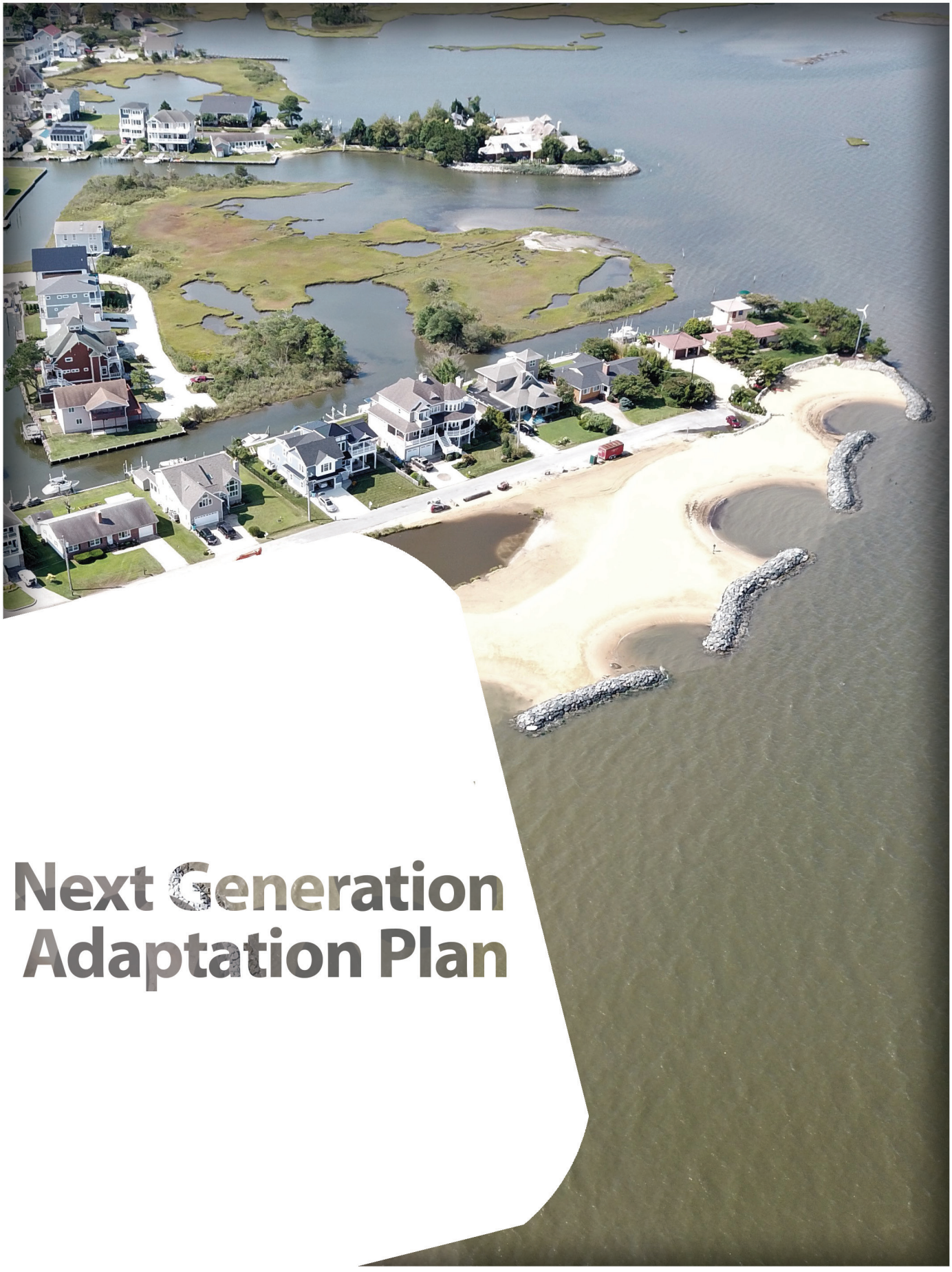


Next Generation Adaptation Plan

Table of Contents

Message from the Chair

Maryland is facing a pivotal time in our climate change history. The decisions we make now have major implications for the future of our state. Today, we're already experiencing the impacts of climate change such as increasing water temperatures, coastal erosion, and flooding. These effects are expected to become more severe over time.

Government officials and community leaders can more effectively predict, respond to, and recover from changing conditions by building climate change adaptation and resilience strategies into their policies and procedures.

As the chair of the Adaptation and Resiliency Working Group (ARWG), I am excited to present our Next Generation Adaptation Plan (NextGen): a 10-year roadmap to increase climate change resilience in Maryland.

The priorities and milestones in the NextGen Plan build on the ARWG's previous product, the Adaptation Framework released in 2021. The Adaptation Framework identifies focus areas that have the greatest potential for building Maryland's climate resilience. The Framework also includes a list of over 100 strategies and activities to guide adaptation.

The NextGen Plan prioritizes those activities and expands on them to create an implementation plan for the next decade. During that time, we will assess our progress as projects are completed and modify our strategies to ensure they are meeting climate adaptation goals.

The milestones outlined in the NextGen Plan aim to increase resilience for five sectors:

Water Resources,
Natural Resources and Ecosystems,
Working Lands and Natural Resource Based Economies,
Human Health, and
Critical Infrastructure.

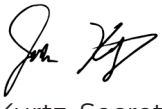
Throughout these sectors, the Plan integrates climate jobs and training, local government assistance and the principles of justice, equity, diversity, and inclusion.

The NextGen Plan contains an ambitious list of priority actions. Top among these actions are goals to prioritize equity in decision-making processes, expand technical assistance to local governments, address climate-related health risks, anticipate habitat changes across our working lands and waterfronts, and develop a decision support tool for analyzing hazard risks to Maryland's critical infrastructure.

In developing the NextGen Plan, the ARWG brought together multi-talented experts who embody the state's commitment to making Maryland climate-resilient. This partnership enables Maryland to pursue innovative climate change adaptation and resilience strategies.

Climate change–whether in the form of stronger storms, increased flooding, or hotter temperatures–will create new expenses for the state. It's in Maryland's best interest to act now to limit the future costs and effects caused by climate change.

The actions called for in the NextGen Plan are possible thanks to the unprecedented level of collaboration among state agencies, local governments, academics, and nonprofit partners. Together, we will continue to guide our state as we build Maryland's resilience to climate impacts and deliver equitable adaptation for all Marylanders.



Josh Kurtz, Secretary
Department of Natural Resources

NextGen Acknowledgements List

Plan Development Team

- Amanda Small, NOAA Coastal Management Fellowship Program
- Catherine McCall, Maryland Department of Natural Resources
- Ryland Taylor, Maryland Department of Natural Resources
- Sarah Lane, Maryland Department of Natural Resources

Focus Area and Sector Group Co-Leads

- Allison Breitenother, Maryland Department of Transportation
- Amanda Small, Maryland Department of Natural Resources
- Anne Hairston-Strang, Maryland Department of Natural Resources
- Brandy Alexis Espinola, University of Maryland Environmental Finance Center
- Catherine McCall, Maryland Department of Natural Resources
- Clifford Mitchell, Maryland Department of Health
- Gabe Cohee, Maryland Department of Natural Resources
- Jim George, Maryland Department of the Environment
- Sarah Lane, Maryland Department of Natural Resources
- Sasha Land, Maryland Department of Natural Resources

Focus Area and Sector Group Participants

The following dedicated teams of focus area and sector group participants lent their individual and organizational expertise, time, and resources to make the NextGen Plan possible.

Annie Sekerak
Ben Daniels
Cait Whiteleather
Charlotte Shearin
Christine Burns
Claudia Jones
Debbie Herr Cornwell
Elliott Campbell
Evan Isaacson
Fredrika Moser
Hannah Mayhew
Jackie Specht
Jane Sinclair
Jason Dubow
Jennifer Esposito
Jesse Delph
Karen Metchis
Kate Charbonneau
Kate Durant
Kate McClure
Kate Vogel
Katherine Charbonneau
Kevin Antoszewski
Lisa Hoerger
Michael Grassmann
Nell Ziehl
Nick Kelly
Patrick Wynn
Ronnie Gist
Sabine Bailey
Sandi Olek
Sara Bender
Sarah Widman
Scott Christensen
Spyros Papadimas
Susan Makhlouf
Tammy O'Connell
Tay Harris
Todd Sabin

The state of Maryland recognizes Anthony Burrows and the DNR Communications team for creating the graphic design and layout of the NextGen Plan, and Gabrielle Jones, who supported the NextGen Plan development during an internship through Morgan State University and MDNR.

The NextGen Team is also grateful for everyone who took the time to review this document and provide feedback.

Cover photo: Selsey Road in West Ocean City - Maryland Chesapeake Bay Program

Executive Summary

Climate impacts from sea level rise, warming temperatures, and altered precipitation patterns are some of the greatest challenges facing Maryland's diverse natural, human, social and economic systems. Maryland is a leader in climate change action, continually implementing programs and strategies for anticipating and reducing climate impacts that require dynamic and coordinated action across sectors. Climate adaptation - actions taken to reduce vulnerability to the impacts of climate change by preparing and adjusting to new conditions - is aimed at enhancing the resilience of natural and human-based systems, whereas climate resilience is the ability of a system to recover from climate impacts. Maryland's Next Generation (NextGen) Adaptation Plan is a roadmap where adaptation and resilience are both considered core elements to reduce overall climate impacts over the next ten years.

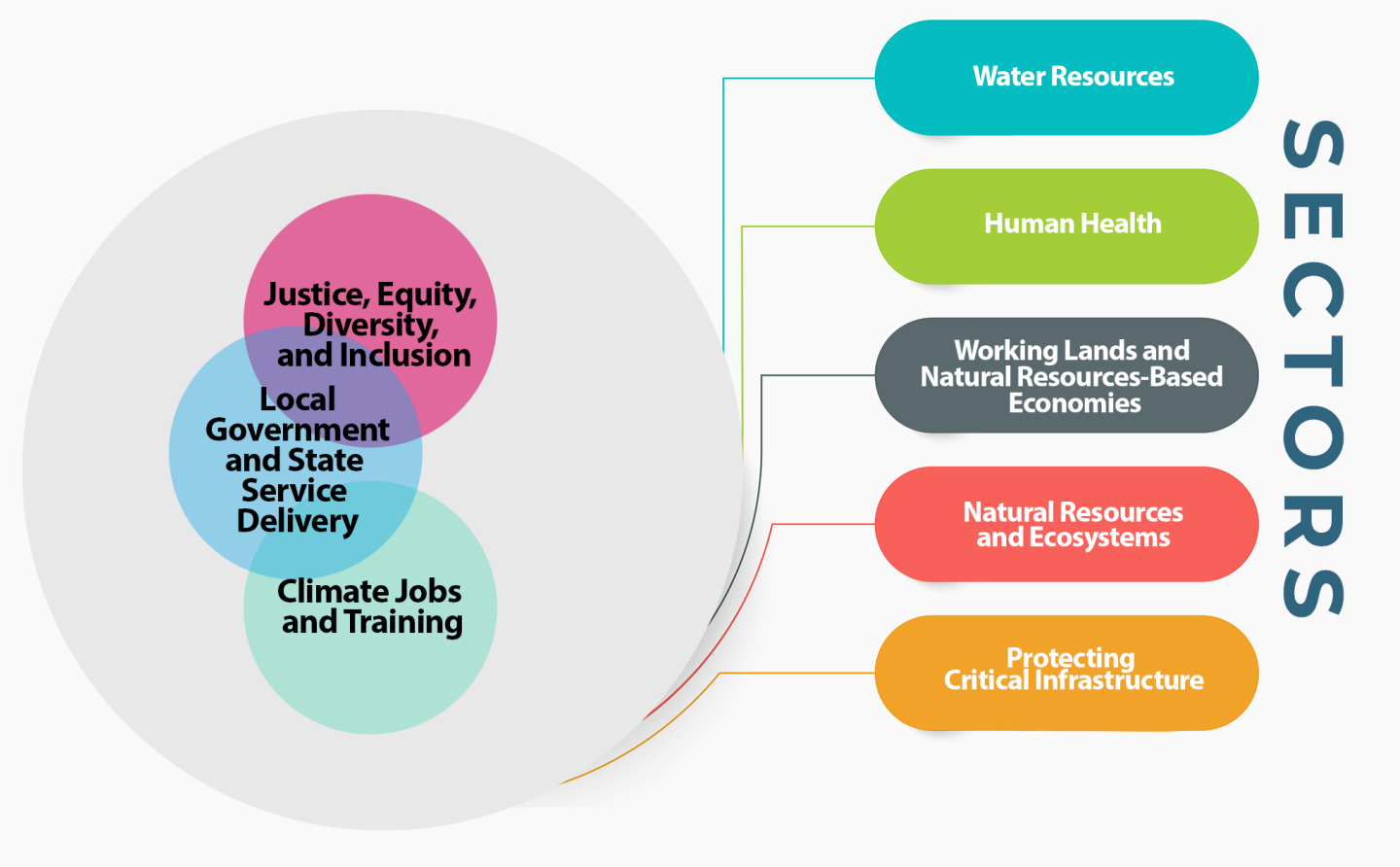
This NextGen Adaptation Plan is driven by input and feedback from state, local and nonprofit partners and should be used as a prioritization tool to inform annual work plans and strategy implementation as Maryland continues building adaptation and resilience into all state programs and policies. These policies will allow the flexibility to maneuver and adjust with new research to provide an effective adaptive management strategy across all affected sectors. In doing this, the NextGen Plan seeks to prioritize actions within underserved and disproportionately vulnerable populations and communities by building in policies that require additional funding and efforts to be directed to these areas. These ambitious goals are not achievable overnight and will require a collective commitment from partners at the state, federal, local and community level.

The Maryland Commission on Climate Change (MCCC) is charged with developing an action plan and timetable to mitigate and adapt to the impacts of climate change in Maryland. The Adaptation and Resiliency Working Group (ARWG) was formed as part of the original MCCC executive order and is chaired by the Secretary of the Maryland Department of Natural Resources (MDNR). Work performed by the ARWG has focused on providing tools and recommendations for state and local governments to strategically plan for and adapt to climate change.

In 2021, the ARWG released the Maryland Climate Adaptation and Resilience Framework Recommendations (Adaptation Framework), which provides high-level goals to support Maryland's adaptive capacity and resilience to climate change impacts. The NextGen plan directly builds off the high-level concepts put forth in the Adaptation Framework and proposes priorities with achievable short, mid and long-term milestones over the next ten years. Like the Adaptation Framework, the formation of the NextGen plan was split into five sector groups and three focus groups containing overarching priorities designed to be applied across all sectors and agencies. The consensus-driven process began with a recommitment of participants to these sector and focus groups ensuring representation from as many relevant agencies, local government and public sectors as possible.

These groups then met regularly to 1) select and update the Adaptation Framework strategies to be included as priorities in the NextGen Plan, 2) assess which resources are necessary to implement the priorities 3) categorize priorities as either “resource ready” or “investment needed” (see definitions in Appendix C) and 4) develop a timeline of milestones for implementing each priority over a 10-year timeframe. Many milestones have clearly defined leads, but overall specific deliverables will be accountable to the MCCC with progress tracked by the ARWG.

The impacts of climate change are already apparent and not experienced uniformly across this diverse state. Maryland will continue to coordinate across sectors and geographies to simultaneously implement adaptation, resilience and mitigation priorities affecting all populations. The influx of federal financial support is a great opportunity for Maryland to ensure its climate adaptation structure is ready to progress, but that funding will not sustain the implementation of these adaptation priorities long term. As the state continues to make historic investments in resilience through the coordinating role in the Office of Resilience at the Maryland Department of Emergency Management and by elevating resilience within agencies through resilient systems officer positions, the opportunities to advance these NextGen milestones in the coming years are significant. The next ten years are a critical time for action. The priorities in this NextGen Plan provide a roadmap to keep the state moving forward and ensure no Marylander is left behind.Maryland Office of Resilience at the Maryland Department of Emergency Management and by elevating resilience within agencies through resilient systems officer positions, the opportunities to advance these NextGen milestones in the coming years are significant. The next ten years are a critical time for action. The priorities in this NextGen Plan provide a roadmap to keep the state moving forward so Maryland leaves no one behind.



Focus Areas

Justice, Equity, Diversity, and Inclusion
Coordinate and collaborate on aligned adaptation actions that avoid unintended consequences and achieve equitable outcomes for at-risk, underserved, and vulnerable populations; Invest in adaptation projects and programs that address historic and current inequities and equitably involve underserved and overburdened communities; Co-create adaptation solutions with communities and local and state government.

Local Government and State Service Delivery
Build local government capacity to adapt to climate change; collaborate between state and local governments to understand climate impacts and implement adaptation solutions; Co-create local adaptation solutions through supporting and engaging in regional partnerships; Conduct public educational outreach and training; Provide sufficient funding, tied to adaptation goals, to support local governments.

Climate Jobs and Training
Ensure no net job loss as a result of changing climate conditions; increase opportunities for climate adaptation training and education for entry level, mid-career job seekers and existing employees; Provide re-training to support employees during climate-driven industry changes; Invest in new and emerging technology and new adaptation-related economies; Incorporate climate adaptation into early-career training programs and educational curriculum.

Sectors

Water Resources
Address changing water quality impacts in the face of climate change; Ensure equitable access to safe, plentiful water statewide; Increase the resilience of Marylanders to water-driven climate hazards; Align and coordinate water-related adaptation work; Secure resources to support water resilience needs.

Human Health
Protect from direct and indirect climate impacts by understanding and planning for the climate impacts on health; Conduct a statewide climate and health profile report that evaluates morbidity and mortality data, as well as programming and adaptive capacity in the state; Establish a statewide climate and health partnership network to expand the climate and health surveillance program; Integrate a Health Impact Assessment framework for health equity into all climate adaptation decisions statewide; Expand climate and health communication and education efforts to increase awareness and understanding of individual risk to encourage behavior change and risk reduction individually and at the community and statewide level.

Working Lands and Natural Resources-Based Economies
Preserve and restore working lands and waters while ensuring land uses support other statewide resiliency goals; Support the economic development and sustainability of agriculture, forestry and working waters; Create food security in the face of climate change; Expand education and outreach to support the sector in achieving adaptation goals.

Natural Resources and Ecosystems
Manage lands and waters to protect, conserve, connect and restore natural resources; Create regulatory and policy cooperation for climate adaptation; Empower and engage communities to support natural resources' adaptation; Practice adaptive management to incorporate flexibility into natural resource management; Establish funding opportunities to advance adaptation goals and preserve resources.

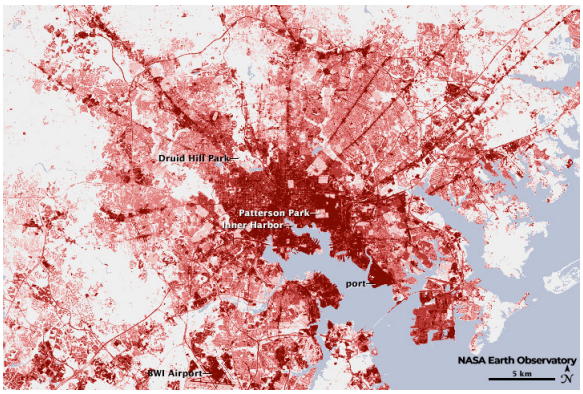
Critical Infrastructure
Create an inventory of all critical infrastructure in Maryland; Integrate an Asset Management Adaptation Plan framework into critical infrastructure decision-making; Create a decision support toolbox to inform critical infrastructure planning and operations; Update plans to reflect top infrastructure resilience priorities; Integrate resiliency components into priority critical infrastructure projects.

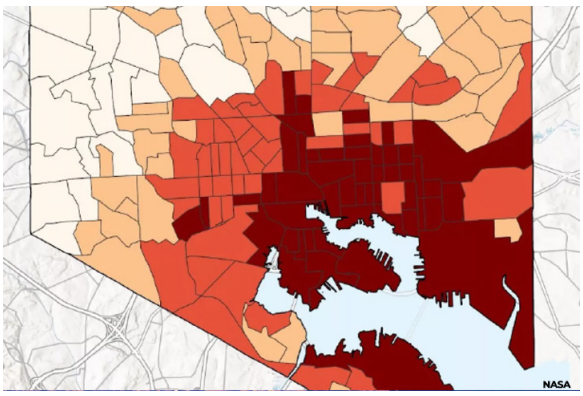
Justice, Equity, Diversity and Inclusion

Coordinate and collaborate on aligned adaptation actions that avoid unintended consequences and achieve equitable outcomes for at-risk, underserved, and vulnerable populations; Invest in adaptation projects and programs that address historic and current inequities and equitably involve underserved and overburdened communities; Co-create adaptation solutions with communities and local and state government.

Group Introduction:
While all Marylanders will be impacted by climate change, those who have historically had more resources will be in a better position to respond, recover and adjust as climatic changes occur, while others will be disproportionately affected. The effects of climate change can be especially devastating for vulnerable populations such as children and the elderly, people with disabilities and medical conditions, and low-income people. Such populations may be more susceptible to disease, have trouble accessing resources, or live in areas that do not promote good health or well-being. In many cases, those most vulnerable to climate impacts are underserved and overburdened in terms of finances, resources, etc. as a result of generations of disinvestment due to racism and other forms of marginalization creating social, health, environmental and economic inequities.

One example of this reality is the pattern of urban heat in Baltimore City. Researchers have found that the hottest areas of Baltimore are also the least wealthy, and Baltimore's hottest neighborhoods today align with areas that were "redlined" by the Home Owners Loan Corporation in the 1930s. Redlining is a process that was used to identify certain areas as high-risk for mortgage lenders, which would not issue loans for housing in "hazardous" areas. Two of the factors used to label an area as high-risk were the racial identity and socioeconomic status of its residents. By removing the possibility of homeownership from certain members of society, redlining entrenched racial segregation and disinvestment. Today, redlined areas in Baltimore have more pavement and less green space than other areas, causing residents of these neighborhoods to experience temperatures up to ten degrees hotter than other parts of Baltimore. Climate change will continue to exacerbate this disparity as temperatures keep rising.





All adaptation work must engage a diversity of interested and impacted parties in order to develop and implement approaches that appropriately reflect many voices and opinions. It is also integral that community-scale work is led or co-led by community members and honors community goals and experiences. Government agencies need to understand structural systems that create and perpetuate social inequities and in turn develop cross-sector or cross-government collaborations to address the root causes of disproportionate social and environmental impacts. This "inside" government approach should parallel the "outside" government strategy of equitable partnership with community members most impacted by climate risks. The Justice, Equity, Diversity and Inclusion (JEDI) priorities and milestones help demonstrate the types of approaches and considerations that need to be integrated into climate adaptation work for it to be equitable and inclusive, and can serve as planning resources for state agencies and local governments.

