U.S. Environmental Protection Agency
Mid-Atlantic Region

# CLIMATE ADAPTATION IMPLEMENTATION PLAN

## 2024 Update

*Prepared by the U.S. EPA Region 3 Climate Collaborative*
*October 2024*

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*EPA Publication Number: 903K24001*

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SEP 1 2 2022

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# Preface

Climate change is threatening communities across the nation. Millions of Americans feel the destructive effects of climate change each year when the power goes down, rivers and lakes go dry, homes are destroyed by wildfires and communities are flooded by hurricanes. Underserved communities are especially vulnerable to the climate crisis and are more likely to experience the negative health and environmental effects of extreme weather events.

The Biden-Harris Administration is actively confronting the climate crisis while also advancing environmental justice. As part of a whole-of-government approach, the U.S. Environmental Protection Agency is strongly committed to taking the actions necessary to protect human health and the environment and to increase the resilience of the entire nation, even as the climate changes.

The EPA's commitment to action is reflected in its FY 2022-2024 Strategic Plan and in the 2021 Climate Adaptation Action Plan. Both documents present priority actions the agency will take to ensure that its programs, policies and operations remain effective under future climate conditions while we work to support states, territories, tribes and communities in increasing their own adaptive capacity and resilience to climate change impacts.

From flooding at Superfund sites, to wildfires causing air pollution, to sea-level rise affecting water quality and infrastructure, the EPA will boldly address climate impacts in both its programs and the communities it serves. We recognize the importance of tribal, state and local government partnerships in efficient, effective and equitable implementation of climate change adaptation strategies. Our plans were informed and improved by input we received in listening sessions we held to engage these and other partners as we developed these plans.

To ensure we are addressing the climate crisis in a comprehensive way, each of our national program and regional offices has developed individual Climate Adaptation Implementation Plans that outline how the EPA will attain the agencywide goals described in the broader Climate Adaptation Action Plan. These plans describe how programs and regions will integrate climate adaptation into their programs, partnerships and operations. They also describe how they will help partners build their resilience and capacity to adapt, while delivering co-benefits, including curbing greenhouse-gas emissions and other pollution, and

promoting public health, economic growth and climate justice. Of course, the EPA has a major role to play on emissions reductions as well, though that is not the focus of these plans. Indeed, we must focus on both climate adaptation and mitigation to ensure our nation and communities thrive in an era of climate change.

As part of this effort, we will empower our staff and partners by increasing awareness of how climate change may affect our collective ability to implement effective and resilient programs. We will also provide them with the necessary training, tools, data, information and technical support to make informed decisions and integrate climate adaptation into our work.

The EPA will work to modernize its financial assistance programs to encourage climate-resilient investments across the nation. We will also focus on ensuring that investments funded by the Bipartisan Infrastructure Law, the Inflation Reduction Act and other government programs are resilient to the impacts of climate change. Finally, as our knowledge advances and as impacts continue to develop, our response will likewise evolve. We will work to share these developments to enhance the collective resilience of our nation.

The actions outlined in these implementation plans reflect the EPA's commitment to build every community's capacity to anticipate, prepare for, adapt to and recover from the increasingly destructive impacts of climate change. Together with our partners, we will work to create a healthy and prosperous nation that is resilient to the ever-increasing impacts of climate change — which is vital to the EPA's goal of protecting human health and the environment and to ensuring the long-term success of our nation.

Janet G. McCabe

# EPA Mid-Atlantic Regional Administrator's Statement on Climate Change Adaptation

Like many of you, I recall learning about greenhouse gasses in elementary school – a time when shoveling the driveway for snow was a common winter chore and flooding was as rare as an east coast earthquake. Without a doubt, times have changed for us in the Mid-Atlantic Region, as it has for virtually every area of our world.

Some of EPA's ten regions are experiencing too little water, leading to utility shortages, crop failure, and wildfires. Here in Region 3, we have the opposite problem… too much water. Increases in extreme precipitation events can cause flooding that leads to destruction of property, devastation of livelihoods, and loss of life.

Recent news reports tell the tale: destructive floods in West Virginia and Philadelphia; tornados in suburban Maryland; saltwater intrusion contaminating drinking water throughout Delmarva; shifts in temperatures, rainfall, pests, and diseases affecting crop yields in Pennsylvania; temperatures in our cities making summer days not just unbearable, but unsafe; sea level rise eroding Delaware beaches, swallowing the Chesapeake's historic inhabited islands, and undermining the Navy's ability to conduct and support operations in Virginia, the largest naval base in the world.

The climate we had been accustomed to is no longer a reliable guide for what to expect in the future. And so, we are stepping up to do our part to minimize the causes and safeguard our people and environment to its impacts, with a special emphasis on our most vulnerable communities.

This Climate Adaptation Implementation Plan serves as Region 3's response to President Biden's Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," and Administrator Regan's direction in EPA's National Climate Adaptation Action Plan. Our plan incorporates climate adaptation into everything we do at EPA while at the same time working to reduce greenhouse-gas emissions.

The plan has five overarching goals that guide our actions: 1) supporting community infrastructure and disaster resilience; 2) improving watershed and ecosystem health; 3) providing training and outreach; 4) developing maps and tools; and 5) seeking innovation for program and decision support.

The plan describes dozens of adaptation actions under these goals, including: ensuring municipal drinking water and wastewater facilities can withstand climate impacts; understanding how Superfund clean-ups along our coasts can adapt to more intense storm surges; promoting natural wetlands along rivers and bays to protect from surges and store carbon; and working with our partners to protect the Chesapeake Bay.

Above all, our plan is intended to be outcome and action oriented. We will track progress on the actions described in this plan and work closely with our partners to increase climate resilience for all. We invite you to join us in this effort, as we are all in this together.

Adam Ortiz

Regional Administrator

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# CHAPTER 1: Introduction

Climate change is here. According to the US Global Change Research Program, the Earth's climate is warming faster than at any point in the history of modern civilization, primarily because of emissions of heat-trapping greenhouse gases from fossil fuel combustion, deforestation, food waste and land-use change. The impacts are on display every day across the nation: sea levels are rising, intense storms are becoming more frequent, and extreme temperatures are continuing to break records. Each of these impacts has the potential to harm human health and the livelihoods of our communities, as well as damage critical infrastructure and ecosystems that serve us across the Mid-Atlantic region and the nation.

This document serves as the EPA Region 3 response to President Biden's Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," and EPA Administrator Regan's direction to update regional Implementation Plans as stated in the EPA 2021 Climate Adaptation Action Plan. This plan is intentionally designed to align with the EPA's Strategic Plan (FY2022-2026) to enhance EPA Region 3's ability to support these strategic goals, and to facilitate our ability to report on progress related to those goals. Furthermore, this document aligns with the principles and objectives described in the National Climate Resilience Framework, released by the Biden Administration in September 2023.

The EPA Region 3 Climate Adaptation Implementation Plan (CAIP) is intended to be a living document that will be updated periodically to demonstrate progress toward priority actions designed to increase climate resilience across the region. This plan primarily focuses on adaptation, which means taking actions to prepare for and adjust to both the current and projected impacts of climate change. However, EPA Region 3 is also engaged in actions to address the reduction of greenhouse gas (GHG) emissions in its climate mitigation efforts. These two concepts go hand in hand in combating the effects of climate change. As GHG emissions are lowered, it is hoped that efforts to reduce harmful impacts will be lessened, but until we can achieve significant global reductions in overall atmospheric carbon dioxide ($CO_2$), we must plan, prepare, and act to reduce harmful impacts that are already occurring at a record pace.

**Definitions**

**Climate change adaptation** or climate adaptation means taking actions to prepare for and adjust to both the current and projected impacts of climate change.

**Adaptive capacity** is the ability of a human or natural system to adjust to climate change (including climate variability and extremes) by moderating potential damages, taking advantage of opportunities, or coping with the consequences.

**Climate resilience** can be generally defined as the capacity of a system to maintain function in the face of stresses imposed by climate change and to adapt the system to be better prepared for future climate impacts.

**Climate change mitigation** refers to actions limiting the magnitude and rate of future climate change by reducing greenhouse gas emissions.

This plan recognizes that not only are our critical resources and natural ecosystems vulnerable to the effects of climate change, but certain populations and communities can be especially vulnerable to climate

impacts. One of the principles guiding EPA's efforts to integrate climate adaptation into its everyday actions calls for adaptation plans that prioritize people, places, and infrastructure that are most vulnerable to adverse climate impacts.

**Vulnerable Populations**

Children, pregnant women, the elderly, minorities, the poor, persons with underlying medical conditions and disabilities, those with limited access to information, and tribal and indigenous peoples.

In late 2021, following President Biden's Executive Orders on climate change and environmental justice, and under the leadership of our Regional Administrator, EPA Region 3 began an analysis of available data to identify high-priority environmental justice areas of concern, some of the most environmentally overburdened communities in the Mid-Atlantic. As we pursue a multimedia effort to address existing injustices, we will work with these communities to help increase adaptive capacity and resilience to climate change impacts using existing tools and resources. These efforts will be supplemented through disaster support activities that aim to mitigate impacts from extreme weather events (e.g., Superstorm Sandy) using a community-driven solutions approach.

Effective climate adaptation will be designed and implemented with meaningful involvement from all parts of society. This is what we mean by climate justice. As such, this plan has been shared publicly and has undergone a deliberate coordination and outreach effort to ensure that it incorporates meaningful involvement from all parts of society. As this plan is implemented, EPA

**Tribal Treaty and Reserved Rights**

Under the Constitution, treaties with tribal nations are part of the supreme law of the land. They establish unique sets of rights, benefits and conditions for the treaty-making tribes who ceded millions of acres of their homelands to the United States. In return, tribal nations received recognition of property rights in land and resources as well as federal protections. Tribal treaty rights have the same legal force and effect as federal statutes, and they should be integrated into and given the fullest consideration throughout EPA's collective work. Reserved rights are the rights tribes retain that were not expressly granted to the United States by tribes in treaties. Treaty and reserved rights, including but not limited to the rights to hunt, fish and gather, may be found both on and off reservation lands. Agencies should consider treaty and reserved rights in developing and implementing climate adaption plans to protect these rights and ensure the Agencies meet their legal and statutory obligations and other mission priorities as we work to combat the climate crisis.

In September 2021, EPA joined 16 other federal agencies in signing a Memorandum of Understanding (MOU) that committed those parties to identifying and protecting tribal treaty rights early in the decision-making and regulatory processes. Accordingly, EPA will consider and protect treaty and reserved rights in developing and implementing climate adaptation plans through strengthened consultation, additional staff training and annual reporting requirements.

Region 3 will identify, engage with, and assist the populations and communities most vulnerable to the impacts of climate change.

EPA Region 3 and its partners are uniquely positioned to take effective climate action through the framework that we already employ to achieve our respective missions: promote, incentivize, and enforce. *Promotion* includes a vast array of voluntary initiatives already exemplified through partnerships across the region. *Incentivization* utilizes our collective resources through both existing and new funding streams such as the Infrastructure Investment and Jobs Act (IIJA) (Public Law 117-58, also known as the "Bipartisan Infrastructure Law") and the Inflation Reduction Act (Public Law 117-169). Furthermore, by applying climate resilience criteria to those funding resources and offering technical assistance to enable and implement climate-smart practices it is possible to build climate adaptation and resilience principles into infrastructure projects whenever possible. *Enforcement* involves updating our policies, regulations, and guidance over time to ensure these practices are followed. These approaches are supported by identification of data needs and opportunities for collaboration and coordination with partners as well as efforts to support science and research.

**The Infrastructure Investment and Jobs Act (IIJA)**

The Infrastructure Investment and Jobs Act (IIJA, or Bipartisan Infrastructure Law [BIL]) is a historic investment in the water infrastructure improvements, pollution cleanup initiatives, and workforce opportunities necessary to transform communities around the country. Much of the federal assistance provided through IIJA will scale up EPA's existing grant and loan programs, such as the State Revolving Fund Programs and Brownfields Grants. It will also be delivered through the creation of new low-interest financing programs, primarily for tribes and rural or disadvantaged communities. With this significant influx of capital from IIJA, it will be more important than ever for EPA – and our state, tribal, and local partners – to invest in resilient infrastructure projects that withstand climate change for decades to come.

EPA Region 3 will take steps to ensure the outcomes of infrastructure investments using IIJA funds are resilient to the impacts of climate change. EPA Region 3 will explore opportunities to integrate climate change considerations into its financial assistance programs, including through staffing key leadership positions in EPA's Resilient Infrastructure Subgroup on Climate (RISC), in order to expand support for projects that increase climate resilience while delivering co-benefits for public health, the mitigation of greenhouse gases, and the reduction of other pollution. EPA Region 3 will also provide technical assistance to recipients of IIJA funds to help them make climate smart infrastructure investments.

In the chapters that follow, the plan identifies key programmatic vulnerabilities (*see* Chapter 2) and actions that will be taken to address the impacts of climate change over time. Priority actions are those that will be elevated for tracking by EPA's Office of Policy and are identified in Chapter 3. Additional actions have been identified by lead programs and are described in Chapters 4-13. Each of the actions outlined in this plan generally falls under one of the five overarching goals established by EPA Region 3 as illustrated below.

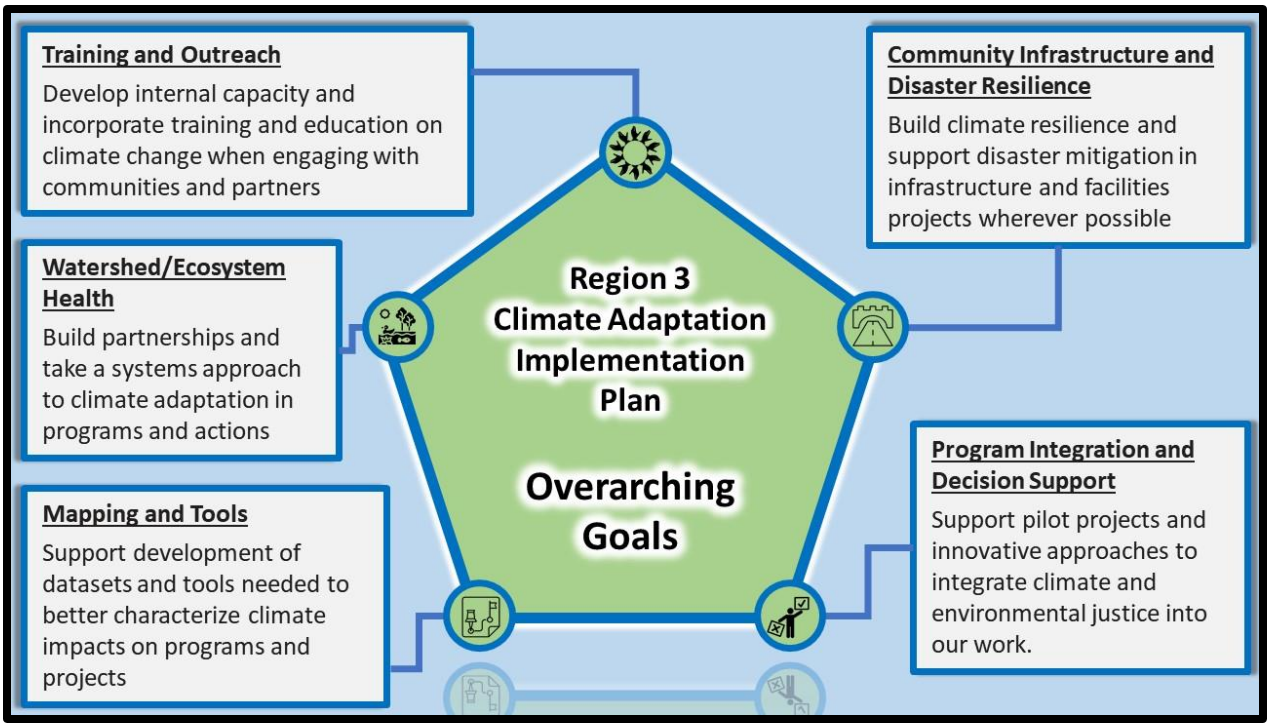



*Figure 1.1 – EPA Region 3 Climate Adaptation Overarching Goals.*

**The Inflation Reduction Act (IRA)**

The Inflation Reduction Act (IRA) was signed into law on August 16th, 2022, and represents the most significant action Congress has taken on clean energy and climate change in the nation's history. It redefines American leadership in confronting the existential threat of the climate crisis and sets forth a new era of American innovation and ingenuity to lower consumer costs and drive the global clean energy economy forward.

Through the Inflation Reduction Act (IRA), EPA will improve the lives of millions of Americans by reducing pollution in neighborhoods where people live, work, play, and go to school; accelerating environmental justice efforts in communities overburdened by pollution for far too long; and tackling our biggest climate challenges while creating jobs and delivering energy security.

IRA investments will drive significant emissions reductions over the next decade through programs that also lay the groundwork for long-term decarbonization of hard-to-abate sectors. The IRA makes historic investments in climate action that are expected to reduce U.S. emissions approximately40% by 2030 while supporting disadvantaged communities and the clean energy industrial base. EPA will play a major role in delivering these programs. The Agency received $41.5 billion in appropriated funds.

In addition to specific actions that address the impacts of climate change, the plan lays out EPA Region 3's cross-programmatic strategies to:

- Address climate mitigation (*see* Chapter 9)

- Integrate science into the foundation of our efforts to combat climate change (*see* Chapter 10)
- Develop internal climate leaders of tomorrow through training and education (*see* Chapter 11)
- Engage with our partners to leverage collective efforts and share knowledge (*see* Chapter 12)
- Ensure that climate adaptation and resilience are incorporated into Region 3 facilities management goals (*see* Chapter 13)

Above all, this plan is intended to be outcome- and action-oriented. EPA Region 3 will track our progress on priority actions (*see* Chapter 3) and monitor our ability to work with partners to achieve desired end states (e.g., by partnering with entities identified in the Region 3 Climate Plan Dashboard). The Region 3 Climate Adaptation Implementation Plan itself and actions contained within will evolve over time to ensure that we focus the Region's resources where needed and that we deliver on our commitment to increase climate resilience for all as an integral part of our mission to protect human health and the environment in EPA Region 3.

# CHAPTER 2: Regional Programmatic Vulnerability Assessment

## Background

The following is an assessment of the vulnerabilities of selected EPA Region 3 programs with respect to the impacts of climate change. It builds upon the work presented in Section 4 of EPA's 2021 Climate Adaptation Action Plan, as well as other Climate Adaptation Implementation Plans developed by EPA National Program Offices, (e.g., Office of Air and Radiation, Office of Water, etc.), and it summarizes vulnerabilities related to the seven goals in EPA's FY 2022-2026 Strategic Plan as they relate to Goal 1: Tackle the Climate Crisis.

This vulnerability assessment also builds upon a previous assessment developed by EPA Region 3 in 2014. It has been updated for the current Climate Adaptation Implementation Plan to reflect advances in peer-reviewed science (climate impacts) and the professional judgment of regional staff (programmatic impacts). Vulnerability assessment is an ongoing process. This plan will be executed as a living document that will be updated as needed to account for new knowledge, data, and scientific evidence about the impacts of climate change on EPA's mission.

Climate trends in EPA Region 3 (*see* Climate Trends) will have impacts on specific sectors (*see* Sectoral Impacts) and EPA programs (*see* Selected Programmatic Climate Change Vulnerabilities). Significant climate change hazards that pose a threat to EPA Region 3 include:

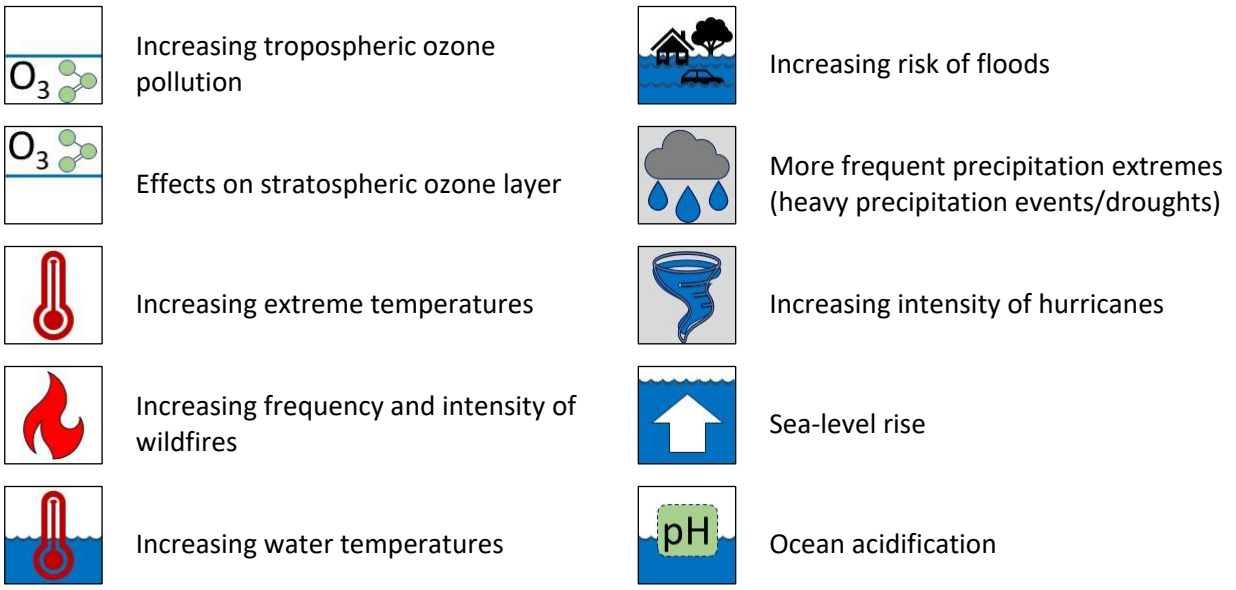



*Figure 2.1 – Significant climate change hazards in EPA Region 3.*

## Regional Description

EPA Region 3, EPA's Mid-Atlantic region, serves Delaware (DE), the District of Columbia (DC), Maryland (MD), Pennsylvania (PA), Virginia (VA), and West Virginia (WV). The Region is unique in that it straddles two different climate regions, as defined by the US Global Change Research Program (USGCRP)[i] – the Northeast (DE, DC, MD, PA and WV) and the Southeast (VA). As a result, EPA Region 3 is characterized by a varied climate, which includes snowy winters, vibrant autumns, and extreme events (such as nor'easters and heat waves) characteristic of the Northeast, and mild temperatures and high humidity characteristic of the Southeast.

Additionally, the western portions of EPA Region 3 (sections of western PA and WV) can exhibit climate characteristics similar to USGCRP's Midwest region.

EPA Region 3's geography spans a range of landform types, from the Appalachian Mountains through the Piedmont Plateau down to coastal areas, that include tidal rivers, estuaries and barrier islands. The Chesapeake Bay Watershed and the Delaware River Basin include a significant portion of the Region's rivers, coastline and population centers, including large urban areas like Philadelphia, Baltimore and Washington, D.C., which are home to sensitive populations and communities that are particularly vulnerable to the impacts of a changing climate. Outside of urban areas there are streams, wetlands, uplands, and forests with ecological conditions that range from pristine to degraded. Agricultural, industrial, and residential sectors within the region use and impact natural resources within these disparate ecosystems, so climate change can have tangible effects on people's lives and livelihoods.

Certain populations including children, pregnant women, the elderly, minorities, the poor, persons with underlying medical conditions and disabilities, those with limited access to information, and tribal and indigenous populations can be especially vulnerable to the impacts of climate change. Also, certain communities – whether defined by geographic location or other common characteristics – are particularly vulnerable, such as those located in low-lying coastal areas. This plan will seek to address vulnerabilities described below in order to increase the climate resiliency of people, places, ecosystems, and infrastructure that are most vulnerable to adverse climate impacts.

## Climate Trends

The following is a summary of the range of climate trends and sectoral impacts that are described for EPA Region 3 from USGCRP's State Climate Summaries[ii] and the Fourth National Climate Assessment[iii].

*Temperature* - In EPA Region 3, average annual temperatures have increased by 1-2°F over the past century (slightly less than 1°F in WV, approximately 1.5°F in VA, more than 1.5°F in MD and DC, approximately 2°F in PA, and more than 2°F in DE). Historically unprecedented warming is projected across the region by the end of the 21st century. The number and intensity of extreme heat events are projected to increase, while extreme cold waves are projected to be less frequent.

*Precipitation* - In West Virginia, both total annual precipitation and the number of extreme precipitation events have been above average in the 21st century. Pennsylvania has also experienced a large increase in heavy rain events. Across EPA Region 3, winter and spring precipitation amounts are projected to increase, as well as the number and intensity of extreme precipitation events, posing an increased risk of flooding.

*Drought* - Drought is a periodically occurring natural phenomenon across much of the region. Higher temperatures are projected to increase the rate of soil moisture loss during dry spells, resulting in more intense naturally occurring droughts in the future and adverse effects on agriculture.

*Sea-Level Rise* - Global sea level has risen by about 8 inches since 1880 and is projected to rise another 1 to 4 feet by 2100. Sea-level rise along the EPA Region 3 coastline has been much higher

than the global rate. For example, the coast of Delaware has seen sea-level rise at a rate of more than one foot per century. Sea-level rise will increase the frequency, extent, and severity of coastal flooding, with the potential for significant environmental and economic impacts, including shoreline erosion and damage to property and infrastructure.

## Sectoral Impacts

*Health Concerns* - Changing climate threatens the health and well-being of people in the Northeast through more extreme weather, warmer temperatures, degradation of air and water quality, and sea-level rise. These environmental changes are expected to lead to health-related impacts and costs, including additional deaths, emergency room visits and hospitalizations, and a lower quality of life. Health impacts are expected to vary by location, age, current health, and other characteristics of individuals and communities.

Rural communities are integral to the Southeast's cultural heritage and to the strong agricultural and forest products industries across the region. More frequent extreme heat episodes and changing seasonal climates are projected to increase exposure-linked health impacts and economic vulnerabilities in the agricultural, timber, and manufacturing sectors. By the end of the century, over 500 million labor hours could be lost from extreme heat-related impacts. Such changes would negatively impact the region's labor-intensive agricultural industry and compound existing social stresses in rural areas related to limited local community capabilities and associated with rural demography, occupations, earnings, literacy, and poverty incidence.

Urban population centers in proximity to local water bodies face a host of impacts. More frequent and intense precipitation events that result in flooding may lead to an increase in adverse indoor air quality – and associated health impacts – from mold and mildew. Sea-level rise in more populated areas will impact the residential, commercial and industrial sectors whose homes, businesses and facilities lie alongside rivers and streams, leading not only to economic disruption but to contamination of drinking water, indoor air quality degradation and other health impacts. The increase in ground-level air pollution and the heat island effect will exacerbate the health challenges faced by populations already struggling with asthma and related respiratory diseases.

