-based method for stabilizing a shoreline and protecting it from erosion. Unlike traditional "hard" shoreline stabilization techniques, such as concrete seawalls, living shorelines are made of natural materials such as plants, sand, rock, or oyster shells.

**Source:** https://www.fisheries.noaa.gov/insight/understanding-living-shorelines

**Managed retreat**
*Definition:* When individuals or entire communities move away from high-risk areas to reduce exposure to hazards.

**Source:** Resilient Maryland Strategy

**Manufactured housing**
*Definition:* A structure built on a permanent chassis and designed to be used as a dwelling.

**Source:** https://www.federalregister.gov/documents/2021/01/12/2020-28227/manufactured-home-construction-and-safety-standards

**Microgrid**
*Definition:* A collection of interconnected loads, generation assets, and advanced control equipment installed across a defined geographic area that is capable of disconnecting from the macrogrid (the utility scale electric distribution system) and operating independently.

**Source:** https://energy.maryland.gov/reports/marylandresiliencythroughmicrogridstaskforcereport_000.pdf

**Modular housing**
*Definition:* A structure designed to be used as a dwelling with a permanent foundation, built with or without a chassis, and transportable in one or more sections. Modular homes are built in a factory to State standards and enforced by the State using State laws and regulations.

**Source:** https://labor.maryland.gov/labor/build/buildmobilehud.shtml

**Nuisance flooding**
*Definition:* High tide flooding that causes public inconvenience.

**Source:** https://dnr.maryland.gov/ccs/Documents/Final_Nuisance_Flood_Plan_Guidance_2024.pdf

**Nutrient runoff**
*Definition:* When excess fertilizer leaves the field and enters local waterways in surface water runoff. These nutrients cause algae in the water to bloom much faster than it would under normal conditions.

**Source:** https://www.usda.gov/about-usda/news/blog/farmers-keeping-nutrients-field-out-streams

**Place-based Resilience**
*Definition:* Advancing community-led resilience projects in areas that are disproportionately affected by hazards and stressors, by fostering collaboration across local, regional, and state agencies and combining resources to optimize resilience benefits. A collaborative, place-based approach to resilience will lead to transformation instead of one-off projects.

**Source:** Refers to a focus area of the Resilient Maryland Strategy. Definition developed collaboratively.

**Pluvial flooding**
*Definition:* Flooding that occurs when heavy rainfall overwhelms local stormwater systems.

**Source:** Resilient Maryland Strategy

**Public health emergency**
*Definition:* A public health emergency is an event that can cause harm to a person's health or to the health of a community. These events can happen at any time, anywhere and include outbreaks, natural disasters, accidental releases of industrial chemicals, and intentional acts with biological, chemical, radiological, or nuclear agents.

**Source:** https://www.cdc.gov/orr/about/index.html

**Resilience**
*Definition:* Resilience is the ability of communities to adapt to the challenges of changing conditions and disasters, including human-caused and natural hazards – and to build, advance, and maintain capacities related to quality of life, health and well-being, durable systems, economic vitality, human made and nature-based infrastructure, and sustainable environmental systems.

**Source:** Resilient Maryland Strategy

**Resilience Authority**
*Definition:* In Maryland, Senate Bill 457 authorizes local governments to establish and fund a resilience authority under local law. This state legislation defines a resilience authority as an "authority incorporated by one or more local governments in accordance with this title whose purpose is to undertake or support resilience infrastructure projects." This legislation also specifies certain authorities that local governments may grant to a resilience authority, including the authority to issue bonds. At the time of publication, two resilience authorities exist in Maryland: the Resilience Authority of Annapolis and Anne Arundel County and the Resilience Authority of Charles County.

**Source:** https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/sb0457/?ys=2020rs

**Resilience Bonds**
*Definition:* A Resilience Bond is a new insurance instrument designed to help cash-strapped governments increase both physical protection and financial insurance against disasters. These bonds link insurance coverage that public sector entities can already purchase (including parametric insurance policies and catastrophe bonds) with capital investments in resilience projects (such as, flood barriers and building retrofits) that reduce expected losses from disasters. This connection between insurance and infrastructure is important, because just as life insurance doesn't actually make you physically healthier, catastrophe bonds do not reduce physical risks and only payout when disasters strike.

**Source:** https://wordpress-72417-4576953.cloudwaysapps.com/wp-content/uploads/pdf/RE.bound-Program-Report-September-2017.pdf

**Robust Economy & Job Creation**
*Definition:* Promoting an equitable, robust and competitive economy while creating new jobs that support resilience and preparing the workforce for future hazards.

**Source:** Refers to a focus area of the Resilient Maryland Strategy. Definition developed collaboratively.

**Salinization**
*Definition:* Salinization is used to describe the process by which water-soluble salts accumulate in fresh surface waters or in soils within agricultural land, wetlands, and coastal forests.

**Source:** https://planning.maryland.gov/Documents/OurWork/RRP/envr-planning/Marylands-plan-to-adapt-to-saltwater-intrusion-and-salinization.pdf

**Saltwater intrustion**
*Definition:* The movement of brackish water into freshwater, including into surface waters, aquifers, and water within soils. Historically, saltwater intrusion has been used to describe the movement of saltwater into aquifers only.

**Source:** https://dnr.maryland.gov/ccs/Pages/Definitions-and-Terms.aspx

**Seawalls**
*Definition:* Massive structures used to protect backshore areas from heavy wave action.

**Source:** https://dnr.maryland.gov/ccs/publication/sect54owners_sm.pdf

**Social vulnerability**
*Definition:* Demographic and socioeconomic factors (such as poverty, lack of access to transportation, and crowded housing) that adversely affect communities that encounter hazards and other community-level stressors.

**Source:** https://www.atsdr.cdc.gov/place-health/php/svi/index.html

**Stressor**
*Definition:* Chronic challenges that harm communities on blue-sky days and can make hazards more severe.

**Source:** Resilient Maryland Strategy

**Subsidence**
*Definition:* A gradual settling or sudden sinking of the Earth's surface due to removal or displacement of subsurface earth materials.

**Source:** https://www.usgs.gov/mission-areas/water-resources/science/land-subsidence

**Value-added products**
*Definition:* The alteration or enhancement of a raw agricultural product, including livestock, or an agricultural service in a way that increases the product or service's worth to a consumer and brings more revenue to a farmer, producer, or processor; and includes all enterprises, including those providing equine activities, in which an agricultural business or the agricultural business's products or services are altered, marketed, produced, or processed in a way that adds income to a farmer, producer, or processor.

**Source:** https://mda.maryland.gov/Documents/SGD VAA _ FINAL _ 10-7-25.pdf

**Wetlands**
*Definition:* Transitional areas between land and water, where soil is saturated or covered by water at least part of the time. They take many forms, including mangroves, marshes, swamps, bogs, and wet prairies.

**Source:** https://www.usgs.gov/faqs/what-are-wetlands#:~:text=Wetlands%20are%20transitional%20areas%2C%20sandwiched,Wetland%20and%20Aquatic%20Research%20Center

# ** End of Appendix J **

Maryland
DEPARTMENT OF
EMERGENCY MANAGEMENT

MARYLAND OFFICE OF
RESILIENCE
*A Resilient Maryland, Rooted in Community*

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