Addressing the root causes of social inequities that disproportionately impact certain communities presents both a challenge and an opportunity to improve government processes. Complex issues, such as increased social vulnerabilities to climate hazards, rarely have a singular solution or immediately available independent funding that can be implemented by one sector or government agency alone. The collaborative and interdisciplinary approach (often called a "whole government" or "whole-of-government" approach) promoted by the Next Generation Adaptation Plan priorities and milestones will help government programs work in alignment, not in tension, toward equitable adaptation solutions.

Key: Throughout the document on the left we indicate where these focus areas across sectors. The key below will help you identify which sectors are part of the focus area.

FOCUS Justice, Equity, Diversity, and Inclusion | Local Government and State Service Delivery | Climate Jobs and Training

SECTORS Water Resources | Human Health | Working Lands and Natural Resource-Based Economies | Natural Resources and Ecosystems | Protecting Critical Infrastructure

"Resource Ready" Priorities

Priority 1: Build equitable representation into governance.

a. **Short Term (0-2 years)**
   i. Define "equitable representation" with assistance from the Maryland Commission on Climate Change's (MCCC) Climate Justice Steering Committee and/or the EJ Commission in a glossary and provide working examples in governance.
   ii. Increase government transparency by creating an annual report of state employee demographics.
   iii. Begin to improve equity in hiring procedures across state agencies by conducting a needs assessment for the current process of promoting job listings and recruiting for positions. Promote diversity in the workforce by targeting advertising for job announcements, continually reassessing job requirements and modifying civil service laws.
   iv. All agencies should expand pathways to entering careers in environmental governance.

1. Build support for recognizing interdisciplinary qualifications, climate certificate programs and climate work embedded in alternative fields (e.g. finance, accounting, wastewater) as acceptable experience for job requirements.

2. Establish a pipeline program for actively engaging more Black, Indigenous, People of Color (BIPOC) in these pathways. For example, improve and renew partnerships with fellowship and internship programs.
3. Commit to hosting fellows from existing programs such as the Chesapeake Bay Trust or the Climate Conservation Corps.

v. All agencies should hire staff who specialize in climate and equity work to assist agencies to embed Justice, Equity, Diversity and Inclusion (JEDI) into programs and policies.

vi. Assist the Department of Budget and Management (DBM) with assistance from the Department of Commerce (Commerce) and Department of Labor (Labor) to develop a statewide guide for best hiring practices. Develop guidance for agencies to think about where they do their career outreach. Include best practices, resources and how to expand their reach.

vii. Actively invest in career development opportunities such as youth outreach for climate adaptation career opportunities, training pipelines and instituting an apprenticeship program that does not require higher education degrees and prioritizes direct experience for entry-level positions (for example, strengthening partnerships with Historic Black Colleges and Universities and Predominantly Black Institutions).

1. Task the MCCC Just Transition Working Group with equitably assisting the transition into climate ready career development opportunities.

b. Mid Term (2-5 years)

i. Incorporate equity and transparency processes within state programs and policies.

1. Continue to regularly assess and publish findings of diversity and inclusion at all levels of state agencies, boards and commissions and actively seek to increase representation from historically excluded and underserved communities.
2. Administer an anonymous survey (potentially hiring an outside consulting group) to regularly assess the culture of state agencies to ensure the work environment is culturally competent and supportive of BIPOC staff. This will help with retention of diverse staff.

c. Long Term (5+ years)

i. The Commission on Environmental Justice and Sustainable Communities (CEJSC) or other multi-agency task force will work to develop a strategy to shift culture with the goal of removing systemic racism from state programs and policies.

ii. All agency Human Resources offices (HR) should connect the new strategy with training for state agency leaders and staff to improve core competencies around the intersection of climate change and JEDI.

Priority 2: Ensure that state agencies are aligned in centering environmental and climate justice and streamline coordination and collaboration.

a. Short Term (0-2 years)

i. State agencies work with partners and local jurisdictions to continue building on EJ screening tools and processes to identify and map underserved and overburdened communities and vulnerable populations threatened by climate change and the associated capacity needs to support community-driven adaptation action.

ii. In collaboration with the Maryland Office of Resilience at the Maryland Department of Emergency Management (MDEM), begin development of a "language map" that acts as a glossary to define the ways language is used across agencies for outreach such as grants, reports, and mapping initiatives, etc. to ensure equitable representation of climate justice communities.

iii. The Adaptation and Resiliency Working Group (ARWG) works with the MCCC and Governor's office to develop and issue an Executive Order committing to ambitious adaptation-related JEDI goals based on the Justice 40 initiative. ARWG member agencies identify specific steps to continue meaningful progress, including where goals are applied (e.g. which programs and policies) and how they are supported (i.e. not solely relying upon grant funding, and where state funds are applied via regulatory programs).

iv. Assist in the continued review, development and promotion of the MCCC Climate Justice Equity Toolkit that builds common glossaries and prompts for consideration of JEDI principles across agencies.

v. Revisit the Health in All Policies Task Force recommendations. Embed equity into this to ensure accountability. Then advance legislation, health and equity in all policies, to make this an intrinsic aspect of all agencies.

b. Mid Term (2-5 years)

i. The ARWG and the Climate Justice Steering Committee work collectively with state agencies to develop and/or re-commit to statewide actions and policies highlighting and elevating JEDI and climate adaptation. This may include:

   1. Creating a governor's cabinet-level position or an authority that coordinates environmental justice (EJ) and climate justice (CJ) staff in state agencies to redefine structure around JEDI and adaptation;
   2. Drafting language for legislative action that set Justice 40 goals;
   3. Agency-specific statements and commitments about ways that communication, engagement and investments will advance actionable steps.

ii. Form a permanent JEDI, EJ and/or CJ subgroup of ARWG to work with the CJ Steering Committee and coordinate this effort.

iii. Work with the MCCC Education, Communication and Outreach working group (ECO) on promotion and implementation of the Equity Toolkit in agency work to ensure it is being used widely and applied correctly.
iv. Evaluate existing state resources relevant to training on the intersection of climate change and JEDI and identify gaps.

c. Long Term (5+ years)

i. After evaluating existing resources and identifying gaps, develop consistent training criteria for state agency leaders and staff to improve core competencies around the intersection of climate change adaptation and JEDI. Create a shared culture and responsibility for centering underserved communities and vulnerable populations in adaptation and resilience initiatives.
ii. Implement the Equity Toolkit across all agencies.

Priority 3: Develop and implement a comprehensive communications and engagement strategy across the state of Maryland that resonates with residents and aligns with community needs.

a. Short Term (0-2 years)

i. Establish an equitable engagement task force to develop a comprehensive communications plan. The task force should be made up of organizations led by and serving people of color (POC), community-based organizations and organizations that prioritize JEDI.
    1. Work with MCCC ECO and CJ Steering Committee to assess communications needs within residential communities.

a. Understand the local organizations, communities, governance and trusted figures.
b. Create additional capacity at the state or agency level with collaboration from University partners to do outreach, interviews and focus group discussions to assess priorities and community needs.
c. Schedule regular listening sessions with underserved communities that go beyond engaging local governments into action.

ii. All agencies should schedule regular community engagement events to establish a presence in the areas served.
iii. When planning community meetings or sessions, all agencies should provide assistance such as childcare and travel reimbursement to reduce barriers for participation.
iv. Identify capacity and time constraints for state agency implementation of deep engagement and how partnerships might be able to address limitations.

b. Mid Term (2-5 years)

i. In collaboration with the Maryland Office of Resilience, conduct a comprehensive inventory of the capacity and approach of state agencies for outreach and communications and assess outcomes of community engagement for best practices. Employ locals to participate and conduct this assessment.
ii. Develop a more coordinated approach to outreach and engagement by building community profiles for vulnerable groups that contains information about identified priorities, vulnerabilities, needs and established community organizations to be shared statewide.

c. Long Term (5+ years)

i. Compile a best practices document using the above inventory that includes a minimum standard of communications with communities and guidance on coordinating and tracking interactions with community partners to ensure they are not further burdened. Cite case studies as examples for what has worked in the past.

ii. Create a shared platform across agencies to track communications with communities. For example, noting when agencies have been involved in discussions, received funding, permitting, etc. With the goal of lessening the communication burden on communities and ensuring state coordination and transparency.

"Investment Needed" Priorities

Priority 1: Identify patterns and legacies of structural disinvestment in underserved and overburdened communities to produce guidance and technical assistance for state agencies and local governments to remove obstacles to accessing resources.

a. Short Term (0-2 years)

i. To identify burdens, in collaboration with the Maryland Office of Resilience, develop a decision support tool to help agencies and departments assess existing JEDI tools that identify patterns and legacies of structural disinvestment and obstacles to access for underserved and overburdened communities.

ii. Use the Supporting Equitable Access to Funding for Adaptation Resources initiative (SEAFARE) to identify barriers to funding (see Resource Ready, Priority 1) and begin to develop legislative recommendations to address equity issues across state agencies.

iii. Identify government programs related to climate adaptation across sectors and within each, identify potential burdens, lack of alignment and potential for cumulative impacts.

b. Mid Term (2-5 years)

i. Continue ongoing work with Maryland Department of the Environment (MDE) and the CEJSC in consultation with affected communities to evaluate burdens and cumulative impacts and identify potential solutions (see Resource Ready Priority 3).
   1. Work within individual communities to define those burdens and cumulative impacts.
   2. Include health as a major indicator (e.g. tools like the Maryland Department of Health EPHT Program).

c. Long Term (5+ years)

i. Based on the patterns and legacies identified in short and midterm milestones, develop guidance and deliver technical assistance and resources to address structural disinvestments.

Priority 2: The Maryland Office of Resilience, in collaboration with other state agencies, will Improve decision-making processes for climate adaptation funding programs to prioritize investment in underserved and overburdened communities.

a. Short Term (0-2 years)

i. Develop an equitable investment strategy across state agencies with extensive public and local government input in order to ensure a prioritization process that is fair, transparent and based on shared community goals regardless of funding source.

1. Include an evaluation scorecard with criteria and processes for prioritizing expenditures that heavily weights JEDI considerations in the decision-making process for grant programs, capital projects, technical assistance initiatives and other aspects of state funding allocation.
2. Ensure ongoing community engagement; create transparent milestones to track progress.
3. When appropriate, ensure funding goes directly to the community and is not distributed to a third party.

ii. Perform a comprehensive review of where state funds are going that includes an evaluation of investments and economic impact, including an analysis of the geographic spread of investments, identification of priorities for invested communities and the long-term impacts of those investments.

b. Mid Term (2-5 years)

i. Deploy an equitable investment strategy, ensuring all state agencies are evaluating projects and programs based on adaptation and equity scoring criteria.

ii. Continue comprehensive reviews of state fund allocations at periodic intervals (suggested every 5 years) to build transparency.

iii. In coordination with the Maryland Office of Resilience, consider legislation to require vulnerability assessments beyond Federal Emergency Management Agency (FEMA) requirements, including a review of potential cumulative impacts on residents for all proposed projects over an explicit threshold (dollar or percent) established by the agency or jurisdiction.

1. Environmental impact assessments that determine the social and environmental impacts on residents.

c. Long Term (5+ years)

i. The Governor's office should consider reparations to address the historical inequities of investment that have adaptation-related implications across all sectors (e.g. development in flood-vulnerable locations, access to health services).

ii. Review Maryland Environmental Policy Act (MEPA) regulations and revise the recommendations to include climate adaptation. Encourage and/or require state agencies to adopt MEPA recommendations.

Priority 3: Commit resources to develop working relationships, information exchange and trust between agencies and underserved and overburdened communities affected by climate.

a. Short Term (0-2 years)

i. Collaborate with the Maryland Office of Resilience and the Governor's Office of Community Initiatives on outreach planning and implementation.
    1. Develop strategies for engaging communities prior to department/ agency project planning.
    2. Increase project timelines to co-develop project concept design through community engagement project development.

ii. Encourage state and local entities to conduct outreach in identified communities to start relationship-building.
    1. Dedicate staff to serve as liaisons between agencies and communities. Track staff involvement so communities do not feel burdened by multiple points of contact.

iii. Contract with organizations led by and serving BIPOC (e.g., minority-based enterprises), community-based organizations (CBOs) and organizations that prioritize JEDI to conduct outreach and engagement efforts.

iv. Develop and adopt policies that address procurement and reimbursement practices that allow the state to directly fund community liaisons and CBOs without going through other third parties (i.e. Non-Governmental Organizations [NGOs], universities, etc.). Incorporate into the Inter-Agency Funding Coordination scope of work.

b. Mid Term (2-5 years)

i. Using state and local agency communication and engagement mechanisms, create a work session framework for regular meetings with communities to identify their climate adaptation needs and how state/local entities can assist.

ii. Establish a community liaison program that compensates community members for serving as representatives in local/state government projects (especially in unincorporated communities).

c. Long Term (5+ years)

i. Continue to commit to relationships with communities through staff turnover by tracking relationships across and within agencies in a shared log.

Local Government and State Service Delivery

Build local government capacity to adapt to climate change; collaborate between state and local governments to understand climate impacts and implement adaptation solutions; co-create local adaptation solutions through supporting and engaging in regional partnerships; conduct public educational outreach and training; and provide sufficient funding, tied to adaptation goals, to support local governments.

Group Introduction:
Local governments will shoulder much of the burden in planning for and adapting to the impacts of climate change in the coming decade. As the severity of climate impacts increases, local governments will need to adjust their operations and seek innovative solutions to new problems. Sea level rise may drive land use change, creating ripple effects across planning and zoning, infrastructure needs, and tax bases.

Changing precipitation patterns may require new approaches to stormwater system maintenance programs and revisions to floodplain ordinances. Emergency services will need to grapple with extreme heat events and potential impacts to accessibility caused by storm-induced flooding as well as chronic nuisance flooding caused by sea level rise. An effective response to addressing these and other climate impacts at the local level will require risk assessment planning, as well as substantial investment and shared commitments to building the capacity to take action.

This investment will require participation by federal, state, regional and non-governmental interested and impacted parties to enable and empower local governments to achieve climate change adaptation goals and milestones.

This Next Generation Adaptation Plan recognizes the important role that local governments will play in climate change adaptation by emphasizing the need to support them through capacity building and collaboration. A "one size fits all" approach will not be sufficient; just as Maryland's geography varies widely across the state, all local governments operate differently and have distinct challenges. At the state level, it will be imperative to build a robust toolkit to support local climate adaptation work that has been informed by the needs of local governments to account for climate change in planning and implementation work.

Toolkit training sessions will provide relevant and recent data and recommendations for using the data to inform decision making. Sustained efforts to conduct educational outreach and secure funding resources to support resilience-building projects will also be critical for long-term success. Climate impacts are already being felt in many communities and local governments are already taking action, creating a strong baseline of local adaptation action to be expanded upon.

Key: Throughout the document on the left we indicate where these focus areas across sectors. The key below will help you identify which sectors are part of the focus area.

FOCUS Justice, Equity, Diversity, and Inclusion | Local Government and State Service Delivery | Climate Jobs and Training

SECTORS Water Resources | Human Health | Working Lands and Natural Resource-Based Economies | Natural Resources and Ecosystems | Protecting Critical Infrastructure

"Resource Ready" Priorities

Priority 1: The ARWG provides a web-based toolkit of capacity-building tools, resources, grant opportunities and training to assist local partners. This toolkit will Include resources from state and federal governments as well as from NGOs and private grant-making organizations.

a. Short Term (0-2 years)

i. The Maryland Office of Resilience will lead an interagency process to create a statewide toolkit of grants, program support and technical assistance to assist local partners in facilitating messaging consistency and resource accessibility. The tool will include data collected by MDEM and the ARWG Local Capacity Building Workgroup. MDEM will share the toolkit with the ARWG and state agency partners for review. This toolkit should:

1. Address specific climate impacts (e.g. including sea level rise, coastal storms, salinization, increasing temperatures and changing precipitation patterns) and identify resources and funding opportunities to aid in adaptation actions in local communities.
2. Review the data and analyses collected through the Maryland Department of Natural Resources (MDNR) Chesapeake and Coastal Service needs assessment of local government staff to determine if results are applicable.
3. Incorporate the results from SEAFARE.
4. Utilize new MDE permitting guidelines to advance resilience.

ii. Through identified networks provide toolkit outreach and training for local government and peer audiences.

b. Mid Term (2-5 years)

i. In coordination with the Maryland Office of Resilience, MDNR's Chesapeake and Coastal Service will conduct an evaluation of the gaps and effectiveness of the toolkit and provide recommendations to MDEM on revisions and updates. For specific impacts identify specific tools and determine how they are used and provide instructions and/or case studies on the platforms.

ii. Evaluate the need for integrating the toolkit into a central adaptation hub that serves cross-government coordination.

c. Long Term (5+ years)

i. Review specific tools identified in the toolkit every three years and update recommendations, instructions and case studies to ensure it is current and relevant.

Priority 2: Initiate a strong educational outreach campaign to build local support for bold, sustained, equitable climate adaptation action. Consider focusing messages on the cost of inaction in terms of health, fiscal impacts, local economy and jobs using local examples, visualization and trusted messengers.

a. Short Term (0-2 years)

i. With support from the ARWG and other MCCC working groups, the ECO working group should develop and lead the outreach campaign. The development of this campaign should consider, at minimum:
   1. Identify the goals of the outreach campaign including target audiences.
   2. Define key messages for bold, sustained, equitable climate adaptations across the different regions/sectors of Maryland. This should consider messaging around the cost of inaction.
   3. Identify how the campaign will be conducted.
   4. Determine the metrics by which progress is measured.

ii. Launch the outreach campaign (Year 2).

iii. The MCCC and ARWG will work to ensure that the campaign is distributed throughout the state of Maryland across partner networks. Partner with the Maryland Resiliency Partnership and the Maryland Office of Resilience to ensure coordination at the state level through intentional social media postings, outreach and engagement and in-person sessions. Identify and train trusted messengers such as community liaisons, schools, churches, NGOs to spread messages through passive and active engagement.

b. Mid Term (2-5 years)

i. Determine if the campaign is building support for adaptation action through evaluation of the metrics, i.e., is the campaign reaching the intended audience and if not develop a different strategy for outreach based on the evaluation data.

c. Long Term (5+ years)

i. Review communications tools, visualizations and messages every 3-5 years and update to reflect new data, information and climate impacts.

"Investment Needed" Priorities

Priority 1: Work with local governments to develop regional scale resilience collaborations that address the needs of climate-vulnerable and underserved communities and prioritize adaptation actions.

a. Short Term (0-2 years)

i. Create regional impact statements that quantify present and near term (2050) changes.
   1. This could include an analysis of sea level rise, high tide flooding, high tide flooding, drought, salinization, extreme heat and precipitation-induced flooding. Identify gaps in assessment data.

ii. Identify how state and local governments are addressing impacts for each region identified in various planning initiatives.
   1. Identify capacity needs and opportunities.
   2. Identify immediate next steps leading to the implementation of adaptation projects.

b. Mid Term (2-5 years)

i. Identify priority projects for each region and identify a lead agency to work with the community to go from planning to implementation.
ii. Catalog projects and outcomes.
iii. Update data sources as new information becomes available.

c. Long Term (5+ years)

i. Refresh the list of priority projects on an annual basis. Set a new list of priority projects to implement.
ii. Use adaptive management to assess changes in climate vulnerability and ensure that adaptation solutions remain flexible to meet community needs.
   1. State agencies will identify best practices to respond to a changing environment.changing environment.

Priority 2: Employ multiple means of increasing technical support to local governments, including regional partnerships and a local resilience capacity assistance service.

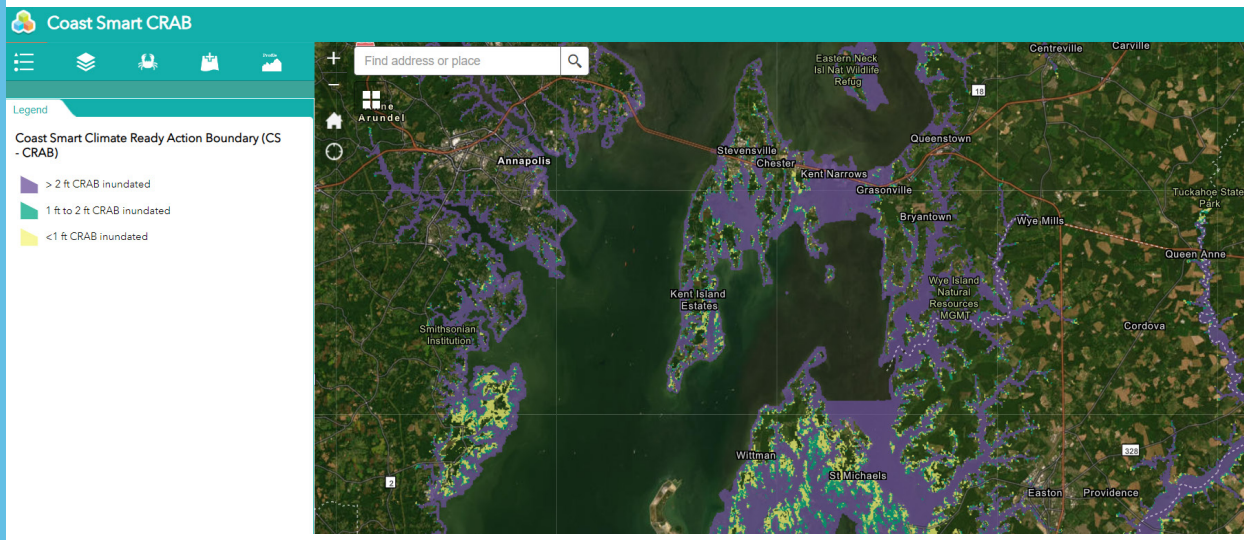
a. Short Term (0-2 years)

i. State agencies evaluate existing programs that provide technical assistance and capacity building to local governments. Identify gaps in service delivery and staffing capacity at the agency level.

ii. Key agencies, including the Maryland Office of Resilience, determine lead role identification and support agencies and how to assign or coordinate activities, including any roles with partners.

iii. Identify technical support needs and employ the appropriate mechanism for service delivery and identify gaps.

iv. Assess which local jurisdictions have adopted higher regulatory standards that address climate impacts that go beyond minimum (e.g. National Flood Insurance Program requirements or CoastSmart standards) and provide technical assistance to those local jurisdictions interested in implementing the identified higher regulatory standards.



b. Mid Term (2-5 years)

i. To expand service delivery, state agencies partner with community organizations beyond environmental groups to provide technical assistance and extend outreach.

ii. Address gaps in service delivery for establishing a broader service delivery network.

iii. Assess which communities have leadership positions responsible for oversight of the climate adaptation plan and strategy alignment and implementation to inform the technical assistance network.

c. Long Term (5+ years)

i. Review service delivery impacts every 5 years and make updates to the service delivery network.