*Natural Systems* - The seasonality of the Northeast is central to the region's sense of place and is an important driver of rural economies. Less distinct seasons with milder winters and earlier spring conditions combined with more frequent flooding events are already altering ecosystems and environments in ways that adversely impact tourism, farming, forestry, biodiversity, and culturally important landscapes. The region's rural industries and livelihoods are at risk from further changes to forests, wildlife, snowpack, and streamflow.

The Southeast's diverse natural systems, which provide many benefits to society, will be transformed by climate change. Changing winter temperature extremes, wildfire patterns, sea levels, hurricanes, floods, droughts, and warming ocean temperatures are expected to redistribute species and greatly modify ecosystems. As a result, the ecological resources that people depend on for livelihood, protection, and well-being are increasingly at risk. Future generations can expect to experience and interact with natural systems that are increasingly different from those that we have seen in the past, including through changes to the distribution of medicinal and culturally important plants.

*Coastal Systems* - The Northeast's coast and ocean support commerce, tourism, and recreation that are important to the region's economy and way of life. Warmer ocean temperatures, sea-level rise, and ocean acidification threaten these sectors. The adaptive capacity of marine ecosystems and coastal communities will influence ecological and socioeconomic outcomes as climate risks increase.

The Southeast's coastal plain and inland low-lying regions support a rapidly growing population, a tourism economy, critical industries, and important cultural resources that are highly vulnerable to climate change impacts. The combined effects of extreme rainfall events and sea-level rise are already increasing flood frequencies, which impact property values and infrastructure viability, particularly in coastal cities. Without significant adaptation measures, these regions are projected to experience daily high tide flooding by the end of the century.

*Agriculture* - Climate change threatens agricultural productivity through changes in temperature and precipitation patterns, increased pest and disease pressures, decline in pollinator health, reduced crop and forage quantity and quality, and infrastructure damage. Agricultural productivity is additionally threatened by impacts to water supply and increased frequency and intensity of extreme weather events, which can cause increased soil erosion and threats to soil health.

Climate change is projected to impact crop production by reducing both quantity and quality of yields, altering optimal growing season periods, and increasing likelihood of crop failure and damage. Similarly, livestock production will be impacted by reducing the quantity and quality of pasture and forage, lowering the yield of feed grain, affecting livestock health, and fostering the spread and resilience of pathogens and parasites that affect livestock development. These impacts on food production impact farmers and ranchers and the communities they serve.[iv]

*Urban Environments* - Urban residents face disproportionate exposure to cumulative risks, lack of open and green space, inadequate access to transportation, as well as high rates of asthma and childhood lead poisoning. The Northeast's urban centers and their interconnections are regional and national hubs for cultural and economic activity. Major negative impacts on critical infrastructure, urban economies, and nationally significant historic sites are already occurring and will become more common with a changing climate.

Many southeastern cities are particularly vulnerable to climate change compared to cities in other regions, with expected impacts to infrastructure and human health. The vibrancy and viability of these metropolitan areas, including the people and critical regional resources located in them, are increasingly at risk due to heat, flooding, and vector-borne disease brought about by a changing climate. Many of these urban areas are rapidly growing and offer opportunities to adopt effective adaptation efforts to prevent future negative impacts of climate change.

*Reducing Risks* - Many communities are proactively planning and implementing actions to reduce risks posed by climate change. Using decision support tools to develop and apply adaptation strategies informs both the value of adopting solutions and the remaining challenges. Experience gained through project implementation provides a foundation to advance future adaptation efforts. Furthermore, today's emissions choices could generate starkly different climate futures by mid-century and beyond; the higher the emissions today, the greater the climatic changes and

resulting impacts tomorrow. **Reducing greenhouse gas emissions now reduces the need for climate adaptation measures in the future.**

# Selected Programmatic Climate Change Vulnerabilities

The following section discusses how EPA Region 3 environmental and human health programs may be vulnerable when faced with the impacts of a changing climate. This selection of programmatic vulnerabilities will be described in the context of the major goals in EPA's 2022-2026 Strategic Plan. The issues described here do not reflect a complete listing of vulnerabilities to EPA programs. EPA Region 3, working with other EPA offices and regional stakeholders, will periodically update the information and scope of the programmatic vulnerability assessment.

## Ensure Clean and Healthy Air for All Communities

### *Increased tropospheric ozone*

The Mid-Atlantic Region currently has three nonattainment areas for the 2015 ozone standard, affecting more than 12 million residents. Climate change, higher temperatures and weaker air circulation in the United States will lead to more ozone formation, even if emissions of ozone-forming chemicals stay constant.[v] Recent research indicates that climate change could result in modeled increases in ozone concentrations of up to 2–4 ppb by 2050 and 5–8 ppb by 2095, relative to historical periods.[vi] In addition to the direct impact of temperature change on ozone formation, an increase in energy demand due to higher average temperatures may also lead to a worsening of air quality. Sources within or upwind of the region may be required to implement additional control measures to address increased emissions due to growing demand for electric generation.

In terms of regional resources, greater collaboration with our states will be necessary on planning and rule development to address any additional challenges in achieving or maintaining attainment. All three nonattainment areas in the Mid-Atlantic Region are urban areas with sensitive populations: Philadelphia, Washington D.C., and Baltimore. Higher nighttime temperatures projected in urban areas, as a consequence of both climate change and enhanced effects from urban heat islands, will likely exacerbate the health impacts from ozone pollution on urban populations.[vii]

Climate change also has the potential to increase the length of the ozone season.[viii] Currently, the ozone season runs from April through October. During this period, daily ozone levels are recorded and reviewed. An increase in the length of the ozone season would require a longer reporting period, translating to more time spent for data reviews in the Region. Changes in weather patterns that cause inversions may also play a role in increasing the number of ozone days. Although ozone is most likely to reach unhealthy levels on hot sunny days in urban environments, it can still reach high levels during colder months. Ozone can also be transported long distances by wind, so even rural areas can experience high ozone levels.

### *Altered effects on the stratospheric ozone layer*

Climate change will likely have effects on the stratospheric ozone layer; however, the interactions between the changing climate and ozone layer are complex. Climate change affects the ozone layer through changes in chemical transport, atmospheric composition and temperature. In turn,

changes in stratospheric ozone can have implications for weather and climate in the troposphere. Climate change may exacerbate the health effects of ozone layer damage at some latitudes and mitigate them at others.[ix]

In order to build adaptive capacity with respect to this vulnerability, EPA Region 3 may need to heighten public awareness of the health risks of ultraviolet (UV) radiation exposure, through existing EPA partnership programs such as SunWise®. Climate change may also lead to an increase in the use of cooling devices, such as air conditioners, which contain ozone depleting substances (ODSs) or ODS substitutes. As a result, EPA Region 3 may need to make changes to its current efforts to promote programs such as GreenChill® and Responsible Appliance Disposal in the Mid-Atlantic.

### *Air Quality affected by changes in the frequency or intensity of wildfires*

In the Mid-Atlantic region, there is currently one moderate nonattainment area for the 2012 Particulate Matter (PM)2.5 standard in Allegheny County, PA. While the impact of climate change on ambient PM2.5 levels remains somewhat uncertain, there is evidence indicating that climate change will impact PM levels through changes in the frequency or intensity of wildfires.[x]

For example, in 2008, monitors in the Norfolk area of Virginia experienced 24-hour PM2.5 levels four times (83 ug/$m^3$) the standard due to wildfires in North Carolina. And in June 2023, a weather system carried smoke from wildfires in Canada hundreds of miles into the US, pushing air quality into the unhealthy or worse categories in areas from the mid-Atlantic through the Northeast and parts of the Upper Great Lakes. EPA encouraged people living in these areas to check their Air Quality Index (AQI) throughout the day and to take steps to reduce smoke exposure and protect their health, especially for pregnant women and people with preexisting conditions like asthma, chronic obstructive pulmonary disease (COPD), and heart disease.[xi]

Although we cannot say with certainty that these wildfire events were directly caused by climate change, modeling indicates that the dry conditions prerequisite for wildfires are more likely in many areas as the climate warms, and that such events are expected to become more frequent on average. These examples also demonstrate the impact of fires on PM levels in the Region and are indicative of the potential health and environmental concerns.

In 2021, the National Interagency Fire Center's (NIFC) reported a total of 58,733 wildfires across the country that had burned more than 7.13 million acres, including a series of devastating fires in California over the summer. Altogether, damage from the 2021 Western fires was estimated at $10.6 billion.

Ozone, too, has the potential to increase as a result of wildfire smoke. For example, one study of a fire that occurred in 2015 connected the event with ozone exceedances in Maryland.[xii]

In addition, windblown dust from areas affected by drought can diminish air quality. During the winter months, climate change also increases the frequency of temperature inversions, which can trap particulate matter, leading to fine particulate matter (PM2.5) exceedances.

### *Increased exposure to indoor air problems*

Existing indoor environmental problems may worsen, and new ones may be introduced, as climate change alters the frequency and severity of adverse outdoor conditions.[xiii]

Extreme temperatures and heavy precipitation events will likely increase as a result of climate change[xiv], which may contribute to indoor environmental problems in homes and occupied buildings across the Mid-Atlantic, through increased dampness, moisture, and flooding.[xv]

Frequent breakdowns in a building's protective envelope, as a result of extreme weather conditions caused by climate change, may lead to water infiltration into indoor space, increased dampness, and, in turn, increased exposure to mold and other biological contaminants.[xvi] In addition, much of the housing stock in urban areas in the Mid-Atlantic region is older than many peer cities, with cities like Philadelphia where more than half of all dwellings were built before 1950.[xvii] Older homes are prone to mold and mildew issues, and often lack modern climate control systems to help residents cope with both extreme heat and poor indoor air quality.

Residents may weatherize buildings to increase comfort and save energy. Although in general these actions should be encouraged, this may lead to a reduction in ventilation and an increase in indoor environmental pollutants unless measures are taken to preserve or improve indoor air quality.[xviii] EPA has developed practical guidance for improving or maintaining indoor environmental quality during home energy upgrades or remodeling in single-family homes and schools. EPA's guidance and protocols may need to be revised to include state and local considerations for projected climatic changes. In addition, these programs may need to increase partnerships with other agencies to address training needs and workforce development for building owners, managers, and others, as well as develop new tracking mechanisms to assess the effectiveness of weatherization and remodeling techniques as they relate to indoor environmental quality.

Changes in the emergence, evolution, and geographic ranges of pests, infectious agents, and disease vectors may lead to shifting patterns of indoor exposure to pesticides as occupants and building owners respond to new infestations.[xix]

Changes in the climate can also worsen the quality of the air outdoors which infiltrates into indoor environments. Rising carbon dioxide ($CO_2$) levels and warmer temperatures can increase outdoor airborne allergens which can infiltrate indoor spaces. Warmer temperatures and shifting weather patterns can lead to more frequent and severe wildfires. Smoke and other particle pollution generated outdoors, including from wildfire events and dust storms, can infiltrate indoor environments and contribute to levels of indoor particulate matter.

The Mid-Atlantic region includes several large urban areas, which are very likely to see increases in the risk of illness and death related to extreme heat and heat waves. For example, in the 1900s, Philadelphia averaged four days per year with temperatures above 95°F, but by the end of the 21st century that number could climb to more than 50 days per year.[xx] The elderly and those with existing health problems are particularly vulnerable.[xxi] Increased frequency of extreme weather events may result in power outages, leading to increased exposure to potentially dangerous indoor conditions.[xxii]

EPA Region 3 may need to build its adaptive capacity to these increasing and changing health risks through its indoor air quality programs, resources, and public outreach and assistance. Partnerships between EPA Region 3 and stakeholders, such as state/local governments, non-profits, etc., will need to be strengthened in order to inform affected populations about adaption

options related to higher temperatures. Strengthening ties between the Region's energy efficiency and indoor air quality programs will be necessary to address the relationship between building ventilation during efficiency retrofits and potential indoor air problems that may result.

### *Impacts to energy production and efficiency*

Rising temperatures are expected to increase energy requirements for cooling and decrease energy requirements for heating. The former will result in significant increases in electricity use and higher peak demand. The electricity grid itself is also vulnerable to the effects of climate change, such as extreme weather events and peak demand increases resulting from rising temperatures, which could cause interruptions in the electric power supply.[xxiii] Current models indicate that heat events are likely to intensify peak load on American electrical grids, including the PJM Interconnection, which services all six states in EPA Region 3.[xxiv] The Mid-Atlantic's urban areas and sensitive populations, such as the elderly, are particularly vulnerable to power interruptions during extreme weather events like heat waves.

### *Extreme weather events may impact air monitoring systems*

Extreme weather events, including severe winds, flooding and lightning, could cause damage to the ambient air and RADNET monitoring systems in EPA Region 3. Loss of data if monitors are physically inaccessible for long periods of time is also a concern. The Region will need to continue to devote resources to ensuring that monitors can be safely accessed and operated. Changes in meteorology (i.e., increasing temperatures, changes in circulation, inversions) could alter where maximum concentrations occur, thereby affecting air monitoring network adequacy and EPA's ability to effectively model future air quality and provide useful information to the public. As the climate becomes less predictable and more dynamic, EPA's capacity to manage these worsening endpoints will degrade as the likelihood of extreme events increases and predictions become more difficult.

### *Interactions of sulfur, nitrogen, and mercury deposition within ecosystems*

While there is limited scientific evidence on this topic, additional research is underway to better understand how patterns in the atmospheric deposition of sulfur, nitrogen, and mercury with projected changes in the climate and carbon cycle will affect ecosystem growth, species changes, surface water chemistry, and mercury methylation and bioaccumulation.[xxv] The potential impacts could have consequences for the effectiveness of ecosystem protection provided by Agency emissions reduction programs.

### *Other Impacts*

Modeling uncertainty means that it may be difficult if not impossible to anticipate the evolving needs of environmental justice and other vulnerable communities in our region. There will likely be economic impacts on residents and businesses that we cannot currently foresee. EPA will need to develop its own internal capacity, flexibility, and resiliency, to foster more resilient communities.

## Ensure Clean and Safe Water for All Communities

### *Water and energy infrastructure*

Deteriorating water infrastructure compounds the climate risk faced by society. Extreme precipitation events are projected to increase in a warming climate and may lead to more severe

floods and greater risk of infrastructure failure in some regions. Infrastructure design, operation, financing principles, and regulatory standards typically do not account for a changing climate. Current risk management does not typically consider the impact of compound extremes (co-occurrence of multiple events) and the risk of cascading infrastructure failure.[xxvi] Interdependencies across critical infrastructure sectors such as water, energy, transportation, and telecommunication (and related climate security issues) can lead to cascading failures during extreme weather and climate-related disruptions.[xxvii]

Much of the infrastructure in the Northeast, including drainage and sewer systems, flood and storm protection assets, transportation systems, and power supply, is nearing the end of its planned life expectancy.[xxviii] In addition to aging infrastructure, many water systems in the Northeast are also taxed due to population increases and competition among water needs for agriculture, municipal use, recreation, and ecosystems. Extreme precipitation events may exacerbate existing problems in many cities in the Northeast, especially overflows of combined sewer systems. Drinking water and sewer infrastructure is expensive to build and maintain, and climate change may present a new set of challenges for designing upgrades to the nation's drinking water, wastewater and stormwater infrastructure.

Also, a significant fraction of the region's energy infrastructure is located near the densely populated coasts and tide-influenced bays of the Northeast, from power plants to oil refineries, to facilities that receive oil and gas deliveries. Rising sea levels are likely to lead to direct losses, such as equipment damage from flooding or erosion, and indirect effects, such as the costs of raising vulnerable assets to higher levels or building new facilities farther inland. Although nearly 70% of the Northeast coast has some physical ability to dynamically change, an estimated 88% of the Northeast population lives on developed coastal landforms that have limited ability to naturally adapt to sea-level rise.[xxix]

Making Northeast systems resilient to the kind of extreme climate-related disruptions the region has experienced recently—and the sort of disruptions projected for the future—would require significant new investments in infrastructure.[xxx]

### *Water quality impacts from climate change*

Projected increases in air temperature and altered precipitation patterns will have direct effects on water quality, including changes to streamflow, water temperature, and saltwater intrusion[xxxi] as well as the response of nutrients, sediment, pathogens and cyanobacterial blooms.[xxxii] Impacts to water quality are dependent on the interaction between climate-driven changes in the waterbody, basin-specific water management practices and changes to land use. Climate-driven changes include:

- Changes in streamflow, including those caused by fluctuations in groundwater levels in shallow aquifers, that impact the efficiency of pollution removal by microorganisms;
- Saltwater intrusion to rivers and aquifers exacerbated by sea-level rise, storm surges, and altered freshwater runoff in coastal areas[xxxiii];
- Increased heavy precipitation events that drive more frequent pollutant loading to water bodies[xxxiv];

- Excessive runoff and soil erosion from agricultural cropland, which lead to field production issues and downstream impacts on quality of water resources, including eutrophication and hypoxia;
- Increased risk of algal blooms due to the longer persistence of warm water temperatures combined with episodic increases in nutrient loading[xxxv];
- Warmer air and water temperatures increasing the survival of waterborne pathogens.[xxxvi]

A specific Mid-Atlantic water quality concern is saltwater intrusion in the Delaware River. The Delaware River Basin covers over 13,500 square miles and includes a 330-mile-long river and bay that drain portions of New York, Pennsylvania, New Jersey, and Delaware. Over 15 million people rely on its water resources for potable, industrial, and agricultural use. Climate-driven changes to air and water temperature, precipitation patterns and sea level can produce negative impacts to water quality, including salinity changes in the river.

The Delaware River Basin Commission monitors the "salt line" location along the tidal Delaware River as it fluctuates in response to changes in stream flows, which either dilute or concentrate chlorides in the river. The salt line location plays an important role in the Delaware River Basin water quality and drought management programs because brackish water moving upstream from the Delaware Bay during low-flow and drought conditions increases sodium chloride concentrations in public water supplies, presenting a public health concern.[xxxvii] As salt-laced water moves upriver, it also increases corrosion control costs for surface water users, particularly industry, and can raise the treatment costs for public water suppliers. Salinity levels also affect aquatic living resources.

The normal location of the salt line is near the mouth of the Delaware Bay at river mile 67; however, at times it shifts northward. During the summer months of 1999, the salt line moved to river mile 88 and during the 1960's 'drought of record' the salt line reached its farthest recorded upstream location at river mile 102, just 8 miles below important drinking water intakes in Pennsylvania and New Jersey. Sea-level rise creates the potential for more frequent and persistent northward shifts in the salt line.

### *Flooding from increasingly frequent intense storm events and sea-level rise[xxxviii]*

Since the mid-20th century, the annual number of days with very heavy precipitation has increased more in the Northeastern US than anywhere else in the country, and projections indicate that this trend will continue through the end of the century.[xxxix] In EPA Region 3, precipitation and associated surface runoff are likely to see the largest increases in the winter and spring seasons. More frequent intense storm events can lead to localized flooding that results in impacts to urban, agricultural, rural and underserved communities. These impacts are exacerbated along the coastline, where sea-level rise compounds the threat of flooding events.

Urban areas are at risk for large numbers of evacuated and displaced populations and damaged infrastructure due to both extreme precipitation events and recurrent flooding, potentially requiring significant emergency response efforts and consideration of a long-term commitment to rebuilding and adaptation. Much of the urban infrastructure in EPA Region 3, including drainage and sewer systems, flood and storm protection assets, transportation systems, and

power supply, is nearing the end of its planned life expectancy. Climate-related disruptions will only exacerbate existing issues with aging infrastructure.

Flooding can adversely impact agricultural productivity. More intense precipitation events have increased the risk of some types of inland floods, particularly in valleys, where people, infrastructure, and agriculture tend to be concentrated. With little redundancy in their infrastructure and, therefore, limited economic resilience, many rural communities have limited ability to cope with climate-related changes.

Poor, elderly, historically marginalized, recent immigrants, and linguistically or socially isolated individuals, as well as those populations with existing health disparities are more vulnerable to precipitation events and flooding due to a limited ability to prepare for and cope with such events.

Sea-level-rise rates in EPA Region 3 have also led to a doubling or tripling of high-tide flooding events in some places, causing more persistent and frequent (so-called nuisance flooding) impacts over the last few decades. When coupled with storm surges, sea level rise can pose severe risks of flooding, with consequent physical and mental health impacts on coastal populations.

In addition to property and infrastructure impacts, the facilities and cultural resources that support coastal tourism and recreation (such as parking lots, pavilions, and boardwalks), as well as cultural landscapes and historic structures and sites, will be at increased risk from high tide flooding, storm surge, and long-term inundation. In some locations, these culturally and socially important structures also support economic activity; for example, many fishing communities rely on small docks and other shoreside infrastructure for their fishing operations, increasing the risk of substantial disruption if they are lost to sea-level rise and increasing storm frequency. Furthermore, preserving cultural landscapes and mitigating flood hazards to historic structures and sites protects intangible expressions of culture, such as oral traditions, arts, behaviors, ceremonies, practices, knowledge, and traditional techniques.

### *Changes to aquatic ecosystems and the composition and distribution of species*

Aquatic ecosystems include nontidal rivers, streams and wetlands; marine environments; and coastal wetlands. EPA Region 3 includes the entire Chesapeake Bay, which alone accounts for 11,684 miles of shoreline, a length longer than the entire West Coast of the United States.[xl]

Nontidal rivers, streams and wetlands face a complex array of management challenges and adaptation requirements due to climate change. Changes in precipitation rates and groundwater dynamics will alter hydrology, and water chemistry and atmospheric changes will alter temperature. When combined, these will affect the biological communities within the aquatic ecosystems. Compounding factors that need to be accounted for include changes in terrestrial ecosystems and land cover – for example, the amount, composition, and connectivity of upland forests, floodplains and riparian areas, which will affect the physical and biological integrity of these waters.

Sea-level rise poses a complex array of management challenges and adaptation requirements along the coast. For example, in the Chesapeake Bay relative sea level is projected to rise more than a foot by mid-century and more than two feet by the end of century (under an intermediate-

low scenario).[xli] Subsidence of the land produces sea-level-rise rates that are substantially higher than the global average and among the highest rates in the US outside of Louisiana. The combination of subsidence and sea-level rise threatens portions of cities, inhabited islands, tidal wetlands, and other low-lying regions. Climate change may also affect the volume of the Bay, salinity distribution and circulation, as will changes in precipitation and freshwater runoff. These changes will affect seasonal oxygen depletion and efforts to reduce the agricultural nitrogen runoff into water bodies.

Warmer Chesapeake Bay waters will make survival difficult for northern species such as eelgrass and soft clams, while allowing southern species and invasive species transported in ships' ballast water to move in and change the mix of species that are caught and must be managed. Additionally, more acidic waters resulting from rising carbon dioxide levels will make it difficult for oysters to build their shells and will complicate the recovery of this key species.

Coastal wetlands often migrate landward, disappear, or change in type in response to sea-level rise through accretion. Dense coastal development is often protected by shoreline armoring, which prevents wetland migration and leads to loss of submerged wetlands. Submerged aquatic vegetation (SAV) also protects shorelines from erosion, improves water quality, and provides critical habitat for a variety of organisms. Their populations are susceptible to rising water temperatures and water quality changes due to climate change. Coastal wetlands and SAV are essential for providing storm surge buffers, preserving estuarine water quality as well as supporting economically important fish and wildlife habitat. Preserving and restoring coastal wetlands can absorb carbon dioxide from the atmosphere, which has a positive impact on greenhouse gas emissions; wetland loss, by contrast, releases additional carbon into the atmosphere.

### *Robust science and data to support decision-making*

Water temperature, precipitation, and sea level are critical variables in almost everything the Region does in the water program, from setting water quality standards, developing TMDLs, and issuing NPDES permits to helping to build drinking water and wastewater treatment infrastructure. Having better data and information on how much and how fast water temperature will increase, how extreme storms may be, and how high and fast sea level will rise will enable EPA Region 3 to fulfill statutory and regulatory responsibilities. Developing consistent scientific methods and robust datasets to support long-term policy decisions on climate change vulnerability assessments and adaptation planning will help inform these decisions.

## Safeguard and Revitalize Communities

### *Restoring and Preserving Land*

Increased flooding and sea-level rise may increase the risk of contaminant releases from vulnerable Resource Conservation and Recovery Act (RCRA) Corrective Action sites, Superfund sites, Brownfield sites, Leaking Underground Storage Tank (LUST) sites, other contaminated sites, and landfills. Flooding from more intense and frequent storms and extreme storm events could affect the migration and management of contaminants. Sea-level rise can lead to inundation and saltwater intrusion which may impact the performance of site remedies and cause the transport

of contaminants at sites in coastal areas. Contaminant migration could also occur after prolonged power loss at cleanup sites where pump and treat systems dependent on grid electricity.

Impacts may be most severe for cleanup sites that are not yet completed; however, sites with waste in place following a cleanup and permitted facilities that manage hazardous materials may also be vulnerable. Sites with on-site containment or treatment remedies within the 100- or 500-year floodplain of a surface water body and/or within the sea-level rise zone 1.5 meters above high tide are of particular concern in EPA Region 3. Sediment sites with *in-situ* capping remedies are vulnerable to flood regime changes and re-suspension and deposition of contaminated sediment. Flooding from storms and inundation due to sea-level rise could jeopardize land revitalization efforts including renewable energy generation, greener cleanups, and ecological revitalization projects, as well as other site reuse or redevelopment plans at Brownfield sites and completed Superfund Sites.

Increased ambient temperatures and extreme heat may impact the design and operation of remediation systems. Cleanup sites with waste in place phytoremediation or a vegetative cap may be vulnerable in areas that experience drought or changing plant hardiness zones. Slowed growth rates during heat waves could impact the success of the remedy or revitalization effort, and excessive vegetation loss could lead to erosion. Coastal, stream, and mountain ridgetop habitats are examples of ecosystems in EPA Region 3 that are vulnerable to increases in ambient temperature.

As storm and flood events increase in frequency and severity, emergency responses to hazardous materials release and oil spills may also increase. Financial constraints and response capacity for Emergency Response staff and Response Support Corps are potential vulnerabilities in EPA Region 3. Existing emergency planning and chemical containment strategies at oil and chemical facilities may not be sufficient. Current landfill capacity may also be insufficient to handle surges in disposal of hazardous and municipal wastes generated from extreme storm events. Availability of utilities and transportation infrastructure may be limited as a result of increased impacts to those systems. Power loss and blocked roads can hamper emergency responses.