Priority 3: Align existing state funding and programs to deliver climate adaptation and build community resilience prioritizing underserved and overburdened communities to receive assistance.

a. Short Term (0-2 years)

i. State agencies will identify and catalog funding and programs that build resilience.
ii. Determine criteria using existing state and federal mapping tools to identify underserved and overburdened communities across state agencies.
iii. Identify communities that have not received funding and understand community specific reasons why this has occurred.
iv. Identify barriers and solutions in distributing funding to underserved and overburdened communities through state funding programs.
    1. Utilize SEAFARE recommendations in this analysis.
    2. Across state agencies revise funding solicitations to clearly identify and establish criteria to prioritize the communities identified in 3.a.ii.
    3. Focus capacity building efforts or technical assistance partners in these priority communities to enable application to these solicitations.

b. Mid Term (2-5 years)

i. Key agencies will assess and adjust funding and programs to better serve underserved and overburdened communities to propel on the ground projects.
ii. Funding agencies will review applications and target technical assistance to diversify future applicants.
    1. Continually assess funding mechanisms to identify barriers for underserved and overburden communities.

c. Long Term (5+ years)

i. Develop a statewide grant application portal that facilitates an equitable distribution of funding and reduces barriers for applicants.
    1. Update and maintain the portal and analyze the impact of completed projects within underserved and overburdened communities.
ii. Provide technical and financial resources to assist throughout the grant cycle.
iii. Develop a case study on Maryland's holistic approach to climate adaptation using specific communities as examples of interdisciplinary, systems thinking, adaptive management climate projects.

Climate Jobs and Training

Ensure no net job loss as a result of changing climate conditions; increase opportunities for climate adaptation training and education for entry level, mid-career job seekers and existing employees; provide re-training to support employees during climate-driven industry changes; invest in new and emerging technology and new adaptation-related economies; incorporate climate adaptation into early-career training programs and educational curriculum.

Group Introduction:
Maryland's economy is diverse, with job sectors in aerospace and defense, agriculture and commercial fishing, biotechnology, finance and insurance, manufacturing, telecommunications and transportation and trade leading the state's economic growth. In 2019, 18.1 percent of the state's workforce was employed in the public sector and 81.9 percent in the private sector. Climate change will alter, create and impact job opportunities across Maryland. Existing industries may transform to meet climate goals, requiring their workforces to transfer existing or acquire new skills to adjust to new job requirements.

New adaptation-related job sectors may emerge to deploy climate-smart technologies or implement projects that build resilience in the natural and built environments. Innovative climate change mitigation and adaptation technologies will lead to new job growth opportunities as these technologies often require hardware and software manufacturing, deployment and maintenance. Education, training and re-training can build climate awareness across all job sectors and help to position the state's workforce and economies to meet future adaptation challenges.

Climate change presents an opportunity for the state to reimagine its existing and future economies. The state can act now to ensure that vital industries such as agriculture for food production and energy production can not only adapt to a changing climate, but create new economic opportunities and foster sustainable local and regional economies.

This Next Generation Adaptation Plan approaches jobs and training through the lens of understanding how implemented climate adaptation activities across sector groups may demand unique knowledge, skills and market strategies. The Climate Jobs and Training goals outline the types of approaches and considerations that could be integrated into short and long-term economic development plans, industry adjustment approaches and workforce education, training and retraining opportunities in response to climate adaptation activities.

Many existing local, regional and state initiatives and programs are positioned to help create and develop - directly or indirectly - new jobs that address the growing effects of climate change, or that can aid existing job sectors in adapting to changing environmental conditions. For example, a number of educational and outreach programs are already underway addressing industry job adjustments, providing grant and loan programs promoting job security or promoting worker safety.

Key: Throughout the document on the left we indicate where these focus areas across sectors. The key below will help you identify which sectors are part of the focus area.

FOCUS Justice, Equity, Diversity, and Inclusion | Local Government and State Service Delivery | Climate Jobs and Training

SECTORS Water Resources | Human Health | Working Lands and Natural Resource-Based Economies | Natural Resources and Ecosystems | Protecting Critical Infrastructure

"Resource Ready" Priorities

Priority 1: New Industry Development: Continue, refine and expand grant and accelerator programs to reflect industry needs for adaptation and increased resilience.

a. Short Term (0-2 years)

i. Define the scope of industries and job types that are part of an adaptation economy within Maryland. Of those industries and job types, identify which have job gaps, which have the potential for job creation and which have needs that the state could help address through incentives and regulations to secure and expand those opportunities.

1. This identification process should include, at minimum, the following industries: cultural and eco-tourism; outdoor restoration economies; energy production; manufacturing; food service; agriculture; fisheries; wood and timber. Specific examples may include:
   a. Agriculture: agroforestry, incorporating trees and shrubs into pasture and crop land
   b. Energy production: increase decentralized energy distribution
   c. Restoration: install green and blue infrastructure projects

d. Education and Training: build climate into education and training programs and increase the number of climate educators

2. This identification process should be linked to the Investment-needed Priority 2 action related to an economic analysis of adaptation-related economic sectors.

ii. Refine research and development focused requests for proposals (RFPs) to include an adaptation track, targeting products and techniques that provide climate resilience within the industries identified above. Leverage or build upon existing federal research initiatives (e.g. Small Business Innovation Research), academic and private climate change-oriented research and development activities and restoration funding that contributes to job creation (such as the Advanced Research Projects Agency-Energy and Chesapeake and Atlantic Coastal Bays Trust Fund) to connect industry needs to RFP requirements.

b. Mid Term (2-5 years)

i. Continue and seek to expand State funding into grant initiatives that provide mutual benefits to job creation and climate adaptation. For example, green and blue restoration projects installed through grant initiatives (e.g. Chesapeake and Atlantic Coastal Bays Trust Fund; Resiliency through Restoration; MD Clean Commerce Act/Bay Restoration Fund; Maryland Department of Agriculture [MDA] Soil Health Program, 5 Million Trees Initiative) contribute to job creation and increase resilience to flooding and other climate impacts.

ii. Support adaptation technology implementation and pilots by designing grants and low-interest or no-interest loans for climate adaptation related businesses. Maryland Agricultural and Resource-Based Industry Development Corporation's (MARBIDCO) loans and grants to new farmers and existing farm businesses looking to expand their production may serve as a model for this program. Examples include blue catfish and aquaculture.

iii. Expand eligibility within grants and loans that provide funding to Maryland businesses for climate adaptation-related technologies, products and techniques (e.g. Manufacturing 4.0 Grant Program). Eligible technologies should include existing climate resilience products and techniques as well as emerging technologies that are identified in the short-term step above.

c. **Long Term (5+ years)**
   i. For new industries operational in the 5+ year timeframe, the state will work to ensure that the industry and the infrastructure that supports it are designed, built and maintained in a resilient manner to avoid, minimize or mitigate climate impacts. For example, Maryland could apply CoastSmart criteria to ensure that offshore wind and electric vehicle manufacturing facilities and the infrastructure that supports them are in compliance.

Priority 2: Mid-Career Retraining: connect job seekers and Maryland companies with state grants and training resources. Target engagement and retraining efforts to underserved and overburdened communities. Success in implementing this goal will be measured by increased state and local financial investment in middle career training programs that foster and build increased worker participation in these training programs over time (e.g. Commercial Driver's License operators shift from coal-fired power plants to adaptation industries). Investments in early education about climate will help to build awareness about how climate affects different jobs and ensure a robust workforce exists to provide climate retraining opportunities.

a. **Short Term (0-2 years)**
   i. The ARWG compiles an inventory of existing education and training programs already available and identifies gaps and opportunities for program expansion.
   ii. Labor, in coordination with the ARWG, pursues an EARN grant that gathers partners to define training class objectives on a sector-specific basis and assemble class participants around integrating resilience into various industries. A component of the EARN grant will consider geographically-specific needs and the program will recruit underserved and overburdened community members to participate.
      1. Sector-specific elements of the EARN grant may include: fisheries, water treatment, outdoor restoration economy, wood and timber industries.
      2. Geographically-specific elements of the EARN grant will include: WorWic Community College programs for offshore wind, and the Frostburg State University campus-scale, micro-grid Resilience Maryland project.

3. Curriculum considerations for the EARN grant will include: notations about where educational curriculum matches the state workforce training needs, and where curriculum updates may be needed to ensure education and training programs match state workforce training needs.

iii. Maryland State Department of Education (MSDE), MDNR and other relevant state agencies continue to expand investments in high school climate curriculum to inspire and educate our future workforce on climate issues and build the skills necessary to meet adaptation industry needs.
    1. For example, education programs underway in Baltimore City Public Schools, with funding from Maryland Energy Administration (MEA), integrate offshore wind into curriculum and other opportunities to build a workforce for clean-energy economies.

iv. Labor will connect adaptation industry opportunities into upskilling partnerships within underserved and overburdened communities, utilizing networks such as the American Job Centers and Chambers of Commerce.

v. Maryland will incorporate the recommendations from the Chesapeake Bay Program's Workforce Action Team Multi-Year Strategy to implement the climate adaptation outcome into the Chesapeake Bay Agreement.

b. Mid Term (2-5 years)

i. Expand the scopes of work for existing workforce capacity building programs for underserved and overburdened communities to incorporate additional climate adaptation-focused outcomes into various economies.
    1. Sector-specific capacity program updates will include adaptation strategies for economies such as: wood and timber, fisheries and outdoor recreation.

ii. The CoastSmart Council will integrate climate adaptation and resilience into engineering standards when providing training to state agencies, local governments and engineering firms. This will include working with MEA on microgrid energy resilience; Maryland Department of Transportation's (MDOT) design of roads and airports; and Maryland Department of the Environment (MDE) when developing plans and designs for stormwater management, drinking water production, dam construction, wastewater treatment and its associated infrastructure.

c. Long Term (5+ years)

i. The ARWG coordinates an interagency funding task force that seeks additional financial resources to support program needs to increase the number of participants to help meet workforce development goals.

ii. Maryland will target and track sustained enrollment in re-training program participation and continue to re-evaluate adaptation career and re-training needs based on evolving state goals and climate impacts.

Priority 3: Early-Career Training: Continue investing in early career training programs that enhance adaptation and incorporate climate resilience into K-12, higher educational and professional curriculum requirements. Success in implementing this goal will be measured by increased state and local financial investment in early career training programs and revised curricula that enhance climate resilience.

a. Short Term (0-2 years)

i. MSDE, MDNR and other relevant state agencies continue to invest in high school climate curriculum, so the workforce is inspired and educated on climate issues and ready to enter career fields in resilient industries. The ARWG will connect with the Maryland Environmental Literacy Advisory Network to highlight existing job opportunities within the restoration economy and climate change sectors by incorporating these career examples into materials for K-12, higher educational, and professional curriculum. Curriculum content will be amended as needed to ensure materials match the workforce industry needs.

ii. Labor and the ARWG, following the completion of the resilient industry EARN grant review, connects with the Chesapeake Conservation and Climate Corps Program to expand adaptation-related skills in paid service placements.

iii. MDNR and MSDE continue to incorporate climate content into Project Green Classrooms with an additional focus on issues of environmental justice.

iv. The ARWG will work with the Department of Service and Civic Innovation to integrate climate adaptation and resilience training into the Maryland service-year program.

v. Maryland will incorporate the recommendations from the Chesapeake Bay Program's Workforce Action Team Multi-Year Strategy to implement the climate adaptation outcome within the Chesapeake Bay Agreement.

vi. Initiate coordination with the University System of Maryland, including community colleges, to update curriculum with enhanced material on climate change and climate change career/restoration career opportunities. Several programs and examples exist to build from that include the Partnership for Action Learning in Sustainability (PALS), iCare, University of Maryland (UMD) Right Now - climate change experts, Socio-Environmental Synthesis Center, and the Orsted financial commitment to higher-ed STEM education.

b. Mid Term (2-5 years)

i. Labor, in coordination with the ARWG, expands opportunities within, and develops content for, youth apprenticeship programs to focus on skills and industries that enhance adaptation and resilience. For example, State parks and State Highway Administration utilized the Maryland Youth Apprenticeship and Training Program to incorporate skills training that provides climate adaptation and resilience benefits. To expand this opportunity, MDNR and Labor will identify funding sources to establish and sustain youth apprenticeship programs at more state parks and forests.

ii. The ARWG, along with the MSDE and the University System of Maryland, will conduct outreach about resilience-related careers and professional development opportunities with high schools, higher-ed career counseling centers, county workforce and job fair staff, and American Jobs Centers to establish a workforce pipeline.

c. Long Term (5+ years)

i. Long-Term strategies will be outlined as effort advances.

"Investment Needed" Priorities

Priority 1: Develop and expand training/education for entry level, mid-career job seekers, existing employees, and Department of Corrections job training programs to connect them with state-level resources, grants and training opportunities focused on climate adaptation. Success will be measured by increased worker participation in these training programs over time.

a. Short Term (0-2 years)

i. Early career: Initiate outreach with Chambers of Commerce, community organizations and major employers to connect job seekers to training resources, and identify employers who will hire these job seekers upon training completion.

ii. Mid-career: Initiate outreach with Chambers of Commerce, industry organizations and major employers to connect job seekers to retraining resources.

iii. MDNR will partner with the Maryland Entrepreneur Hub and integrate adaptation objectives into keywords, search terms and filters.

iv. Labor will host events to bring together businesses and qualified job seekers to provide a platform for the workforce to meet and learn about opportunities that are available at companies in the region, build their networks and connect with hiring Maryland companies.

v. Labor will establish an adaptation-related job fair through the American Job Centers located throughout the state. Other state agencies will integrate adaptation-related career messaging into their recruitment activities.

b. Mid Term (2-5 years)

i. The state provides its own workforce with training opportunities to ensure that policies, investments and work comprehensively incorporate climate adaptation across all service delivery areas.
ii. Early career: Develop a Youth Apprenticeship network of opportunities to get high school students interested and engaged in adaptation-related occupations.
iii. Mid-career: Develop professional development opportunities across industries for workers to build knowledge and skills in adaptation-related occupations. Provide education and training to employees about climate impacts that affect their occupation.
iv. Utilizing the Maryland Entrepreneur Hub, identify employers who will hire these early job seekers upon retraining completion.

c. Long Term (5+ years)

i. Long-Term strategies will be outlined as effort advances.

Priority 2: Target a "No Net Job Loss" goal where various economic sectors (e.g. manufacturing, forestry, food service, agriculture, fisheries, energy production, etc.) emerge or pivot to support climate adaptation. Success will be measured by average positive job growth, particularly for adaptation-related jobs through 2030.

a. Short Term (0-2 years)

i. Issue a request for proposals then develop a contract and scope of work to complete a state-level strategic economic analysis of the potential for job losses and adaptation-related gains resulting from direct climate impacts in Maryland. The analysis should:

1. Identify demographic groups, regions and economic sectors that may present more opportunity or need more government support for adaptation management strategies.
2. Assess potential opportunities to bolster local, regional and sustainable economies.
3. Propose options for achieving equitable distribution of job growth and income increases throughout the state's regions, across all education levels, and including underserved populations.
4. Frame results to convey the importance of climate adaptation for future economic growth, workforce development and competitiveness.

5. Consider building upon the modeling analysis by Hsiang et al.9 that estimated nation-wide economic damage from climate change with a Maryland-specific focus and expanded consideration of demographics and additional economic sectors.
6. During development, the Climate Jobs and Training focus group should connect with each sector and focus group to ensure that there is a comprehensive review of adaptation-related industry and job needs.

ii. Conduct outreach by hosting targeted webinars and meetings to communicate analysis results to localities and businesses. Outreach will help localities and businesses prioritize their efforts to mitigate potential jobs losses due to climate change and incorporate future needs into long-term planning.

b. Mid Term (2-5 years)

i. To ensure that any development and redevelopment planning incorporates future resilient industry infrastructure needs, the ARWG, Maryland Department of Planning (MDP), MDOT and Commerce develop and share guidance for government and regional planning partnerships on ways to integrate climate-related job needs within regional Comprehensive Economic Development Strategy (CEDS) and other land-use plans. During implementation, the Climate Jobs and Training focus group should connect with the Protecting Critical Infrastructure sector group and the Local Government Action and State Service Delivery focus group.

ii. The Climate Jobs and Training focus group and agency partners should connect with the NextGen sector groups and the Local Government Action and State Service Delivery focus group to highlight ways that the adaptation-related job gains identified from the short term milestone analysis can be advanced through grant and technical support programs.

iii. State agencies with technical assistance positions, fellowships, year of service opportunities, or service corps that support climate adaptation will pursue opportunities to increase the number of positions while retaining staff to provide continuity and build trust with communities and landowners. For example, foresters working with private landowners to implement forest buffers.

c. Long Term (5+ years)

i. During integration of climate-related job needs in CEDS and other land-use plans, the Climate Jobs and Training focus group and government partners should work to enhance or establish the physical, education and training infrastructure necessary to meet climate-related job needs.

Water Resources

Address changing water quality impacts in the face of climate change; Ensure equitable access to safe, plentiful water statewide; Increase the resilience of Marylanders to water-driven climate hazards; Align and coordinate water-related adaptation work; Secure resources to support water resilience needs.

Group Introduction:
All Marylanders rely on clean, healthy water resources for freshwater supply, recreation and culture. Dammed rivers create lakes and reservoirs that supply energy and fresh drinking water and provide flood control and recreation. In total, Maryland has more than 3,100 miles of shoreline and the Chesapeake Bay watershed spans the vast majority of the state and portions of surrounding states. Bays, tributaries and wetlands provide habitat for natural resources, carbon sequestration and water quality benefits. Both humans and the natural environment depend on these waters to survive and thrive.

Predicted changes in sea level, precipitation patterns and drought due to climate change threaten to disrupt communities' relationships with water and will require us to change the ways in which it is managed as both a resource and a hazard. Drought, sea level rise and saltwater intrusion may diminish sources of fresh, potable water. The increase in large, flashy precipitation events creates more stormwater runoff from impervious surfaces, which reduces groundwater, damages streams, carries pollutants into waterways and degrades water quality. Storm events can cause flooding, as periods of heavy precipitation overwhelm systems that were not designed with sufficient capacity to manage them. Sea level rise-induced nuisance flooding can be chronically present regardless of storm events and associated saltwater intrusion can damage to soils.

Changes to the shoreline as a result of sea level rise may impact the ways people access and interact with the water for recreation, which may be further exacerbated by degraded water quality and its impact on the ecosystems that water resources support. The water resources sector is complex, elements of which are woven throughout many aspects of climate adaptation planning.

The Water Resources sector group used these three main topics to organize its work:
- Water quality: the physical, chemical and biological qualities of Maryland's waters and their impacts on ecosystem health.
- Water supply: the use of water resources to support human life.
- Water hazards: the incidence of flooding, sea level rise, storm surge, drought and other hazards.

Informed adaptation plans will require robust research and monitoring to understand climate impacts to all aspects of water resources across the state. Findings from this research must then be incorporated into policy, regulation and funding. In order to be successful, this work will require robust communication and collaboration by many interested and impacted parties, including through partnerships made across each of the other sectors included in this Plan.

Key: Throughout the document on the left we indicate where these focus areas across sectors. The key below will help you identify which sectors are part of the focus area.

FOCUS Justice, Equity, Diversity, and Inclusion | Local Government and State Service Delivery | Climate Jobs and Training

SECTORS Water Resources | Human Health | Working Lands and Natural Resource-Based Economies | Natural Resources and Ecosystems | Protecting Critical Infrastructure

"Resource Ready" Priorities

Priority 1: Water Quality: Through routine evaluations, integrate emerging research and monitoring results into policies, programs and permits to improve Maryland's response to the impacts of climate change on water resource quality. During evaluations identify gaps to inform upcoming research and monitoring, creating a feedback loop.

a. Short Term (0-2 years)

i. The ARWG partners with the MCCC's Science and Technical working group (STWG) to increase communication of emerging science for integration into policy and program changes. Enhance communication of the research findings with state agency staff and leadership (via MCCC) on a topic-by-topic basis to help integrate research results into programs, regulations and policies.

1. Working with STWG, create a research repository to inform policy and program changes. Evaluate the repository on an annual basis, identifying gaps to determine new priority research needs to inform effective policy, regulatory, and programmatic change.

2. Coordinate with institutes of higher education to pursue research needs. Seek new partnerships, as well as expand the scope of existing partnerships, with Historically Black Colleges and Universities to implement research projects.
    a. Existing partnership examples: University of Maryland Partnership for Action Learning in Sustainability (PALS) program that connects agency staff with UMD students to create tangible deliverables that help us achieve our sustainability and resilience goals while helping students get work and portfolio experience; the Strengthening the Mid-Atlantic Region for Tomorrow program that increases competitiveness and capabilities in pursuing federal and state contract and grants for the purpose of research and development, education and workforce development.

3. Actively track research that is already in progress and communicate with researchers to learn about their work and its implications.
    a. Example: Evaluate the Pooled Monitoring Forum results and provide adaptation focused feedback on its subsequent request for proposal development.

ii. Monitor Climate Impacts on Water Quality: MDNR's Chesapeake and Coastal Service unit and the Resource Assessment Service unit, in consultation with the Maryland Water Monitoring Council, will work to determine the ideal suite of climate variables to be measured in Maryland associated with climate adaptation for water resources, as well as determine the cost and staff capacity requirements. Existing programs to consult include community science and government sponsored programs such as the tidal shoreline monitoring through Resiliency through Restoration, RiverKeepers monitoring programs, Swimguide in Coastal Bays, data from Maryland's National Estuarine Research Reserve (NERR), Eyes on the Bay, UMD's agricultural monitoring for soil health and Healthy Watersheds Goal Implementation Team recommendations.
iii. Advancing Stormwater Resiliency in Maryland (A-StoRM) Environmental Site Design: MDE will update state stormwater environmental site design regulations to account for climate change precipitation. Follow-on steps are included in subsequent mid-term milestones.
iv. A-StoRM Stormwater Quantity Management Planning: MDE will conduct research and engagement with interested and impacted parties to develop options for stormwater quantity management requirements, while documenting the process and outcomes.

v. Erosion and Sediment Control Standards and Specifications: By November 2023, MDE will develop a plan and identify resources needed for revising the Standards and Specifications. (See SB471 Sediment Control Plans, Discharge Permits for Stormwater Associated with Construction Activities, and Notice and Comment Requirements).
vi. Water-Related Permit Reviews for Climate: By July 2024, MDE will conduct screening level climate adaptation reviews for 60 percent of all MDE Water and Science Administration permit categories. Propose readily possible changes to permit analyses and templates for interested and impact parties review. Recommend studies and new authorities needed to enable other changes to permit templates in the future. By December 2024 conduct screening level climate adaptation reviews for 95 percent.

b. Mid Term (2-5 years)

i. A-StoRM Stormwater Quantity Management: MDE will develop draft enhanced stormwater quantity control regulations and associated updates to BMP and conveyance system design criteria for flood protection.
ii. Erosion Control: MDE will revise Erosion and Sediment control Standards and Specifications handbook to reflect climate resilience.
iii. MDP adjusts land use management practices to account for the recommendations from the saltwater intrusion report.
iv. MDP uses climate monitoring results to inform the regular analysis of adaptation progress.
v. Monitoring Funding: Based on the parameters identified in the short-term milestone, MDP identifies funding sources to collect and analyze additional climate related data. Incorporate into the Inter-agency Coordination funding group scope.
vi. MDNR assesses SLR impact on groundwater quality of monitoring wells in coastal areas. Expanding the well network may be required.

c. Long Term (5+ years)

i. In partnership with MDE, MDNR will incorporate climate variables into the Statewide monitoring strategy.

ii. Water-Related Permits: MDE Water and Science Administration will update regulatory approval templates (internal guidance) to incorporate climate change and resiliency. The term "approval" is shorthand for all regulatory instruments including individual and general discharge permits, water appropriations permits, various construction permits, plan approvals, licenses and certifications. Note that some of these cover water hazards and water supply issues. Include equity considerations in the process and products.

iii. Chesapeake Bay Watershed Implementation Plan Updates: The Council on the Chesapeake and Coastal Bays Watershed will update the Chesapeake Bay Watershed Implementation Plan (WIP) and milestones to account for increased loads and best management practices (BMPs) for performance losses from climate change.

Priority 2: Water Hazards: Facilitate/Refine statewide and local climate vulnerability assessments, starting with the most disadvantaged communities that are marginalized, underserved and overburdened. Incorporate future climate change scenarios into state and local hazard mitigation and action plans. Assessments should consider water-related hazards such as drought, and make connections to non-water-related stressors. Prioritize resilience-building actions to mitigate water-based hazards while integrating multiple goals.

a. Short Term (0-2 years)

i. MDNR and its Chesapeake and Coastal Service will map disadvantaged communities that are marginalized, underserved and overburdened and overlay it with climate vulnerabilities.

ii. Working with UMD Sea Grant, MDNR and its Chesapeake and Coastal Service unit provide sea level rise training sessions, guidance documentation on the introduction of sea level rise and sea level rise visualizations to communicate flooding risk effectively.

iii. MDNR identifies a state-owned website to provide water hazard updates as new data is available. One potential website could be the Maryland Resilience Partnership.

iv. Dam Safety:
   1. Maryland's Probable Maximum Precipitation (PMP): MDE develops updated PMP information including future climate projections for use in dam design standards.
   2. Dam Removal Guidance Development: MDE develops updated guidance on technical, financial and regulatory aspects of dam removal. This will help expedite the process thereby reducing risks associated with extreme rainfall and similar climate change impacts.
   3. Inundation Area Mapping: MDE develops dam inundation area maps. A GIS layer will be created for all high and significant hazard dams in Maryland for use by local planning and emergency management agencies, MDEM and the public. This work is linked to the infrastructure sector.
   4. Habitat Enhancement: MDNR identifies sites for dam removal that would provide fish passage and apply for federal funding to remove those dams and other stream barriers, restoring aquatic ecosystems.

v. Watershed Flood Pilot Study - Model Development: MDE develops watershed flood analysis model(s) as part of a flood mitigation pilot study, conditioned on funding availability.

vi. A-StoRM Stormwater Quantity Management: MDE initiates a working group focused on federal, state and local coordination for managing runoff to prevent or minimize impacts of higher intensity rain events including lot-to-lot flooding.

vii. Living Shoreline Enhancement: MDE and MDNR develop a strategy for increasing the length of living shorelines statewide by 15 percent over the baseline 2015-2023 data.

viii. Water Regulatory Compliance: By June 2024 MDE develops a procedure using a risk assessment tool (from MDE, National Oceanic and Atmospheric Administration, MDNR) to rate the climate change impact risks of facilities referred to the Office of the Attorney General for formal enforcement actions. Identify climate resilience actions in agreements or orders for the most at risk facilities.

b. Mid Term (2-5 years)

i. MDNR and its Chesapeake and Coastal Service unit will implement climate adaptation projects with climate-vulnerable communities, including flooding and other water hazards, by utilizing existing funding programs such as Resiliency through Restoration and the Chesapeake and Atlantic Coastal Bays Trust Fund. When siting and designing projects, MDNR and its Chesapeake and Coastal Service unit will provide opportunities for community members to share their experience and vision for their communities and co-create the strategies to be pursued.

ii. Watershed Flood Pilot Study - Impact Analyses: MDE conducts watershed flood analyses to assess flood impacts using model(s) developed as part of a pilot study, conditioned on funding.
iii. Watershed Study Guidance: Develop guidance for conducting watershed studies based on experience with pilot studies, conditioned on funding. MDE lead
iv. The state will review Comprehensive Plans to provide guidance and recommendations back to local entities. Direct state resources toward plans that will focus on the most underserved and overburdened populations first. MDP, MDE and MDNR to coordinate with other state agencies through the ARWG.

v. MDNR, MDP and MDE will work with MDEM to develop tools and training to assist local governments in integrating climate resilience considerations into local hazard mitigation plans, which should consider and identify water quality and other co-benefits in addition to flood mitigation, including the use of non-gray options and conservation easements in hazard mitigation strategies. Provide opportunities for community members to share their experience and vision for their communities and co-create the strategies to be pursued. Recommend that both state and local resources are directed at plans that will focus on the most underserved and overburdened populations first.
vi. Dam Safety - Earthen Spillway Design Criteria: Based on PMP results (short-term milestone), MDE develops updated earthen spillway design criteria. This will help ensure their resilience under more frequent and intense rainfall patterns associated with climate change.
vii. A-StoRM Stormwater Quantity Management Planning: MDE enhances stormwater volume control regulations and associated updates to BMP and conveyance system design criteria. Incorporate the recommendations from the federal, state and local interested and impacted parties through technical and regulatory advisory groups.

viii. Living Shoreline Enhancement: MDE, with support from MDNR, implements the strategy developed during the short-term milestone of increasing the length of living shorelines statewide by 15 percent over the baseline 2015-2023 data.
ix. Water Regulatory Inspections: MDE implements climate change vulnerability screening and targeting for compliance inspections: By July 2025, increase inspections in risk areas by 20 percent. By December 2025, revise inspection guidelines.
x. Hazard Mitigation Plan Expansion: MDE, MDEM and MDH integrate recommendations from the Environmental Public Health Tracking Program regarding vibrio, harmful algal blooms, fish consumption and mosquitos into state and local hazard mitigation plans.

c. Long Term (5+ years)

i. MDE and Labor develop technical guidance and educational standards for integrating climate adaptation into public works programs that are identified within the Climate Jobs and Training focus group milestones:
    1. The initiative will provide methods for evaluating vulnerability and standards of practice to improve resilience of water management infrastructure including bridges and culverts, stormwater systems, wastewater collection and treatment works, and drinking water treatment and distribution systems. Methods will include optimal use of green infrastructure and nature-based solutions as a complement to gray infrastructure.
ii. MDE, MDEM and MDH identify and distribute funds to remediate mold and mildew within low-income communities.
    1. Enhance FEMA's remediation funding for local communities that prioritizes low income and low access to health care.
    2. Work with county health officers to deliver funding.
iii. A-StoRM Implementation and Adaptive Management: MDE implements the updated stormwater quantity control regulations and design manual via various interested and impact parties training processes. Identify and document changes to include in future refinements of the regulations.
iv. MDE identifies and monitors SLR impact on septic systems and develops a plan to replace impacted or likely to be impacted systems with alternative/innovative designs, or connection to sewer or smaller scale community treatment systems.

Priority 3: Inter-Agency Funding Coordination: The ARWG, in collaboration with the Maryland Office of Resilience, establishes a multi-agency task force within ARWG to coordinate funding resources to support the water sector's goals, working in collaboration with other ARWG sector groups, to expedite the process and identify mutual opportunities. Manage funds to create a robust project portfolio when securing federal planning and capital funds. Prioritize projects, facilitate technical support for proposal development, fund administration and project management in disadvantaged communities that are marginalized, underserved, and overburdened, with preference for grants, as opposed to loans.

a. Short Term (0-2 years)

i. Establish the Inter-Agency Funding Coordination working group. Develop the working group's goals: better leverage and communicate related funding programs to maximize their impact; determine how disadvantaged communities that are marginalized, underserved and overburdened will be prioritized and supported, solicit or assign members, and launch the group. Determine how to track and communicate progress.
   1. This working group will coordinate with the ARWG Capacity Building working group when developing their charge and scope.
   2. Private entities will be invited to participate.

ii. Identify and dedicate one or two federal grant specialists who can facilitate the development and implementation of federal grant applications. Explore expanding MDE's Local Support Program or utilizing the Maryland Office of Resilience to encompass this need.

iii. Develop a pipeline of projects, prioritizing projects in disadvantaged communities that are marginalized, underserved and overburdened cataloged by funding amount, location, best management practice and partners.
   1. Include future projects proposed within the Supplemental Environmental Project library.

b. Mid Term (2-5 years)

i. Identify and pursue funding available for climate-related data monitoring and analytical support.

ii. Specifically consider how to utilize the recommendations in the Capacity Building Organizations-Capacity Building Initiative (CBO-CBI) lessons learned report.

iii. Long-term Water Resources Planning: This group will work to secure the funds needed by the state water supply program to implement measures identified by the Wolman Commission for preventing any future water supply problems and establishing a sound science-based understanding of the state's water resources, like the coastal plain aquifer system.

iv. Drought Monitoring and Response Plan Implementation: This group will work to identify funding for additional groundwater well monitoring for water availability and drought assessment.

v. Communicate the importance of continued federal investment.

c. Long Term (5+ years)

i. Long-Term strategies will be outlined as effort advances.

"Investment Needed" Priorities

Priority 1: Water Supply: Proactively adjust water supply management practices and programs to account for climate change impacts to both water supply availability and source water quality. Address risks due to drought, heat-induced increases in water demand, sea level rise, storm surge, flooding and severe weather. Ensure adequate state staffing levels to manage these risks by supporting local hazard management planning, focusing on historically underserved communities.

a. Short Term (0-2 years)

i. Increase the State Water Supply Program's Staff Capacity: Ensure MDE's State Water Supply Program has adequate staffing to take proactive measures to help community water supply systems build resilience to climate change stresses.

ii. Increase the State Water Supply Program's Capacity to manage Water Appropriation and Use Permits - Funding.

iii. MDE oversees Public Water Treatment Plant Operations - Funding.

iv. Establish an Indirect Potable Reuse Pilot Program: MDE develops permitting that enables indirect potable reuse of municipal wastewater effluent via a pilot program (implement SB471 Sediment Control Plans, Discharge Permits for Stormwater Associated with Construction Activities, and Notice and Comment Requirements). By December 2024, the State Water Supply Program will provide a status report to the Governor's Office on a pilot program to permit indirect potable reuse of reclaimed water (treated municipal treatment plant effluent). This pilot program is intended, among other goals, to establish technical and administrative procedures for developing alternative water sources that build drought resilience.

v. Drought Monitoring and Response Plan Review: MDE conducts a review of the State Drought Monitoring and Response Plan. Include an assessment of the groundwater monitoring well network and recommend enhancements.

vi. Algal Bloom Monitoring and Response: MDE enhances current algal bloom monitoring operations and evaluates water system adaptation capacities, such as the potential for water intake relocation, incorporation of additional treatment for algal bloom toxins and expanded storage capacity. MDE partners with the University of Maryland Center for Environmental Science (UMCES) to incorporate recommendations identified from their partnership with Mote Marine Laboratory.

vii. Water Supply and Society: ARWG and CEJSC evaluate the socio-economic aspects of water supply management including identifying local water access problems, drinking water quality problems and the intersection with equity and environmental justice issues.

viii. Water Audit Program Development: MDE develops updated guidance on methods and tools to be used by community water supply system utilities for water accounting. More precise water accounting will better inform options for controlling water losses and conservation thereby making water systems more efficient and resilient to climate change impacts.

ix. Water Infrastructure Climate Resilience Assessment (WICRA) initiative: A voluntary cost-share technical assistance program using methods like EPA-CREATE to identify cost effective climate adaptation projects for local water supply and wastewater infrastructure. Integrate the WICRA initiative with critical infrastructure sector group; legislation to initiate; needs funding as mid-term milestone (develop). MDE to lead.

b. Mid Term (2-5 years)

i. Long-term Water Resources Planning: MDE secures the funds needed by the state water supply program to implement measures identified by the Wolman Commission for preventing any future water supply problems and establishing a sound science-based understanding of the state's water resources, such as the coastal plain aquifer system. Incorporate this scope into the Interagency Funding Coordination working group tasks.

ii. Drought Monitoring and Response Plan Implementation: MDE identifies funding for additional groundwater well monitoring for water availability and drought assessment. Incorporate into the Interagency Funding Coordination working group tasks.

iii. Clean Drinking Water Access: If and where safe and reliable drinking water is inaccessible to residents, develop and employ interventions, including State administrative penalty and enforcement authority. MDE to lead with support from MDH.

iv. Source Water Protection: MDE seeks State legislation and revised regulations that require local jurisdictions to assess and protect source waters and provide financial and technical assistance to help them do so.

v. Saltwater Intrusion Assessment: The sustainability of key coastal water sources to account for sea level rise and saltwater intrusion impacts should be evaluated and mitigation actions implemented. MDE will evaluate potential climate threats to surface water quality that could affect a community's water supply and might warrant avoidance measures or enhanced water treatment processes, along with drought-vulnerable community supply systems, so that corrective action plans can be developed.

vi. Private Water Wells: MDE continues research initiated in past investigations that identified areas with large concentrations of individual wells under the influence of surface water, which are at risk of contamination. Initiate actions for cases that can be remedied by the creation of public supply systems, including grouping smaller systems.

c. Long Term (5+ years)

i. The ARWG and Maryland Department of Health (MDH) will evaluate water supply policies, programs and projects utilizing the Maryland Health Impact Assessment (HIA) toolkit.

Human Health

Protect from direct and indirect climate impacts by understanding and planning for the climate impacts on health; Conduct a statewide climate and health profile report that evaluates morbidity and mortality data, as well as programming and adaptive capacity in the state; Establish a statewide climate and health partnership network to expand the climate and health surveillance program; Integrate a Health Impact Assessment framework for health equity into all climate adaptation decisions statewide; Expand climate and health communication and education efforts to increase awareness and understanding of individual risk to encourage behavior change and risk reduction individually and at the community and statewide level.

Group Introduction:
The physical environment, including the air people breathe, water people consume and weather people experience, plays an important role in influencing population and individual health. Some environmental consequences of climate change have direct impacts on health that are readily apparent. For example, flooding from an extreme precipitation event can cause drowning events which are typically immediate and visible. However, environmental consequences of climate change can also create indirect impacts on health that may be profound, while less immediate and visible.

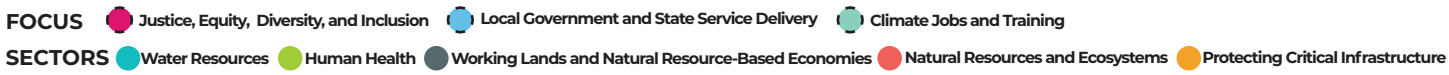
For example, increased precipitation can lead to an increase in motor vehicle accidents and resulting injuries. Changes in extreme temperatures also affect crop yields and food supply, as well as posing a risk to vulnerable people with cardiovascular, respiratory disease and other chronic health problems and disabilities. worst climate impacts and protect human health.

Natural resources, green infrastructure, resilience planning for the built environment and other resources provide opportunities to mitigate some of the worst climate impacts and protect human health. For example, trees in urban environments help cool their surroundings, absorb stormwater and improve air quality. By increasing the quantity and accessibility of natural resources, communities can directly address public health risks posed by climate change, while ensuring equitable access to green spaces.

Equity is a key focus of Maryland's climate change and health adaptation planning. These initiatives require the continued development of epidemiological data analysis tools, technical project support and education and outreach strategies. To reduce the public's burden of disease from climate impacts, partners at the state, local and regional level must work collaboratively to monitor climate-related health outcomes and develop effective adaptive interventions through just and equitable approaches.

Underserved and overburdened communities already experience a greater health burden due to greater environmental exposures and lower access to resources resulting from the legacies of institutional racism and marginalization (for example, inequitable distribution of care providers, green space, transportation, healthy foods, economic security, and adaptation tools and resources). Unless explicitly addressed, climate change is likely to exacerbate these disparities.

Key: Throughout the document on the left we indicate where these focus areas across sectors. The key below will help you identify which sectors are part of the focus area.



"Resource Ready" Priorities

Priority 1: MDH and MDNR improve the availability, quality and access to green spaces in at least three communities, utilizing available health data and expertise at the state and local level to support green space programming.

a. Short Term (0-2 years)

i. With support from MCCC CJ, create a list of communities prioritized for health informed greenspace improvement using information from programs that may include MDNR's Park Equity Mapper, MDNR's Program Open Space, the 5 Million Trees Initiative, MDA's small farm and urban agriculture program, MDH EPHT portal and MCCC CJ Steering Committee.

ii. Identify partners working in the prioritized communities to understand existing capacity for greenspace implementation (December 2025).

iii. Begin holding listening sessions and targeted engagement meetings with community members, leaders and partners to understand specific health and greenspace needs to inform pilot program development (December 2025).

iv. Identify available and needed funding for greenspace enhancement and expansion projects (December 2025).

b. Mid Term (2-5 years)

i. Continue holding listening sessions and targeted engagement meetings with community members, leaders and partners to understand specific health and greenspace needs to inform pilot program development (December 2026).
ii. Identify:
    1. Locations for greenspace enhancement or expansion (informed by community needs and wants, the Environmental Public Health Tracking Portal [EPHT] and other health priority areas as identified by MDH), within the prioritized communities (December 2026);
    2. Funding needs for the communities (December 2026)
iii. As soon as possible, begin moving forward on developing specific approaches, securing funding and implementing the approaches in prioritized communities (move to implementation on at least two communities by December 2026).
iv. Develop evaluation protocol for community engagement and green space enhancement and expansion programming (December 2026).

c. Long Term (5+ years)

i. Move to implementation on at least three communities by December 2029.
ii. Deploy evaluation protocol in communities with implemented programming (December 31, 2034).
iii. Use findings to write a white paper on the initiative including (December 31, 2035):
    1. Approach to community identification
    2. Community engagement and partnership including location and program specific determinations
    3. Process and outcomes of the implementation of developed plans.

Priority 2: The ARWG establishes the Maryland Department of Health as a full member of the Maryland Commission on Climate Change.

a. Short Term (0-2 years)

i. Develop and submit a proposal brief formally requesting the Health Department be added to the MCCC as a full member (August 2024).
ii. Chair of the ARWG brings the legislative ask to the membership for a vote of approval to submit to the MCCC as a priority recommendation from the ARWG.
iii. In partnership with the MCCC, develop health-informed climate strategies and policies to protect public health from stressors such as increasing heat and flooding.

b. Mid Term (2-5 years)

i. This priority is intended to be completed in the Short-Term.

c. Long Term (5+ years)

i. This priority is intended to be completed in the Short-Term.

Priority 3: MDH creates an expanded surveillance program through the State's Environmental Public Health Tracking (EPHT) Program to display data on direct and indirect health impacts attributable to climate change.

a. Short Term (0-2 years)

i. Compose a Technical Advisory Committee (TAC) of partners across the state that can inform the development, deployment and utilization of the EPHT Program (ongoing, meet twice a year).
ii. Launch the updated EPHT Tracking Portal (December 31, 2023) – complete as of July 2023.
iii. MDH works with the MCCC ECO Working Group to host at least one webinar to demo the EPHT tracking site and highlight how to use the data to inform programs and decision making. (December 31, 2025)
iv. Deploy Public Health Actions informed by the data in the EPHT and partner needs. Complete 3 Public Health Actions annually, starting in 2025.
    1. Priority public health action should be to understand current emergency alert systems (MDH-heat, MDEM-weather, MDE-air quality and others) and implement improved or more coordinated alert systems to integrate climate change impacts so both increase preparedness of the public, reduce health impacts from climate impacts and increase awareness of climate's impact in Maryland.

b. Mid Term (2-5 years)

i. Continue to hold regular (bi-annual) TAC meetings (ongoing).
ii. Deploy Public Health Actions informed by the data in the EPHT and partner needs. Complete 3 Public Health Actions annually (ongoing).
iii. Work with the ARWG and the TAC (led by MDH) to identify additional data needs (e.g. sources, utilization, or access) for enhanced integration of climate and health considerations into programming across the state.
    1. Integrate the EPHT portal (utilization of the portal itself, or the data within the portal) into at least one additional state agency protocol annually, beginning in 2025.
iv. Secure another round of funding for the continuation of the EPHT portal. (December 31, 2030)

c. Long Term (5+ years)

i. Ongoing milestones will be dependent on the needs of the state, MDH and TAC as identified and included in the new proposal for continued support (1.b.iv.).

"Investment Needed" Priorities

Priority 1: MDH, in partnership with subject matter experts, produces an update to the Maryland Climate and Health Profile Report (CHPR), with planned updates to the report every 5 years.

a. Short Term (0-2 years)

i. Explore potential university and MDH partnerships to identify who has capacity and interest to be lead on this strategy. (April 1, 2025)
ii. Secure funding to complete the CHPR. Significant funding and investments will be required to advance mid and long-term actions. (December 31, 2025)

b. Mid Term (2-5 years)

i. MDH and University partners should establish a steering or technical advisory committee to review and refine the proposed scope (see i-vi below) to ensure alignment with known needs around climate and health. CHPR should be expanded beyond the 2016 CHPR Scope, which only included assessment of the health outcome data, to be more holistic in its representation of the climate and health profile of Maryland (funding, technical assistance, programmatic, research, health data impacts, etc.). (July 1, 2026)
ii. Conduct a quantitative analysis on climate and health impacts on Maryland's populations including but not limited to: car accidents during extreme weather events, myocardial infarction and other cardiovascular events, heat stress and strokes, hospital and extreme dehydration visits during and following extreme weather events, Lyme disease rates and other health outcomes of interest as identified.
iii. Assess the existing policy and programming around the state addressing climate and health considerations. This should include policy (health in all policies, occupational health and safety, operational, and other policy arenas as identified), research (university and federal partners), programmatic (cooling/community needs) and educational efforts by state agencies, local governments, community groups and nonprofits. Assessment will provide the state with critical information to understand how best to address and reduce the health burden associated with climate impacts.
iv. Develop best practices for integrating climate and equity considerations into a Health Impact Assessment (HIA) process.
v. Evaluate existing climate and health education and communication capacity in the state to inform the development of best practices for integrating climate and health considerations into efforts by state agencies, local governments, non-profits, schools, community groups and others as identified.