Potential impacts to permitted RCRA units may occur. Operations such as open burning may be impacted by increased wind or precipitation, preventing scheduled burns from occurring. Impacts on the delay in burning could increase the need for storage capacity (i.e., additional permitted units). Facilities with permitted surface impoundments, which experience flooding events, may be required to activate emergency ponds with extended use, creating potential issues with land disposal regulations and volatile organics. Permitted RCRA piles might also experience challenges with storage that lead to the need for additional controls to maintain sufficient management.

### *Sustainable Materials Management*

Sustainable Materials Management (SMM) includes food loss and waste, which generate nearly eight percent of global greenhouse gas emissions.[xlii]

Over one-third of the food produced in the United States is never eaten,[xliii] wasting the resources used to produce it and creating a myriad of environmental impacts, including food insecurity, which is an environmental justice concern. Additionally, food wasted further along the supply

chain carries more impacts than food lost or wasted earlier, since the impacts are cumulative[xliv] – food lost during primary production embodies the resources used to grow the food, whereas food wasted during the consumption stage embodies the resources used to grow, process, package, store, and distribute the food up to the point the food reaches the consumer.

Food waste is the single most common material landfilled and incinerated in the United States, comprising 24% and 22% of landfilled and combusted municipal solid waste (MSW), respectively.[xlv] As food and other organic materials decompose in a landfill, methane is emitted and contributes to global warning. Municipal solid waste landfills are the third largest source of methane emissions in the United States, [xlvi] and an estimated 58 percent of the methane emissions released to the atmosphere from these landfills are from food waste[xlvii].

Composting reduces greenhouse gas emissions by diverting organic waste from landfills. Compost use can sequester carbon in the soil, reduce emissions from agricultural practices, and replace carbon-intensive products like nitrogen fertilizer and peat.

Compost application can also improve climate resilience. Establishing composting programs and increasing the use of compost in different sectors can help states, cities, and communities work toward climate change goals, as well as goals for waste reduction, landfill diversion, healthy soils, local food systems, and economic development.[xlviii] Applying compost also has the potential to improve the physical, chemical, and biological attributes of soils. By incorporating compost into water resource management efforts, communities can promote sustainable solutions for managing runoff and water quality, including adaptation to climate-driven changes in hydrology and runoff (e.g., droughts and flooding).

A changing climate will impact agricultural production and output, making it even more important to prevent wasted food and help farms adapt. Additionally, land in the US suffers from topsoil loss and erosion, leading to issues with water quality, water-holding capacity, loss of food crops, soil health, and community and ecosystem resilience. Also, degraded soil can release carbon. As communities face more frequent flooding, longer wildfire seasons, and more intense droughts, the adaptive capacity and resilience of soils will need to be addressed.

Similarly, other materials like plastics, metals and construction and demolition waste will need to be more sustainably managed to adapt to increasing demands and reducing supply. Disaster debris can also be better diverted from landfill disposal. Potential vulnerabilities include:

- Materials management infrastructure for organics (e.g., composting facilities) in communities may not have been built to be resilient to new and increased risks caused by a changing climate, resulting in larger quantities of disaster debris during a climate event.
- Solid waste management infrastructure including material recycling facilities might be vulnerable to climate related disruptions, which could affect the disposal or management of waste and recyclable materials (resulting in an accumulation of materials), as well as limiting inputs to products made with recycled material.

## Ensure Safety of Chemicals for People and the Environment

### *Use of Toxic chemicals*

A changing climate will likely result in changes in the timing and location of planting crops, which in turn affects the volume and timing of agricultural chemical use. This change in agricultural chemical use could impact risk management decisions made by EPA Pesticides and Toxic Substances Program, particularly with regard to the protection of migrant farm workers.

Changes in temperature and precipitation are expected to lead to increases in mosquitoes and other pests controlled by regulated pesticides. An associated rise in cases of West Nile Virus and other diseases carried by mosquitoes may lead to greater public demand for use of pesticides to control these disease vectors. This may in turn affect the workload of the EPA Pesticides program.

### *Storage of Toxic Chemicals*

Flooding from more frequent intense storms and extreme events could compromise chemical containment strategies at oil facilities and toxic chemical and pesticide storage facilities. Facilities located in coastal areas and/or within the 100- to 500-year floodplain of a surface water body are of concern to EPA Region 3. If these facilities do not properly manage the storage of these chemicals and/or store them at higher elevations, the extreme weather events that are expected as a result of climate change may result in the release of toxic chemicals into the environment, including to surface waters via storm water discharges.

### *Exposure to Toxic Chemicals from Demolition/Renovation Activities:*

The extreme weather events that are likely to occur as a result of climate change (e.g., high winds, heavy precipitation events) may damage community infrastructure (e.g., schools and childcare facilities) and residential homes. As a result, there may be an increased risk of exposure to lead, asbestos, and PCBs if buildings are renovated or demolished as part of the recovery efforts.

## Enforce Environmental Laws and Ensure Compliance

EPA protects human health and the environment through vigorous and targeted civil and criminal enforcement by conducting inspections and investigations to ensure compliance with environmental laws and regulations. Climate change may impact the manner in which the Region prioritizes enforcement initiatives. It may also impact how EPA allocates resources and affect the Region's ability to inspect, monitor and ensure compliance with environmental laws; this includes the Region's enforcement powers to address climate vulnerabilities and foster adaptation to changing climatic conditions. For instance, the Region's Enforcement and Compliance Assurance Division (ECAD) has the opportunity to address climate change vulnerabilities facing the region by making a concerted effort to incorporate adaptation as a part of settlement negotiations, mitigation projects, injunctive relief, in compliance discussions, or in other enforcement-related contexts.

Climate change also creates vulnerabilities in the Region's ability to carry out its enforcement and compliance duties, including:

- The increase in intense weather events will lead to an increase in the Region's involvement in disaster response and remediation. This diversion of staff and resources may impact traditional enforcement efforts (as well as other EPA programs).
- Extreme weather events and changes to weather patterns may also contribute to pervasive non-compliance among the regulated community. Examples include an

increase in existing infrastructure failures including power outages due to storms or high demand for cooling and heating, wastewater treatment plants experiencing an increase in bypasses due to increased contributions to plants exceeding design capacity.

- Climate change may affect environmental monitoring and sampling in various media that informs the Region's compliance and enforcement work. Heavy precipitation events, floods, severe winds, and tornados have the potential to damage environmental monitoring equipment, and delay or prevent sampling by hindering access to sites. Sea-level rise and coastal flooding may also impact EPA Region 3 and its partners' long-term sampling locations and may require setting up new sampling sites. Environmental sampling methods and strategies may be compromised and require modifications. Climate change impacts may also introduce new chemicals that were not previously monitored. This may affect the Region's ability to ensure compliance with environmental requirements by regulated entities and take effective enforcement action where there may be violations.
- With an increase in natural disasters and extreme weather events, regulated parties may attempt to invoke *force majeure* clauses more frequently than before. *Force majeure* clauses may appear in enforcement agreements such as consent decrees (CD) and can affect CD obligations or timeliness of injunctive relief when an extraordinary event occurs. EPA will need to discuss with regulated entities how to account for and meet obligations despite anticipated extreme weather events.

### EPA Region 3 Managed Facilities and Operations

Threats from climate change include an increase in extreme temperatures, droughts, intensity of precipitation and ground level ozone pollution, which will affect EPA Region 3 employees and facilities.

As discussed in more detail in the subsection "Ensure Clean and Healthy Air for All Communities," climate change could increase exposure to indoor air quality problems in our buildings from dampness and mold, and expose occupants to different pests, infectious agents and disease vectors, as well as any pesticides applied to address these infestations.

More frequent high-heat days could lead to an increase in heat-related illnesses for our employees, especially older employees and workers doing field work who cannot reduce their exposure by limiting exertion and time outdoors due to mission requirements. Additionally, hot summer days can worsen air pollution, especially in urban areas, and threaten the health of vulnerable employees. This could increase absenteeism and/or reduce the productivity of our staff.

The increase in frequency and intensity of heavy precipitation events described in the subsection "Ensure Clean and Safe Water for All Communities" is projected worsen in the future, leading to more frequent flooding and impacts to our road and mass transit systems.

Climate change impacts, including increased severe weather, may also affect the Region's Continuity of Operations Plan (COOP) that describes efforts to prepare and react to issues

affecting the operation of our facilities. Unique or site-specific vulnerabilities are described below.

Higher temperatures will likely cause an increase in electricity use and cost in our building to power air conditioning. This increased use could contribute to stress on the power supply grid resulting in brownouts, blackouts and the need to use backup power generators.

### *Philadelphia Office located at 4 Penn Center, Philadelphia, Pennsylvania*

The EPA Region 3 Headquarters relocated to a new location at 4 Penn Center as of July 2022. Approximately 84% of EPA Region 3's Philadelphia workforce is using mass transit to commute to work. Any disruption to the functioning of this system is a vulnerability that would impact the ability for the workforce to commute to this location. Past examples include a shutdown of mass transit in Philadelphia due to impacts from Hurricane Sandy.

| EPA Region 3 Philadelphia Federal Employee Mass Transit Participation | | | |
|---|---|---|---|
| **Calendar Year** | **Number of EPA Philadelphia Gov Employees** | **Number of EPA Philadelphia Gov Mass Transit Participants** | **Percentage of EPA Philadelphia Gov Mass Transit Participants** |
| **2019** | 641 | 539 | 84% |

*Table 2.1 – EPA Region 3 Philadelphia federal employee mass transit participation prior to the onset of the COVID-19 pandemic in 2020.*

Past periods of drought in the Delaware watershed have resulted in saltwater intrusion causing concern for the Philadelphia drinking water supply intake on the tidal Delaware River north of the city. Expected sea-level rise from climate change may exacerbate this vulnerability in the future, which could impact the drinking water of the Philadelphia Office.

### *Environmental Science Center (ESC) located at 701 Mapes Road, Fort Meade, Maryland*

Vulnerability to flooding of the Environmental Science Building should not be an issue. The building site has a very robust stormwater runoff system that directs rainwater falling on approximately 70% of the site to a large capacity infiltration basin that can capture all the volume produced by a two-year storm and almost all the volume of a ten-year storm before there would be any discharge.

### *Wheeling Field Office located at 1060 Chapline Street, Wheeling, West Virginia*

Despite its current location, which is less than a quarter mile from the Ohio River with an upstream drainage area of approximately 25,030 square miles, flooding of the Wheeling office is not expected to be a problem. The office is more than fifty feet above the river level and has never been impacted by historic flood events associated with hurricanes in the drainage area or other severe weather. As discussed above, localized flooding of area roads could still be an issue for the approximately 20 Wheeling office employees on their commute to work and for business travel. As a less modern facility with aged mechanical infrastructure, the Wheeling Office would be less resilient to dramatic changes in atmospheric temperatures.

### *Chesapeake Bay Program Office located at 1750 Forest Drive, Annapolis, Maryland*

Our Chesapeake Bay Program Office is located in an office complex approximately three miles from a watershed that contains over 150 major rivers and streams and drains approximately 64,000 square miles. Due to increased flood risk, the office was recently relocated to a site with

a higher elevation. A predicted increase in the intensity of hurricanes could impact the office due to its proximity to the coast. As discussed in more detail in the subsection "Ensure Clean and Safe Water for All Communities," sea-level rise is also a threat to this facility as it will compound the effect of heavy precipitation, increase in flooding and storm surge.

# CHAPTER 3: Priority Actions

Chapter 2 examined climate vulnerabilities across Region 3. The remainder of this plan is action-oriented, focusing on programmatic and cross-programmatic activities that bolster climate resilience in Region 3's environmental work.

Each action within this plan follows a consistent template that describes the action, including metrics, challenges, and co-benefits, and clearly links the action to:

- Climate hazards identified in the vulnerability assessment (*see* Chapter 2)
- Overarching priority goal(s)
- Relevant Long-term Performance Goal(s) from EPA's Strategic Plan (FY2022-2026)
- Activity timeframe (period over which the activity will be active)
- Specific science needs, if any, required to do the work

Additional narrative will accompany each action template to provide greater detail when necessary. This format will allow for consistent monitoring and tracking as progress is made. The template is displayed below:

### Action Title.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | | | | | | | | | |
| **Overarching Goal(s):** | | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *(Reference to pertinent topics covered in Chapter 2)* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | | | | | | | | | | |
| **Metric(s):** | | | | | | | | | | |
| **Project Challenges:** | | | | | | | | | | |
| **Co-benefits:** | | | | | | | | | | |
| **Owner Email:** | | | **New Work?** | | | | **Resources Available?** | | | |
| **Science Needs** | | | | | | | | | | |
| | | | | | | | | | | |

***Sample Climate Adaptation Action Template***

****HOVERING OVER ANY ICON IN THE DOCUMENT WILL REVEAL THE DESCRIPTION OF THE ICON FROM LEGENDS BELOW. ****

*LEGEND for CLIMATE HAZARD(S) (from Chapter 2 - Vulnerability Assessment): Increasing tropospheric ozone pollution, Effects on stratospheric ozone layer, Increasing extreme temperatures, Increasing frequency and intensity of wildfires,*

*Increasing water temperatures, Increasing risk of floods, More frequent precipitation extremes (heavy precipitation events/droughts), Increasing intensity of hurricanes, Sea-level rise, Ocean acidification.*

*LEGEND for OVERARCHING GOAL(S): Community Infrastructure and Disaster Resilience, Program Integration and Decision Support, Mapping and Tools, Watershed/Ecosystem Health, Training and Outreach.*

*LEGEND for PERFORMANCE GOAL(S): **LTPG 1 –** By September 30, 2026, implement all priority actions in EPA's Climate Adaptation Action Plan and the 20 National Program and Regional Climate Adaptation Implementation Plans to account for the impacts of the changing climate on human health and the environment. **LTPG 2 –** By September 30, 2026, assist at least 400 federally recognized tribes to take action to anticipate, prepare for, adapt to, or recover from the impacts of climate change. **LTPG 3 –** By September 30, 2026, assist at least 450 states, territories, local governments, and communities, especially communities that are underserved and disproportionally at risk from climate change, to take action to anticipate, prepare for, adapt to, or recover from the impacts of climate change.*

EPA Region 3 also identified five overarching climate adaptation goals: 1) Community Infrastructure & Disaster Resilience, 2) Program Integration & Decision Support, 3) Mapping & Tools, 4) Watershed and Ecosystem Health, and 5) Training & Outreach. Each of the actions in this plan address one or more of these goals, which are illustrated in Figure 3.1.

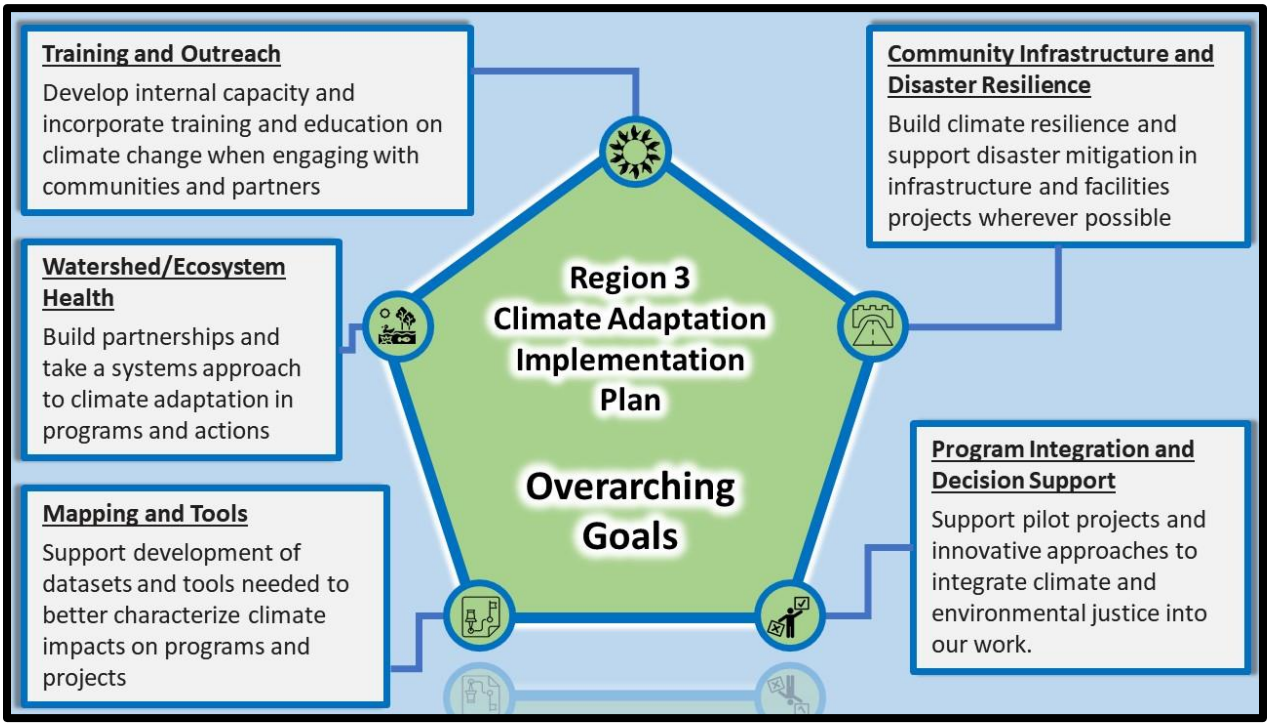


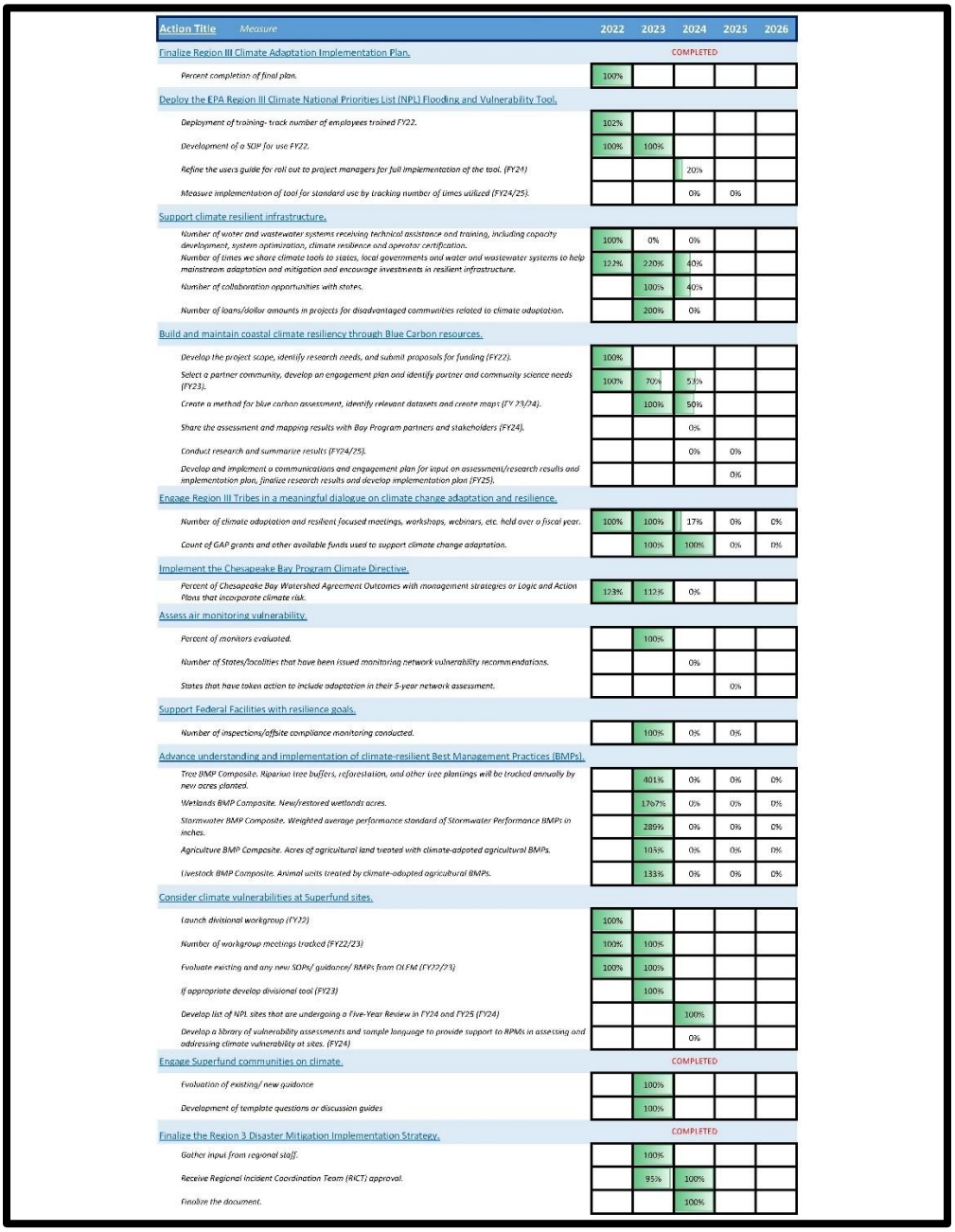

***Figure 3.1** – Based on the actions developed for the EPA Region 3 Climate Adaptation Implementation Plan, five overarching climate adaptation goals were identified. Each of the actions in this plan address one or more of these goals.*

A subset of the actions developed for the plan have been selected as Priority Actions and are included in this chapter. Priority Actions aim to address all five overarching goals and cover a broad swath of programmatic and cross-programmatic actions.

Actions that are not identified as Priority Actions, will reside in their respective chapters throughout the plan and continue to be developed and monitored by the region as they move forward. As these actions mature in future planning years, they may also be added to the set of

Priority Actions in this chapter; for those that have been moved into Chapter 3, a notation has been added to the "Traceable Accounts" section of the relevant Priority Action.

In subsequent updates of this plan, the Priority Actions for each fiscal year in this chapter will be updated to demonstrate progress, discuss challenges, and identify any changes made to priority actions since the prior year. All Priority Actions will be tracked publicly at: https://www.epa.gov/climate-adaptation/progress-region-3-priority-climate-actions.



| Action Title / Measure | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|
| Finalize Region III Climate Adaptation Implementation Plan. | | | COMPLETED | | |
| Percent completion of final plan. | 100% | | | | |
| Deploy the EPA Region III Climate National Priorities List (NPL) Flooding and Vulnerability Tool. | | | | | |
| Deployment of training- track number of employees trained FY22. | 102% | | | | |
| Development of a SOP for use FY22. | 100% | 100% | | | |
| Refine the users guide for roll out to project managers for full implementation of the tool. (FY24) | | | 20% | | |
| Measure implementation of tool for standard use by tracking number of times utilized (FY24/25). | | | 0% | 0% | |
| Support climate resilient infrastructure. | | | | | |
| Number of water and wastewater systems receiving technical assistance and training, including capacity development, system optimization, climate resilience and operator certification. | 100% | 0% | 0% | | |
| Number of times we share climate tools to states, local governments and water and wastewater systems to help mainstream adaptation and mitigation and encourage investments in resilient infrastructure. | 122% | 220% | 40% | | |
| Number of collaboration opportunities with states. | | 100% | 40% | | |
| Number of loans/dollar amounts in projects for disadvantaged communities related to climate adaptation. | | 200% | 0% | | |
| Build and maintain coastal climate resiliency through Blue Carbon resources. | | | | | |
| Develop the project scope, identify research needs, and submit proposals for funding (FY22). | 100% | | | | |
| Select a partner community, develop an engagement plan and identify partner and community science needs (FY23). | 100% | 70% | 53% | | |
| Create a method for blue carbon assessment, identify relevant datasets and create maps (FY 23/24). | | 100% | 50% | | |
| Share the assessment and mapping results with Bay Program partners and stakeholders (FY24). | | | 0% | | |
| Conduct research and summarize results (FY24/25). | | | 0% | 0% | |
| Develop and implement a communications and engagement plan for input on assessment/research results and implementation plan, finalize research results and develop implementation plan (FY25). | | | | 0% | |
| Engage Region III Tribes in a meaningful dialogue on climate change adaptation and resilience. | | | | | |
| Number of climate adaptation and resilient focused meetings, workshops, webinars, etc. held over a fiscal year. | 100% | 100% | 17% | 0% | 0% |
| Count of GAP grants and other available funds used to support climate change adaptation. | | 100% | 100% | 0% | 0% |
| Implement the Chesapeake Bay Program Climate Directive. | | | | | |
| Percent of Chesapeake Bay Watershed Agreement Outcomes with management strategies or Logic and Action Plans that incorporate climate risk. | 123% | 112% | 0% | | |
| Assess air monitoring vulnerability. | | | | | |
| Percent of monitors evaluated. | | 100% | | | |
| Number of States/localities that have been issued monitoring network vulnerability recommendations. | | | 0% | | |
| States that have taken action to include adaptation in their 5-year network assessment. | | | | 0% | |
| Support Federal Facilities with resilience goals. | | | | | |
| Number of inspections/offsite compliance monitoring conducted. | | 100% | 0% | 0% | |
| Advance understanding and implementation of climate-resilient Best Management Practices (BMPs). | | | | | |
| Tree BMP Composite. Riparian tree buffers, reforestation, and other tree plantings will be tracked annually by new acres planted. | | 401% | 0% | 0% | 0% |
| Wetlands BMP Composite. New/restored wetlands acres. | | 176% | 0% | 0% | 0% |
| Stormwater BMP Composite. Weighted average performance standard of Stormwater Performance BMPs in inches. | | 289% | 0% | 0% | 0% |
| Agriculture BMP Composite. Acres of agricultural land treated with climate-adpoted agricultural BMPs. | | 103% | 0% | 0% | 0% |
| Livestock BMP Composite. Animal units treated by climate-adopted agricultural BMPs. | | 133% | 0% | 0% | 0% |
| Consider climate vulnerabilities at Superfund sites. | | | | | |
| Launch divisional workgroup (FY22) | 100% | | | | |
| Number of workgroup meetings tracked (FY22/23) | 100% | 100% | | | |
| Evaluate existing and any new SOPs/ guidance/ BMPs from OLEM (FY22/23) | 100% | 100% | | | |
| If appropriate develop divisional tool (FY23) | | 100% | | | |
| Develop list of NPL sites that are undergoing a Five-Year Review in FY24 and FY25 (FY24) | | | 100% | | |
| Develop a library of vulnerability assessments and sample language to provide support to RPMs in assessing and addressing climate vulnerability at sites. (FY24) | | | 0% | | |
| Engage Superfund communities on climate. | | | COMPLETED | | |
| Evaluation of existing/ new guidance | | 100% | | | |
| Development of template questions or discussion guides | | 100% | | | |
| Finalize the Region 3 Disaster Mitigation Implementation Strategy. | | | COMPLETED | | |
| Gather input from regional staff. | | 100% | | | |
| Receive Regional Incident Coordination Team (RICT) approval. | | 95% | 100% | | |
| Finalize the document. | | | 100% | | |

***Figure 3.2*** *– Progress on the EPA Region 3 Priority Actions identified for Fiscal Years (FY) 2022 through 2026 as of the first quarter of FY24. Tracking is available at https://www.epa.gov/climate-adaptation/progress-region-3-priority-climate-actions and is updated on a quarterly basis.*

**Priority Action: Finalize Region 3 Climate Adaptation Implementation Plan**

Finalizing the Region 3 Climate Adaptation Implementation Plan was one of the Priority Actions for fiscal year 2022. It involved updating the 2014 climate vulnerability assessment, developing actions and Priority Actions for fiscal years 2022 and 2023, and coordinating across regions and national programs to eliminate overlap of effort and identify synergies.

# Priority Actions: Fiscal Year 2022

## Deploy the EPA Region 3 Climate National Priorities List (NPL) Flooding and Vulnerability Tool.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | | | | |  | | | |
| **Overarching Goal(s):** | | |  | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | | LTPG 2 | | | LTPG 3 | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 |

**Climate Vulnerability**

*Storm surge, flooding, storm event impacts.*

**Action**

| | |
|---|---|
| **Description:** | *Continue to finalize and refine deployment the joint ORD and EPA climate change mapping tool. This tool can be used to model and predict flood-related impacts on Superfund Sites for future events and in real time to measure effects of a current storm.*<br>*The expected outcome of this Priority Action that SEMD staff will be better able to incorporate climate considerations into their work.* |
| **Metric(s):** | • *Deployment of training- track number of employees trained. (FY22)*<br>• *Development of a SOP for use. (FY22/23)*<br>• *Refine the user's guide for roll out to project managers for full implementation of the tool. (FY24)*<br>• *Measure implementation of tool for standard use by tracking number of times utilized. (FY24/25)* |
| **Project Challenges:** | *Completion of tool development; developing a training.* |
| **Co-benefits:** | *Allow for more resilient and adaptable remedies to be identified and implemented; potential for more positive impacts to surrounding communities in addressing climate vulnerabilities.* |

| | | | | | |
|---|---|---|---|---|---|
| **Owner Email:** | *Mohollen.Laura@epa.gov; Kennedy.Cathleen@epa.gov* | **New Work?** | *No* | **Resources Available?** | *Yes* |

**Science Needs**

*Continued ORD and GIS Support.*

***Additional Narrative:***

*This tool has been developed as a joint project between EPA Region 3 and the Office of Research and Development. The tool takes a systems-based, two-pronged approach to climate and flood vulnerability assessment of Superfund National Priority List (NPL) sites and associated communities. Inundation of hazardous waste sites has the potential to release toxics into floodwater and transport contaminated soil and sediments into surrounding communities. A majority of contaminated sites are near low-income housing with already overburdened populations. However, flood vulnerability assessments typically focus on physical and infrastructure impacts. This tool comprises 1) screening level metrics to characterize NPL sites and community vulnerabilities, and 2) community scale information on distribution of contaminants during flood events under multiple climate scenarios for the most vulnerable sites. This flexible framework can be readily adopted to assess contaminated sites and community vulnerabilities to climate, flood, and other natural hazards. The screening level assessment uses GIS analysis to quantify metrics in three categories: flood, sediment, and environmental justice. Metrics are then integrated into a community resilience planning tool with the option to weight the metrics based on user priority needs. This tool provides managers and communities a means to prepare for future extreme events and informs sites and communities most vulnerable for further community scale assessment. A clear SOP for use, communications and training plan will ensure the tool is implemented and utilized fully in the region.*

***Traceable Accounts***

*In the October 2022 version of the Region 3 Climate Adaptation Implementation Plan, this Priority Action was planned for FY22 and FY23. The work has been expanded to include refinement of a users' guide for project managers, and implementation metrics have been pushed back into FY24 and expanded to include FY25 as well.*

*The original description of this Priority Action read: "Finalize, and deploy (including staff training) the newly developed joint ORD and EPA climate change mapping tool. This tool can be used to model and predict flood-related impacts on Superfund Sites for future events and in real time to measure effects of a current storm."*

## Support climate resilient infrastructure.

| | | | | | | |
|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | |  | | | |
| **Overarching Goal(s):** |  | | | | |  |
| **Performance Goal(s):** | LTPG 1 | | LTPG 2 | | LTPG 3 | |
| **Activity Timeframe:** | FY22 | FY23 | FY24 | FY25 | FY26 | |

**Climate Vulnerability**

*Infrastructure design, operation, financing principles, and regulatory standards typically do not account for a changing climate, and current risk management does not consider the impact of compound extremes (co-occurrence of events) and the risk of cascading infrastructure failure.*

**Action**

**Description:**

*Build climate resilience into water, wastewater and stormwater infrastructure throughout EPA Region 3 by:*

- *Providing technical assistance and training to water and wastewater systems focused on capacity development, system optimization, climate resilience and operator certification.*
- *Providing climate tools to states, local governments and water and wastewater systems to help mainstream adaptation and mitigation and encourage investments in resilient infrastructure.*
- *Collaborating with state SRF programs to promote and encourage targeted outreach efforts toward financially distressed and disadvantaged communities and those that may be disproportionately impacted by climate change.*
- *Encouraging states to prioritize funding and technical assistance to disadvantaged communities that may be disproportionately impacted by climate change.*

**Metric(s):**

- *Number of water and wastewater systems receiving technical assistance and training, including capacity development, system optimization, climate resilience and operator certification. (FY22-25)*
- *Number of times we share climate tools with partners to mainstream adaptation and mitigation and encourage investments in resilient infrastructure. (FY22-25)*
- *Number of collaboration opportunities with states. (FY23-25)*
- *Number of loans in projects for disadvantaged communities related to climate adaptation. (FY23-25)*

**Project Challenges:** *Limited opportunities for hands-on efforts; ability to influence state priorities; acceptance by systems or willingness to change*

**Co-benefits:** *Enhances resilience to allow better preparedness, quicker recovery and addresses hazard mitigation by breaking the cycle of disaster damage, reconstruction, and repeated damage; protects public health when water facilities continue to operate.*

| | | | | | |
|---|---|---|---|---|---|
| **Owner Email:** | *Wisniewski.Patti-Kay@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* |

**Science Needs**

*Science needs are not required to implement this project; however, it is likely that science needs could be identified when collaborating with utilities or the states.*

***Additional Narrative:***

***<u>Climate Vulnerability</u>***

*Deteriorating water infrastructure compounds the climate risk faced by society. Infrastructure design, operation, financing principles, and regulatory standards typically do not account for a changing climate, and current risk management does not consider the impact of compound extremes (co-occurrence of events) and the risk of cascading infrastructure failure. Failure to build resilience into water, wastewater and stormwater infrastructure could impact public health by the inability to provide clean water and safe drinking water services.*

***<u>Description</u>***

*Build climate resilience into water, wastewater and stormwater infrastructure throughout EPA Region 3 by:*

- *Providing technical assistance and training to water and wastewater systems focused on capacity development, system optimization, climate resilience and operator certification.*
- *Providing climate tools to states, local governments and water and wastewater systems to help mainstream adaptation and mitigation and encourage investments in resilient infrastructure.*
- *Collaborating with state SRF programs to promote and encourage targeted outreach efforts toward financially distressed and disadvantaged communities and those disproportionately impacted by climate change, leading to more climate resilient projects.*
- *Encouraging states to prioritize funding and technical assistance to disadvantaged communities disproportionately impacted by climate change.*
- *Encouraging states to incorporate climate resilience criteria into their SRF priority ranking systems (Note: Most of our states already do this).*
- *Collaborating with states to focus historic Bipartisan Infrastructure Law (BIL) SRF funding towards fostering water and wastewater system resilience to all hazards, including new and emerging threats like cybersecurity.*
- *Working with the states to utilize BIL funding to help water and wastewater agencies reach GHG reduction targets, incorporate renewable energy generation, invest in carbon sinks, and other projects that reduce the GHG footprint of the water industry.*
- *Ensuring states are fully implementing the Floodplain Management Executive Order as it applies to SRF projects.*
- *Advising the states following disasters on the Emergency Use options under SRF and the EPA/FEMA Disaster memo.*

## Build and maintain coastal climate resiliency through Blue Carbon resources.

| | | | | | |
|---|---|---|---|---|---|
| **Climate Hazard(s):** | | | | | |
| **Overarching Goal(s):** | | | | | |
| **Performance Goal(s):** | LTPG 1 | | LTPG 2 | | LTPG 3 |
| **Activity Timeframe:** | FY22 | FY23 | FY24 | FY25 | FY26 |

**Climate Vulnerability**

*Communities are looking for solutions to build and maintain resilience to impacts like coastal and inland flooding, sea-level rise, salt-water intrusion, and erosion, while also meeting other goals, such as protecting and improving water quality and habitat for economically important living resources. Wetlands, tidal marshes, and sea grass (SAV) are coastal "blue carbon" resources that represent potential climate change adaptation, mitigation, and coastal resilience solutions for communities.*

**Action**

| | |
|---|---|
| **Description:** | *Through this Action, CBPO, LSASD, WD and ORD will identify and actively engage with a community within the Chesapeake Bay watershed to:*<br>• *Understand the coastal climate adaptation and resilience challenges they face, and the information, science, and resources needed to address them.*<br>• *Identify, analyze, and implement solutions incorporating blue carbon resources to address local challenges and related priorities.*<br>• *Develop and transfer methods, approaches, data, or tools that can be used by the community to monitor and sustain resilient solutions.*<br>*As vulnerability to the impacts of climate change and the resources to address it are not equitably distributed, the chosen community will be a historically underserved or marginalized coastal community.* |
| **Metric(s):** | • *Develop the project scope, identify research needs, and submit proposals for funding. (FY22)*<br>• *Select a partner community, develop an engagement plan and identify partner and community science needs. (FY22-24)*<br>• *Create a method for blue carbon assessment, identify relevant datasets and create maps. (FY 23/24)*<br>• *Share the assessment and mapping results with Bay Program partners and stakeholders. (FY24)*<br>• *Develop and implement a communications and engagement plan for input on assessment/research results and implementation plan, finalize research results and develop implementation plan. (FY25)* |
| **Project Challenges:** | *Staff and funding to support community outreach.* |
| **Co-benefits:** | *Coastal blue carbon resources can sequester and store carbon while also acting to buffer storm surges, prevent erosion, improve water quality, provide habitat, and support local economies in multiple ways.* |

| | | | | | |
|---|---|---|---|---|---|
| **Owner Email:** | *Jenkins.Bill@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *No* |

**Science Needs**

*TBD through community and stakeholder/partner engagement.*

## Engage Region 3 tribes in a meaningful dialogue on climate change adaptation and resilience.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** | | |  | | | | | |  | |
| **Performance Goal(s):** | LTPG 1 | | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *Many communities are proactively planning and implementing actions to reduce risks posed by climate change. Using decision support tools to develop and apply adaptation strategies informs both the value of adopting solutions and the remaining challenges. Experience gained through project implementation provides a foundation to advance future adaptation efforts.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | • *Host a standalone climate adaptation workshop for federally recognized tribes in FY23.*<br>• *Use the Regional Tribal Operations Committee (RTOC) as a forum for ongoing climate change adaptation information sharing, training, and capacity building.*<br>• *Exchange information with the National Tribal Science Council on national tribal climate change adaptation needs and directions, as appropriate.*<br>• *Support and encourage the use of General Assistance Program (GAP) grants, and other available funds for climate change adaptation, as particular funds allow (e.g., education of staff and members, assessing their community and environment, and developing climate change adaptation plans).*<br>• *EPA Region 3 will coordinate all actions and proposed language involving Indigenous Knowledge (IK) with the American Indian Environmental Office (AIEO) prior to taking action or finalizing language on IK. To facilitate this effort, AIEO is establishing a process for coordination within EPA that provides for timely and active participation between AIEO and Program and Regional Offices.* | | | | | | | | | |
| **Metric(s):** | • *Number of climate adaptation and resilient focused meetings, workshops, webinars, etc. held over a fiscal year. (FY22-26)*<br>• *Count of GAP grants and other available funds used to support climate change adaptation. (FY23-26)* | | | | | | | | | |
| **Project Challenges:** | *Time constraints of tribal staff* | | | | | | | | | |
| **Co-benefits:** | *Facilitating these touch points will foster better relationships with EPA and other federal/state/non-profit and academic institutions* | | | | | | | | | |
| **Owner Email:** | *Hamilton.Brian@epa.gov* | | **New Work?** | *Yes* | | | **Resources Available?** | *Yes* | | |
| **Science Needs** | | | | | | | | | | |
| *None identified right now. Need experts to communicate information.* | | | | | | | | | | |

***Additional Narrative:***

***<u>Examples of EPA Actions Involving Indigenous Knowledge</u>***

*Examples of EPA actions involving Indigenous Knowledge (IK) include providing guidance and direction regarding IK, reviewing and learning best practices on IK, conducting webinars on IK, and learning how to potentially consider IK in federal research, policies, and decision making, including climate adaptation programs and activities.*

***<u>Tribal Climate Initiative</u>***

*The Tribal Climate Initiative is a formal process designed to connect climate needs and goals identified by tribes within Region 3 to the resources and programs that could help meet those needs and goals. It includes cataloging and tracking resource requests through regular meetings with tribal environmental representatives.*

## Implement the Chesapeake Bay Program Climate Directive.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** | | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | FY24 | | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *The consequences of a changing climate affect all aspects of life in the Chesapeake Bay watershed, from habitats to communities, living resources to public infrastructure. Changing environmental conditions not only affect the health and resilience of the Bay ecosystem and the populations that rely on its life-sustaining services, but also the success of protection and restoration work across the Bay watershed.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *The Chesapeake Bay Program Office will provide core management, scientific, facilitation, technical, and staffing support to build capacity of the Chesapeake Bay Program (CBP) to prepare for and respond to climate change and advance core elements of the Climate Directive:*<br>• *Address threats of climate change in all aspects of the work by integrating science and adaptation*<br>• *Prioritize communities and habitats most vulnerable to ever increasing risks*<br>• *Apply the best scientific, modeling, monitoring, and planning capabilities of the CBP*<br>• *Connect Chesapeake Bay restoration goals with emerging opportunities in climate adaptation, mitigation, and resilience.* | | | | | | | | | |
| **Metric(s):** | • *Percent of Chesapeake Bay Watershed Agreement Outcomes with management strategies or Logic and Action Plans that incorporate climate risk. (F22-24)* | | | | | | | | | |
| **Project Challenges:** | *Staff and funding to support sustained community engagement; improving scientific capabilities to monitor, model and assess ecosystem impacts and response to climate change; capacity of CBP to prepare and respond to climate change; coordination of climate adaptation efforts across Goal Implementation Teams; developing indicators and tracking/assessing progress on climate change.* | | | | | | | | | |
| **Co-benefits:** | *This action will produce co-benefits across all goals and outcomes of the Chesapeake Bay Agreement.* | | | | | | | | | |
| **Owner Email:** | *Williams.James@epa.gov* | | **New Work?** | *Yes* | | **Resources Available?** | *No* | | | |
| **Science Needs** | | | | | | | | | | |
| *This action will affect all aspects of the CBP's work, therefore, the CBP will need continued efforts to build a comprehensive understanding of the current science and critical research gaps across the goals and outcomes of the Chesapeake Bay Watershed Agreement.* | | | | | | | | | | |

***Additional Narrative:***

***Climate Vulnerability***

*Sea-level rise, warming temperatures, increased precipitation and flooding, species migration, and eroding shorelines are just a few of the impacts the Chesapeake Bay region is expected to experience.*

***Description***

*For this action, the CBPO will support and facilitate implementation of the Chesapeake Executive Council Directive No. 21-1 Collective Action for Climate Change (Climate Directive) across Chesapeake Bay Program goals, outcomes, and partnership activities. The Climate Directive commits the Partnership to address the threats of climate change in all aspects of its work to restore the Bay and its watershed. It builds upon a strong foundation of collaborative science and action established by the Climate Adaptation Outcome in the 2014 Chesapeake Bay Watershed Agreement.*

*The CBPO recognizes that the effects of climate change have a disproportionate impact on vulnerable and disadvantaged communities in the Chesapeake Bay watershed. Through this action, the CBPO will guide and support CBP efforts to increase community engagement and provide underrepresented populations a seat and opportunity to engage in discussions related to climate adaptation at the CBP and in design of projects that may affect their communities.*

*A number of actions included in the EPA Regional Climate Adaptation Implementation Plans have synergies with or may support implementation of the CBP Climate Directive, including but not limited to "Build and maintain climate resiliency through Blue Carbon resources'', "Focus protection and restoration actions to create and maintain resilient watersheds and ecosystems", "Update the Sea-level-rise Exploration and Assessment (SEA) decision support tool", and "Promote successful climate adaptation case studies in EPA's Adaptation Resource Center (ARC-X) tool".*

***Co-benefits***

*Goals and outcomes of the Chesapeake Bay Agreement include sustainable fisheries, water quality, vital habitats, climate change, toxic contaminants, stewardship and diversity among others.*

## Consider climate vulnerabilities at Superfund sites.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | |  | | |  | | | | |
| **Overarching Goal(s):** | | |  | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |

**Climate Vulnerability**

*A range of potential vulnerabilities will be addressed by this action. Ensuring that actions taken in the Superfund program remain protective includes evaluating climate vulnerabilities from a range of impacts such as sea-level rise, storm and flood events, increased ambient temperatures.*

**Action**

| | |
|---|---|
| **Description:** | *Continue to implement and refine the R3 SEMD Remedial Climate Considerations Guidelines to evaluate and document potential climate vulnerabilities throughout the Superfund process, using tools such as the EPA Region 3 Climate National Priorities List (NPL) Flooding and Vulnerability Tool and OLEM Climate Vulnerability Assessments Protocol (upon availability).*<br>*The expected outcome of this priority Action that SEMD staff will be better able to incorporate climate considerations into their work.* |
| **Metric(s):** | • *Launch divisional workgroup. (FY22)*<br>• *Number of workgroup meetings tracked. (FY22/23)*<br>• *Evaluate existing and any new SOPs/ guidance/ BMPs from OLEM. (FY 22/23)*<br>• *If appropriate develop divisional tool. (FY23)*<br>• *Develop list of NPL sites that are undergoing a Five-Year Review in FY24 and FY25. (FY24)*<br>• *Develop a library of vulnerability assessments and sample language to provide support to RPMs in assessing and addressing climate vulnerability at sites. (FY24)* |
| **Project Challenges:** | *Resourcing issues and staff capacity to participate. Adoption at enforcement led projects and federal facilities.* |
| **Co-benefits:** | *Allow for more resilient and adaptable remedies to be identified and implemented; potential for more positive impacts to surrounding communities in addressing climate vulnerabilities.* |

| | | | | | |
|---|---|---|---|---|---|
| **Owner Email:** | *Mohollen.Laura@epa.gov; Kennedy.Cathleen@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* |

**Science Needs**

*Science needs previously identified by SEMD include science and tools needed to map, predict and prepare for climate vulnerabilities at Superfund sites, and ecological impacts. (see Chapter 10)*

***Additional Narrative:***

*The National Contingency Plan dictates that potential site remedies are evaluated by nine criteria (outlined in 40 CFR 300.430(e)(9)(iii)). The evaluation considers both short- and long-term protectiveness of human health and the environment, and as such climate vulnerabilities should be considered when evaluating options for remedy selection. In addition, at Superfund sites where there are contaminants left in place or during an ongoing remedial action, a Five-Year Review is conducted to evaluate protectiveness, including vulnerabilities and impacts from a changing climate. Documenting these evaluations will ensure that any new or previously unidentified climate vulnerabilities are adequately assessed and tools such as EPA Office of Land and Emergency Management (OLEM) 2014 Technical Fact Sheets and the Greener Cleanup Principals will be identified and considered in the evaluations. With the above action, EPA Region 3 plans to more consistently and explicitly consider climate into all phases of evaluating and addressing remedial and removal sites.*

***Traceable Accounts***

*In the October 2022 version of the Region 3 Climate Adaptation Implementation Plan, this Priority Action was listed as an action in CHAPTER 6: Safeguard and Revitalize Communities and was planned for FY22 and FY23. In this plan update the work has been identified as a Priority Action and expanded to include new measures for FY24.*

*The original description of this Priority Action read: "SEMD will create a divisional Standard Operating Procedure which will describe how to consider, evaluate, and document potential climate vulnerabilities throughout the Superfund process (i.e., site investigations, removal and remedial activities and five-year reviews). This action will build upon existing tools and resources such as OLEM Climate Vulnerability Assessments, climate adaptation guidance from OLEM and the regional climate mapping tool."*

## Finalize the Region 3 Disaster Mitigation Implementation Strategy.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | |  | | |  | | | | |
| **Overarching Goal(s):** |  | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *This project will address the "Flooding from increasingly frequent intense storm events and sea level rise" as well as "Water and energy infrastructure" and "Water quality impacts from climate change" vulnerabilities.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *The Region 3 Disaster Mitigation Implementation Strategy describes the regional roles and responsibilities in carrying out disaster mitigation through the Promote/Incentivize/Enforce framework.* | | | | | | | | | |
| **Metric(s):** | • *Gather input from regional staff. (FY22/23)*<br>• *Receive Regional Incident Coordination Team (RICT) approval. (FY23)*<br>• *Finalize the document. (FY23/24)* | | | | | | | | | |
| **Project Challenges:** | *Getting feedback on the regional roles and responsibilities from designated personnel.* | | | | | | | | | |
| **Co-benefits:** | *Successful implementation of this project will lead to increased regional coordination and disaster preparedness.* | | | | | | | | | |
| **Owner Email:** | *Rachko.Samantha@epa.gov* | | **New Work?** | *No* | | **Resources Available?** | *Yes* | | | |
| **Science Needs** | | | | | | | | | | |
| *None.* | | | | | | | | | | |

***Additional Narrative:***

***Traceable Accounts***

***Completed as of FY24 Q1***

*In the October 2022 version of the Region 3 Climate Adaptation Implementation Plan, this Priority Action was listed as an action in CHAPTER 5: Ensure Clean and Safe Water for All Communities and was planned for FY22. The work has been identified as a Priority Action and was officially completed in FY24 Q1.*

## Update the Sea-level-rise Exploration and Assessment (SEA) decision support tool.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | | | | | | | |  |
| **Overarching Goal(s):** | | | |  | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 |

**Climate Vulnerability**

*When coupled with storm surges, sea-level rise can pose severe risks of flooding, with consequent physical and mental health impacts on coastal populations. In addition to property and infrastructure impacts, the facilities and cultural resources that support coastal tourism and recreation as well as cultural landscapes and historic structures will be at increased risk from high tide flooding, storm surge, and long-term inundation.*

**Action**

| | |
|---|---|
| **Description:** | *The Water Division, in partnership with the Laboratory Services and Applied Science Division and the Office of Research and Development, will develop a sea-level rise data product that will allow EPA Region 3 programs to assess the threat of sea-level rise quickly and easily into specific projects and for specific locations.*<br>*The expected outcome of this Priority Action is that sea-level data will be more easily incorporated into regional decision-making processes.* |
| **Metric(s):** | • *Process sea-level-rise data produced by the Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Interagency Task Force for the 2022 interagency report into GIS mapping layers. (FY22/23)*<br>• *Finalize the app to explore sea-level-rise data generated by the Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Interagency Task Force. (FY24)*<br>• *Obtain approval to release the tool publicly. (FY24)* |
| **Project Challenges:** | *The scientific and modeling foundations for this project have been firmly established and reviewed, but the work requires substantial processing time to generate new map layers.* |
| **Co-benefits:** | *This app would allow the Region and the Agency to make sea-level related decisions using a common framework.* |
| **Owner Email:** | *Konfirst.Matthew@epa.gov* **New Work?** *Yes* **Resources Available?** *Yes* |

**Science Needs**

*Successful completion of this project requires technical GIS support from the Laboratory Services and Applied Sciences Division.*

***Additional Narrative:***

***Traceable Accounts***

*The release of an updated report and data set by the Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Interagency Task Force in 2022 delayed progress on this action, which was originally listed in CHAPTER 5: Ensure Clean and Safe Water for All Communities. As such, the timeline for this Priority Action has been updated.*

# Priority Actions: Fiscal Year 2023

## Assess air monitoring vulnerability.

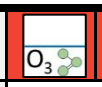
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | |  | | | | | | | |
| **Overarching Goal(s):** | | | |  | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *This action relates to extreme weather events that can affect residential access to monitoring equipment, principally hurricanes and major flooding episodes.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Evaluate EPA Region 3's Ambient Air Monitoring Infrastructure to identify which sites may be vulnerable to flooding, extreme weather, or other climate impacts, and create a plan of action to address these vulnerabilities.* | | | | | | | | | |
| **Metric(s):** | • *Percentage of monitors evaluated. (FY23)*<br>• *Number of states/localities that have been issued monitoring network vulnerability recommendations. (FY24)*<br>• *States that have taken action to include adaptation in their 5-year network assessment. (FY25)* | | | | | | | | | |
| **Project Challenges:** | *Coordination with National level program, potential for project to raise concerns about siting,* | | | | | | | | | |
| **Co-benefits:** | *Protect against loss of data, which may help with local progress toward NAAQS attainment.* | | | | | | | | | |
| **Owner Email:** | *Riley.Alison@epa.gov* | | **New Work?** | Yes | | **Resources Available?** | *No* | | | |
| **Science Needs** | | | | | | | | | | |
| *Access to flood plan maps, etc. to determine site vulnerability.* | | | | | | | | | | |

***Additional Narrative:***

***Traceable Accounts***

*In completing the analysis for this project, the scope expanded to produce a product with broader interest than originally conceived. The project timeline has therefore been expanded into FY24, with data for metrics 2 and 3 also being shifted into FY24.*