This evaluation should outline gaps in education and outreach efforts, identifying communities, or programs that need additional support for integrating climate and health considerations.

vi. Disseminate CHPR and relevant information within to partners around the state to support integration of health and the climate and health in all policies approach.

c. Long Term (5+ years)

i. Long-Term strategies will be outlined as effort advances.

Working Lands and Natural Resources-Based Economies

Preserve and restore working lands and waters while ensuring land uses support other statewide resiliency goals; Support the economic development and sustainability of agriculture, forestry and working waters; Create food security in the face of climate change; Expand education and outreach to support the sector in achieving adaptation goals.

Group Introduction:
The lands and waters across Maryland support a wide variety of working uses and natural resources-based economies. From farming to fishing to timbering, Maryland workers build their livelihoods on the abundance and health of natural resources and working lands, fueling industries for residents and visitors alike to enjoy. These resource lands and waters simultaneously support basic environmental services for clean water and air, pollination, habitat, soil health and more, creating the opportunities for traditional markets and ecosystem services markets to work well together.

Resource-based industries are the fabric of rural communities, providing jobs, support services and a food and fiber supply for the state and the region. Maryland has more than 12,400 farms statewide, which cover more than 1.9 million acres of cropland, pastureland, and woodlands. Forestry is the fifth largest industry in the state, employing an estimated 18,000 Marylanders and supplying wood for homes, furniture and paper products. Each year, watermen harvest approximately 500 million pounds of seafood from the Chesapeake Bay, providing beloved and iconic blue crabs, oysters and striped bass.

Climate change will alter the way that these lands and resources are managed, used and sustained. Changes in seasonality may influence the growing and food production season, in turn impacting food accessibility and affordability. Successful expansion of forestry-based economies may be hindered by heat stress and longer droughts, increased pests or disease due to increased temperatures and saltwater intrusion impacting coastal forests viability. Changes in water temperatures and salinity may alter fish and other aquatic species habitat ranges, disrupting fishery management and seafood supply.

While working lands provide climate mitigation benefits through carbon sequestration, climate adaptation must ensure that resource-based industries are sustained under altered environmental conditions. This will require land and resource managers to support local jurisdictions in land conservation planning that is designed to invest in sustainable uses and reduce environmental impacts of harvest. Additionally, resource managers can support a robust workforce by engaging diverse user groups, applying research and innovative technologies and capitalizing on changing environmental and economic conditions and shifting market opportunities.

Key: Throughout the document on the left we indicate where these focus areas across sectors. The key below will help you identify which sectors are part of the focus area.

FOCUS Justice, Equity, Diversity, and Inclusion | Local Government and State Service Delivery | Climate Jobs and Training

SECTORS Water Resources | Human Health | Working Lands and Natural Resource-Based Economies | Natural Resources and Ecosystems | Protecting Critical Infrastructure

"Resource Ready" Priorities

Priority 1: Within three years, MDNR forms a plan for addressing land retention and aquatic habitat changes that is equitable, inclusive of interests and addresses issues of all affected farmers, foresters, landowners and watermen in the state. Build on existing climate adaptation and natural resource planning initiatives and programs, and expand partnerships with social services and economic development interests.

a. Short Term (0-2 years)

i. Identify key agencies and interested parties to participate in the planning process and assign a coordination lead. This process is initiated with the support of MDP, MDNR, MDE and MDA.

ii. Identify scope of the plan and the target audience. The plan will take a landscape approach to maintaining the resource lands and management actions that support resources-based industries and maintain a resilient supply chain. The purpose of the plan is to coordinate implementation actions across existing and novel initiatives and programs to achieve these outcomes.

1. The following focus areas should be considered for inclusion: Ensuring fair community access to working lands and industries while maintaining ecosystem functions; Landscape-level conservation planning; Wildfire risk reduction; Workforce development; Coordinating economic development.

iii. Key agencies identify a process for robust involvement of interested and impacted parties that incorporates resource maps and risk analysis tools.
iv. Key agencies engage with local governments and community partners to identify priority issues and preferred pathways. Work with connector groups to address equity priorities.
    1. Assess local and community assets and needs for maintaining resource-based industries.
    2. For example, summarize existing resource-based industry reports (e.g. Salisbury University's Business Economic and Community Outreach Network) by county and identify any new measures needed to address equity for job types, wages, etc.
v. Involve the scientific, land trust and development communities in the planning process.

b. Mid Term (2-5 years)

i. Key agencies produce the plan with regular interested and impacted parties engagement.
ii. Build on multidisciplinary expertise, local involvement and results from ongoing funded research on climate vulnerability to craft goals and actions. Envision what types of land and aquatic uses will be included.
iii. Conduct outreach on plan drafting and respond to public comments.

c. Long Term (5+ years)

i. Assess how the plan is being utilized in conjunction with other land and aquatic conservation initiatives.
ii. Make adjustments if and where necessary based on assessment and feedback from the broader working lands community.

Priority 2: Explore opportunities to develop new markets emerging for agriculture, forestry and fisheries as a result of climate impacts and saltwater intrusion. Consider recreation as a non-traditional market.

a. Short Term (0-2 years)

i. MDP assists state agencies in working with local governments to develop guidance materials for zoning and land planning. These materials should:
   1. Include consolidated messaging on the benefits of adopting new technology, creating carbon-positive product lines and reducing environmental impacts for natural resources lands and waterfronts.
   2. Raise awareness of planning and zoning needs for resource-based industries to achieve these benefits.
   3. MDA, MARBIDCO, and MDNR provide detailed natural resource and resource-based industry data to 1) build understanding of and support for existing and emerging markets for these industries, and 2) inform comprehensive and small area planning.

ii. MDA develops policies that support cultivating diverse products in partnership with industry professionals. State agencies engage with industry partners (e.g. farmers, processors, distributors, service providers) to assess existing successes and adjust programs to address unmet needs.

iii. MDNR Forest Service and partners implement an economic adjustment strategy with regional analysis of assets and opportunities that incorporates analysis of ecosystem services, sustainable materials and zero-waste initiatives.
iv. MDNR fisheries removes legal and cultural bottlenecks to bring new markets online, such as invasive species and aquaculture. These initiatives may require developing and expanding pilot programs and surveys as well as coordinating the end use of products such as processing facilities and partnerships with food assistance organizations.

b. Mid Term (2-5 years)

i. MDA and MDNR establish industry-specific metrics and conduct progress evaluations to identify unmet needs. Use these assessments to develop BMPs for utilizing new resources.
ii. MDA and MDNR match funding opportunities and market-based policies to these identified needs for further progress.

c. Long Term (5+ years)

i. MDA, MDNR and other state agencies build support for BMPs by establishing policies and/or regulations that facilitate long-term acceptance of resource utilization and collaborating with industry partners. Potential collaborative actions are:
    1. Agricultural producers develop a more diverse working lands model.
    2. Foresters and agricultural producers build a network of demonstration areas for agroforestry and agrotourism.
    3. Fishing industry participants, including watermen and landowners, leverage invasive species and aquaculture as alternatives to the wild-caught market.
ii. Establish a process for building robust supply chains for new products as they emerge (i.e. invasive species) by increasing opportunities to invest in mutually beneficial partnerships that promote the end use of these products.

Priority 3: MDA and MDNR work with farmers across the state to increase their adoption of soil health and conservation practices beyond annual cover cropping and conservation tillage to improve soil health, sequester carbon and help meet goals outlined in the Climate Solutions Now Act.

a. Short Term (0-2 years)

i. Expand pilot programs to include techniques development and outreach for peer-to-peer farmer education.
ii. Coordinate across departments while building on Healthy Soils Program priorities.
iii. Develop a whole farm perspective rather than managing individual fields.
    1. Incorporate planning tools (ex: remote sensing imagery, drone imagery, landscape scale prioritization such as Nature's Network).
    2. Incentivize preferred practices in cost-share and technical assistance (multi-species cover crops, alley cropping, silvopasture).
    3. Include considerations for recycling and waste reduction and wildfire risk reduction in overall planning.
iv. Engage with interested and impacted parties and develop demonstration projects for agroforestry as a strategy for improving soil health.
v. Use results and recommendations from Phase I of the Hughes Center climate vulnerability study to inform BMPs related to adaptation and meeting CSNA goals (ex: crop selection, saltwater intrusion).

b. Mid Term (2-5 years)

i. Identify and improve models and/or metrics to quantify whole farm conservation and restoration outcomes.
ii. Evolve policies and programs to advance adoption of soil health practices with quantified benefits, where tools exist, with focus on continued adoption of practices within farm operation to observe outcomes.
iii. Engage with the scientific community to establish peer-reviewed metrics for tracking success.

c. Long Term (5+ years)

i. Utilize previously established metrics to re-evaluate the farm landscape and adjust programs and metrics according to changing crop regimes and farm types.
ii. Direct outreach towards previously unengaged landowners to increase use of conservation practices.

"Investment Needed" Priorities

Priority 1: MDA and MDNR adopt Climate Smart agriculture and forestry statewide by utilizing ecosystem marketplaces where appropriate.

a. Short Term (0-2 years)

i. Ensure Climate Smart practices address the full range of climate hazards, including increased risk of wildfires and forest health stressors, and align with established climate BMPs.
    1. State agencies work to coordinate with the National Cohesive Wildland Fire Management Strategy, Maryland Fire Wise and tree planting initiatives (e.g. One Trillion Trees globally and 5 Million Trees statewide).
ii. Expand the scope of state lands resiliency plans. Assess the potential for a regional approach, and regular coordination among local jurisdictions pursuing coastal and climate resiliency, with state, federal, NGO and private sector input.
iii. Work with MDE and the Green and Blue Infrastructure Policy Advisory Commission to determine how the state can or should be involved in facilitating ecosystem marketplaces, including authorities established by the Conservation Finance Act. Possible avenues include:
    1. Aggregating projects or consolidating programs for landowner participation;
    2. Establishing public land roles as buffer pools or insurance for larger ecosystem markets.

b. Mid Term (2-5 years)

i. Work with MDE and the Green and Blue Infrastructure Policy Advisory Commission to:

1. Evaluate missing gaps in program authorities, financial instruments, or processing and marketing capacity and identify pathways to establish needed policies and programs.
2. Develop guidance on when it is appropriate to engage in ecosystem markets. Consider regulatory requirements and interface with Maryland's conservation history.
    a. Outline how landowners can qualify for specific programs.
    b. Improve recognition for existing Climate Smart and conservation practices.

ii. MDNR performs scoping on the potential for Climate Smart fisheries and aquaculture practices.

a. Long Term (5+ years)

i. Develop market drivers for climate smart products by promoting awareness and demand.
ii. Improve coordination between industries for end use of products.

Priority 2: MDA, with support from MDNR and UMD Extension, augments Maryland's resources-based industries workforce by addressing structural barriers, expanding outreach and building skill sets to comprehensively increase the diversity of participants. State agencies expand partnerships and research to explore and implement ways to make farming, forestry and fishing more attractive to youth and others.

a. Short Term (0-2 years)

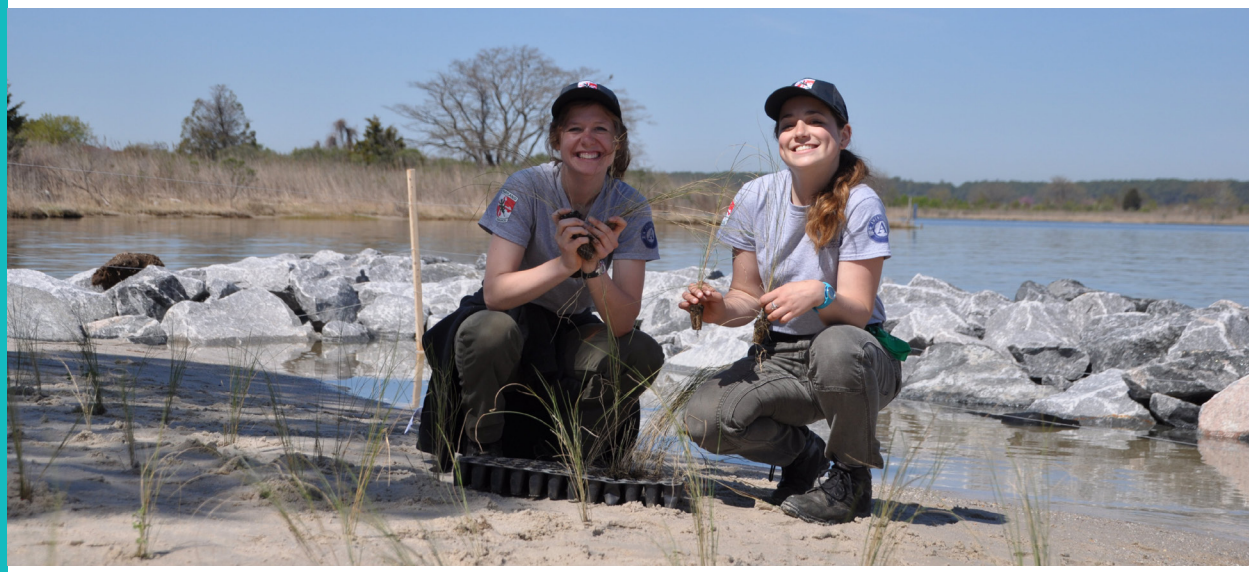
i. MDA, MDNR and other agencies evaluate existing state and partner programs like University of Maryland Extension and certificates related to industry workforce and identify needs for implementation and expansion.

1. Coordinate staff capacity and funding opportunities for program expansion.
2. Evaluate regulations and legislation to identify legal barriers to program expansion.
3. Initiate the investigation of potential avenues for program expansion with incentives for a more diverse user base.

ii. MDA, MDNR and other agencies set the expectation and requirement for distributing program application materials in multiple languages.
   1. Determine where those services can be provided for state agencies.
   2. Assess which languages are prevalent in local communities.

b. Mid Term (2-5 years)

i. Leverage educational opportunities to train young people and help them transition into permanent job positions. Identify opportunities to integrate internships, apprenticeships and service years.
   1. Examples: conservation corps, americorps, beginner farmers.
   2. Involve state employees in training programs.



ii. Develop and expand programs to engage with industry professionals.
   1. Identify opportunities for business grants or low/no interest loans to cover startup costs.
   2. Create opportunities for industry participants to have mentorship.

iii. Establish training for utilizing ecotourism to supplement natural resources-based businesses.

iv. Diversify broader markets and products.

c. Long Term (5+ years)

i. Conduct program evaluations. Based on the results, make adjustments to existing programs or create new ones.

Priority 3: MDA and MDNR encourage innovation and adoption of new technologies to enable farmers, foresters, landowners and watermen to increase sustainability, profitability and resiliency of operations.

a. Short Term (0-2 years)

i. MDA and MDNR organize pilot programs, like MDA's Healthy Soils Program, to evaluate the effectiveness of new technologies. For example, MDNR conducts research for use of new fisheries technologies on vessels, fishing gear and aquaculture prior to scoping regulatory authority for implementation.

ii. MDA and MDNR improve the flexibility for farmers and foresters to participate in innovative programs by exploring financing options. For example, The Nature Conservancy's Resilient Protection Frameworks which are designed to simultaneously facilitate marsh migration and preserve landowners' cultural and financial interests.

b. Mid Term (2-5 years)

i. Set up a strategy for continuing data collection after pilot programs end. Engage the scientific community and industry participants to develop metrics for tracking the effectiveness of new technologies over time. For example:
    1. Using its existing authority, MDNR utilizes data to update fisheries regulations.
    2. MDE, MDA and MDNR track United States Department of Agriculture efforts to better define protocols for measuring climate smart agriculture and forestry (CSAF) outcomes.

ii. MDA and MDNR improve industry access to a wider range of raw materials. Identify and, if possible, remove policies and legal barriers that inhibit utilization of new materials. Utilize data from pilot programs and the best available climate science to support these changes. For example:
    1. Work with MDE to develop clean heat standards and create markets for lower quality wood, including the State Wood Energy Team. Expand the use and awareness of MEA Grants and other funding sources.
    2. Build awareness on the benefits of mass timber by establishing or expanding a pilot program for utilizing mass timber in state green building guidance. Develop a certification or classification that would allow alternative wood types (ex: tulip poplar), to be used for mass timber.

c. Long Term (5+ years)

i. MDA and MDNR explore public-friendly ways to discuss pilot programs and their efficacy.

ii. MDA and MDNR provide support for flexibility, access to funding and interest in measuring what the impacts of the new practices are over time. Establish consensus between the scientific and industry communities.

Natural Resources and Ecosystems

Manage lands and waters to protect, conserve, connect and restore natural resources; Create regulatory and policy cooperation for climate adaptation; Empower and engage communities to support natural resources' adaptation; Practice adaptive management to incorporate flexibility into natural resource management; Establish funding opportunities to advance adaptation goals and preserve resources.

Group Introduction:
Maryland is rich in wildlife and natural diversity, spanning ecosystems and habitats from the Appalachian plateau to the low-lying coastal plain, and the many aquatic environments in between. These varied ecosystems are critical to the vitality of the state's wildlife and biodiversity. Natural resources and ecosystems provide recreational opportunities and sustenance, clean air and water, serve spiritual and cultural needs, benefit quality of life and tie together community heritage.

These same resources buffer us from natural hazards and climate impacts, for example, marshes help to absorb wave impact, reducing storm surge and mitigating flood damages. Yet these protective services and benefits may themselves be diminished by climate change over the next decade and beyond. Rising sea levels threaten to submerge the state's vast marshes that filter water and provide fish spawning and nursery habitat. Changing precipitation patterns may result in more wildfires. Warmer temperatures may create or exacerbate non-native and invasive species management challenges, warm coldwater streams, and increase ocean acidification.

By actively engaging state, local and community organizations, the state can make significant progress in helping natural resources and ecosystems to adapt to changing conditions over the next ten years. The scope of priorities and milestones proposed here are as varied and vast as the regions of the state. This group intends that the outlined steps encompass both land and aquatic based conservation, management, planning and restoration measures.

Key: Throughout the document on the left we indicate where these focus areas across sectors. The key below will help you identify which sectors are part of the focus area.

FOCUS Justice, Equity, Diversity, and Inclusion | Local Government and State Service Delivery | Climate Jobs and Training

SECTORS Water Resources | Human Health | Working Lands and Natural Resource-Based Economies | Natural Resources and Ecosystems | Protecting Critical Infrastructure

"Resource Ready" Priorities

Priority 1: MDNR, with the support of MDE and MDP, updates and prioritizes conservation and restoration targets (e.g. Targeted Ecological Areas, oyster reefs, endangered and listed species). Set numeric goals to address significant vulnerabilities or changes and facilitate natural resource and ecosystem climate migration by utilizing the latest information and climate science about habitat vulnerability and migration and species shifts.

a. Short Term (0-2 years)

i. Land Conservation and Habitat: Establish conservation targets for different habitat types. For example, TEAs in perpetual resilience easements, construction of oyster reefs, surface water quality standards designated uses and creation or protection of wetland migration corridors. These targets should include:

1. Annual and cumulative metrics;
2. Habitat-specific parameters and methodologies to measure progress;
3. Explanation of the natural resource and ecosystem benefits of the targets (e.g. wetland migration and loss acreage, habitat refugia, flood storage).

ii. Habitat Restoration: Develop or re-design management and restoration plans and projects that reflect anticipated future conditions and include climate adaptation measures consistent with established restoration goals and programs.

iii. Aquatic Conservation and Habitat; Habitat Restoration: Strengthen program and project linkages at the land-water interface.
    1. Increase upland and aquatic habitat connectivity (e.g. paired nearshore-upland restoration projects, opportunities for fishing and boating access to aquatic spaces).
    2. Identify sustained strategies for staff capacity and funding that provide support for identifying and advancing projects that advance natural resource adaptation goals.

iv. Interested and Impacted Parties Engagement: Increase community and partner buy-in for and understanding of landscape conservation and restoration actions that provide adaptation benefits by collaborating on messaging and engagement strategies.
    1. Utilize existing networks, advisory groups and community partnerships.
    2. Expand capacity for implementing resilient conservation and restoration projects in underserved communities.
    3. Consider existing or new roles for community-based participation (e.g. watermen, coastal communities and those who rely on natural resources for sustenance and income).

b. Mid Term (2-5 years)

i. Land Conservation and Habitat: Perform an evaluation of metric-based targets and project performance; adjust policies, management and restoration plans; and communicate how and why projects provide resilience benefits.

ii. Habitat Restoration: Institutionalize adaptive management by building on MDNR's pre- and post-construction monitoring protocols to develop guidance for resilient restoration, including considerations during project planning, permitting and management.
iii. Aquatic Conservation and Habitat; Habitat Restoration: Develop a habitat and resource-specific system for quantifying nearshore-upland conservation progress that can be used to develop long-term targets. For example, fisheries outcomes could be addressed by:
    1. Mapping existing and restored fish habitat (e.g. Submerged aquatic vegetation, oyster reefs, marshes) and cross-reference those areas with seasonal fish usage.
    2. Establishing fish habitat goals for various life cycle stages.
iv. Aquatic Conservation and Habitat: Establish programs and partnerships that allow private property owners to undertake nearshore conservation and management actions that both protect properties and advance state habitat migration goals.

c. Long Term (5+ years)

i. Evaluate progress of 0-2 and 2-5 year actions and investments and reassess the climate science and monitoring that could drive program and project updates.

1. Land Conservation and Habitat: Support and/or adjust the expansion of existing conserved lands to more inland or higher elevation areas, allowing for the migration of habitats and access opportunities.
2. Habitat Restoration: Support the transition of repetitive loss properties to community open space in areas that could facilitate habitat migration.
3. Aquatic Conservation and Habitat: Update existing or develop new policies, plans and projects that strengthen the ability of resources in the aquatic nearshore and Critical Area to adjust to climate-related bay water quality impacts and reach a new baseline.

Priority 2: MDNR, with the support of the ARWG, MDE, MDP and MDA, develops adaptation implementation plans and policies for resource management issues that would benefit from inter-agency coordination to accelerate adaptation (e.g. wetland migration, dredged material management, upland wildlife habitat management).

a. Short Term (0-2 years)

i. Key agencies and organizations involved in resource management issues tied to adaptation goals coordinate to compile agency-specific activities and priorities. Agencies clearly identify which actions are programmatic and/or regulatory.

ii. Key agencies and organizations involved in these resource management issues determine how to assign or coordinate activities, including any roles with partners.