## Support Federal Facilities with resilience goals.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | |  | | |  | | |
| **Overarching Goal(s):** | | | |  | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *Increased tropospheric ozone; Altered effects on the stratospheric ozone layer; Interactions of sulfur, nitrogen, and mercury deposition within ecosystems; Vulnerability and uncertainty related to impacts to water in the Region; Water and energy infrastructure; Use of toxic chemicals; Storage of toxic chemicals; Exposure to toxic chemicals from demolition/ renovation activities* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Federal Facilities Enforcement (FFE) has been difficult to achieve in a timely manner, and negotiations are protracted. The targeting of federal facilities located in areas that could be subject to resiliency goals, such as those located in river valleys or in coastal areas may be able to support resiliency plans for sea-level rise and worsening flooding, as a supplement to monetary penalties. Many federal facilities are located in non-attainment areas where the use of emergency generators in the summer ozone season may have an increased impact on air quality and climate health. Chemical storage upgrades provide opportunities in low lying areas that may be another area for resiliency to combat sea level rise and worsening flooding.* | | | | | | | | | |
| **Metric(s):** | • *Number of inspections/offsite compliance monitoring conducted. (FY23-25)* | | | | | | | | | |
| **Project Challenges:** | *Partnering with federal facilities in a productive manner, working with and around federal budgets that may not be easily changed.* | | | | | | | | | |
| **Co-benefits:** | *EJ* | | | | | | | | | |
| **Owner Email:** | *Willard.ErinM@epa.gov; Hall.Kristen@epa.gov* | **New Work?** | *No* | **Resources Available?** | *Yes* | | | | | |
| **Science Needs** | | | | | | | | | | |
| *Mapping, satellite floodplain, and additional data to show sea level change, rain events and flooding history in areas with federal facilities to start to develop a baseline trend data set.* | | | | | | | | | | |

## Advance understanding and implementation of climate-resilient Best Management Practices (BMPs).

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | | | |  |  |  | | |
| **Overarching Goal(s):** | | | | | |  | | | |
| **Performance Goal(s):** | LTPG 1 | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | FY23 | FY24 | FY25 | | FY26 | | | |

**Climate Vulnerability**

*Climate change impacts on air temperature, precipitation volume and intensity, sea-level rise and saltwater inundation, occurrence of extreme weather events, and derivative hydrological responses (e.g., soil moisture, partitioning of surface runoff and subsurface flow) affect BMP performance and resilience, while implementation of "climate smart" BMPs and land-based natural solutions (such as forest restoration) may provide multiple benefits for climate mitigation and adaptation.*

**Action**

| | |
|---|---|
| **Description:** | *Further data and research are needed to understand the climate change impacts and adaptation options on BMP performance. There is currently limited data on BMP climate resilience (i.e., pollutant removal performance, maintenance, shelf life, siting and design) and adaptation co-benefits for living resources and habitat. Working closely with Chesapeake Bay Program partners, CBPO will take steps to develop a better understanding of BMP responses, including new and other emerging BMPs, to climate change conditions and support implementation of climate adapted BMPs.* |
| **Metric(s):** | *The annual implementation of climate adapted BMPs will be tracked with the CBP's CAST database (FY23-26):*<br>• *Tree plantings (riparian tree buffers, reforestation, etc.) tracked annually by new acres planted.*<br>• *Wetland BMPs tracked annually by new/restored wetlands acres.*<br>• *Stormwater Performance Standard BMPs will be measured by the change in the weighted average performance standard in inches.*<br>• *Acres of agricultural land treated with climate adapted agricultural BMPs.*<br>• *Climate adapted agricultural BMPs will be tracked annually in acres of agricultural land treated (Agriculture Composite) and, for Livestock Waste Management Systems, in animal units.* |
| **Project Challenges:** | *Availability of funding and technical staff to support work; Need for updates to stormwater design regulations and standards.* |
| **Co-benefits:** | *Greenhouse gas mitigation, pollution mitigation, increased ecosystem resilience, protection of living resources and habitat, climate justice, improved agricultural soils, reduced flooding, improved public safety, and property protection.* |

| | | | | | |
|---|---|---|---|---|---|
| **Owner Email:** | *Williams.James@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *No* |

**Science Needs**

*Improved quantification of the monetized co-benefits of the climate adapted BMPs.*

***Additional Narrative:***

***Description***

*Working closely with Chesapeake Bay Program partners, the Chesapeake Bay Program Office will take steps to develop a better understanding of BMP responses, including new and other emerging BMPs, to climate change conditions and support implementation of climate adapted BMPs by:*

- *Supporting development of a research agenda on climate change impacts on BMP performance and adaptation benefits.*
- *Facilitating partner coordination and alignment of programmatic and research activities related to climate adapted BMPs, stormwater management and natural climate solutions.*
- *Reviewing best management practice design, inspection, and maintenance standards to account for the impacts of climate change in stormwater and nonpoint source management.*
- *Communicating technical climate change assessments and research into implementation by supporting adoption by state and local partners and integration into planning and programs.*

***Metric(s)***

Metrics tracked using the CAST database are labeled: Tree Composite, Wetland Composite, Stormwater Composite, Agriculture Composite, and Livestock Composite, respectively.

***Co-Benefits***

*Co-benefits of tree planting, cover crops, urban stormwater practices, and tidal marsh restoration include greenhouse gas mitigation, pollution mitigation, increased ecosystem resilience, protection of living resources and habitat, climate justice (e.g., by improving flood resilience and public health protection), and improved agricultural soils. Co-benefits of climate adapted stormwater BMPs include sediment and nutrient reduction, reduced flooding, improved public safety, and property protection.*

## Engage Superfund communities on climate.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | |  | | | | | | | |
| **Overarching Goal(s):** | | |  | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *A range of potential vulnerabilities will be addressed by this action, as outlined in Chapter 2.* | | | | | | | | | | |
| ***Action*** | | | | | | | | | | |
| **Description:** | *Develop a standard practice to engage communities affected by Superfund sites and related activities to address relevant climate concerns (e.g., through a Site's Community Involvement Plan (CIP), Five-Year Review interviews).* | | | | | | | | | |
| **Metric(s):** | • *Evaluation of existing/new guidance. (FY23)*<br>• *Development of template questions or discussion guides. (FY23)* | | | | | | | | | |
| **Project Challenges:** | *Participation and cooperation from a community affected by Superfund sites can be a challenge; along with ensuring the feedback received is truly reflective of local climate considerations.* | | | | | | | | | |
| **Co-benefits:** | *Build stronger partnerships and relationships with community members which may have information on local level climate considerations (i.e., local flooding in storm events).* | | | | | | | | | |
| **Owner Email:** | *Mohollen.Laura@epa.gov; Kennedy.Cathleen@epa.gov* | | **New Work?** | *Yes* | | **Resources Available?** | *Yes* | | | |
| **Science Needs** | | | | | | | | | | |
| *None.* | | | | | | | | | | |

***Additional Narrative:***

*Throughout the Superfund process, EPA conducts early, frequent and meaningful community engagement. This engagement is both statutorily required and implemented as a best practice. Ensuring climate considerations are incorporated into this community engagement will be a key part of ensuring local level and community concerns are understood. By developing a SOP which outlines standard questions and climate information to consider at a community level will ensure that engagement is consistent, equitable and defined, allowing EPA to ensure it is incorporated throughout the project.*

***Traceable Accounts***

***Completed as of FY23 Q3***

*In the October 2022 version of the Region 3 Climate Adaptation Implementation Plan, this action was listed as an action in CHAPTER 6: Safeguard and Revitalize Communities. The work has been identified as a Priority Action and was officially completed in FY23 Q3.*

## Partner with the Regional Science Council to host climate-focused webinars for both internal and external audiences.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Threat(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** | | | | | | | | | |  |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *Webinar topics could include any of the vulnerabilities described in Chapter 2.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Climate focused webinars, presentations and special events, partnering with the highly successful recurring Regional Science Council Presents series; events will serve as an educational and capacity-building resource on climate for the technical needs of the regional workforce. The expected outcome of this Priority Action that EPA Region 3 staff will be better able to incorporate climate considerations into their work.* | | | | | | | | | |
| **Metric(s):** | • *Number of webinars, presentations and events with a climate focus hosted each quarter. (FY23-26)* | | | | | | | | | |
| **Project Challenges:** | *None.* | | | | | | | | | |
| **Co-benefits:** | *None.* | | | | | | | | | |
| **Owner Email:** | *Poeske.Regina@epa.gov; Vedula.Diana@epa.gov* | **New Work?** | *No* | **Resources Available?** | *Yes* | | | | | |
| **Science Needs** | | | | | | | | | | |
| None. | | | | | | | | | | |

## Resilience capacity building in Environmental Justice/Social Justice Communities for climate change planning.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** |  | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | FY24 | | FY25 | | | FY26 | |

**Climate Vulnerability**

*Not only are our critical resources and natural ecosystems vulnerable to the effects of climate change, but certain populations and communities can be especially vulnerable to climate impacts, including children, pregnant women, the elderly, minorities, the poor, persons with underlying medical conditions and disabilities, those with limited access to information, and tribal and indigenous peoples.*

**Action**

| | | | | | |
|---|---|---|---|---|---|
| **Description:** | *Many environmental/social/climate justice communities in Region 3 lack the resilience to offset expected climate changes, including changes in natural hazards. Few of these communities have specific climate change plans to develop the strategies necessary to build their resilience capacity to these expected long-term changes and events.*<br>*This research project will directly contribute to two critical EPA Region 3 priorities: a more comprehensive implementation of climate change adaptation and resilience and the development of a Standard Operating Procedure (SOP) for a multi-media EPA process to address environmental injustices in communities of concern. The project results will provide a proof-of-concept approach for climate change planning. The expected outcome of this Priority Action is that two vulnerable communities will improve their climate resilience.* | | | | |
| **Metric(s):** | • *Identify potential candidate communities for resilience capacity building for improved climate change planning using existing EPA tools, models and databases. (FY23)*<br>• *Collaborate with partners to refine candidate community list. (FY24)*<br>• *Initiate community research and engagement workshops to determine the accuracy of the assessment. (FY24/25)*<br>• *Work with selected communities to develop strategies to address shortcomings in resilience to climate change, natural hazards and socio-economic impacts. (FY24/25)*<br>• *Finalize community-specific climate change plans that address local issues and concerns. (FY25)* | | | | |
| **Project Challenges:** | *Developing substantial community interest in resiliency improvements.* | | | | |
| **Co-benefits:** | *This model could be used in other vulnerable communities in the future.* | | | | |
| **Owner Email:** | *Connor.Garth@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* |

**Science Needs**

*Technical and funding support through a Regional-ORD Applied Research (ROAR) grant.*

## Developing Next-Generation Intensity-Duration-Frequency (NGIDF) Curve Data for EPA Region 3.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | | | | |  | | | |
| **Overarching Goal(s):** |  | |  | |  | |  | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 |

**Climate Vulnerability**

*Extreme rainfall events have been increasing over the past few decades, exacerbating flooding and stormwater challenges throughout the Mid-Atlantic region. These increases in extreme rainfall are expected to continue throughout the 21st century, and they present challenges to designing and managing stormwater infrastructure.*

**Action**

| | |
|---|---|
| **Description:** | *The Chesapeake Bay Program has commissioned and is operationalizing a webtool to mitigate climate-change-induced impacts in the Chesapeake Bay Watershed (CBW) using intensity-duration-frequency (IDF) curves developed using projected future extreme precipitation data; however, the limited geographical coverage inhibits its broader uptake by EPA Region 3 environmental programs.*<br>*EPA Region 3 will work with ORD and other relevant partners to generate a Next-Generation IDF (NGIDF) dataset to cover all of Region 3. The project will incorporate data currently being developed by ORD and newer methodological advances that allow for more accurate characterization of precipitation extremes.*<br>*As a follow on to this work, the resulting data could also be incorporated into the EPA Region 3 Climate National Priorities List (NPL) Flood/Climate Vulnerability Mapping Tool and other EPA tools, including EnviroAtlas, to provide additional detail about climate vulnerabilities at NPL sites.* |
| **Metric(s):** | • *Generate dataset to cover all of Region 3. (FY25)* |
| **Project Challenges:** | *Integrating this unified dataset with other datasets that cover specific portions of the Mid-Atlantic.* |
| **Co-benefits:** | *Unified dataset available for all of EPA Region 3* |
| **Owner Email:** | *Konfirst.Matthew@epa.gov* **New Work?** *Yes* **Resources Available?** *Yes* |

**Science Needs**

*Technical and funding support through a Regional-ORD Applied Research (ROAR) grant.*

## Increase regional and national collaboration to ensure consistency among vulnerability assessment mapping tools and approaches.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** | | | |  | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *Discussion may touch on any of the topics covered in Chapter 2.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Increase consistency across regional mapping tools and better use limited resources to identify vulnerabilities among clean-up/hazardous sites and other topic areas identified through the Climate Adaptation Planning Subgroup of the EPA GIS Workgroup.*<br>*The expected outcome of this Priority Action is a more coordinated approach to climate-related tool development across the agency.* | | | | | | | | | |
| **Metric(s):** | • *Number of meetings attended for collaboration (target: monthly) (FY23-26)*<br>• *Number of times Region 3 climate-related tools are presented to national-level workgroups (target: as needed) (FY23-26)* | | | | | | | | | |
| **Project Challenges:** | *GIS users are ubiquitous across the agency and may or may not be engaged in the Climate Adaptation Planning Subgroup of the EPA GIS Workgroup. Identifying relevant climate-focused GIS projects will be an ongoing challenge.* | | | | | | | | | |
| **Co-benefits:** | *Collaboration could help mitigate resource constraints slowing the implementation of projects that build climate resilience.* | | | | | | | | | |
| **Owner Email:** | *Denardi.Kristopher@epa.gov; Hensley.Kelsey@epa.gov* | | **New Work?** | *Yes* | | **Resources Available?** | *Yes* | | | |
| **Science Needs** | | | | | | | | | | |
| *Science needs will be addressed through this Priority Action.* | | | | | | | | | | |

# Priority Actions: Fiscal Year 2024

## Convene a "Watershed Partnerships Workshop" to address climate adaptation at the watershed scale.

| | | | | | |
|---|---|---|---|---|---|
| **Climate Hazard(s):** | | |  |  | |
| **Overarching Goal(s):** | | | |  | |
| **Performance Goal(s):** | LTPG 1 | | LTPG 2 | | LTPG 3 |
| **Activity Timeframe:** | FY22 | FY23 | FY24 | FY25 | FY26 |

**Climate Vulnerability**

*Flooding from increasingly frequent intense storm events and sea-level rise, and changes to the frequency and duration of high heat events impact not only individual waterbodies, but entire watersheds. The interconnected nature of stream networks, ecosystems and communities creates an imperative to design solutions at a larger scale that allows partners the opportunity to take advantage of the co-benefits described below.*

**Action**

| | |
|---|---|
| **Description:** | *In collaboration with the Delaware River Basin Commission, the Water Division will facilitate a workshop in FY25 to support innovative efforts to incorporate climate adaptation into combined water quality and quantity planning at the watershed scale. Participants will include partners from across the Delaware River Watershed with a focus and/or interest in this topic (Tribal, state and local entities and engineers, foresters, conservationists, floodplain managers, utilities, and watershed groups).* |
| **Metric(s):** | • *Number of federally recognized tribes, states, territories, local governments, and communities, especially communities which are underserved and disproportionally at risk from climate change that have **presented** about ways to take action to anticipate, prepare for, adapt to, or recover from the impacts of climate change at the watershed scale. (FY25)*<br>• *Number of federally recognized tribes, states, territories, local governments, and communities, especially communities which are underserved and disproportionally at risk from climate change that **participated** in the workshop. (FY25)* |
| **Project Challenges:** | *This workshop could conceivably be of interest to a large number of partners, which would have an impact on planning, coordination and technical resources required to hold the event.* |
| **Co-benefits:** | *Integrating climate adaptation into water quality and quantity planning: efficiency in collection and management of datasets, leveraging additional partners and funding, and efficiencies gained by multi-objective planning. Green infrastructure: air quality and ecosystem co-benefits and ancillary benefits to the community, like green job creation, outdoor recreation space and increased property values.* |

| | | | | | |
|---|---|---|---|---|---|
| **Owner Email:** | *Konfirst.Matthew@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* |

**Science Needs**

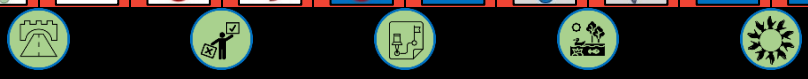
*Science needs could be identified during the workshop.*

***Additional Narrative:***

***Traceable Accounts***

*In the October 2022 version of the Region 3 Climate Adaptation Implementation Plan, this action was listed in CHAPTER 5: Ensure Clean and Safe Water for All Communities.*

## Create an annual engagement plan and a toolkit of communication and engagement resources.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** |  | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | LTPG 2 | | LTPG 3 | | | | | |
| **Activity Timeframe:** | FY22 | FY23 | FY24 | | FY25 | | FY26 | | | |
| **Climate Vulnerability** | | | | | | | | | | |
| *All relevant vulnerabilities currently listed in this report and additional future vulnerability, as determined through the engagement process.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Create a toolkit of communication and engagement resources to make the Climate Adaptation and Implementation Plan and other EPA climate resources and information more accessible and beneficial to communities in the region. Resources should be developed using the methods and modes of communication that are most effective based on study of the audience and engagement goals. Resources could include talking points, approved slide decks, science resources, fact sheets, decision support tools, maps, case studies, etc.*<br>*The divisional offices have identified general and specific stakeholder groups that the Region will engage and partner with to implement the priority actions identified in the program specific chapters.* | | | | | | | | | |
| **Metric(s):** | • *Number of internal communication and engagement resources created. (FY24-26)*<br>• *Number of external communication and engagement resources created. (FY24-26)*<br>• *Create an annual engagement plan. (FY24-26)* | | | | | | | | | |
| **Project Challenges:** | *Robust upfront engagement and effective listening will be needed to ensure resources will be available and appropriate for the communities that are underserved and disproportionally at risk from climate change. For example, language and translation services may be necessary for many communities in the region.* | | | | | | | | | |
| **Co-benefits:** | *There may be opportunities to add climate adaptation communication and engagement messages into other programmatic outreach work by developing and using the toolkit. For example, including climate adaptation talking points into RA level event talking points for water infrastructure events.* | | | | | | | | | |
| **Owner Email:** | *Dunn.Michael@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* | | | | | |
| **Science Needs** | | | | | | | | | | |
| *Understanding the science needs of partners and delivering science and technical tools and information to our partners will be a key role of the engagement process.* | | | | | | | | | | |

***Additional Narrative:***

***Traceable Accounts***

*In the October 2022 version of the Region 3 Climate Adaptation Implementation Plan, this Priority Action was listed as "Create a toolkit of communication and engagement resources" in CHAPTER 11: Communication and Engagement Strategy (CHAPTER 12 in this updated plan).*

## Convene a quarterly meeting with Region 3 jurisdictions to coordinate across the Mid-Atlantic on climate issues.

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| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** |  | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *Discussion may touch on any of the topics covered in Chapter 2.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Convene a high-level, quarterly meeting with EPA Region 3 jurisdictions (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia) and selected regional partners to coordinate on climate-related topics.*<br>*The expected outcome of this Priority Action is a more coordinated approach to climate adaptation across the region.* | | | | | | | | | |
| **Metric(s):** | • *Number of quarterly meetings held. (FY24-26)* | | | | | | | | | |
| **Project Challenges:** | *The EPA Mid-Atlantic region covers a diverse range of climate priorities and will have to prioritize topics.* | | | | | | | | | |
| **Co-benefits:** | *Collaboration done through this group could help mitigate resource constraints slowing the implementation of projects that build climate resilience.* | | | | | | | | | |
| **Owner Email:** | *Konfirst.Matthew@epa.gov* | | **New Work?** | *Yes* | | **Resources Available?** | *Yes* | | | |
| **Science Needs** | | | | | | | | | | |
| *Science needs may be identified during quarterly meetings.* | | | | | | | | | | |

## Advance understanding of and engage with partners on the environmental impacts of wasted food and the beneficial uses of compost application to soil.

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| **Climate Hazard(s):** | | |  | | | |  | | |
| **Overarching Goal(s):** | | | | | | | |  | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | FY24 | | FY25 | | FY26 | |

**Climate Vulnerability**

*As food and other organic materials decompose in a landfill, methane is emitted. Methane emissions contribute to the greenhouse gases that cause global warming.*
*Additionally, land in the US suffers from topsoil loss and erosion, leading to issues with water quality, water-holding capacity, loss of food crops, soil health, and community and ecosystem resilience. Also, degraded soil can release carbon. As communities face more frequent flooding, longer wildfire seasons, and more intense droughts, the adaptive capacity and resilience of soils will need to be addressed.*

**Action**

| | | | | |
|---|---|---|---|---|
| **Description:** | *Develop and cultivate partnerships with states, tribes, territories, and communities in increasing their own adaptive capacity and resilience to climate change impacts through wasted food reduction practices and compost application. The expected outcome of this Priority Action is that progress will be made towards implementing EPA's circular economy goals.* | | | |
| **Metric(s):** | • *Amount of organic materials (tons/year) diverted from landfills and incinerators (target: based on number of active Region 3 grants). (FY24-26)*<br>• *Amount of compost applied to soils (target: contingent on availability of data). (FY24-26)* | | | |
| **Project Challenges:** | *Data availability.* | | | |
| **Co-benefits:** | *Greenhouse gas mitigation; adaptation/resilience; improved soil health* | | | |
| **Owner Email:** | *Piergiovanni.peter@epa.gov; Pennington.melissa@epa.gov; Goldstein.elana@epa.gov* | **New Work?** | *Yes* | **Resources Available?** *Yes* |

**Science Needs**

*None.*

***Additional Narrative:***

***Description***

*This Priority Action was originally included in the 2022 Climate Adaptation Implementation Plan within CHAPTER 6: Safeguard and Revitalize Communities and was titled "Apply Sustainable Materials Management (SMM) to agricultural practices." It has been updated to focus on food waste and the climate adaptation and mitigation cobenefits of compost creation and use.*

## Pilot project to streamline interagency coordination on federally supported climate resilience efforts in Baltimore.

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| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** |  | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | FY24 | | FY25 | | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *(Reference to pertinent topics covered in Chapter 2)* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Addressing Climate resilience in the Baltimore metro area will require a high level of interagency coordination. Approval, funding and implementation of infrastructure projects involves partners across federal, state, and local government.*<br>*EPA is engaging with communities to understand concerns, challenges, and potential solutions. EPA will develop a strategy to streamline joint review of proposed projects.*<br>*The expected outcomes of this Priority Action are that interagency coordination on climate resilience will be strengthened and that the Baltimore metro area will see the benefits of that coordination.* | | | | | | | | | |
| **Metric(s):** | *Joint review strategy development and implementation.*<br>• *Identify partners and develop strategy. (FY24)*<br>• *Strategy implementation. (FY25)* | | | | | | | | | |
| **Project Challenges:** | *Buy in from multiple partners will be needed for successful implementation.* | | | | | | | | | |
| **Co-benefits:** | *Increased capacity and resource leveraging* | | | | | | | | | |
| **Owner Email:** | *Trakis.Lisa@epa.gov* | **New Work?** | *No* | **Resources Available?** | *Yes* | | | | | |
| **Science Needs** | | | | | | | | | | |
| *None.* | | | | | | | | | | |

## Understanding carbon storage/sequestration implications of local decision-making.

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|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | | | | |  | | | |
| **Overarching Goal(s):** | | |  | |  | |  | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 |

**Climate Vulnerability**

*Wetlands and forests are diverse systems that provide valuable benefits to humans including carbon storage and sequestration. When wetlands and forests are lost, carbon storage and sequestration are also lost, but that potential loss is frequently not considered in decision making partially due to the lack of data to make such a determination. Region 3 is interested in investigating how to include these losses in project reviews for NEPA and Section 404 of the Clean Water Act (CWA 404).*

**Action**

**Description:** *This Regional-ORD Applied Research (ROAR)project will investigate the best methods to estimate and to help establish a baseline for carbon storage and sequestration, and to apply those methods to create geospatial data indicating total carbon stored, carbon stored in above and below ground living biomass, and carbon stored in soil in forested and wetland ecosystems across R3. R3 is particularly interested in considering carbon storage and sequestration within their NEPA and CWA 404 reviews but understanding carbon storage and sequestration is important everywhere.*

*The expected outcome of this Priority Action is that the region will have a better understanding of carbon storage and sequestration potential using quantified estimates.*

**Metric(s):**

- *Develop the project scope; commit funds and obtain student services or ORISE approval; conduct kick-off meetings with R3 and ORD collaborators. (FY24)*
- *Investigate existing models and sources of data; conduct literature review; examine NWCA site data for R3. (FY24)*
- *Finalize methods to generate geospatial data layers; generate geospatial data layers; submit journal article. (FY24/25)*
- *Incorporate geospatial data layers into EnviroAtlas; develop a Use Case for EnviroAtlas; hold training for R3; generate "pilot" web-based resource in EnviroAtlas or EJSCREEN for review from key stakeholders; develop draft training materials, standard operating procedure, and technical documentation for stakeholders. (FY25)*

**Project Challenges:** *Ensuring resulting data are of adequate rigor and accuracy.*

**Co-benefits:** *Information developed here will have far-reaching applications for EPA programs and partners.*

| **Owner Email:** | *Jenkins.Bill@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* |
|---|---|---|---|---|---|

**Science Needs**

*TBD through implementation of the project. Technical and funding support through a ROAR grant.*

***Additional Narrative:***

***<u>Description</u>***

*If successful, the method can then be applied to other Regions and could inform EPA's evaluation of projects in the context of the CWA 404 and NEPA nationally.*

*The expected outcome of this project will be spatially explicit gridded (e.g., a data point for every 30 by 30-meter pixel on the ground) estimates of above and below ground live biomass carbon storage as well as carbon stored in soil for wetlands and forests. It will also provide preliminary estimates of lost carbon sequestration potential. The geospatial data, once vetted and reviewed, will be readily accessible through EnviroAtlas.*

## Create a framework for strategic, multi-scale planning for coastal wetland restoration.

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| **Climate Hazard(s):** | | | | | |  | | | | |
| **Overarching Goal(s):** | | |  | |  | |  | |  | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | FY24 | | FY25 | | | FY26 | |

**Climate Vulnerability**

*Coastal wetlands and living shorelines provide vital habitat, water quality, and resilience benefits. Rising sea levels and increases in salinity threaten to degrade and diminish these environments faster than they can be restored or reestablished on higher ground.*

**Action**

**Description:**

*CBPO and LSASD will bring together appropriate stakeholders to develop:*

- *A transferrable framework for planning and siting large-scale coastal wetland restoration and enhancement projects that utilizes existing tools and priorities and incorporates various marsh habitat benefits, vulnerability, resilience considerations, ecological tipping points, etc.*
- *An outreach plan for communities conveying the local benefits of coastal wetland restoration, and to collaborate on the framework/vision.*
- *A monitoring protocol for coastal wetland restoration, enhancement, and protection projects, focusing on the Chesapeake Bay, that indicates which aspects of coastal wetlands should be evaluated post-project construction, given project goals and the environmental conditions.*

*Design a pilot project that incorporates these elements.*

**Metric(s):**

- *Develop the project scope; identify potential partners/stakeholders to participate, and potential funding sources. (FY24)*
- *Convene partners to reach agreement on prioritization and siting criteria. (FY24)*
- *Create a transferable, strategic framework with input from community stakeholders to identify and evaluate potential geographies and sites for large scale coastal wetland restoration. (FY25)*
- *Engage with interested stakeholders to develop a pilot tidal wetland restoration project utilizing the strategic framework. (FY25)*
- *Develop a consistent Pooled Monitoring protocol that outlines key success metrices for coastal wetlands. (FY25)*

**Project Challenges:** *Maintaining stakeholder engagement, considering taxed capacity at state and federal agencies. Maintaining funding to support science development.*

**Co-benefits:** *Wetlands provide multiple, significant benefits to people and communities. Building wetland resiliency is critical to ensuring those benefits continue.*

| **Owner Email:** | *Jenkins.Bill@epa.gov; Williams.James@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* |
|---|---|---|---|---|---|

**Science Needs**

*TBD through community and stakeholder/partner engagement.*

***Additional Narrative:***

*Summary From the Climate Workshop Eco Session: Strategically prioritize ecosystems and their components for implementation (conservation, restoration, management), utilizing information such as vulnerability.*

*Specifically, we need a multi-scale (large scale to site) coastal master plan(s) to help us focus on what kind of intervention, if any, is suitable for certain sections of the coastline and to focus multi-sector and partner efforts in specific, right-sized geographies. This will allow us to concentrate and leverage funding, address multiple aspects/areas of an issue (science, policy), and therefore accelerate progress, which can then be replicated. We need to decide where to work, and where not to work based on several factors:*

- *Ecological condition and vulnerability to climate related impacts that incorporates both local/site and landscape-level data, metrics and analyses.*
- *Ecological or resilience function-based "tipping points".*
- *Unintended consequences of interventions. How do you weigh and balance decision-making about where to go and what to do acknowledging there is going to be a ripple effect?*
- *Those ecosystem services we are trying to support and that jurisdictions, communities, and landowners are interested in (e.g., community resiliency, wildlife habitat, carbon sequestration).*

*Need to Investigate: 1) How a strategic prioritization approach to large and small scale planning and implementation, based on ecosystem service outcomes, could support decision-making, including identifying geographic areas to focus on; 2) What research/data collection and assessments (e.g. vulnerability) are necessary to support strategic prioritization, and weigh cost/benefits (e.g. unintended consequences) of implementation practices; 3) How to define and measure "resilience", as defined by multiple endpoints or criteria? and 4) How best to communicate information and results to decision-makers, communities, and landowners.*

*Summary From Climate Workshop Eco Session: Monitor, assess, and develop information on ecosystem vulnerability and the benefits of implementation options. Investigate what kind and level of monitoring is needed to meet multiple needs:*

- *To support adaptive management approach to siting, design, implementation of projects, including monitoring of baseline condition, project effectiveness, etc.*
- *To enable entry into Blue Carbon markets, as natural infrastructure needs to be in place for 100 years;*
- *Given sea-level rise, subsidence, and increased erosion rates, need stable, long-term monitoring of coastal wetland condition, and the effectiveness of projects implemented;*
- *Need additional information on, and metrics for, Natural Infrastructure/Nature-Based Solutions project effectiveness over time (i.e., for building resilience of communities and ecosystems, and other management objectives); and*
- *Explore sources of funding for long-term pooled monitoring.*

## Partnerships and grants adaptation review.

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| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** |  | |  | | | |  | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *All relevant vulnerabilities listed in this report.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Evaluate ongoing and upcoming grants and partnership initiatives for adaptation benefits and identify opportunities for increasing access or leveraging resources. This includes funds being disseminated under the Bipartisan Infrastructure Law, The American Rescue Plan, and the Inflation Reduction Act.*<br>*The expected outcome of this Priority Action is a more robust understanding of the scope of existing adaptation efforts, resources needs and opportunities identified.* | | | | | | | | | |
| **Metric(s):** | • *Assessment report generated. (FY25)* | | | | | | | | | |
| **Project Challenges:** | *Need for FTE, coordination with HQ on language being developed to incorporate adaptation considerations in national funding opportunities.* | | | | | | | | | |
| **Co-benefits:** | *Increased awareness/interest in utilizing EPA programs to further community-level adaptation goals.* | | | | | | | | | |
| **Owner Email:** | *Riley.Alison@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* | | | | | |
| **Science Needs** | | | | | | | | | | |
| *None.* | | | | | | | | | | |

## Innovative advancements in lake and wetland monitoring with imagery and machine learning modeling.

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| **Climate Hazard(s):** | | | | | | |  | | | |
| **Overarching Goal(s):** | | |  | | | |  | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |

**Climate Vulnerability**

*Water quality impacts from climate change; flooding from increasingly frequent intense storm events and sea-level rise; changes to aquatic ecosystems and the composition and distribution of species; robust science and data to support decision-making.*

**Action**

**Description:** *New cost-effective approaches for monitoring are needed to understand the impacts of changing thermal and hydrologic conditions on ecosystems as well as to identify specific habitats and regions that may be resistant or more susceptible to climate change. This project will help states, tribes, and others by furthering a low-cost and user-friendly alternative for lake and wetland monitoring with the use of continuous imagery from trail cameras and machine learning modeling. A novel human-assisted ranking-based model approach will use images for lakes (% ice cover, water level, leaf on/off, algal blooms); for wetlands (% ice cover, depth, leaf on/off, bloom dates).*
*The expected outcome of this Priority Action is that climate threats to lakes and wetlands will be better quantified for future decision making.*

**Metric(s):**

- *Determining final parameters based on funding, and partners' needs. (FY24)*
- *Identifying and engaging potential partners through personal contact, meetings, webinars, existing work teams, etc. (FY25)*
- *Training for trail camera deployment, database usage, & annotations. (FY25)*
- *Establishing existing or new lake and wetland sites, including identifying which ones will have ground-truth data also available. (FY25)*
- *Uploading of lakes and wetlands photos by partners. (FY25)*
- *Rank images. (FY25)*
- *Develop models. (FY25)*

**Project Challenges:** *Cooperation and participation from multiple partners*

**Co-benefits:** *A low-cost monitoring approach has a broad audience across the US, will inform stakeholder decisions in a wide array of environmental applications, and could support local monitoring and conservation efforts in EJ communities in part due to the no-cost website platform.*

| **Owner Email:** | *Krock.Kelly@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* |
|---|---|---|---|---|---|

**Science Needs**

*Technical and funding support through a Regional-ORD Applied Research (ROAR) grant.*

## Develop a fine-scale stream network temperature model for Chesapeake Bay Watershed.

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| **Climate Hazard(s):** | | |  | |  | |  | | |
| **Overarching Goal(s):** | | |  | |  | |  | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 |

**Climate Vulnerability**

*EPA Region 3 includes the entire Chesapeake Bay (CB), which alone accounts for 11,684 miles of shoreline, a length longer than the entire West Coast of the United States. Water temperature, precipitation, and sea level are critical variables to study and make up an essential component of the Region's water program. Having better data and information on how much and how fast water temperature is increasing, how the frequency and magnitude of extreme storms will change, and the rate and to what levels sea level is rising will enable EPA Region 3 to fulfill statutory and regulatory responsibilities. Developing consistent scientific methods and robust datasets to support long-term policy decisions on climate change vulnerability assessments and adaptation planning will help inform these decisions.*

**Action**

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| **Description:** | *Develop a fine-resolution statistical spatial stream network (SSN) temperature model in EPA's cloud Data Management and Analytics Platform (DMAP) platform using shade, air temperature, water budget components from the mechanistic CB Watershed Model, other landscape predictors, and previously compiled continuous temperature monitoring data.* | | | | |
| **Metric(s):** | • *Form Technical Advisory Committee; create QAPP. (FY24)*<br>• *Create/link QC programs in R & compile/QC datasets. (FY24)*<br>• *SSN Model Development/Calibration. (FY25)*<br>• *Draft App in DMAP Cloud Platform. (FY25)*<br>• *SSN Model Current Predictions. (FY25)*<br>• *Presentation/Final report/products delivered. (FY25)* | | | | |
| **Project Challenges:** | *Collating CB watershed stream temperature data into a single database; Integrating higher resolution data from the CB Program.* | | | | |
| **Co-benefits:** | *This action will produce co-benefits across all goals and outcomes of the Chesapeake Bay Agreement.* | | | | |
| **Owner Email:** | *Gootman.Kaylyn@epa.gov* | **New Work?** | *No* | **Resources Available?** | *Yes* |

**Science Needs**

*Improved information on current distribution of stream thermal regimes and thermal refuge areas across the CB watershed and how risk varies with weather and long-term climate trends across years, enabling stakeholders to focus on conservation and restoration activities. Technical and funding support through a Regional-ORD Applied Research (ROAR) grant.*

## Expanding the Wetland Regional Monitoring Program.

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| **Climate Hazard(s):** | | |  | | | | | | | |
| **Overarching Goal(s):** | | |  | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *Temperature, precipitation, drought* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *State and tribal biological assessment programs will need information to account for long-term changes in the reference conditions of wetlands. The Wetlands Regional Monitoring Network (WRMN) program can help by: 1) Expanding progress upon a previous Regional Applied Research Effort (RARE) project by developing additional reference quality wetlands for continuous monitoring of vegetation as well as soil condition. 2) Filling a data gap that will allow us to understand how baseline conditions of wetlands are shifting over time across a broad geographic and climate range.* | | | | | | | | | |
| **Metric(s):** | • *Re-establish workgroup (assemble existing and new members and establish regular calls). (FY24)*<br>• *Assemble protocols, QAPPs, site selection criteria and identify existing and new sites. (FY24/25)*<br>• *Finalize Protocols and QAPP (submitted for approval) and new sites), site list and criteria. (FY25)*<br>• *Create final output (finalized Protocols, Approved QAPP and 6-10 sites up and monitoring. (FY26)* | | | | | | | | | |
| **Project Challenges:** | *Site selection, staff capacity* | | | | | | | | | |
| **Co-benefits:** | *Allow regions to characterize trends over time; development of common protocols and metrics to be shared across regions* | | | | | | | | | |
| **Owner Email:** | *Fitzgerald.Megan@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* | | | | | |
| **Science Needs** | | | | | | | | | | |
| *Technical and funding support through a Regional-ORD Applied Research (ROAR) grant.* | | | | | | | | | | |

## Provide Training for ECAD and ORC to Incorporate Climate Adaptation Considerations in Enforcement Cases.

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| **Climate Hazard(s):** |  | | | | | | | | |
| **Overarching Goal(s):** | |  | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | FY23 | FY24 | FY25 | FY26 | | | | |
| **Climate Vulnerability** | | | | | | | | | |
| *Variety depending on case.* | | | | | | | | | |
| **Action** | | | | | | | | | |
| **Description:** | *In consultation with HQ Office of Enforcement and Compliance Assurance, compile resources and provide trainings to ECAD and ORC on incorporating climate change into regional enforcement cases.* | | | | | | | | |
| **Metric(s):** | • *Number of trainings given and resources created. (FY24)* | | | | | | | | |
| **Project Challenges:** | *There are no separate resources of staff time set aside for this.* | | | | | | | | |
| **Co-benefits:** | *Trainings have been shared nationally with other EPA Regional offices and in headquarters; trainings and resource guides also provide education to staff.* | | | | | | | | |
| **Owner Email:** | Reinfeld.Aviva@epa.gov | **New Work?** | *Yes* | **Resources Available?** | *No* | | | | |
| **Science Needs** | | | | | | | | | |
| *Capturing examples from existing cases, learning about new screening tools and best management practices, creating connections between EPA scientists and case teams when expert knowledge may assist in case development.* | | | | | | | | | |

# CHAPTER 4: Ensure Clean and Healthy Air for All Communities

EPA Region 3's Air and Radiation Division (ARD) has a long history of engagement on addressing climate change impacts and protecting the Region's citizens from air pollution through implementation of the Clean Air Act (CAA). ARD programs are responsible for ensuring implementation of the National Ambient Air Quality Standards (NAAQS) which includes reviewing permits and approving/disapproving State Implementation Plan revisions. To complement our regulatory work, ARD programs include energy efficiency, renewable energy, clean diesel, indoor air quality and radon outreach programs to reduce emissions of criteria pollutants, greenhouse gases and air toxics. Extreme temperatures and increased average temperatures, as well as extreme flooding events in urban areas, are the climate change impacts of most concern for ARD. As a result of climate change impacts in the Region, it is expected that our workload will increase.

Most of ARD's historic and ongoing work on climate relates to developing, supporting and implementing mitigation strategies to reduce emissions of carbon dioxide and other greenhouse gases, or otherwise minimize air-related impacts on the climate. Many of these activities also include adaptation elements. For example, grant and partnership programs that address energy efficiency and fuel use reductions that reduce carbon emissions also undertake community engagement efforts to help citizens build climate preparedness and promote sustainable and resilient rebuilding after adverse events. In particular, these programs target overburdened and communities with environmental justice concerns, which are often highly vulnerable to climate change impacts.

## Air-related Programmatic Vulnerability Assessment

Air pollution is rarely cited first in discussions about the consequences of climate change adaptation, because the health impacts caused by air quality episodes tend to be less immediate than those that result from storms and wildfires. However, it is anticipated that in the US there could be as much as a 50% increase in excess mortality related to climate change-related changes to ground-level ozone by 2025-2035.[xlix] And although a great deal of progress has been made towards attainment since the inception of the CAA and establishment of NAAQS, some areas face ongoing challenges meeting attainment goals, which could be set back by climate change. Additionally, programs related to air quality and health will likely be impacted (*see* Table 4.1).

## Opportunities for Climate Action

EPA Region 3's ARD has for decades engaged in voluntary and partnership programs to address environmental concerns through non-regulatory methods. While none of the Region's existing air program activities are specifically targeted at climate adaptation, many do tackle climate adaptation as a co-benefit of reducing fossil fuel consumption, or through community engagement programs. Our efforts will build upon these existing programs.

### *Community Engagement*

ARD will leverage our existing data resources, stakeholder activities, and organizational expertise to identify communities at greatest risk from climate impacts. These will include:

- Neighborhoods located in heat islands and flood plains.

- Residences in close proximity to facilities of concern, such as petroleum or chemical processing plants.
- Areas with high asthma rates and other susceptibilities to respiratory and cardiovascular disease, with a particular emphasis on vulnerable populations and underserved communities.
- Localities with a high percentage of older housing stock.

| Tropospheric Ozone | Stratospheric Ozone |
|---|---|
| • NAAQS attainment<br>• Asthma and other health impacts | • UV radiation outreach<br>• GreenChill®<br>• Responsible appliance disposal |
| **Increased Wildfires** | **Indoor Environments** |
| • NAAQS attainment<br>• Asthma and other health impacts<br>• Toxics | • Mold<br>• Infiltration of ambient air pollution, pollen, indoor pollutants<br>• Increased time spent indoors due to extreme weather |
| **Energy Production** | **Air Monitoring** |
| • Increased demand<br>• Peak grid<br>• Energy Star® | • Monitoring network<br>• RADNET |
| **Interactions of Sulfur, Nitrogen and Mercury Deposition** | **Engagement** |
| • Ecosystem protection<br>• Impacts uncertain | • EJ communities<br>• Asthma |

*Table 4.1 – Review of Identified Air Vulnerabilities*

EPA Region 3 has undertaken an analysis of available data to identify high-priority environmental justice areas of concern and some of the most environmentally overburdened communities in the Mid-Atlantic. The multimedia effort to address existing injustices and the cumulative impacts of pollution in these communities will include help increasing adaptive capacity and resilience to climate change. ARD staff will develop a comprehensive plan to target those areas for future engagement, resources, and funding opportunities.

In tandem with our community climate assessment, ARD will work to evaluate vulnerabilities and needs within our existing stakeholder network, while expanding the network to include new community-based partners who would benefit from collaboration and engagement. We will utilize existing networks in moving forward with our adaptation-related activities, such as Energy Star® and SmartWay®.

ARD will compile a clearinghouse of informational resources, training materials, potential funding opportunities (including federal, state, and other financial sources), technical assistance, mapping, and other resources to assist our community partners. EPA Region 3's Indoor Air

Program already conducts outreach and education activities and will continue to build upon and refine those efforts, utilizing the most up-to-date science and best practices.

### *Grants and other Financial Assistance*

ARD typically administers numerous grant and rebate programs, totaling tens of millions of dollars in funding each year. However, funding has expanded significantly since the Inflation Reduction Act (IRA) was signed into law by President Biden on August 22, 2022. This law allocated more than $40 billion to EPA for programs that reduce GHGs while providing important co-benefits to Americans such as improved air quality and more resilient communities. IRA expanded funding for existing EPA programs and established several brand new programs, such as the Greenhouse Gas Reduction Fund, Climate Pollution Reduction Grants, the Clean Ports Program and the Clean Heavy-Duty Vehicles Program.

In cooperation with our headquarters office, ARD will implement guidance and directives related to climate change, including climate adaptation measures for our grantees and rebate recipients. This work will also extend to our work in communities with environmental justice concerns, which heavily intersect with climate-vulnerable populations.

Through work with our existing partners and programs, we will anticipate and prepare for all new grant requirements related to adaptation and build upon this work to maximize the impact of the grant funds spent, and in doing so raise awareness about climate vulnerabilities and tools to address them. For example, our grantees and subgrantees may be tasked with incorporating adaptation into the outreach, written materials, and any public events they conduct during meeting the milestones set out under their grant work plans. Currently, ARD's state partners are required to report regularly on climate change activities. ARD will include a specific request for reporting on climate adaptation activities. In addition, ARD will build upon our ongoing climate work to connect more closely with adaptation activities happening at the state level and will be better prepared to anticipate needs and issues for communities in those states.

While virtually all the grants we administer are part of national-level programs, EPA Region 3 will work with our states to connect with potential grant and rebate applicants and encourage projects that benefit climate-vulnerable populations. We will attempt to connect these potential recipients, including organizations that may not have grant writing staff or extensive experience with project-management, with publicly available trainings and resources to help them improve their ability to submit and manage successful applications.

Finally, ARD will take steps to connect potential community partners with our existing stakeholder network, fostering beneficial peer-to-peer relationships and sharing of best practices and institutional knowledge.

### *Within Air and Radiation Division*

ARD will undertake a project to assess our programmatic infrastructure vulnerabilities. Our staff will review the greater ambient air quality monitoring network in our states to identify which locations and assets are susceptible to fires, storms, and flooding, or could otherwise become damaged or inaccessible because of extreme weather, leading to compromised or lost data. We will also assess any potential for emergent issues with state or other partners that could impede

our work in the Region. In addition, ARD staff will undergo training when it is offered, as appropriate, and will identify any training gaps that should be addressed.

**Measurement and Evaluation:** ARD will continuously work to track progress toward meeting our goals, which may include:

- State reports submitted
- Number of stakeholders, partners, and communities identified
- Plans for outreach and engagement developed
- Informational clearinghouse created and populated
- Number of new grant applicants
- Number of grant workplans that address climate adaptation
- Events, meetings, or trainings held

**Program-specific Discussion on Climate Science Needs:** Moving forward to make a meaningful impact on climate adaptation concerns in EPA Region 3 will require the best available science and data resources at EPA's disposal. This will include access to mapping software and GIS data, census and other population data, climate and air quality modeling, existing data tools such as EJScreen, and other resources to be determined.

One of the biggest challenges the Region faces is translating and utilizing data and science via our programmatic work to ensure that the assistance and information we provide to communities is meaningful and useful. Our focus will be on using what we know about climate now to anticipate future needs and concerns, to help vulnerable populations prepare for the inevitable effects of climate change where they live. The Region is mindful that community needs and vulnerabilities may increase over time, and that we should also be prepared to target resources.

Many of our state partners are engaged in some capacity in adaptation planning activities. We will coordinate with them and their stakeholders to identify any issues that may arise as such planning activities move forward.

EPA Region 3 will work to build internal capacity to be able to incorporate climate change data into modeling and emissions analyses. Examples include: 1) determining emission trends for sources associated with climate change impacts (frequent and more intense storms, more high temperature days), such as portable electric generators and peaking power plants; 2) updating current datasets used for dispersion modeling to consider human activities like sprawl and meteorological datasets (rainfall patterns, temperatures, etc.); and 3) the identification and refinement of GHG emissions data, especially from non-traditional sources.

### *Air Quality and Adaptation*

Although tremendous progress has been made improving air quality across the nation, climate change makes it more difficult to attain air quality standards and protect the quality of the air we breathe, posing higher risks to public health, and especially overburdened and vulnerable populations.

**To ensure clean and healthy air for all communities, EPA Region 3 will take the following actions:**

29. Maintaining open communication with community stakeholders to share resources and identify climate concerns.

## Maintaining open communication with community stakeholders to share resources and identify climate concerns.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | |  |  | |  |  |  | | |
| **Overarching Goal(s):** |  | | | |  | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | FY23 | FY24 | | FY25 | | FY26 | | | |
| **Climate Vulnerability** | | | | | | | | | | |
| *This action relates to extreme weather events that can affect human health and housing conditions, principally hurricanes and major flooding episodes, but also heat waves.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Engage on a case-by-case basis high-risk EPA Region 3 communities with EJ concerns or experiencing disproportionate adverse impacts to inform our community engagement efforts. Strategies will vary depending on the specific stressors and needs of the impacted community* | | | | | | | | | |
| **Metric(s):** | • *Number of communities engaged.* | | | | | | | | | |
| **Project Challenges:** | *Access to internal and external data, cooperation from external partners and stakeholders.* | | | | | | | | | |
| **Co-benefits:** | *Partnership building, potential prevention of hazardous incidents.* | | | | | | | | | |
| **Owner Email:** | *Riley.Alison@epa.gov* | **New Work?** No | | | **Resources Available?** *No* | | | | | |
| **Science Needs** | | | | | | | | | | |
| Existing maps, access to specific vulnerability maps, other data. | | | | | | | | | | |

# CHAPTER 5: Ensure Clean and Safe Water for All Communities

Climate change impacts are experienced though interactions with our water resources and result in direct and cascading effects on our daily lives in communities and natural environments throughout EPA Region 3. Climate change acts as a threat multiplier, exacerbating existing stressors that can lead to degraded water quality, destabilization of critical water infrastructure, economic impacts, harm to aquatic life, and limitations on recreational opportunities. The Water Division and the Chesapeake Bay Program Office are responsible for protecting built and natural water resources within EPA Region 3.

## Water Division

The Water Division (WD) ensures drinking water is safe and restores and maintains watersheds and their aquatic ecosystems to protect human health, support economic and recreational activities, and provide healthy habitat for fish, plants, and wildlife.

The Division is responsible for implementing the Clean Water Act (CWA), Safe Drinking Water Act (SDWA) and Marine Protection, Research and Sanctuaries Act (MPRSA), and provisions of the Ocean Dumping Ban Act across the Mid-Atlantic Region except for inspections and enforcement, which are principally managed by the Enforcement and Compliance Assurance Division (ECAD).

Each branch and section within the WD is responsible for executing their own set of core functions and actions in a coordinated manner that enables the division to successfully carry out its mission. The WD accomplishes this primarily through providing oversight to states and in some cases, through direct implementation of specific programs. WD works closely with the ECAD, which is principally responsible for compliance inspections and enforcement actions related to the above listed laws.

The WD coordinates with other divisions within the region to ensure programmatic support, technical assistance, critical funding of state programs, sound science, environmental justice, and when necessary, compliance and enforcement. Table 5.1 provides an “at-a-glance” look at critical functions that the WD manages across the region.

| Wetlands | Clean Water | Drinking Water | Partnerships |
|---|---|---|---|
| • Wetland Permits (CWA 404)<br>• CWA 404(c) "veto" and (q) "elevation"<br>• Ocean Disposal Permits<br>• CWA 401(a)(2) Notification of Permit Application<br>• Mitigation Banking<br>• Tribal Assumption – Treatment as a State (TAS)<br>• No Discharge Zone (NDZ) | • National Pollutant Discharge Elimination System (NPDES) Permits<br>• Impaired Waters (CWA 303(d))<br>• Total Maximum Daily Loads (TMDL)<br>• Water Quality Standards (WQS)<br>• Chesapeake Bay Regulatory Requirements<br>• Clean Water State Revolving Fund (SRF) | • Public Water System Supervision (PWSS)<br>• State capacity<br>• Contaminants (PFAS, Lead, etc.)<br>• Operator Certification<br>• Asset Management<br>• Water Security<br>• Utility Risk and Resilience Assessments<br>• Utility Emergency Response Plans<br>• Underground Injection Control (UIC) Permits<br>• Source Water Protection<br>• Drinking Water State Revolving Fund (SRF) | • Green Infrastructure<br>• Hazard Mitigation<br>• Agriculture<br>• National Estuary Program (NEP)<br>• Nonpoint Source Program (CWA 319)<br>• Water Pollution Control (CWA 106)<br>• Water Quality Management (CWA 604(b)) |

*Table 5.1 – Water Division Programmatic Responsibilities; CWA = Clean Water Act.*

## Chesapeake Bay Program Office

The Chesapeake Bay Program Office (CBPO) provides core scientific and management support for the Chesapeake Bay Program (CBP), a unique, regional partnership that directs the protection and restoration of the Chesapeake Bay and its watershed. Formed in 1983, the Chesapeake Bay Program coordinates efforts among six states (MD, PA, VA, WV, DE, NY), the District of Columbia, the Chesapeake Bay Commission tri-state legislative body, and federal agencies.

The CBP is guided by the 2014 Chesapeake Bay Watershed Agreement (Agreement), which establishes goals and outcomes for sustainable fisheries, water quality, vital habitats, climate change, toxic contaminants, stewardship and diversity, and other areas. Section 117 of the Clean Water Act calls for the CBPO to facilitate and coordinate the Chesapeake Bay Program partnership and authorizes CBPO to administer grant programs and provide technical assistance to nonprofits, state and local governments, academic institutions, and others to support implementation and monitoring towards the Agreement and carrying out CBP's mission. CBPO is also responsible for implementing the requirements of the Chesapeake Bay Accountability and Recovery Act of 2014.

In 2010, the EPA established the Chesapeake Bay Total Maximum Daily Load (TMDL). The Bay TMDL is designed to ensure all nitrogen, phosphorus, and sediment pollution control efforts needed to restore the water quality standards of the Bay and its tidal rivers are in place by 2025.