1. In assigning or coordinating activities, create a budget structure for resilient project implementation, then secure and align funding to advance those plans.
2. In assigning or coordinating activities, identify institutional barriers and limitations in staff capacity or legal requirements.

iii. Following the development of coordination structures, the ARWG creates a structure for regular communication and accountability.

b. Mid Term (2-5 years)

i. The ARWG and key agencies and organizations involved in resource management issues tied to adaptation goals:

1. Check in on progress related to the processes developed in year 0-2;
2. Identify funding, legislative or policy needs.

c. Long Term (5+ years)

i. Establish and/or enact new rules and regulations that overcome barriers and facilitate coordination for climate adaptation programs.

Priority 3: MDNR, with the support of the ARWG, MDP and MDA, supports and utilizes capacity building or circuit-riders for communities that do not have staff to apply for grants or manage projects.

a. Short Term (0-2 years)

i. Identify and prioritize workforce upskilling and retraining needs for Natural Resources and Ecosystems-related topics and practices. Identify specific funding needs.
ii. Key agencies and organizations assess opportunities to expand and leverage programs, technical assistance, capacity programs, networks and funding sources.
iii. Build capacity in small and underserved communities that have fewer resources and staff. Seek opportunities to build that capacity and provide training and education on Natural Resources and Ecosystems-related topics and practices.
iv. Identify specific funding and collaboration needs that exist between state identified targets and local government land use planning tools.

b. Mid Term (2-5 years)

i. Develop a circuit rider and/or regional specialist position that focuses on natural resource- and climate-focused topics.
ii. ARWG facilitates discussions about how to sustain community relationships and capacity support.

c. Long Term (5+ years)

i. Secure the Natural Resources and Ecosystems-related circuit-rider and/or regional specialist position as a permanent or self-sustaining program.

"Investment Needed" Priorities

Priority 1: MDNR and other state agencies develop resource-specific data, tools and protocols that allow resource managers across the state to cohesively understand, plan for and respond to changing conditions and impacts, including accelerated and expanded efforts to manage invasive species.

a. Short Term (0-2 years)

i. Raise awareness and utilization of MDNR's "Planning for Climate Change on Public Lands" website and "Climate Change Adaptation and Resilience Planning Guide" template to better understand, plan for and respond to the impacts of climate change on local and state lands.
ii. MDNR expands the public land planning guide template to develop approaches for adaptation in aquatic habitats.
iii. Identify resource- or risk-specific resilience needs, including any funding and regulatory changes, that identify potential climate impacts. These needs may include:
    1. Data or visualization of climate impacts;
    2. Monitoring (e.g. tracking saltwater intrusion and invasive species);
    3. Chesapeake Bay indicators (temperature, water quality, pH)
iv. MDNR centralizes and/or develops resources and tools for resource managers that consolidates natural resource adaptation and resilience materials into an interdisciplinary package that addresses multiple factors (e.g. sea-level rise, saltwater intrusion, warming temperatures, precipitation changes, invasive species, water quality, wildfire, etc.). Resource managers can use these materials to educate themselves on climate risks and vulnerabilities and integrate these approaches, management options, and science into their work.

1. Guidance should distinguish between the different applications of various tools. For example, the MyCoast Maryland tool may document occurrences of flooding on the landscape and increase understanding of what areas are flooding, how often and to what extent. Wetland migration data may provide landscape-scale projections of habitat shifts.

v. Develop an interagency Wetland Adaptation Strategy for Maryland, considering projections of wetland loss/migration and other climate impacts for both coastal and inland wetlands from now until 2100. The strategy should include suggestions for state policies that are likely to minimize wetland loss and allow wetlands to adapt to climate impacts. Key agencies include MDA, MDE, MDNR, MDOT and MDP.

b. Mid Term (2-5 years)

i. Resource management agencies identify a set of steps for protecting the adaptive potential of resources and climate-vulnerable communities against multiple and compounding impacts of climate change. Proposed steps should consider the data and tools (e.g. MyCoast reports) and monitoring technologies (e.g. drone surveys of invasive species) available to track and project change over time. Key agencies include MDA, MDE, MDNR, MDOT, MDP and MDEM.

ii. Develop training materials that include case studies for how to utilize the guidance and tools package to address the needs identified in the short-term milestones. These materials should reflect interdisciplinary management goals. Key agencies include MDA, MDE, MDNR, MDOT, MDP and MDEM.

iii. The Critical Area program disseminates the interdisciplinary tools package of natural resource adaptation and resilience materials (Investment Needed Priority I.a.iv) to local program partners for implementation on locally-owned and private lands.

iv. Further integrate ecosystem service values into the prioritization process for land acquisition. MDNR will update the accounting for ecosystem service framework and develop associated communication materials and engagement opportunities that focus on how ecosystems convey benefits to communities.

c. Long Term (5+ years)

i. MDA, MDE, MDNR and MDP monitor and respond to new and emerging climate threats. These may be new or worsening diseases or invasive species, intensifying storm events, drought or increasing numbers of extreme heat events.

Priority 2: MDP, with support from the CAC, MDNR and MDE, identifies and incorporates new natural resource and ecosystem focus areas into comprehensive, hazard mitigation, nuisance flood and other local planning documents to afford more protection.

a. Short Term (0-2 years)

i. MDP assists state agencies in working with local governments to review local planning documents and processes and develop consolidated messaging for natural resource and ecosystem resilience that would be applicable to and could be tailored for all plan types.

1. State agencies continue partnerships such as the CBO-CBI initiative to develop an understanding of how different communities interact with natural resources and ecosystems and what their needs may be and how that can be integrated into land planning (e.g. Defensores de la Cuencas).

ii. MDP assists state agencies in identifying strategies and actions for supporting the work of climate-vulnerable and underserved communities to incorporate natural resource and ecosystem focus areas into planning. For example:

1. Comprehensive Plans: Incorporate focus areas into sensitive areas and resilience elements, or include them in green infrastructure plans.
2. Nuisance Flood Plans: Map previously funded flooding projects and use that information to identify project gaps and ongoing concerns.

iii. The Critical Area Program, MDNR, MDE, MDP and other agencies build off work completed by the saltwater intrusion team to explore ways to enable wetland migration to occur. Identify which actions require legislative changes to be addressed in the mid- and long-term. For example, in the Critical Area Program, steps may need to be taken to assess:

1. The need for making changes to existing structures, such as limited fill in areas to prolong structural integrity and allow other areas to convert to wetlands;
2. The need for implementing conservation easements in exchange for tax breaks, or allowing some fill for the life of the owner(s), with tax or other incentives during this time followed by the property being transferred to the local jurisdiction or the state, or developing transfer of development rights (TDR) programs with incentives to attract participants.

b. Mid Term (2-5 years)

i. ARWG, MDNR and MDP design legislative recommendations that reflect the findings in the milestones above and track those proposed legislative changes.

ii. The Critical Area Program, MDNR, MDE, MDP and other agencies consolidate mapping and planning resources and develop guidance for (1) applying these tools and resources consistently across plan types and (2) how managers, private landowners and restoration practitioners should use these tools.

iii. Leverage new and increased funding sources to work with and support climate-vulnerable communities in the utilization of planning tools to develop and implement local adaptation plans that integrate guidance for NRE focus areas.

iv. The Critical Area Program, MDNR, MDE, MDP and other agencies work with local jurisdictions to explore ways to enable wetland migration on local and privately-owned properties. Identify which actions require legislative changes to be addressed in the mid- and long-term. For example, the Critical Area Program may work with jurisdictions that have Critical Area programs to assess:

1. The need for making changes to existing structures, such as limited fill in areas to prolong structural integrity and other areas to convert to wetlands, and ensure that structural practices in the Buffer above Mean High Water does not impede wetland migration or the MDE Living Shorelines Act;
2. The need for implementing conservation easements in exchange for tax breaks, or allowing some fill for the life of the owner(s), with tax or other incentives during this time followed by the property being transferred to the local jurisdiction or the state, or developing transfer of development rights (TDR) programs with incentives to attract participants.

v. Advance NRE-related resilience goals on public lands and at the local level through various land use plans by creating a process and timeline that reflects how open space confers risk reduction benefits to both natural resources and community. This work may include focusing on connections such as utilizing Nuisance Flood Plans to move natural infrastructure projects from the planning to implementation phase.

c. Long Term (5+ years)

i. Conduct a comprehensive analysis of the ways local planning documents have assisted in expanding adaptation strategies across ecosystems and jurisdictions.
ii. Ensure collaboration at the local, county, and state level to incorporate climate adaptation considerations across plan types.

Priority 3: MDNR, with support from MDP, fosters community support for natural resource adaptation by emphasizing the benefits of natural spaces through open spaces, public access and recreation.

a. Short Term (0-2 years)

i. MDNR's Office of Outdoor Recreation works with local public land managers to:
    1. Evaluate which outdoor recreation economies, land units and sites are vulnerable to climate impacts;
    2. Identify messaging opportunities about how recreational public lands provide resilience benefits.
ii. Engage the MDNR's R3 (Recruitment, Retention and Reactivation) team and Outdoor Recreation office to explore ways to incorporate adaptation messaging in work with recreational communities and industry partnerships.

1. Identify opportunities to make aquatic spaces accessible for individuals who are not industry professionals.
2. Integrate applied climate science in fishing, hunting and other recreational uses.

iii. Establish and maintain partnerships with interested community partners, family and student groups and neighborhood associations to develop an understanding of how different communities interact with NRE and what opportunities exist for conserving and restoring NRE to reduce climate risks.

iv. MDNR expands the "Planning for Climate Change on Public Lands" website to include communications materials for local, county and state land managers about how NRE and open space build climate resilience.

v. The Critical Area Program will publish "Public Pathways" guidance that emphasizes both the importance of public access to the water while balancing the impacts to natural resources and future wetland migration.

b. Mid Term (2-5 years)

i. Develop funding approaches for supporting community relationships and capacity partnership over the long term. Identify community leaders and organizations and provide them with resources for community outreach and engagement about how NRE and open space build climate resilience (e.g. La Academia model by Defensores de la Cuencas).

ii. Key agencies continue efforts and investments outlined in the short-term steps (e.g. MDNR's Outdoor Recreation Office and R3, community advisory groups, etc.) to foster continued dialogue. Key agencies accelerate efforts to implement climate adaptation strategies and capital projects and integrate messaging into these efforts.

iii. The Critical Area Program will prioritize and/or incentivize public access in the Critical Area for underserved communities (i.e. potentially via regulatory/statute change) and work to incorporate Environmental Justice into State or Local agency projects that require Critical Area Commission approval.

c. Long Term (5+ years)

i. Maintain a self-sustaining network of local organizations that works together to achieve community resilience and promote stewardship of natural resources and open space – for example, expanding and maintaining MDNR's Es Mi Parque.

ii. Use data from tools, project monitoring and models to analyze and communicate how investments in open space and natural infrastructure projects are providing resilience benefits, including flood reduction.

Critical Infrastructure

Create an inventory of all critical infrastructure in Maryland; Integrate an Asset Management Adaptation Plan framework into critical infrastructure decision-making; Create a decision support toolbox to inform critical infrastructure planning and operations; Update plans to reflect top infrastructure resilience priorities; Integrate resiliency components into priority critical infrastructure projects.

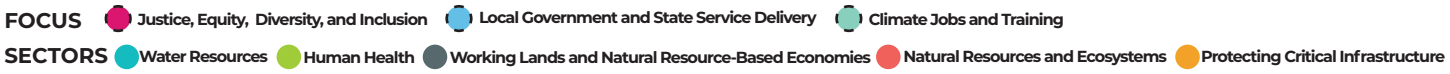
Group Introduction:
Critical infrastructure provides services that act as a backbone for the health, safety and continued operation of the state. Maryland residents and workers rely on safe and functional transportation networks, healthcare infrastructure, utility infrastructure, evacuation routes, communication and cyber security systems, school and emergency services and other critical facilities in their everyday lives.

Climate change impacts, like extreme weather, changes in precipitation patterns and extreme temperatures can impact the operational capacity and functionality of the critical infrastructure facilities across the state.

Nuisance flooding is impacting roads and the services reliant on them, sea-level rise is necessitating relocation of emergency services facilities, and changing precipitation patterns are increasing demand on stormwater infrastructure.

As climate impacts become more frequent and severe, Maryland will need to make investments in critical infrastructure across the state and work collectively to implement adaptation and resilience strategies that protect and strengthen these critical assets. Leveraging or expanding a variety of existing programs to protect and improve critical infrastructure from climate impacts, coupled with the implementation of priorities and milestones identified in the Next Generation Adaptation Plan will move Maryland closer to having a resilient, adaptive and secure critical infrastructure system for years to come.

Key: Throughout the document on the left we indicate where these focus areas across sectors. The key below will help you identify which sectors are part of the focus area.



"Resource Ready" Priorities

Priority 1: Within two years, MDOT, with the support of the ARWG, establishes a definition for how to evaluate infrastructure types for criticality and identify critical infrastructure within agencies or organizations.

a. **Short Term (0-2 years)**
   i. Develop definition guidance for evaluation of infrastructure types and which interested and impacted parties (organizations, agencies, etc.) should be using this approach (June 30, 2025).
      1. Share draft guidance and approach with pertinent interested and impacted parties for feedback (spring 2025). Suggested approach: develop the ARWG meeting agenda around review and invite additional interested and impacted parties.
      2. Partners in process: local governments, asset managers at state agencies, federal partners, JEDI group (i.e. ARWG NextGen or MCCC consider infrastructure impact on vulnerable communities and the emphasis on it for identifying critical assets or infrastructure types), industry representation (e.g. organizations like the National Association of State Energy Officials provide a holistic perspective of how everyone is looking at infrastructure, etc.), entities utilizing the Asset Management Adaptation Plan (AMAP) process for decision making (e.g. Washington Suburban Sanitary Commission).

b. Mid Term (2-5 years)

i. This priority is intended to be completed in the Short-Term, with outputs informing Priority 2 and Priority 3.

c. Long Term (5+ years)

i. This priority is intended to be completed in the Short-Term, with outputs informing Priority 2 and Priority 3.

Priority 2: MDOT, with the support of the ARWG and MDEM, determines necessary elements to incorporate into the Decision Support Toolbox (DST) including equity analysis, risk identification and tolerance, and costs to minimize risk and resiliency measures. Develop guidance for use of the DST for end users within two years.

a. Short Term (0-2 years)

i. With ARWG or the Maryland Office of Resilience as lead, compile a portfolio of efforts, tools and data that informs Decision Support Toolbox (DST) development. (July 1, 2025)

ii. Develop a needs statement for a critical infrastructure specific DST. The statement may end up being that no critical infrastructure-specific DST needs to be developed due to sufficient support from existing tools and resources. Submit the final needs statement to the ARWG. (December 31, 2025)

b. Mid Term (2-5 years)

i. Proceed with mid-term milestones if necessary, dependent on results on 2.d.ii above.

i. Provide a summary of the portfolio of efforts that includes identification of decision support provided (evaluation, prioritization, etc.). Develop a 2-year action plan that outlines steps necessary to develop a critical infrastructure-specific DST. (July 1, 2026)

ii. Complete the DST based on the action plan developed in 2.b.i and present at an ARWG working group meeting. Include a "how to" guide for utilization of the DST and plans for ongoing maintenance or updates. (December 31, 2027)

c. Long Term (5 + years)

i. This priority is intended to be completed in the Mid-Term, with outputs informing Priority 3.

Priority 3: Within four years, MDOT, with the support of the ARWG and MDEM, compiles and publishes a comprehensive inventory of critical infrastructure and assets starting with high risk areas with ownership identified.

a. Short Term (0-2 years)

i. Through an ARWG working group, with the Maryland Office of Resilience, and other identified key interested and impacted parties, evaluate and determine if a critical infrastructure inventory is necessary and effective to achieve the intended goal of a statewide integrated critical infrastructure plan that capitalizes on synergies, ensures redundancies and protects infrastructure across Maryland in the face of climate change impacts. (December 31, 2025)

ii. Develop an Action Plan or alternative approach to identifying critical infrastructure in Maryland to inform planning. (December 31, 2025)

b. Mid Term (2-5 years)

i. Complete inventory of critical infrastructure based on the definition developed under Priority 1. (July 1, 2026)

ii. Develop a scoring system for and then evaluate all critical infrastructure in the inventory for geographic, social, economic and demographic vulnerabilities. (December 31, 2026)

1. Work with the ARWG JEDI team, MCCC Climate Justice Steering Committee and other equity and environmental and/or CJ experts to ensure development of the scoring system aligns with values and Maryland's unique characteristics.
2. Even if the inventory is not determined to be the best course of action, this step should move forward as a tool to inform vulnerability assessment of critical assets. It can be provided to owners and operators of critical assets to inform their decision making.

iii. Provide the inventory with relevant vulnerability scores for the assets to the AMAP Team to inform the development of the AMAP in Maryland. (December 31, 2026)

iv. Set up a process to either regularly (annually or bi-annually), or continuously update the inventory with information on state owned assets. Process should include a plan to reassess assets for their vulnerability at least once every 3 years. (December 31, 2026 for plan of action, December 31, 2029 for updated assessment of assets in the inventory)

c. Long Term (5 + years)

i. Update the assessment of assets in the inventory (either performed by asset owners, or if state-wide lead identified by their office). (December 31, 2032)

"Investment Needed" Priorities

Priority 1: MDOT selects, tests and applies an AMAP Framework to be used statewide to inform planning studies, capital improvement programs, systems risk assessment and management and flexibility to maximize infrastructure life cycles.

a. Short Term (0-2 years)

i. Draft a detailed scope for the development of a State-wide AMAP. Include identification and summary of existing state agency planning documents and processes that should inform the AMAP.

Scope should include the identified list of critical infrastructure asset owners (based on the definition developed under Resource Ready Priority 1). Scope should also include an orders-of-magnitude cost estimate and identification of potential funding avenues to support the completion of an AMAP for the state. Lead partner to be identified. (December 31, 2025)

b. Mid Term (2-5 years)

i. Secure funding and technical assistance support to develop and pilot an AMAP approach in Maryland. Plan for the AMAP pilot and request for funding needs to be informed by the status of Resource Ready Priorities 1 (Critical Infrastructure definition), 2 (Decision Support Toolbox), and 3 (Critical Infrastructure inventory) (December 31, 2026), as well as needs to complete the remaining components of the AMAP (proposed components listed below).

1. Geo-referenced asset inventory
2. Condition assessment
3. Vulnerability Assessment
4. Level of Service
5. Likelihood of failure
6. Risk Exposure / Risk Register
7. Prioritization Optimization
8. Long-term Funding Strategies
9. Key Performance Indicators

ii. Deploy AMAP Pilot (January 1, 2027 – December 31, 2030).

c. Long Term (5 + years)

i. Integrate the AMAP and functional components into standard operating procedures at the state level to ensure alignment with and sustainability of critical infrastructure management.

1. Specific details such as measurable outcomes will need to be identified later as the AMAP is developed, piloted and refined. At minimum, the reference to the AMAP planning document, and incorporation of the definition, vulnerability assessment process, and prioritization optimization is integrated into decision making in state agency operations for all agencies with critical infrastructure (per definition in Resource Ready Priority 1).

Priority 2: Within seven years, MDOT outlines a plan for integrating the AMAP framework into capital improvement planning and resiliency-based programs.

a. Short Term (0-2 years)

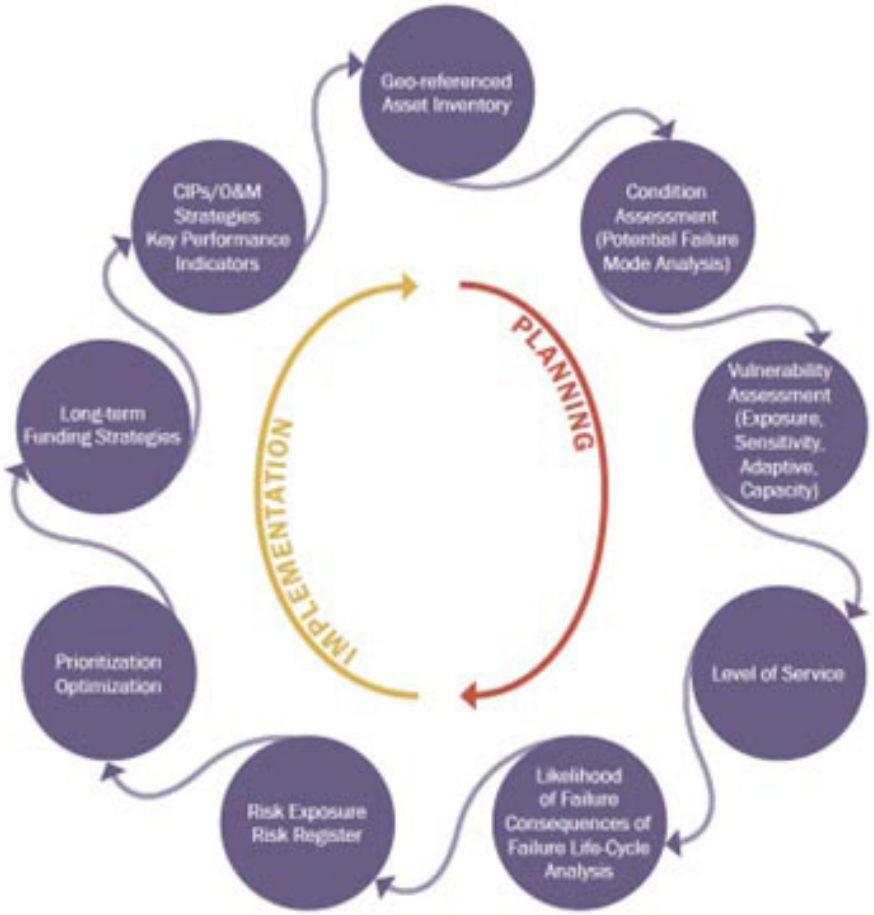
i. Assess current gaps in capital improvement planning related to resiliency.

b. Mid Term (2-5 years)

i. If scope and funding allows, include local government(s) representatives in the development and pilot of the AMAP to ensure better alignment with and easier adoption of an AMAP approach at the local level. (align with milestones under Investment Needed Priority 1, above).

c. Long Term (5 + years)

i. Following the completion of the AMAP pilot, establish a local government working group to review the definition, approach and lessons learned to inform the implementation of an AMAP approach and systematic critical infrastructure perspective into the local government order of operations. (within 2 years of the completion of the AMAP, estimated December 31, 2035)



Appendix A: Priorities Table

NextGen Adaptation Plan Priorities

Resource Ready	Investment Needed
JEDI	
Priority 1: Build equitable representation into governance.	**Priority 1:** Identify patterns and legacies of structural disinvestment in underserved and overburdened communities to produce guidance and technical assistance for state agencies and local governments to remove obstacles to accessing resources.
Priority 2: Ensure that state agencies are aligned in centering the environment and climate impacts and streamline coordination and collaboration.	**Priority 2:** Improve decision-making processes for climate adaptation funding programs to prioritize investment in underserved and overburdened communities.
Priority 3: Develop and implement a comprehensive communications and engagement strategy across the state of Maryland that resonates with residents and aligns with community needs.	**Priority 3:** Commit resources to develop working relationships, information exchange and trust between agencies and underserved and overburdened communities affected by climate.
Local Government Action and State Service Delivery	
Priority 1: The ARWG provides a web-based toolkit of capacity-building tools, resources, grant opportunities and training to assist local partners. This toolkit will Include resources from state and federal governments as well as from NGOs and private grant-making organizations.	**Priority 1:** Work with local governments to develop regional scale resilience plans that address the needs of climate-vulnerable and underserved communities and prioritize adaptation actions.
Priority 2: Initiate a strong educational outreach campaign to build local support for bold, sustained, equitable climate adaptation action. Consider focusing messages on the cost of inaction in terms of health, fiscal impacts, local economy and jobs using local examples, visualization and trusted messengers.	**Priority 2:** Employ multiple means of increasing technical support to local governments, including regional partnerships and a local resilience capacity assistance service.
	Priority 3: Align existing state funding and programs to deliver climate adaptation and build community resilience prioritizing underserved and overburdened communities to receive assistance.