The CBPO works with other offices within EPA Region 3 and EPA, the watershed jurisdictions, and key federal agencies to review two-year water quality milestones that measure progress made in achieving the Bay TMDL and the jurisdictions' Watershed Implementation Plans.

| Science, Analysis and Implementation | Partnership and Accountability |
|---|---|
| Implement and coordinate science, research, modeling, support services, monitoring, data collection, and other activities. | Coordinate the development and implementation of specific management strategies and Logic and Action plans to carry out the responsibilities of the signatories to the Chesapeake Bay Watershed Agreement. |
| Develop information pertaining to the environmental quality and living resources of the Chesapeake Bay ecosystem. | Facilitate the partnership's collaborative decision-making to achieve the goals and outcomes of the Chesapeake Bay Watershed Agreement through the CBP organizational structure. |
| Support the efforts of states and other partners to attain Chesapeake Bay water quality standards and meet the goals of the Chesapeake Bay TMDL. | Communicate partnership progress to interested public through the development and upkeep of metrics, through social and traditional media and web sites and through other multi-media approaches. |

*Table 5.2 – Chesapeake Bay Program Office Programmatic Responsibilities.*

## Water-related Programmatic Vulnerability Assessment

Climate change is already having an impact on the ability of the WD and the CBPO to fulfill their congressionally mandated responsibilities. As climate change warms the atmosphere, altering the hydrologic cycle, changes to the amount, timing, form, and intensity of precipitation will continue. Other expected changes include the flow of water in watersheds, as well as the quality of aquatic and marine environments. These impacts are likely to affect the programs designed to protect water quality, public health, and safety. Table 5.3 indicates which WD and CBPO programs will be impacted by the vulnerabilities described in Chapter 2.

| Water and energy infrastructure | Water quality impacts from climate change |
|---|---|
| • Clean Water State Revolving Fund (CWSRF)<br>• Drinking Water State Revolving Fund (DWSRF)<br>• Green Infrastructure<br>• Hazard Mitigation<br>• Operator Certification<br>• Public Water System Supervision (PWSS)<br>• Water Security/Preparedness | • Agriculture<br>• Impaired Waters (CWA §303(d))/Total Maximum Daily Loads (TMDLs)<br>• Green Infrastructure<br>• Hazard Mitigation<br>• National Estuary Programs (NEPs)<br>• Nonpoint Source (NPS) Program<br>• Permits (municipal, industrial, stormwater/MS4, Concentrated Animal Feeding Operations, UIC, wetlands)<br>• Public Water System Supervision (PWSS)<br>• Source Water Protection (SWP) Program<br>• Water Quality Standards (WQS) |
| **Flooding from increasingly frequent intense storm events and sea-level rise** | **Changes to aquatic ecosystems and the composition and distribution of species** |
| • Agriculture<br>• Green Infrastructure<br>• Hazard Mitigation<br>• Municipal Separate Storm Sewer Systems (MS4)<br>• Clean Water State Revolving Fund (CWSRF)<br>• Drinking Water State Revolving Fund (DWSRF)<br>• Water Quality Standards (WQS)<br>• Water Security/Preparedness | • Agriculture<br>• National Estuary Programs (NEPs)<br>• Nonpoint Source (NPS) Program<br>• Source Water Protection (SWP) Program<br>• Wetlands Permits (CWA §404)<br>• Wetlands Mitigation Banking |

*Table 5.3 – Water-related Programmatic Vulnerability Assessment.*

## Existing Climate Work

### *Water and Energy Infrastructure*

The **Clean Water and Drinking Water State Revolving Fund Programs** support projects related to climate change, including Green Project Reserve (GPR)-green projects, Energy and Water efficiency, groundwater recharge, and stormwater management and encourage state partners to consider climate related projects, as opposed to solely traditional water infrastructure projects. Outreach on climate mitigation includes assisting wastewater utilities with more stringent effluent limits, addressing increased wet weather events and energy conservation. Public outreach on climate-related activities is achieved through publication of success stories and sharing State Revolving Fund Fact Sheets with EPA Region 3 examples with EPA and state peers.

The **Green Infrastructure Team** helps manage the Green Streets, Green Jobs, Green Towns (G3) grants, which specifically require consideration of climate to be ranked higher; coordinates with regional, national, and interagency workgroups on climate adaptation and disaster mitigation;

and designs and improves tools to support climate adaptation (e.g., Sea Level Evaluation and Assessment (SEA Tool), EPA's Adaptation Resource Center (ARC-X)).

Priorities for the **Nonpoint Source Program** are set by the state; however, nonpoint source solutions include installation of green infrastructure practices that can help manage existing and projected increases to precipitation.

Nationally, the **Underground Injection Control (UIC) Program** has finalized requirements for geologic sequestration of carbon dioxide in Class VI wells, a new class of wells that fall under the authority of the Safe Drinking Water Act. The UIC permitting program is designed to protect underground sources of drinking water, and the Inflation Reduction Act has incentivized Carbon Capture and Sequestration through expansion of the Internal Revenue Service Code Section Q45 tax credit (*see* 26 US Code § 45Q).

### *Water Quality Impacts from Climate Change*

Much of the focus of EPA's water quality programs for the past four decades has been on restoring impaired waters and reducing pollutant levels in waterways. While EPA and our state, tribal and other partners have made, and continue to make, considerable progress in this important task, we recognize the need to also protect and maintain the chemical, physical and biological integrity of our Nation's waters (CWA Section 101(a) objective) as intended by Congress. Integrating healthy watersheds protection into CWA programs will help both maintain healthy watersheds and ensure sustainability of restored watersheds, especially in light of climate change. EPA created the **Healthy Watersheds Program** to enhance our ability to protect healthy aquatic ecosystems and their watersheds over time. The Program's vision is to protect and maintain the aquatic ecological integrity of watersheds and supporting habitat networks to ensure that future generations may enjoy these resources and the social and economic benefits that they provide.

The **Water Quality Standards Program** utilizes the 2014 EPA report "Being Prepared for Climate Change: A Workbook for Developing Risk-Based Adaptation Plans," which guides users through development of a risk-based climate change adaptation plan consisting of a vulnerability assessment and an action plan to reduce the most pressing risks and the Risk Identification Checklists, which were updated in 2021.

Changes in temperature, stream flow data, precipitation, and sea level need to be accounted for in newly issued **NPDES permits**. For example, Intensity, Duration Frequency (IDF) curves that incorporate future precipitation data have been created for the Chesapeake Bay Watershed and can be used to develop climate-resilient design standards instead of relying solely on historical data.

The **Source Water Protection Program** supports development of Risk and Resilience Assessments and Emergency Response Plans (ERPs) for public water systems; promotes and supports implementation of best management practices (BMPs) that protect upstream water supplies (land preservation, agricultural conservation practices, green infrastructure, etc.); coordinates on review of Clean Water Act Section 106 grants, which usually include a climate resilience or climate adaptation component relevant to source water protection; and participates in external source water collaboratives, with states, and other federal agencies (US Department of Agriculture

(USDA) Natural Resources Conservation Service, Association of State Drinking Water Administrators), in order to leverage funding for source water protection.

As part of the achieving the water quality goals under the Chesapeake Bay Watershed Agreement, jurisdictions agreed to develop actions to address an increase in nitrogen and phosphorus loads due to 2025 climate change conditions in their Watershed Implementation Plans. For agriculture, some of the actions relate to implementing "climate-smart" agricultural conservation practices that not only reduce nutrient and sediment pollution from agricultural lands, but also reduce greenhouse gas emissions and/or store carbon in the soil and build farm resiliency.

### *Flooding from Increasingly Frequent Intense Storm Events and Sea-Level Rise*

The **Drinking Water Program** shares tools and resources with regional water suppliers and state programs, including Climate Ready Water Utilities, Flood Resilience Guide, and Power Resilience Guide and encourages their use to build resilience to the impacts of extreme weather events. The program also supports states in the development of climate adaptation training for water utilities. Risk Assessments under America's Water Infrastructure Act (AWIA) of 2018 require a review of severe weather events impacting community water suppliers serving greater than 3,300 persons. AWIA also requires Emergency Response Plans (ERPs). These assessments and ERPs are reviewed and updated every five years to capture changes at water systems and any new or potential impacts from severe weather.

Regionally, the **Underground Injection Control (UIC) Program** has permitted an Aquifer Recharge Project in Hampton Roads, Virginia, to recharge the depleted Potomac Aquifer and to combat saltwater intrusion and land subsidence.

To address climate mitigation, the **NPDES Program** has focused on promoting the use of biogas recovery systems to reduce methane emissions from livestock waste as well as to ensure energy security and help respond to disasters impacting wastewater treatment plants and working cooperatively with industry stakeholders and waste officials to reduce or avoid methane emissions from landfills through the Landfill Methane Outreach Program.

### *Changes to Aquatic Ecosystems and the Composition and Distribution of Species*

The **404 Regulatory Program** is exploring how to incorporate climate comments into wetland permit applications, third-party mitigation and regulatory reviews, including developing a GIS-based tool to analyze resiliency and climate effects for permit review.

The **Enhancing State and Tribal Program** is updating its Core Element Framework (CEF) to include climate change actions that states and tribes can incorporate when developing their wetland programs; focusing on climate change, resiliency and marsh migration as priority issues for the interagency Mid-Atlantic Wetland Workgroup (MAWWG); prioritizing research addressing climate impacts on wetlands in the FY2024 Wetland Program Development Grants Request for Proposal; and examining past grant project accomplishments related to climate change and marsh migration, sea-level rise and living shorelines.

The **Ocean Program** is actively working on understanding and communicating the impacts of ocean acidification, including updating a Story Map to be published on the EPA website.

The **National Estuary Program** engages in an array of activities with the potential for positive climate adaptation benefits, including but not limited to preservation and restoration of intertidal and tidal wetlands and benthic habitats; installation of living shorelines; research programs related to "blue carbon" (carbon stored in coastal and marine ecosystems) and carbon sequestration; and adaptation methodologies.

The **Watershed Resources Registry** (WRR) is working with state partners to evaluate GIS data layers that could be added to each WRR and used to develop climate resiliency analyses.

## Opportunities for Climate Action

Given the scope and scale of climate impacts on the work being done by the WD and CBPO, promoting climate resilience and supporting climate justice are both important to sustain and enhance the investments that have been made in clean and safe water for communities across EPA Region 3. The activities included in the next section of this chapter address a variety of climate concerns in multiple WD programs and the CBPO. As we complete and learn from these activities, we will develop additional goals in future years to ensure that climate adaptation is fully integrated into all EPA Region 3 water programs.

**To ensure clean and safe water for all communities, EPA Region 3 will take the following actions:**

30. Focus protection and restoration actions to create and maintain resilient watersheds and ecosystems.
31. Develop EPA Region 3-specific "Standard Climate Modules" for each Water Division work unit.
32. Promote successful climate adaptation case studies in EPA's Adaptation Resource Center (ARC-X) tool.

## Focus protection and restoration actions to create and maintain resilient watersheds and ecosystems.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | |  | | | | | | |
| **Overarching Goal(s):** |  | |  | |  | |  | |  |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | | LTPG 3 | |
| **Activity Timeframe:** | FY22 | FY23 | | FY24 | | FY25 | | FY26 | |

| **Climate Vulnerability** | |
|---|---|
| *Temperature extremes, wildfire patterns, rising sea levels, hurricanes, floods, droughts, and warming ocean temperatures are expected to significantly alter ecosystems and delivery of the ecological resources and benefits that people depend on for livelihood, protection, and well-being. The adaptive capacity and resilience of ecosystems and watersheds will influence ecological and socioeconomic outcomes as climate risks increase.* | |
| **Action** | |
| **Description:** | *This Action will utilize the newly developed Region-wide 1-meter landcover data and the latest science and tools to identify, assess, prioritize and map both protection and restoration opportunities that will maintain and increase watershed and ecosystem resiliency to climate change. This information will allow Regional Programs, states, local governments, non-governmental organizations and private landowners to aggregate and view the protection and restoration opportunities at multiple scales, from watershed to parcel level.* |
| **Metric(s):** | • *Secure funding for GIS contractor, engage partners, identify data, methods and tool needed (FY23).*<br>• *Select analytical and mapping methods (FY23/24).*<br>• *Complete analysis, develop maps, and create a prototype visualization tool (FY24/25).*<br>• *Solicit feedback from regional programs on products and summarize the feedback received (FY25).*<br>• *Modify analytical methods and tool(s) based on feedback, create host platform, and share data/tools with partners (FY25/26).*<br>• *Track ongoing utility of products to identify updates/improvements to data, maps and visualization tool/platform (FY26).* |
| **Project Challenges:** | *Staff for data analysis, visualization; and coordination with other federal and state agencies.* |
| **Co-benefits:** | ***Protection** will: reduce the need for and cost of restoration activities; sustain or increase the availability of open/green space for recreation; increase local economic opportunities; and sustain carbon sequestration function (possibly ensuring access to carbon sequestration markets).* ***Restoration** will: support/create jobs; increase recreational opportunities, ecosystem services, and carbon sequestration functions.* |

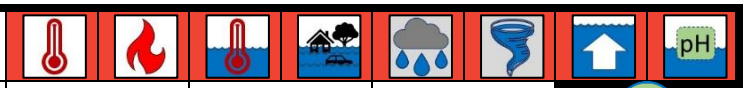
| **Owner Email:** | *Jenkins.Bill@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *No* |
|---|---|---|---|---|---|

| **Science Needs** |
|---|
| *Modeling and assessing ecosystem and watershed function and changes due to climate change.* |

***Additional Narrative:***

*The information generated can also be combined with other data sets (from tools like EJ Screen and EnviroAtlas) to further assess protection and restoration opportunities in concert with other priorities and describe additional benefits. As part of this action, we will also identify organizations that have the capacity to use this information to plan, collaborate, fund, and/or implement relevant actions.*

## Develop EPA Region 3-specific "Standard Climate Modules" for each Water Division work unit.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | |  | | | | | | | |
| **Overarching Goal(s):** | | | | | | | | |  | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | FY24 | | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *Given that this activity encompasses all Water Division programs, it will address the entire range of vulnerabilities described in Chapter 2.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *All relevant work units in the Water Division will develop a "standard climate module" to be used in training and outreach activities with external partners. To ensure message consistency across the agency, modules will be adapted from those developed by National Program Offices and then tailored to address Region 3-specific issues.* | | | | | | | | | |
| **Metric(s):** | • *In FY22, each of the seven work units in the Water Division will have developed a "standard climate module" to be used in training and outreach activities with external partners.* | | | | | | | | | |
| **Project Challenges:** | *To ensure alignment with National Program Offices, the timing of this work will be dependent on the timeframe pursued by individual Program Offices at EPA Headquarters.* | | | | | | | | | |
| **Co-benefits:** | *This action would allow each program office to carefully consider how climate impacts their program (internal capacity development), communicate those impact to partners (external engagement), and provides opportunity for additional partner engagement regarding EPA or other federal climate resources.* | | | | | | | | | |
| **Owner Email:** | *Konfirst.Matthew@epa.gov* | | **New Work?** | *Yes* | | **Resources Available?** | *Yes* | | | |
| **Science Needs** | | | | | | | | | | |
| *None.* | | | | | | | | | | |

## Promote successful climate adaptation case studies in EPA's Adaptation Resource Center (ARC-X) tool.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** | | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | | FY25 | | FY26 |
| **Climate Vulnerability** | | | | | | | | | | |
| *Given that case studies could be collected from any program across the region, this action could potentially address any of the climate vulnerabilities addressed in Chapter 2.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *This activity will promote successful climate adaptation efforts that have been implemented by state, local, Tribal or other partners in the Mid-Atlantic region as a model for other communities to replicate. Success stories will be developed into case studies that can be incorporated into EPA's Adaptation Resource Center (ARC-X) tool.*<br>*Potential case studies will be identified through the EPA Region 3 Climate Collaborative workgroup, and an effort will be made to cover a diversity of programs and partners. Coordination with the Office of Policy will ensure that those studies selected for writeup broaden the topic areas covered in the existing set of ARC-X database.* | | | | | | | | | |
| **Metric(s):** | • *In FY22-26, a minimum of one Region 3 case study will be identified and submitted to the Office of Policy each year (total = 5).* | | | | | | | | | |
| **Project Challenges:** | *Staff may feel they don't have the appropriate expertise to draft a case study. There may be some hesitancy by managers to commit resources to this effort or sensitivity about sharing certain aspects of the case study.* | | | | | | | | | |
| **Co-benefits:** | *This effort will allow EPA Region 3 to promote successful climate adaptation efforts underway across the region. Limited resources preclude working with every community; however, promoting ideas and methodologies for climate adaptation projects that have been implemented successfully by partners is a good way to disseminate information that could build climate resiliency in a greater number of communities.* | | | | | | | | | |
| **Owner Email:** | *Konfirst.Matthew@epa.gov* | **New Work?** | Yes | **Resources Available?** | *Yes* | | | | | |
| **Science Needs** | | | | | | | | | | |
| *None.* | | | | | | | | | | |

# CHAPTER 6: Safeguard and Revitalize Communities

EPA's waste and land clean-up programs play a crucial role in protecting public health and the environment from exposure to hazardous materials, remediating contaminated property, and making these properties available for reuse. Changes in climate should be taken into consideration in order for the Region to continue to serve these important functions. Sea-level rise, storm and flood events, and increased ambient temperatures are climate change impacts of particular concern for these programmatic focus areas, as described in Chapter 2. EPA Region 3's waste and cleanup activities are addressed in two divisions, the Superfund and Emergency Management Division (SEMD) and the Land, Chemicals and Redevelopment Division (LCRD).

## Superfund and Emergency Management Division

The SEMD is responsible for implementation of activities pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the National Oil and Hazardous Substance Pollution Contingency Plan (the National Contingency Plan or NCP) and the National Response Plan. The division assesses and addresses sites contaminated by hazardous substances and oil spills, prepares for responses to hazardous incidents and potential homeland security events, and engages in robust community involvement. Local area planning is a key part of the SEMD's preparedness program and involves coordinating, planning and training local partners involved in emergency response and chemical response actions. During preparation for a severe weather event, EPA Region 3 communicates with local area planning groups, permitted facilities, state partners, and responsible parties and with our state partners to identify potential vulnerabilities during the storm event and then to identify, mitigate and remediate any effects after the weather event has occurred on the sites.

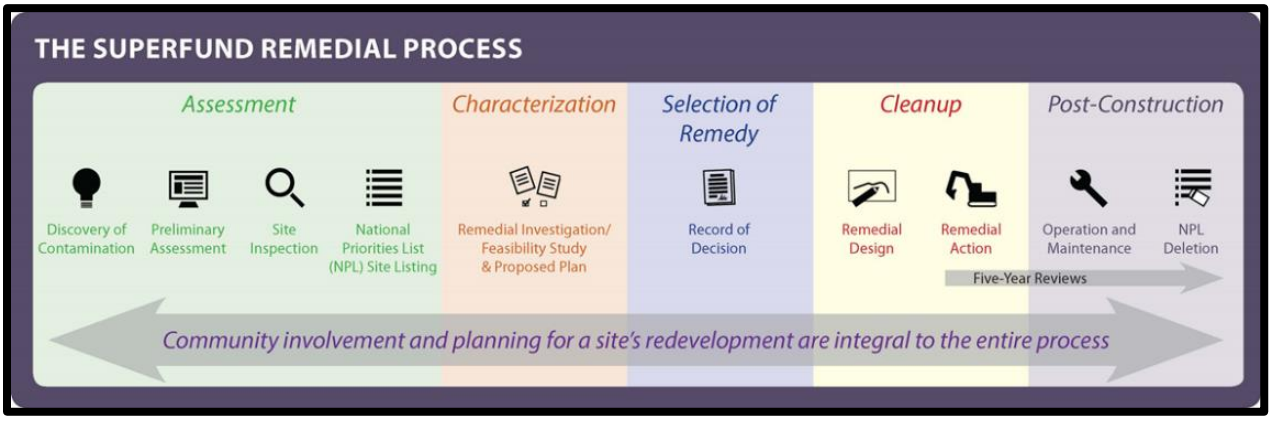



*Figure 6.1 – Overview of the Superfund remedial process.*

## Land, Chemicals, and Redevelopment Division

The LCRD is also responsible for safeguarding and revitalizing communities. Its goal is to provide a safe, clean and sustainable future and is charged with the responsibility of supporting the Agency's mission by protecting the land and its inhabitants from chemicals and hazardous waste. It does so by preventing pollution, promoting sustainable materials management, and supporting redevelopment and community revitalization mandated under several environmental statutes. These programs include the Resource Conservation and Recovery Act (RCRA) and Brownfields

Redevelopment and Sustainable Materials Management. The Division's achievements are reflected in a number of activities such as:

- Continuing partnerships with states and industry on RCRA hazardous waste site cleanups and redevelopment;
- Working with the Army Corp of Engineers through an Intergovernmental Agreement to assist with RCRA site assessments and cleanups;
- Promoting sustainable materials management through partnerships, including sustainable management of food and electronics and helping the government to be a "green" leader;
- Guarding against mismanagement of hazardous waste;
- Working with states to ensure underground storage tanks are intact and sites are ready for anticipated uses, and
- Encouraging site/property revitalization through the Brownfields Revitalization Act, including awarding grant funds for technical assessments and site cleanups.
    - Revitalization and redevelopment of former industrial sites pose an opportunity to work with our state partners to encourage the implementation of climate change measures and apply climate adaptation and resilience strategies as part of revitalization. Although grant solicitation and evaluation criteria are EPA Headquarters driven, the Brownfields Branch in EPA Region 3 can perform targeted outreach to vulnerable communities and educate them on how to address climate change with their existing projects and in Brownfields grant applications. EPA Region 3 Brownfields will integrate climate adaptation into programs and policies while working alongside states, non-profits, local governments, and other community groups. Specific metrics will be developed and tracked to ensure that Brownfield lands are being restored in a climate conscious approach to revitalization.

## Opportunities for Climate Action

In conclusion, impacts from climate change to EPA's waste and land cleanup programs are real and should be evaluated throughout the life of a project. The actions identified in this section and in Chapter 3 will take steps to ensure climate change vulnerabilities are considered in planning, evaluating, and remediating our NPL and other land cleanup sites.

**To safeguard and revitalize communities, EPA Region 3 will take the following actions:**

33. Prioritize Long Term Stewardship (LTS) assessments for RCRA corrective action facilities located in floodplains.
34. Build climate adaptation into Brownfields grants.

## Prioritize Long Term Stewardship (LTS) assessments for RCRA corrective action facilities located in floodplains.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | | | | |  | | |  |
| **Overarching Goal(s):** | | | | |  | | | |  |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 |

| | | | | | |
|---|---|---|---|---|---|
| **Climate Vulnerability** | | | | | |
| *Increased flooding and sea-level rise may increase the risk of contaminant releases from vulnerable Brownfields Redevelopment sites.* | | | | | |
| **Action** | | | | | |
| **Description:** | *LCRD gives (and encourages EPA Region 3 states to give) priority consideration to Resource Conservation and Recovery Act (RCRA) Corrective Action (CA) facilities with completed remedies located within 100-year flood plains for Long Term Stewardship (LTS) Assessments to raise the awareness of potential climate adaptation impacts. In addition, all new Remedy Decisions, for facilities located in 100-year flood plains, will include consideration of potential climate change impacts as part of the long-term effectiveness element of the Remedy Selection balancing criteria.* | | | | |
| **Metric(s):** | • *Number of LTS assessments conducted within 100-year flood plain (reported at the end of the fiscal year).*<br>• *Number of new Remedy Decisions evaluated for Climate Change impacts (reported at the end of the fiscal year).* | | | | |
| **Project Challenges:** | *This work is integrated in the core program work.* | | | | |
| **Co-benefits:** | *Disaster preparedness and partnership building* | | | | |
| **Owner Email:** | Goldblum.Debra@epa.gov; | **New Work?** | *No* | **Resources Available?** | *Yes* |
| **Science Needs** | | | | | |
| *None.* | | | | | |

## Build climate adaptation into Brownfields grants.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | | | | |  | | |  | |
| **Overarching Goal(s):** | | | | |  | | | |  | |
| **Performance Goal(s):** | LTPG 1 | | | | LTPG 2 | | | | LTPG 3 | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |

**Climate Vulnerability**

*Increased flooding and sea-level rise may increase the risk of contaminant releases from vulnerable Brownfields Redevelopment sites*

**Action**

**Description:** *EPA Region 3 can also work with HQ Office of Brownfields and Land Revitalization to:*

- *Emphasize climate adaptation as a key part of the Brownfields application/solicitation process.*
- *Develop outreach strategies to promote climate adaptations for grantees.*
- *Have additional funding available for Brownfield cleanups grants that are pursuing greenspace redevelopment.*
- *Incorporate new technical assistance from EPA contractors to evaluate a grantee's jurisdiction for maximizing climate adaptations.*

**Metric(s):**

- *Conduct at least one outreach and training on Brownfields funding in each state with emphasis on reaching new communities and those impacted by environmental justice and communities impacted by climate change.*
- *Number of presentations that incorporate educational slides on climate-focused redevelopment.*

**Project Challenges:** *Resources and tool development obstacles*

**Co-benefits:** *Greenhouse gas mitigation, disaster preparedness and partnership building.*

| **Owner Email:** | Nowak.Joseph@epa.gov | **New Work?** | *Yes* | **Resources Available?** | *No* |
|---|---|---|---|---|---|

**Science Needs**

*None.*

# CHAPTER 7: Ensure Safety of Chemicals for People and the Environment

The Land, Chemicals, and Redevelopment Division (LCRD) envisions a Safe, Clean and Sustainable Future and is charged with the responsibility of supporting the Agency's mission by protecting its inhabitants from chemicals and hazardous waste and preventing pollution. LCRD's Programs are mandated under several environmental statutes including the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), Residential Lead Based Paint Hazard Reduction Act, Toxic Substances Control Act (TSCA), Asbestos Hazard Emergency Response Act of 1986 (AHERA), Emergency Preparedness and Community Right-to-Know Act (EPCRA) TRI Program, and Pollution Prevention (P2) Act.

One of the key programs at the intersection of chemical safety and climate adaptation is the P2 program. The goal of the P2 Program is to achieve source reduction including reducing hazardous material use, water use, emissions and costs at manufacturers and other businesses.

The P2 program provides grant funding that supports the identification of best practices to reduce toxic chemical use through reduction and/or substitution. These grants fund technical assistance for states, tribes, local governments, communities and industry.

The program is coordinated at the national level, but EPA Region 3 participated in the development of new climate adaptation and mitigation grant criteria and will play a key role in the selection and management of these grants. The proposed FY23/24 P2 Grant Request for Application (RFA) will include an evaluation criterion called "Climate Emphasis," which will provide a point value to the quality and extent to which their narrative describes how the applicant intends to provide and emphasize P2 technical assistance to address the climate impacts of business facilities.

Additionally, the P2 program tracks Metric Tons of Carbon Dioxide Equivalent ($MTCO_2e$) reduced, which supports climate mitigation efforts. It also measures pounds of hazardous material reduced, gallons of water reduced, and costs reduced.