Resource Ready	Investment Needed
Climate Jobs and Training	
Priority 1: New Industry Development: Continue, refine and expand grant and accelerator programs to reflect industry needs for adaptation and increased resilience.	**Priority 1:** Develop and expand training/education for entry level, mid-career job seekers, existing employees, and Department of Corrections job training programs to connect them with state-level resources, grants and training opportunities focused on climate adaptation. Success will be measured by increased worker participation in these training programs over time.
Priority 2: Mid-Career Retraining: connect job seekers and Maryland companies with state grants and training resources. Target engagement and retraining efforts to underserved and overburdened communities. Success in implementing this goal will be measured by increased state and local financial investment in middle career training programs that foster and build increased worker participation in these training programs over time (e.g. Commercial Driver's License operators shift from coal-fired power plants to adaptation industries). Investments in early education about climate will help to build awareness about how climate affects different jobs and ensure a robust workforce exists to provide climate retraining opportunities.	**Priority 2:** Target a "No Net Job Loss" goal where various economic sectors (e.g. manufacturing, forestry, food service, agriculture, fisheries, energy production, etc.) emerge or pivot to support climate adaptation. Success will be measured by average positive job growth, particularly for adaptation-related jobs through 2030.
Priority 3: Early-Career Training: Continue investing in early career training programs that enhance adaptation and incorporate climate resilience into K-12, higher educational and professional curriculum requirements. Success in implementing this goal will be measured by increased state and local financial investment in early career training programs and revised curricula that enhance climate resilience.	

Water Resources	
Priority 1: Water Quality: Through routine evaluations, integrate emerging research and monitoring results into policies, programs and permits to improve Maryland's response to the impacts of climate change on water resource quality. During evaluations identify gaps to inform upcoming research and monitoring, creating a feedback loop.	**Priority 1:** Water Supply: Proactively adjust water supply management practices and programs to account for climate change impacts to both water supply availability and source water quality. Address risks due to drought, heat-induced increases in water demand, sea level rise, storm surge, flooding and severe weather. Ensure adequate state staffing levels to manage these risks by supporting local hazard management planning, focusing on historically underserved communities.
Priority 2: Water Hazards: Facilitate/Refine statewide and local climate vulnerability assessments, starting with the most disadvantaged communities that are marginalized, underserved and overburdened. Incorporate future climate change scenarios into state and local hazard mitigation and action plans. Assessments should consider water-related hazards such as drought, and make connections to non-water-related stressors. Prioritize resilience-building actions to mitigate water-based hazards while integrating multiple goals.	
Priority 3: Inter-Agency Funding Coordination: Establish a multi-agency task force within ARWG to coordinate funding resources to support the water sector's goals, working in collaboration with other ARWG sector groups, to expedite the process and identify mutual opportunities. Manage funds to create a robust project portfolio when securing federal planning and capital funds. Prioritize projects, facilitate technical support for proposal development, fund administration and project management in disadvantaged communities that are marginalized, underserved, and overburdened, with preference for grants, as opposed to loans.	

Human Health	
Priority 1: Improve the availability, quality and access to green spaces in at least three communities, utilizing available health data and expertise at the state and local level to support green space programming.	**Priority 1:** MDH in partnership with subject matter experts produces an update to the Maryland Climate and Health Profile Report (CHPR), with planned updates to the report every 5 years.
Priority 2: Establish the Maryland Department of Health as a full member of the Maryland Commission on Climate Change.	
Priority 3: MDH creates an expanded surveillance program through the State's Environmental Public Health Tracking (EPHT) Program to display data on direct and indirect health impacts attributable to climate change.	

Working Lands and Natural Resources-Based Economies	
Priority 1: Within three years, form a plan for addressing land retention and aquatic habitat changes that is equitable, inclusive of interests and addresses issues of all affected farmers, foresters, landowners and watermen in the state. Build on existing climate adaptation and natural resource planning initiatives and programs, and expand partnerships with social services and economic development interests.	**Priority 1:** Adopt Climate Smart agriculture and forestry statewide by utilizing ecosystem marketplaces where appropriate.
Priority 2: Explore opportunities to develop new markets emerging for agriculture, forestry and fisheries as a result of climate impacts and saltwater intrusion. Consider recreation as a non-traditional market.	**Priority 2:** Augment Maryland's resources-based industries workforce by addressing structural barriers, expanding outreach and building skill sets to comprehensively increase the diversity of participants. State agencies expand partnerships and research to explore and implement ways to make farming, forestry and fishing more attractive to youth and others.
Priority 3: Farmers across the state increase their adoption of soil health and conservation practices beyond annual cover cropping and conservation tillage to improve soil health, sequester carbon and help meet goals outlined in the Climate Solutions Now Act.	**Priority 3:** Encourage innovation and adoption of new technologies to enable farmers, foresters, landowners and watermen to increase sustainability, profitability and resiliency of operations.

Natural Resources and Ecosystems	
Priority 1: Update and prioritize conservation and restoration targets (e.g. Targeted Ecological Areas, oyster reefs, endangered and listed species). Set numeric goals to address significant vulnerabilities or changes and facilitate natural resource and ecosystem climate migration by utilizing the latest information and climate science about habitat vulnerability and migration and species shifts.	**Priority 1:** Develop resource-specific data, tools and protocols that allow resource managers across the state to cohesively understand, plan for and respond to changing conditions and impacts, including accelerated and expanded efforts to manage invasive species.
Priority 2: Develop adaptation implementation plans and policies for resource management issues that would benefit from inter-agency coordination to accelerate adaptation (e.g. wetland migration, dredged material management, upland wildlife habitat management).	**Priority 2:** Identify and incorporate new natural resource and ecosystem focus areas into comprehensive, hazard mitigation, nuisance flood and other local planning documents to afford more protection.
Priority 3: Support and utilize capacity building or circuit-riders for communities that do not have staff to apply for grants or manage projects.	**Priority 3:** Foster community support for natural resource adaptation by emphasizing the benefits of natural spaces through open spaces, public access and recreation.

Protecting Critical Infrastructure	
Priority 1: Within two years, establish a definition for how to evaluate infrastructure types for criticality and identify critical infrastructure within agencies or organizations.	**Priority 1:** Select, test and apply an AMAP Framework to be used statewide to inform planning studies, capital improvement programs, systems risk assessment and management and flexibility to maximize infrastructure life cycles.
Priority 2: Determine necessary elements to incorporate in the Decision Support Toolbox (DST) including equity analysis, risk identification and tolerance, and costs to minimize risk and resiliency measures. Develop guidance for use of the DST for end users within two years.	**Priority 2:** Within seven years, outline a plan for integrating the AMAP framework into capital improvement planning and resiliency-based programs.
Priority 3: Within four years, compile and publish a comprehensive inventory of critical infrastructure and assets starting with high risk areas with ownership identified.	

Appendix B: NextGen ACRONYMS

State Agencies, Bodies, and Policies	
ARWG	Adaptation and Resiliency Working Group of the Maryland Commission on Climate Change
DBM	Department of Budget and Management
ECO	Education, Communication, and Outreach Workgroup of the Maryland Commission on Climate Change
GGRA	Greenhouse Gas Emissions Reduction Act
MCCC	Maryland Commission on Climate Change
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
MDEM	Maryland Department of Emergency Management
MDH	Maryland Department of Health
MDNR	Maryland Department of Natural Resources
MDOT	Maryland Department of Transportation
MDP	Maryland Department of Planning
MEA	Maryland Energy Administration
MSDE	Maryland State Department of Education
STWG	Scientific and Technical Working Group of the Maryland Commission on Climate Change
Regional and State Networks	
CBO-CBI	Community-Based Organization, Capacity Building Initiative
CEJSC	Commission on Environmental Justice and Sustainable Communities
Technical Service Providers	
IEN	Institute for Engagement & Negotiation at the University of Virginia
MARBIDCO	Maryland Agricultural and Resource-Based Industry Development Corporation
UMCES	University of Maryland Center for Environmental Sciences
UMD	University of Maryland
Federal Agencies, Bodies, and Policies	
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
NERR	National Estuarine Research Reserve, part of the National Estuarine Research Reserve Association

Terminology

BIPOC	Black, Indigenous, or Person of Color
BMP	Best Management Practice
CEDS	Comprehensive Economic Development Strategy
CJ	Climate Justice
EJ	Environmental Justice
HAB	Harmful Algal Bloom
JEDI	Justice, Equity, Diversity, and Inclusion
MEPA	Maryland Environmental Policy Act
NGO	Non-Governmental Organization
SLR	Sea Level Rise
TAC	Technical Advisory Committee
WIP	Watershed Implementation Plan, developed by the Chesapeake Bay Program

Appendix C: NextGen Definitions

Environmental Change and Response	
Adaptation	Action to prepare for and adjust to new conditions, thereby reducing harm or taking advantage of new opportunities.10 Climate adaptation refers to those actions taken to reduce vulnerability to the impacts of climate change, aimed to enhance the resilience of natural and human-based systems.[11]
Adaptive Capacity	The extent to which systems, institutions, humans, and the natural environment are able to adapt to the presence of stressors, exploit opportunities when they are presented, or respond to the aftermath of disasters or hazards, climate or non-climate related.[12]
Adaptive Management	A systems approach that prioritizes action, even in the face of uncertainty, while including feedback loops and assessments along the system to inform management decisions and improve outcomes.[13]
Climate Change	Changes in long-term average weather patterns on a global, continental, regional, or local scale occurring as a result of greenhouse gas emissions. Heightened levels of emissions are being generated by human activities, including burning and producing fossil fuels, agricultural practices, and deforestation. As a result, heat is trapped in the Earth's atmosphere at increased levels, causing global temperatures to rise. As temperatures rise, additional environmental changes, or climate impacts, occur.
Climate Stressors	A condition, event, or trend related to climate variability and change that can exacerbate hazards, such as sea level rise.[14] In the context of climate adaptation, non-climate stressors refer to those current or future social, environmental, and economic pressures threatening humans and natural systems that do not stem from climate change, such as access to healthcare and housing, socioeconomic status, habitat fragmentation, invasive species, pollution, disease, and overexploitation. Many existing non-climate stressors will likely be exacerbated by climate stressors, referred to as co-stressors.[15]
Co-Benefits	Benefits that arise out of climate adaptation strategies by mitigating the effects of climate change on humans and the environment, while also addressing other preexisting, non-climate related problems.[15]
Exposure	People, species and ecosystems, environmental services and resources, infrastructure, or other economic, social, and cultural assets are exposed to climate impacts when they are physically located in an area that could be negatively affected by a climate hazard.[16]
Gray Infrastructure	A feature of the urban built environment that collects and conveys excess stormwater through curbs, gutters, drains, piping, and collections systems.[17]
Green Infrastructure	Using natural processes to improve water quality and manage the volume of stormwater runoff at its source through interventions such as rain gardens, bio-retention street planters, and curb cuts to control the flow and direction of water. Green infrastructure can reduce the need for constructing additional gray stormwater infrastructure in many instances by reducing the burden on existing excess water runoff systems.[18]
Greenhouse Gas Mitigation	Addressing the root causes of climate change by stabilizing greenhouse gas emissions globally through actions that may include reducing fossil fuel use, and enhancing the Earth's ability to accumulate and store greenhouses in natural sinks like oceans, forests, and soils.[19]

Hazard Mitigation	In a planning context, any sustainable action to reduce or eliminate long-term risk to people and property from future disasters through actions to break the cycle of disaster damage, reconstruction and repeated damage.[20]
Nature-Based Solution	Using natural features and processes to develop infrastructure projects that provide resilience benefits to coastal communities and habitats. These projects leverage the natural protection that dunes, marshes, wetlands, and reefs provide against flooding, storm damage, and erosion, and may strategically combine pre-existing and engineered features for hazard mitigation.[21,22]
Priority	Climate adaptation outcomes the state has selected for implementation over the next ten years.Priorities are classified as “resource ready” or “investment needed” based on the availability and readiness of resources to be mobilized to advance implementation of the priority. Resources include, but are not limited to: funding, regulation/policy, programs, staff capacity, technical assistance, data collection and monitoring, education and outreach.
Priority: “Resource Ready”	Resource Ready priorities either have funding and implementation support in place or are expected to acquire these assets in the short term.
Priority: “Investment Needed”	Investment Needed priorities require additional action from state agencies and partners to establish a process for acquiring and mobilizing novel resources.
Resilience	The ability of a system to recover from a disturbance, adapting a complex network of interactions to maintain productivity and fundamental identity.[15]
Sensitivity	The extent to which a system, asset, or the natural environment may be negatively affected or benefitted by the effects of climate change.[12,16]
Technical Assistance	Expertise, guidance and/or planning provided by a professional to assist another entity in addressing a specific issue.
Vulnerability	The characteristics of exposure, sensitivity and adaptive capacity that make a system, asset or the natural environment more or less susceptible to harm or change.[23]

Diversity, Equity, Justice, and Inclusion	
Equity	Achieving justice, impartiality and fairness within the procedures, processes, and distribution of resources and rewards by institutions or systems. This requires an understanding of the underlying or root causes of disparities within our society. Equity can be further broken down into categories:24 • Procedural Equity: inclusive, accessible, authentic engagement and representation in decision-making processes regarding programs and policies. • Distributional Equity: programs and policies result in fair distributions of benefits and burdens across all segments of a community, prioritizing those with the highest need. • Structural Equity: decisions are made with a recognition of historical, cultural, and institutional dynamics and structures that have routinely advantaged privileged groups in society. • Trans-generational Equity: decisions consider generational impacts and do not result in unfair burdens on future generations
Diversity	The demographic mix of a specific collection of people, taking into account elements of human difference. Such differences include but are not limited to: age, racial and ethnic identity, faith-based and religious identity, LGBTQ+ populations, gender identity, conditions of disability, relationship to the natural environment, and rural versus urban development conditions.[25]
Inclusion	The degree to which individuals from diverse backgrounds are able to participate fully in the decision-making processes within an organization or group. While a truly "inclusive" group is necessarily diverse, a "diverse" group may or may not be "inclusive".[25]
Justice	The realized ability of all individuals to live a full and dignified life. Achieving justice requires directly dismantling barriers to resources and opportunities in society.26 • Environmental Justice: equal protection from environmental and public health hazards for all people regardless of race, income, culture, and social status.27 • Climate Justice: the pursuit of eliminating inequitable and disproportionate climate impacts on certain communities, including as a result of existing inequitable social conditions exacerbated by climate change.[28]
Underserved and Overburdened Communities	Populations which, as a result of historic and current systemic inequities caused by racism, classism, xenophobia, and other prejudices, (1) receive inadequate or inequitable investment and services; (2) are excluded from decision-making, and as a result may have little influence over outside decisions that impact their daily quality-of-life; and consequently (3) experience environmental or quality-of-life disparities when compared to surrounding populations. These communities routinely experience the cumulative and compounding impacts of industry, environmental hazards, and displacement, among other burdens, and have little to no recourse to address harms. Populations who have been marginalized include Black people, Indigenous people, persons of color, immigrant communities, the elderly, and persons with disabilities.
Vulnerable Populations	Populations that experience greater risk factors for poor health and climate hazards. This typically includes but is not limited to children, the elderly, individuals with disabilities, the socioeconomically disadvantaged, underinsured individuals and those with certain medical conditions, and may be influenced by their racial or ethnic status or sexual orientation.[29]
Whole-of-Government	A collaborative and interdisciplinary approach under which government programs work in alignment through formal and informal networks. This approach recognizes the need for collaborative responses to the public's needs to improve public service. This is also called "whole government".

Note on Terminology

During the process of Adaptation Framework development, partners from the University of Virginia's Institute for Engagement and Negotiation assisted in the capturing of working definitions. Since the Next Generation Adaptation Plan is an extension of the Framework, the majority of those definitions remain the same with the purpose of clarifying the intended meaning for each term in the context of the NextGen Plan. We continue to acknowledge that participants coming from different disciplines attach different nuances to specific terms and that language is ever-evolving, and can be conflicting and controversial. Like the authors of the Adaptation Framework, we recognize that the terms used will not be preferred by all readers, and that the meanings attached to these are likely to continue to evolve and change over time.

Appendix D: Agency Task Table

All State Agencies		
	Priority #	Task Summary
JEDI		
Resource Ready	1	Build equitable representation into governance.
	2	Align state and local government around climate justice
	3	Develop a communication and engagement strategy that aligns with community needs
Investment Needed	1	Identify and address patterns of structural disinvestment in underserved and overburdened communities
	2	Increase equitable investment of climate adaptation funding
	3	Commit resources to develop relationships with underserved and overburdened communities
Local Gov		
Resource Ready	1	Provide a web-based toolkit of capacity building tools, resources, grant opportunities, and trainings
	2	Initiate an educational campaign to support equitable climate adaptation action
Investment Needed	1	Work with local governments to develop equitable resilience plans
	2	Increase technical support to local governments
	3	Align state funding and programs to support climate adaptation in underserved and overburdened communities
Climate Jobs and Training		
Resource Ready	1	Expand grant and accelerator programs to support industry adaptation
	2	Support and create opportunities for mid-career retraining that enhance climate adaptation and resilience and target underserved and overburdened communities
	3	Support and create opportunities for early-career training that enhance climate adaptation and resilience
Investment Needed	1	Connect entry level, mid-career job seekers, and existing employees with state-level resources, grants and training opportunities focused on climate adaptation.
	2	Target a "No Net Job Loss" goal where various economic sectors emerge or pivot to support climate adaptation

Maryland Department of Agriculture				
	Priority #	Timeframe	Colalborators	Task Summary
Working Lands and Natural-Resource Based Economies				
Resource Ready	1	All - as part of team	MDP, MDNR (lead), MDE	Plan for addressing land and aquatic habitat changes
	2	Short	MDP, MARBIDCO, MDNR	Guidance for zoning and land planning
				Support product diversity
		Mid	MDNR	Industry-specific needs assessments
			MDNR	BMPs for novel resource use
		Long	MDNR	Support industry-specific BMPs
	3	All	MDNR	Soil health and conservation
Investment Needed	1	All	MDNR	Climate Smart agriculture and forestry
	2		MDNR, UMD Extension	Augment resources-based industries workforce
	3	Short	MDNR	Finance innovative programs for farmers
		Mid	MDE, MDNR	Pilot program continuing data collection
			MDE, MDNR	Industry access to wider range of raw materials
		Long	MDNR	Pilot program outreach
			MDNR	Support flexibility over time
Natural Resources and Ecosystems				
Resource Ready	3	All - as part of team	ARWG, MDNR, MDP	Support capacity building/circuit-riders
	1	Short	MDE, MDNR, MDOT, MDP	Develop Wetland Adaptation Strategy
		Mid	MDE, MDNR, MDOT, MDP, MDEM	Protect adaptive potential of resources and communities
			MDE, MDNR, MDOT, MDP, MDEM	Train on utilizing the management resources and tools package
		Long	MDE, MDNR, MDP	Monitor and respond to climate threats

Maryland Department of the Environment				
	Priority #	Timeframe	Colalborators	Task Summary
Water Resources				
Resource Ready	1	All	A-StoRM, ARWG, STWG, MDNR, MDP	Use research and monitoring results to increase the resilience of water quality
	2	All	A-StoRM, Labor, MDEM, MDH, MDNR	Refine climate vulnerability assessments and plans to address water-related hazards
Investment Needed	1	Short, Mid	State Water Supply Program, UMCES, Mote Marine Laboratory, MDH	Adjust water supply management practices and programs to address climate change impacts
Working Lands and Natural-Resource Based Economies				
Resource Ready	1	All - as part of team	MDP, MDNR (lead), MDA	Plan for addressing land and aquatic habitat changes
Investment Needed	3	Mid	MDA, MDNR	Encourage innovation and adoption of new technologies to increase resiliency of operations
Natural Resources and Ecosystems				
Resource Ready	1	All	MDNR (lead), MDP	Update and prioritize conservation and restoration targets
	2	All - as part of team	ARWG, MDNR (lead), MDP, MDA	Develop adaptation plans and policies for resource management issues
Invesment Needed	1	Short	MDA, MDNR, MDOT, MDP	Develop Wetland Adaptation Strategy
		Mid	MDA, MDNR, MDOT, MDP, MDEM	Protect adaptive potential of resources and communities
			MDA, MDNR, MDOT, MDP, MDEM	Train on utilizing the management resources and tools package
		Long	MDA, MDNR, MDP	Monitor and respond to climate threats
	2	Short, Mid	MDNR, CAC, MDP	Enable wetland migration

Maryland Department of Health				
	Priority #	TL (Short, Mid, Long)	Collaborators	Task Summary
Water Resources				
Resource Ready	2	Long	MDE, MDEM	Identify and distribute funds to remediate mold and mildew within low-income communities.
Investment Needed	1	Mid	MDE	Develop and administer a program to enforce clean drinking water access
		Long	ARWG	Evaluate water supply policies, programs and projects using the health impact assessment toolkit
Human Health				
Resouce Ready	1	All	MDNR, MCCC CJ	Improve the availability, quality, and access to green spaces
	3	All	MCCC Eco Working Group (Short), ARWG (Mid)	Expanded surveillance via Environmental Public Health Tracking for climate change health impacts
Investment Needed	1	Short, Mid		Update the Climate and Health Profile Report

Maryland Department of Natural Resources				
	Priority #	Timeframe	Collaborators	Task Summary
Water Resources				
Resource Ready	1	Short	MWMC	Monitor climate impacts on water quality
		Mid	MDP	Use climate monitoring to assess adaptation progress
			MDP	Identify funding for climate monitoring
			MDA, MDP	Update with land use management practices with Saltwater Instrusion recommendations
				Assess SLR impact on groundwater quality
		Long	MDE	Incorporate climate variables into Statewide monitoring strategy
	2	Short		Mapping disadvantaged communities
			UMD Sea Grant	Sea level rise training and guidance
			Maryland Resilience Partnership	Water hazards website
			MDE	Dam removal habitat enhancement
		Short, Mid	MDE	Living Shoreline Enhancement
		Mid		Implement climate adaptation projects with climate-vulnerable communities
			MDE, MDP	Review comprehensive plans for equity considerations
			MDEM, MDP	Develop tools and trainings to assist integration of climate resilience into local government plans
			MDE	Living Shoreline Enhancement
Human Health				
Resource Ready	1	All - as part of team	MDH, MCCC CJ	Improve the availability, quality, and access to green spaces

Working Lands and Natural-Resource Based Economies				
Resource Ready	1	All - as part of team	MDP, MDE, MDA	Plan for addressing land and aquatic habitat changes
	2	Short	MDP (lead), MDA, MARBIDCO	Guidance for zoning and land planning
				Economic adjustment strategy for forestry
				Remove barriers for new fisheries
		Mid	MDA	Industry-specific needs assessments
			MDA	BMPs for novel resource use
		Long	MDA	Support industry-specific BMPs
	3	All	MDA	Soil health and conservation
Investment Needed	1	All		Climate Smart agriculture and forestry
	2	All	MDA (lead), UMD Extension	Augment resources-based industries workforce
	3	Short	MDA	Pilot programs to test new technologies
			MDA	Finance innovative programs for foresters
		Mid	MDE, MDA	Pilot program continuing data collection
			MDE, MDA	Industry access to wider range of raw materials
		Long	MDA	Pilot program outreach
			MDA	Support flexibility over time

Natural Resources and Ecosystems				
Resource Ready	1	All	MDE, MDP	Update and prioritize conservation and restoration targets
	2	All	MDP, MDA, MDE, ARWG	Develop adaptation and implementation plans and policies
	3	All - as part of team	ARWG, MDA, MDP	Support capacity building/circuit-riders
Investment Needed	1	Short		Guidance for public lands planning
				Aquatic habitat planning
			MDEM	Resource and risk-specific resilience needs
				Management resources and tools package for climate resilience
			MDA, MDE, MDOT, MDP	Develop Wetland Adaptation Strategy
		Mid	MDA, MDE, MDOT, MDP, MDEM	Protect adaptive potential of resources and communities
			MDA, MDE, MDOT, MDP, MDEM	Train on utilizing the management resources and tools package
				Tools for local partners
				Integrate ecosystem services values
		Long	MDA, MDE, MDP	Monitor and respond to climate threats
	2	Short	MDNR	Consolidated messaging on natural resource and ecosystem resilience
			MDNR	Incorporate natural resources and ecosystem focus areas into planning
		Short, Mid	MDNR, CAC, MDE	Enable wetland migration
		Mid	MDP, ARWG	Draft legislative recommendations
			MDNR, CAC, MDE	Consolitate mapping and planning resources and tools
			MDP	Advance natural resources and ecosystems goals on public lands and at the local level
		Long	MDP	Comprehensive analysis of planning documents in adaptation strategies
			MDP	Collaboration across jurisdictions to incorporate climate resilience across plans
	3	All	MDP	Foster community support for natural resource adaptation

Maryland Department of Transportation				
	Priority #	Timeframe	Collaborators	Task Summary
Natural Resources and Ecosystems				
Resource Ready	2	All - as part of team	MDP, MDA, ARWG	Develop adaptation and implementation plans and policies
Investment Needed	1	Short	MDA, MDE, MDNR, MDP	Develop Wetland Adaptation Strategy
		Mid	MDA, MDE, MDNR, MDP, MDEM	Protect adaptive potential of resources and communities
			MDA, MDE, MDNR, MDP, MDEM	Train on utilizing the management resources and tools package
Critical Infrastructure				
Resource Ready	1	All	ARWG, MEA	Define and identify critical infrastructure
	2	All	ARWG (Short), MDEM Office of Resilience (Short)	Outline the Decision Support Toolbox (DST)
	3	All	ARWG, MDEM Office of Resilience (Short)	Publish comprehensive inventory of critical infrastructure and assets
Investment Needed	1	All		Select, test, and apply an AMAP Framework
	2	All		Develop plan for integrating AMAP into capital improvement and resilience-based programs

Maryland Energy Administration				
	Priority #	Timeframe	Collaborators	Task Summary
Working Lands and Natural-Resource Based Economies				
Investment Needed	3	Mid	MDE, MDNR	Develop clean heat standards and create markets for lower quality wood
Critical Infrastructure				
Resource Ready	1	Short	ARWG, MDOT (lead)	Establish a definition for critical infrastructure

Maryland Department of Planning				
	Priority #	Timeframe	Collaborators	Task Summary
Water Resources				
Resource Ready	1	Mid	MDA, MDNR	Update land use management practices with Saltwater Instrusion recommendations
			MDNR	Use climate monitoring to assess adaptation progress
			MDNR	Identify funding for climate monitoring
	2	Mid	MDE, MDNR	Review comprehensive plans for equity considerations
			MDEM, MDNR	Develop tools and trainings to assist integration of climate resilience into local government plans
Working Lands and Natural-Resource Based Economies				
Resource Ready	1	All - as part of team	MDNR (lead), MDE, MDA	Develop a plan for addressing land and aquatic habitat changes
	2	Short	MDA, MARBIDCO, DNR	Develop guidance for zoning and land planning

Natural Resources and Ecosystems				
Resource Ready	1	All	MDNR (lead), MDE	Update and prioritize conservation and restoration targets
	2	All	MDNR (lead), MDA, MDE, ARWG	Develop adaptation and implementation plans and policies
	3	All - as part of team	ARWG, MDNR (lead), MDA	Support capacity building/circuit-riders
Investment Needed	1	Short	MDA, MDE, MDNR, MDOT	Develop a Wetland Adaptation Strategy
		Mid	MDA, MDE, MDNR, MDOT, MDEM	Protect adaptive potential of resources and communities
			MDA, MDE, MDNR, MDOT, MDEM	Train on utilizing the management resources and tools package
		Long	MDA, MDE, MDNR	Monitor and respond to climate threats
	2	Short	MDNR	Consolidate messaging on natural resource and ecosystem resilience
			MDNR	Incorporate natural resources and ecosystem focus areas into planning
		Short, Mid	MDNR, CAC, MDE	Enable wetland migration
		Mid	MDNR, ARWG	Draft legislative recommendations
			MDNR, CAC, MDE	Consolidate mapping and planning resources and tools
			MDNR	Advance natural resources and ecosystems goals on public lands and at the local level
		Long	MDNR	Conduct a comprehensive analysis of planning documents in adaptation strategies
			MDNR	Collaborate across jurisdictions to incorporate climate resilience across plans
	3	All	MDNR (lead)	Foster community support for natural resource adaptation

Maryland Department of Emergency Management				
	Priority #	Timeframe	Collaborators	Task Summary
Water Resources				
Resource Ready	2	Mid	MDE, MDNR, MDP	Integrate climate resilience into local hazard mitigation plans
			MDE, MDH	Integrate EPHT recommendations into state and local hazard mitigation plans
		Long	MDE, MDH	Mold and mildew remediation funding
	3	All	ARWG	Interagency Funding Task Force
Natural Resources and Ecosystems				
Investment Needed	1	Short	MDNR	Resource and risk-specific resilience needs
		Mid	MDA, MDE, MDNR, MDOT, MDP	Adaptive potential of resources and communities
			MDA, MDE, MDNR, MDOT, MDP	Utilize the management resources and tools package
Critical Infrastructure				
Resource Ready	2	Short	ARWG (mid), MDOT (lead)	Compile portfolio of resilience efforts, tools, and data
	3	Short	ARWG, MDOT (lead)	Determine need for critical infrastructure inventory

Other Partners					
Agency / Organization		Priority #	TL (Short, Mid, Long	Collaborators	Task Summary
Climate Jobs and Training					
Maryland Department of Labor	Resource Ready	2	Short	ARWG	Pursue an EARN grant to integrate resilience into industry
Maryland Department of Labor		2	Short		Connect adaptation industry opportunities into upskilling partnerships
Maryland Department of Labor		3	Short	ARWG	Expand adaptation-related skills in paid service placements
Maryland Department of Labor		3	Mid	ARWG	Expand opportunities for youth apprenticeship programs focused on adaptation and resilience
Maryland State Department of Education		2	Short	MDNR	Invest in high school climate curriculum
Maryland State Department of Education		3	Short	ARWG, MDNR	Invest in high school climate curriculum
Maryland State Department of Education		3	Short	MDNR	Incorporate climate content into Project Green Classrooms
Maryland State Department of Education		3	Mid	ARWG, University System of Maryland	Conduct outreach about resilience-related careers
Maryland Department of Service and Civic Innovation		3	Short	ARWG	Integrate climate adaptation and resilience training into the Maryland Year of Service program
University System of Maryland		3	Short		Update curriculum to include climate change and career opportunities
University System of Maryland		3	Mid	ARWG, Maryland State Department of	Conduct outreach about resilience-related careers
Maryland Department of Commerce	Investment Needed	2	Mid	ARWG, MDP, MDOT	Provide guidance for integration of climate job needs in regional Comprehensive Economic Develment Strategy
Maryland Department of Labor		1	Short		Provide a platform for job seekers to engage in professional development
Maryland Department of Labor		1	Short		Establish an adaptation-related job fair with state agencies

Water Resources					
Council on the Chesapeake and Coastal Bays Watershed	Resource Ready	1	Long		Update WIP and milestones to account for climate impacts
Maryland Department of Labor		2	Long	MDE	Develop educational standards for integrating climate adaptation into public works programs
Working Lands and Natural-Resource Based Economies					
Maryland Department of Commerce	Resource Ready	2	All - As part of team	MDA, MDNR, MDP	Explore opportunities to develop new markets as a result of climate impacts
Maryland Department of Labor		2	All - As part of team	MDA, MDNR, MDP	Explore opportunities to develop new markets as a result of climate impacts
Maryland Department of Commerce	Investment Needed	2	All - As part of team	MDA, MDNR	Expand partnerships and research to increase the diversity of natural resource-based industries
Maryland Department of Labor		2	All - As part of team	MDA, MDNR	Expand partnerships and research to increase the diversity of natural resource-based industries
Maryland Department of Commerce		3	All - As part of team	MDA, MDNR	Encourage innovation and adoption of climate resilience technologies
Maryland Department of Labor		3	All - As part of team	MDA, MDNR	Encourage innovation and adoption of climate resilience technologies

Water Resources					
Council on the Chesapeake and Coastal Bays Watershed	Resource Ready	1	Long		Update WIP and milestones to account for climate impacts
Maryland Department of Labor		2	Long	MDE	Develop educational standards for integrating climate adaptation into public works programs
Working Lands and Natural-Resource Based Economies					
Maryland Department of Commerce	Resource Ready	2	All - As part of team	MDA, MDNR, MDP	Explore opportunities to develop new markets as a result of climate impacts
Maryland Department of Labor		2	All - As part of team	MDA, MDNR, MDP	Explore opportunities to develop new markets as a result of climate impacts
Maryland Department of Commerce	Investment Needed	2	All - As part of team	MDA, MDNR	Expand partnerships and research to increase the diversity of natural resource-based industries
Maryland Department of Labor		2	All - As part of team	MDA, MDNR	Expand partnerships and research to increase the diversity of natural resource-based industries
Maryland Department of Commerce		3	All - As part of team	MDA, MDNR	Encourage innovation and adoption of climate resilience technologies
Maryland Department of Labor		3	All - As part of team	MDA, MDNR	Encourage innovation and adoption of climate resilience technologies

ARWG				
	Priority #	TL (Short, Mid, Long)	Collaborators	Task Summary
Water Resources				
Resource Ready	1	Short	STWG	Communication and integration of emerging water quality science
		Mid	MDNR, MDP	Climate monitoring result integration into analysis of adaptation progress
				Identification of monitoring funding
	2	Mid	MDP, MDE, DNR	Review comprehensive plans
	3	All	MDE's Local Support Program, MDEM's Office of Resilience	Establish the Inter-Agency Funding Coordination working group
Investment Needed	1	Short	CEJSC	Socio-economic aspects of water supply
		Long	MDH	Evaluate water supply policies, programs, and projects
Human Health				
Resource Ready	2	Short	MDH	Establish MDH as a full member of the MCCC
	3	Mid	MDH	Identify data needs to integrate climate and health into state programming
Natural Resources and Ecosystems				
Resource Ready	3	All	MDNR; MDA; MDP	Support capacity building/circuit-riders
Investment Needed	2	Mid	MDNR, MDP	Legislative recommendations on local planning documents
Critical Infrastructure				
Resource Ready	1	All	MDOT (lead), MEA	Define and identify critical infrastructure
	2	Mid	MDOT (lead), MDEM Office of Resilience (short)	Review the Decision Support Toolbox
	3	All	MDOT (lead), MDEM Office of Resilience (short)	Publish comprehensive inventory of critical infrastructure and assets

Appendix E: References

- Bierbaum, Rosina, Arthur Lee, Joel Smith, Maria Blair, Lynne M Carter, F. Stuart Chapin, Susan Ruffo, et al. Rep. Climate Change Impacts in the United States: The Third National Climate Assessment; Ch. 28 Adaptation. U.S. Global Change Research Program, 2014. https://nca2014.globalchange.gov/report/response-strategies/adaptation
- "2030 Greenhouse Gas Emissions Reduction Act Plan." mde.maryland.gov. The Maryland Department of the Environment, February 19, 2021. https://mde.maryland.gov/programs/Air/ClimateChange/Documents/2030%20GGRA%20Plan/THE%202030%20GGRA%20PLAN.pdf.
- Intergovernmental Panel on Climate Change, Climate Change 2014: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2014) (http://www.ipcc.ch/report/ar5/wg2/).
- Implementing cross-framework priority #1 to create an online adaptation hub for Maryland could provide a first step towards sharing progress and results in an open, and accessible way. National Research Council. 2004. "Chapter: 2 Adaptive Management Theories, Frameworks, and Practices." In Adaptive Management for Water Resources Project Planning, 19–32. Washington, DC: The National Academies Press. https://doi.org/10.17226/10972.
- "U.S. Climate Resilience Toolkit (Glossary)." toolkit.climate.gov. U.S. Climate Resilience Toolkit, March 2, 2021. https://toolkit.climate.gov/content/glossary.
- Association of Fish and Wildlife Agencies, Council on Environmental Quality, Great Lakes Indian Fish and Wildlife Commission, National Oceanic and Atmospheric Administration, and U.S. Fish and Wildlife Service. Rep. National Fish, Wildlife and Plants Climate Adaptation Strategy (P.107). National Fish, Wildlife and Plants Climate Adaptation Partnership, 2012. https://www.fishwildlife.org/application/files/9015/8153/2136/NFWPCAS-Final.pdf.
- Association of Fish and Wildlife Agencies, Council on Environmental Quality, Great Lakes Indian Fish and Wildlife Commission, National Oceanic and Atmospheric Administration, and U.S. Fish and Wildlife Service. Rep. National Fish, Wildlife and Plants Climate Adaptation Strategy (P.79) . National Fish, Wildlife and Plants Climate Adaptation Partnership, 2012. https://www.fishwildlife.org/application/files/9015/8153/2136/NFWPCAS-Final.pdf.
- Intergovernmental Panel on Climate Change, Climate Change 2014: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2014) (http://www.ipcc.ch/report/ar5/wg2/).
- US EPA. "Why You Should Consider Green Stormwater Infrastructure for Your Community." US EPA. July 19, 2019. https://www.epa.gov/G3/why-you-should-consider-green-stormwater-infrastructure-your-community.
- US EPA. "What Is Green Infrastructure?" Overviews and Factsheets. US EPA. September 30, 2015. https://www.epa.gov/green-infrastructure/what-green-infrastructure.

- The Earth Science Communications Team at NASA's Jet Propulsion Laboratory | California Institute of Technology. "Climate Change Adaptation and Mitigation." climate.NASA.gov. National Aeronautics and Space Administration, September 18, 2020. https://climate.nasa.gov/solutions/adaptation-mitigation/.
- FEMA. "Hazard Mitigation Assistance Grants." FEMA.gov. March 31, 2021. https://www.fema.gov/grants/mitigation.
- Bridges, Todd, Jeffrey King, Jonathan Simm, Michael Beck, Georganna Collins, Quirijn Lodder, and Ram Mohan, eds. 2021. International Guidelines on Natural and NatureBased Features for Flood Risk Management. Vicksburg, MS: U.S. Army Engineer Research and Development Center. https://hdl.handle.net/11681/41946.
- NOAA, National Ocean Service. "What are nature-based solutions?" NOAA.gov September 27, 2023. https://oceanservice.noaa.gov/facts/nature-based.html?utm_medium=email&utm_source=GovDelivery.
- Association of Fish and Wildlife Agencies, Council on Environmental Quality, Great Lakes Indian Fish and Wildlife Commission, National Oceanic and Atmospheric Administration, and U.S. Fish and Wildlife Service. Rep. National Fish, Wildlife and Plants Climate Adaptation Strategy (P.5). National Fish, Wildlife and Plants Climate Adaptation Partnership, 2012. https://www.fishwildlife.org/application/files/9015/8153/2136/NFWPCAS-Final.pdf .
- Intergovernmental Panel on Climate Change, Climate Change 2014: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2014) http://www.ipcc.ch/report/ar5/wg2.
- Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)] IPCC, Annex I: Glossary [Matthews, J.B.R. (ed.)]. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. 2018; https://www.ipcc.ch/sr15/chapter/glossary/.
- Park, Angela. Rep. Equity in Sustainability: An Equity Scan of Local Government Sustainability Programs (P.5). Urban Sustainability Directors Network, September 2014. https://www.usdn.org/uploads/cms/documents/usdn_equity_scan_sept_2014_final.pdf.
- D5 Coalition. "Diversity, Equity, and Inclusion." d5coalition.org. D5 Coalition, 2014. https://www.d5coalition.org/about/dei/.
- D5 Coalition. "Diversity, Equity, and Inclusion." d5coalition.org. D5 Coalition, 2014. https://www.d5coalition.org/about/dei/.
- Avarna Group. "What Does JEDI Mean?" theavarnagroup.com. The Avarna Group, 2019. https://theavarnagroup.com/wp-content/uploads/2019/05/New-vocab-and-equity-equality-justice-image.pdf.
- The General Assembly of the State of Maryland. "Maryland Environment Section 1-701." law.justia.com. Maryland State Code, 2005. https://law.justia.com/codes/maryland/2005/gen/1-701.html#:~:text=Maryland%20Environment%20Section%201%2D701,-Article%20%2D%20Environment&text=(a)%20In%20this%20section%2C,%2C%20culture%2C%20and%20social%20status.&text=(vi)%20The%20general%20public%20with,or%20expertise%20in%20environmental%20justice .

- Maryland Commission on Climate Change. “Maryland Commission on Climate Change 2020 Annual Report.” 2020. https://mde.maryland.gov/programs/Air/ClimateChange/MCCC/Documents/MCCCAnnualReport2020.pdf.
- Columbia School of Nursing. “High Risk, Underserved, and Vulnerable Populations” nursing.columbia.edu. September 27, 2023. https://www.nursing.columbia.edu/research/research-areas-focus/high-risk-underserved-and-vulnerable-populations#:~:text=These%20include%20individuals%20who%20experience,those%20with%20certain%20medical%20conditions.

Appendix F: Image Credits

- Cover - Selsey Road, West Ocean City - Photo Chesapeake Bay Program
- Page 4 - Stream Restoration, Nanticoke River - Photo Maryland Department of Natural Resources
- Page 10 - Blind Skiing, Wisp Resort - Photo Anthony Burrows
- Page 12 - Secretary Kurtz Coastal Bays Tour - Assateague State Park - Photo Anthony Burrows
- Page 15 - Governor Moore/Office of Community Initiatives - Photo Joseph Andrucyk
- Page 18 - Public Meeting in Oxford Maryland - Photo C Burns
- Page 19 - Hurrican Sandy, Crisfield - Photo - Maryland Department of Natural Resources
- Page 21 - MDE Meeting - Photo Maryland Department of the Environment
- Page 22 - Main Street, Frostburg - Photo Maryland Department of Transportation
- Page 25 - Wind Turbines, Western Maryland - Photo Anthony Burrows
- Page 27 - Solar Panels, Eastern Shore - Photo Anthony Burrows
- Page 28 - Plowing Grain, Eastern Shore - Photo Remsberg
- Page 32 - Conservation Jobs Corps, North Point SP - Photo Stephen Badger
- Page 33 - CJC Stream Restoration, Gwynn Falls, Baltimore - Photo Department of Natural Resources
- Page 34 - Lumber Mill, Eastern Shore - Photo Anthony Burrows
- Page 39 - Storm Water Pond Construction - Photo Maryland Department of Natural Resources
- Page 42 - Storm Damage - Photo Oyster Harbor Annapolis
- Page 47 - Coastal Flooding, Tilghman Island - Photo Anthony Burrows
- Page 50 - Tree Planting, Deep Creek Lake - Photo Maryland Department of Natural Resources
- Page 52 - Street Tree Planting - Photo Maryland Department of the Environment
- Page 55 - Commercial Fishing Boats, Ocean City Inlet - Photo Anthony Burrows
- Page 57 - Oyster Dredging, Tilghman Island - Photo Candy Thompson
- Page 57 - Before and After Photos of Assateague Grass Planting - Photo Anthony Burrows
- Page 59 - Oyster Aquaculture - Photo Stephen Badger
- Page 60 - Cover Crops, Photo Maryland Department of Agriculture
- Page 62 - Forestry Staff at Planting Site - Photo Remsberg
- Page 63 - Bay Grass Planting/Americorps - Photo Department of Natural Resources
- Page 64 - Garrett County Farmers Market - Photo Stephen Badger
- Page 65 - Lumber Mill, Eastern Shore - Photo Anthony Burrows
- Page 67 - Living Shoreline Projet, Eastern Shore - Photo Maryland Department of Natural Resources
- Page 68 - Bay Grasses, Potomac River - Photo Brooke Landry
- Page 69 - Deploying Trees for Fish Habitat - Photo Maryland Department of Natural Resources