## Opportunities for Climate Action

**To ensure safety of chemicals for people and the environment, EPA Region 3 will take the following actions:**

35. Incorporate climate considerations into Pollution Prevention (P2) Program grants.
36. Protect honeybee pollinators using Integrated Pest Management.
37. Evaluate the impact of unusual weather events on pesticide "spray drift."

## Incorporate climate considerations into Pollution Prevention (P2) Program grants.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | |  | | | |  | | |
| **Overarching Goal(s):** | | | |  | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 |

| | | | |
|---|---|---|---|
| **Climate Vulnerability** | | | |
| *A changing climate can affect exposures to a wide range of chemicals. Exposures may change because of changing environmental conditions or changing use patterns.* | | | |
| **Action** | | | |
| **Description:** | *P2 Grants consider climate emphasis as a small point value grantee application evaluation selection criterion. The P2 program requests that grantees report $MTCO_2e$ implementation results annually.* | | |
| **Metric(s):** | • *$MTCO_2e$ reduced* | | |
| **Project Challenges:** | *Adequate FTE to manage additional Infrastructure grant funds* | | |
| **Co-benefits:** | *Amplification of P2 benefits and best practices* | | |
| **Owner Email:** | *Piergiovanni.Peter@epa.gov* | **New Work?** *No* | **Resources Available?** *Yes* |
| **Science Needs** | | | |
| None. | | | |

***Additional Narrative:***

*The EPA Region 3 P2 Program will award funds to technical providers that assist businesses and address climate change impacts. This will be achieved through providing technical information, best practices, and networking to reduce toxic chemical use and address climate change impacts.*

## Protect honeybee pollinators using Integrated Pest Management.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | |  | | | |  | | | |
| **Overarching Goal(s):** | | | |  | | | |  | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *A changing climate can affect exposures to a wide range of chemicals. Exposures may change because of changing environmental conditions or changing use patterns. EPA's efforts to reduce exposures may be affected, including through impacts to pesticide exposure models. Many of EPA's tools and models for examining exposure to chemicals rely on inputs that are sensitive to climate data.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *EPA Region 3 LCRD is focusing efforts on protecting an essential crop pollinator, the honeybee, from detrimental pests and acute pesticide poisoning through their FY22 Integrated Pest Management (IPM) project.* | | | | | | | | | |
| **Metric(s):** | • *Number of participants attending webinar.* | | | | | | | | | |
| **Project Challenges:** | *Resources to update tools and methods* | | | | | | | | | |
| **Co-benefits:** | *Disaster preparedness, partnership building; decrease in food insecurity due to more crop availability* | | | | | | | | | |
| **Owner Email:** | *Daw.Harry@epa.gov* | | **New Work?** | *Yes* | | | **Resources Available?** | *Yes* | | |
| **Science Needs** | | | | | | | | | | |
| *Updated data, tools and methods* | | | | | | | | | | |

***Additional Narrative:***

*EPA Region 3 LCRD is focusing efforts on a Managed Pollinator Protection Plan (MP3) to control pests and reduce pesticide application. Specifically, LCRD is focusing efforts on protecting an essential crop pollinator, the honeybee, from detrimental pests and acute pesticide poisoning through their FY22 Integrated Pest Management (IPM) project. With the development and promotion of outreach materials, this project will spread awareness on three honeybee pests, the Varroa Mite, Greater Wax Moth, and Small Hives Beetle, and IPM strategies to control and prevent these pests from destroying regional honeybee populations. Utilizing geolocation data of registered apiaries and stakeholders, the project will pay particular attention to engaging minority, low-income, and vulnerable communities. LCRD looks to improve the body of knowledge on pollinator pests, sustainable control, and prevention to increase the region's resilience to climate change.*

## Evaluate the impact of unusual weather events on pesticide "spray drift."

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | |  | | | |  | | |
| **Overarching Goal(s):** | | | |  | | | |  | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 |

**Climate Vulnerability**

*A changing climate can affect exposures to a wide range of chemicals. Exposures may change because of changing environmental conditions or changing use patterns. EPA's efforts to reduce exposures may be affected, including through impacts to pesticide exposure models. Many of EPA's tools and models for examining exposure to chemicals rely on inputs that are sensitive to climate data.*

**Action**

| | |
|---|---|
| **Description:** | *State FIFRA inspectors will collect weather data for the day of the application from the nearest weather station and review the certified applicator's records which must include weather data as part of the inspection. The EPA Region 3 states have agreed to compile these findings and report out during year-end reporting in the FIFRA grant workplans. EPA Region 3 states have agreed to include unusual weather observations and overall weather trends in their reporting. For instance, if a state notices a higher than usual number of spray drift complaints in a season, they agree to evaluate weather data for the incidents and report out on any weather trends which could have led to the higher incidence rates.* |
| **Metric(s):** | • *Collection of spray drift incidence rate baseline data* |
| **Project Challenges:** | *Adequate state resources* |
| **Co-benefits:** | *Disaster preparedness, partnership building; decrease in food insecurity due to more crop availability* |

| | | | | | |
|---|---|---|---|---|---|
| **Owner Email:** | Daw.Harry@epa.gov | **New Work?** | *No* | **Resources Available?** | *Yes* |

**Science Needs**

*Updated data, tools and methods*

***Additional Narrative:***

*Four of the EPA Region 3 states have chosen Spray Drift as one of their FIFRA PPG (Performance Partnership Grant) workplan "pick list" items to report out on annually to address climate adaptation. The Grant Guidance activities involve the state "monitoring compliance with spray drift label language and report investigation findings as part of year-end reporting." The states then agree to perform use inspections involving review of label language to ensure drift precautions were adhered to during applications.*

# CHAPTER 8: Enforce Environmental Laws and Ensure Compliance

## Enforcement and Compliance Assurance Division & Office of Regional Counsel

This chapter was developed by the EPA Region 3 Enforcement and Compliance Assurance Division (ECAD) and the Office of Regional Counsel (ORC). ECAD is responsible for developing and implementing enforcement and compliance assurance programs in the Region, by conducting inspections and investigations and compelling compliance with environmental laws and regulations. ORC represents the Region in legal matters including civil, criminal, and administrative cases, and regulatory and permit actions. ORC provides legal support to ECAD to develop and bring administrative and judicial cases to achieve compliance and negotiate settlements to enforce environmental laws throughout the Region.

There are many challenges to incorporating climate adaptation strategies in the enforcement process. Many environmental laws are designed to preserve an existing environmental baseline and restore damage to that baseline through enforcement. With climate change, the environmental baseline is changing, will continue to change, and is hard to predict.

Adaptation can be reactive to changes already underway, but it can also be anticipatory, predicting and proactively preparing for future climate change events. This uncertainty, varying interpretations of risk, and a lack of a defined legal framework for adaptation mean that the Region will need to approach the integration of adaptation flexibly, on a case-by-case basis, depending on geography and industry. The Region has tools at its disposal to use in negotiations including incorporating adaptation measures through mitigation projects, injunctive relief, and other tools such as Supplemental Environmental Projects when law and policy permits such use. Currently, the ability to incorporate climate adaptation measures into enforcement cases may have varying levels of success because in many instances participation in adaptation projects may be voluntary, subject to negotiation, and regulated entities will have different levels of interest and resources to dedicate to adaptation efforts.

ECAD is incorporating climate adaptation into its enforcement efforts through 1) inspection targeting, 2) collecting information on facilities to inform compliance determinations, and 3) crafting resolutions in enforcement negotiations and cases that integrate and address climate adaptation needs in the Region. ECAD also makes an effort to focus on addressing underserved communities facing environmental justice concerns to help make these communities more resilient to climate change. Region 3 also works on integrating climate adaptation enforcement directives from EPA's Office of Enforcement and Compliance Assurance (OECA) into regional enforcement work, including implementing EPA's Climate Enforcement and Compliance Strategy (September 28, 2023) and EPA's National Enforcement Compliance Initiatives ("NECIs") for FY 2024-2027, including the NECI for Mitigating Climate Change. (For more about how OECA is addressing climate *mitigation*, see CHAPTER 9: Climate Mitigation in EPA Region 3.)

Climate change will also require the Region to adapt the ways in which it carries out its enforcement and compliance duties. As described in Chapter 2, ECAD anticipates that climate change may dictate how the Region prioritizes enforcement initiatives, the allocation of

resources, and the Region's ability to inspect, monitor and ensure compliance with environmental laws.

## Opportunities for Climate Action

ECAD is incorporating climate change adaptation considerations both in the initial stages of targeting facilities for inspections and as a part of resolution of enforcement cases, when feasible.

### *Leveraging Targeting, Data and Tools to Integrate Adaptation*

As described below in more detail, several of ECAD's Priority Actions will focus on screening, data collection, and using tools in the targeting process to identify facilities located in the Region facing various climate adaptation challenges. In some cases, this involves leveraging tools already accessible to the agency, but using them in new ways to focus on targeting areas and facilities that will need to consider adaptation measures. In other cases, ECAD will screen and collect data on different types of industries and facilities for consideration in its targeting and inspections.

**Using Tools to Target for Adaptation:** ECAD already utilizes "EJ Screen" as a means of identifying Environmental Justice (EJ) areas of concern and to target enforcement efforts in these areas when possible. EJ Screen's default is to draw a radius of several miles surrounding a facility or site. ECAD is expanding the use of EJ Screen to creatively draw polygons to target facilities across media in ways that are tailored to the geography and demographics of an area. This includes considerations that air pollution travels with prevailing winds (often in the northeast), while water pollution impacts may be in one direction, going downstream. ECAD also uses other tools to identify new locations requiring enforcement and adaptation consideration, including Geospatial Measurement of Air Pollution ("GMAP"), Forward Looking Infrared ("FLIR") cameras, Data Analysis and Reporting Tool ("DART"), flyovers with aircraft to identify otherwise previously unknown emitting facilities or sectors, and leveraging satellite data and other tools to identify impacts from other media. ECAD is also using these technological tools as part of a Super Emitter effort to target and identify large emissions of methane in the Region from both expected sectors (landfill, oil and gas) and unknown sectors.

**Screening and Collecting Data to Target for Adaptation:** ECAD also has begun to screen and collect data in certain areas to inform targeting for adaptation purposes. This includes priority actions to: 1) identify federal facilities located in vulnerable areas and to emphasize adaptation measures, where applicable, in federal facility enforcement cases; 2) identify and consider in targeting instances where facilities may move from one area with heavy community involvement or a low EJ screen score to a new area that may lack community engagement and/or have a higher EJ screen score; and 3) target facilities in certain sectors that face similar adaptation challenges and incorporating adaptation measures during permit renewal phases and enforcement. An example in this last category is an action to identify aging wastewater treatment plants in the Region soon up for permit renewal that will need to adapt to heavy rains and flooding. These climate change factors could affect these facilities' ability to treat wastewater effectively. As part of negotiation of an Administrative Order on Consent or consent decree, such cases could include compliance requirements that include measuring, monitoring and reporting of stormwater flows over time, analyzing hydraulic capacity and integrity of piping, pumps and treatment systems, minimizing infiltration and inflow from greater stormwater flows and higher

water tables, and identifying facility improvements to handle increased frequency and intensity of wet weather events.

### *Incorporating Adaptation into Resolution of Enforcement Actions*

ECAD is working on incorporating adaptation considerations in the resolution of all enforcement actions, when feasible. ECAD and ORC are working in conjunction to identify and introduce case teams to tools available to screen for climate risks as part of case analysis. Case teams will then be able to discuss adaptation challenges with respondents during negotiations, and incorporate adaptation measures, where feasible, into injunctive relief, mitigation projects, and Supplemental Environmental Projects in enforcement cases and in long term planning for incorporation into Consent Decrees. ECAD also intends to work on enhancing community engagement in judicial cases and administrative cases where possible to solicit input from communities on special projects that could include adaptation projects. For instance, as a part of resolution of an enforcement case, ECAD and ORC could include in negotiations updating emergency response plans, stormwater pollution prevention plans, operation and maintenance standard operating procedures, training, and other planning documents to address impacts associated with more intense weather events.

ECAD and ORC consult with OECA on designating adaptation resources, providing guidance on incorporating adaptation into enforcement cases, and providing internal training on this topic. In January 2024 and May 2024, in consultation with OECA, Region 3 hosted trainings on incorporating climate change into regional enforcement cases.

### *Compliance with Adaptation Regulatory Requirements*

As regulations are updated, incorporating adaptation into existing regulatory requirements, ECAD and ORC will assist regulated entities with compliance and education, as appropriate. For example, America's Water Infrastructure Act amendment (2018) to the Safe Drinking Water Act requires community water systems to assess risks to and resilience of systems to natural hazards, and to develop emergency response plans. The Clean Air Act 112r Risk Management Program's "Safer Communities by Chemical Accidental Prevention" Rule finalized on March 1, 2024, requires applicable facilities to perform hazard evaluations to explicitly address natural hazards, including those caused by climate change.

## Opportunities for Climate Action

**To enforce environmental laws and ensure compliance, EPA Region 3 will take the following actions:**

38. Use EJ Screen as an enforcement inspection targeting tool.
39. Increase use of technology to survey large areas to identify areas of focus.
40. Prioritize inspections of facilities with potential climate adaptation and EJ impacts through the landfill targeting initiative.

## Use EJ Screen as an enforcement inspection targeting tool.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | |  |  | | | |
| **Overarching Goal(s):** | | | |  | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | |
| *Increased tropospheric ozone; Altered effects on the stratospheric ozone layer; Interactions of sulfur, nitrogen, and mercury deposition within ecosystems; Water quality impacts from climate change; Storage and Use of toxic chemicals* | | | | | | | | | |
| ***Action*** | | | | | | | | | |
| ***Description:*** | *Use EJ Screen in an innovative way to target areas with EJ concerns or areas adjacent to traditional EJ areas that are rural or may not meet the 80th percentile EJ threshold for other reasons. Use "draw polygon" to target facilities across media in ways that are tailored to the geography and demographics of an area. For example, a medium size chemical manufacturer with both a CAA and NPDES permit in a standard prevailing wind area – CAA impacts will be mostly to the northeast, while NPDES (and SDWA) impacts will be noted downstream, which may be in the opposite direction from the air receptors.* | | | | | | | | |
| **Metric(s):** | *Each media to report out on:*<br>• *Inspections/offsite compliance monitoring in areas with EJ concerns resulting from use of this tool*<br>• *Cases investigated or initiated* | | | | | | | | |
| **Project Challenges:** | *Updated data – some data sets may be years delayed due to data used and reporting requirements.*<br>*Capturing EJ correctly – while this method may allow for expanded identification of EJ areas, existing EPA reporting tools may not currently allow for expanded methods to be used for reporting/recording and this effort could go untracked until databases are updated.* | | | | | | | | |
| **Co-benefits:** | *Use of this approach can ensure that each community affected by different media contributions to pollution are addressed and ensure that communities that might not fall into a target list on a "standard" EJ screen can receive attention.* | | | | | | | | |
| **Owner Email:** | *Hall.Kristen@epa.gov* | **New Work?** | *No* | **Resources Available?** | *Yes* | | | | |
| **Science Needs** | | | | | | | | | |
| *Use of EJ Screen software, and potentially overlapping technologies like monitoring network data or maps.* | | | | | | | | | |

## Increase use of technology to survey large areas to identify areas of focus.

| | | | | | | |
|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | | | |
| **Overarching Goal(s):** | | |  | | | |
| **Performance Goal(s):** | LTPG 1 | | LTPG 2 | | LTPG 3 | |
| **Activity Timeframe:** | FY22 | FY23 | FY24 | FY25 | FY26 | |
| **Climate Vulnerability** | | | | | | |
| *Increased tropospheric ozone; Altered effects on the stratospheric ozone layer; Interactions of sulfur, nitrogen, and mercury deposition within ecosystems; Vulnerability and uncertainty related to impacts to water in the Region; Emergency response; Storage of toxic chemicals* | | | | | | |
| **Action** | | | | | | |
| **Description:** | *Create maps showing data over several days of survey to demonstrate where emissions may be moving and run EJ Screen/ Non-attainment overlays on those neighborhoods. Mapping and tracking emissions movement will better identify at risk communities who may not be located directly near a facility.* | | | | | |
| **Metric(s):** | • *Number of maps created.* | | | | | |
| **Project Challenges:** | *Wind rose modeling of this type is very useful but infrequently available on the small scale that would be provided by this type of monitoring. Providing more training to additional staff members, may need to utilize contractors to assist in survey events, formulate trainings, coordinate with OECA, NEIC for knowledge transfer and OJT opportunities for training.* | | | | | |
| **Co-benefits:** | *Address EJ concerns, identify previously unknown emitting facilities or sectors that can become compliance initiatives.* | | | | | |
| **Owner Email:** | *Hall.Kristen@epa.gov* | **New Work?** | *No* | **Resources Available?** | Yes | |
| **Science Needs** | | | | | | |
| *Training, maintain equipment, research and learn about emerging technologies* | | | | | | |

## Prioritize inspections of facilities with potential climate adaptation and EJ impacts through the landfill targeting initiative.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** | | |  | | |  | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *Altered effects on the stratospheric ozone layer; Increased tropospheric ozone; Water and energy infrastructure (e.g., Landfill Gas to Energy)* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Focus inspection/compliance monitoring efforts on landfills that have not reported as being subject to regulatory requirements based on landfill size and those solely owned and operated by a municipality because they frequently have fewer resources. Use technology like GMAP and methane flyovers to further refine targeting lists. Landfills have the 3rd highest Greenhouse Gas (GHG) emissions of sources in the US.* | | | | | | | | | |
| **Metric(s):** | • *Number of inspections* | | | | | | | | | |
| **Project Challenges:** | *Landfill emissions data are entered by the facility and are dependent upon theoretical calculations that may not be completely accurate. Return to compliance frequently lags actions due to the nature of landfills. EPA should foster a positive relationship with states and local communities because they are "front line" on landfill compliance due to rule delegations and permitting* | | | | | | | | | |
| **Co-benefits:** | *EJ* | | | | | | | | | |
| **Owner Email:** | *Hall.Kristen@epa.gov* | | **New Work?** | *No* | | **Resources Available?** | *Yes* | | | |
| **Science Needs** | | | | | | | | | | |
| *Technologies like GMAP, drones, FLIR camera and mapping* | | | | | | | | | | |

# CHAPTER 9: Climate Mitigation in EPA Region 3

## Background

Climate change mitigation refers to actions limiting the magnitude and rate of future climate change by reducing greenhouse gas emissions. It includes strategies to reduce greenhouse gas sources and emissions and enhance greenhouse gas sinks. Mitigation strategies reduce greenhouse gas emissions, whereas adaptation strategies make communities more resistant and resilient to the effects of a changing climate.

EPA recognizes the need to holistically address mitigation of greenhouse gas emissions to limit the magnitude and rate of climate change while also adapting to those impacts that are unavoidable. Within this adaptation plan, Region 3 will identify strategies that deliver co-benefits for mitigation of greenhouse gases and other pollution, public health, economic growth and job creation, national security, and environmental justice, all of which will be central to building a more resilient future.

The degree to which our communities must adapt to secure a livable future depends upon the extent of local and global temperature increases and the associated impacts of climate change. To avoid the most severe environmental, public health, and economic outcomes associated with a warming climate, atmospheric concentrations of heat-trapping greenhouse gases must be aggressively and rapidly reduced by minimizing (and, ultimately, eliminating) anthropogenic sources of emissions while proliferating sources of carbon-trapping "sinks" (e.g., forests, wetlands, seagrass meadows). The Biden Administration is committed to taking unprecedented action to mitigate the climate crisis, including through actions aimed at rapidly reducing climate pollution, decarbonizing heavy-emitting sectors, and achieving net-zero nationwide carbon emissions by 2050.

Understanding and addressing climate change is critical to EPA's mission of protecting human health and the environment, and we are at the forefront of the Biden Administration's charge to mitigate climate change. In doing so, we are leveraging sound science to track, report, and reduce greenhouse gas emissions; protect and expand natural carbon sinks; and provide financial and technical assistance to our partners who are actively engaged in these activities. While many of EPA's core regulatory and voluntary programmatic activities have a direct goal of reducing or avoiding greenhouse gas emissions, we also ensure that climate change mitigation is included as a co-benefit of our core work and climate adaptation Priority Actions wherever feasible.

In carrying out this work, we are collaborating closely with our state, local, and tribal partners and engaging with communities to ensure that the co-benefits associated with our climate change-mitigating activities maximize positive health and economic outcomes, especially in communities that have experienced historic underinvestment and disproportionate environmental harm.

## Greenhouse Gases

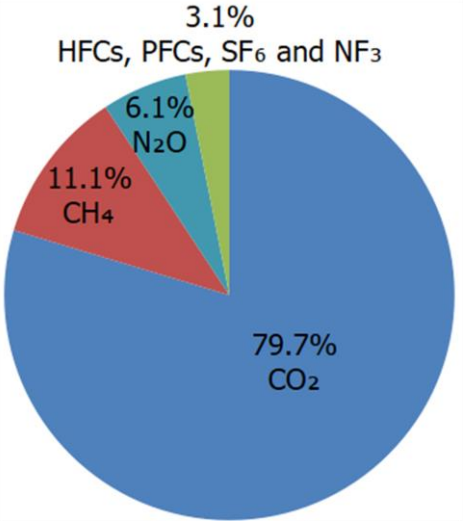
Gases that trap heat in the atmosphere are called greenhouse gases. The main greenhouse gases in Earth's atmosphere are:

**Carbon dioxide ($CO_2$):** Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials, and also as a result of certain chemical reactions (e.g., cement production). Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.

**Methane ($CH_4$):** Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use, and by the decay of organic waste in municipal solid waste landfills.

**Nitrous oxide ($N_2O$):** Nitrous oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater.

**Fluorinated gases:** Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of household, commercial, and industrial applications and processes. Fluorinated gases (especially hydrofluorocarbons) are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). Fluorinated gases are typically emitted in smaller quantities than other greenhouse gases, but they are potent greenhouse gases. With global warming potentials (GWPs) that typically range from thousands to tens of thousands, they are sometimes referred to as high-GWP gases because, for a given amount of mass, they trap substantially more heat than CO2.




*Overview of Greenhouse Gas Emissions - Total U.S. Emissions in 2022 = 6,343 Million Metric Tons of $CO_2$ equivalent (excludes land sector). Percentages may not add up to 100% due to independent rounding. Land Use, Land-Use Change, and Forestry in the United States is a net sink and offsets 13% of these greenhouse gas emissions. This net sink is not shown in the above diagram. All emission estimates are sourced from the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2022.*

The EPA Region 3 Office plays a vital role in implementing these climate change-mitigating activities. We are also poised to realize significant greenhouse gas reductions from the Biden Administration's climate initiatives given the Region's longstanding reliance on fossil fuels for energy production and industrial output, robust agricultural sector, and prevalence of aging commercial infrastructure. Conversely, the Mid-Atlantic Region also contains an abundance of natural landscapes that act as carbon sinks, from the dense forests of West Virginia to the Chesapeake Bay and the myriad aquatic ecosystems within its watershed. Our office is actively engaged in activities that both incentivize and promote the adoption of carbon-free or carbon-negative initiatives, while also enforcing laws that require such actions. This work is broad-based and cross-cutting, touching numerous issue areas and much of our workforce.

Moreover, Region 3 is actively working to cultivate the necessary human and technological resources to position the Mid-Atlantic for a sustainable, decarbonized future. New staff members are being recruited utilizing funding under the Bipartisan Infrastructure Law and the Inflation Reduction Act, and along with existing staff will be continually trained with the best available technical and procedural guidance to carry out EPA's climate mission.

The remainder of this chapter provides examples of EPA Region 3 programs and projects, organized by programmatic chapter (chapters 4-8), that address climate mitigation.

## Ensure Clean and Healthy Air for All Communities

The Clean Air Act (CAA) defines greenhouse gases – specifically, carbon dioxide, hydrofluorocarbons, methane, nitrous oxide, perfluorocarbons, and sulfur hexafluoride – as "air pollutants". Thus, in carrying out their duties to implement the CAA and protect our nation's air from harmful pollution, EPA's Air programs are central to the federal government's efforts to minimize the amount of climate-warming greenhouse gases being added to the atmosphere. Examples of these activities include:

- The establishment of stringent new vehicle $CO_2$ emission standards (the transportation sector represents the single largest source of $CO_2$ emissions among economic sectors in the US).
- Promoting energy efficiency in the commercial, industrial, and residential sectors through Energy Star, SmartWay, and other voluntary climate programs.
- Providing billions of dollars in funding and other financial incentives to state, local, and tribal partners, as well as non-governmental partners and US households, to catalyze climate change-mitigating activities through the Inflation Reduction Act, the Bipartisan Infrastructure Law, and other sources of federal funding.
- The establishment of new rules and the expansion of existing rules that will significantly limit greenhouse gas emissions from the power plant sector (the second largest source of $CO_2$ emissions in the US) and the oil and natural gas sector, a leading source of methane emissions nationwide.

The EPA Region 3 Air and Radiation Division (ARD) includes the execution of these regulatory and voluntary/partnership programs among its core functions. ARD's regulatory programs ensure that the Mid-Atlantic states adequately develop and implement air quality implementation plans

and that air pollution sources are properly constructed and operated in accordance with CAA requirements, including those related to the control of greenhouse gas emissions. ARD's partnership and grants programs provide funding and technical assistance to the regulated community for projects that reduce emissions and improve energy efficiency. Such voluntary programs have, for example, provided funding to schools for the purchase of zero and low-emitting school buses, technical assistance to ports to support the electrification of heavy-duty equipment, and guidance to congregations on methods for improving energy efficiency in their houses of worship. ARD is also actively engaging with state, local, and tribal partners to assist in their climate planning efforts and to ensure that the implementation of federal climate funding maximizes equitable climate and health benefits.

## Ensure Clean and Safe Water for All Communities

**State Revolving Loan Fund:** The Clean Water State Revolving Loan Fund (CWSRF) program has a green project reserve goal whereby states provide at least ten percent of each annual capitalization grant to infrastructure projects that qualify as green infrastructure, energy efficiency, water efficiency, or environmentally innovative. The goal is subject to receipt of eligible applications. Energy efficiency CWSRF projects include combined heat and power, renewable (wind and solar) energy sources, and energy saving technology such as variable speed pumps.

**Underground Injection Control Program – Class VI wells:** Class VI wells are used to inject carbon dioxide ($CO_2$) into deep rock formations. This long-term underground storage is called geologic sequestration (GS). Geologic sequestration is the process of injecting carbon dioxide, captured from an industrial (e.g., steel and cement production) or energy-related source (e.g., a power plant or natural gas processing facility), into deep subsurface rock formations for long-term storage. This is part of a process frequently referred to as "carbon capture and storage" or CCS.

EPA has finalized requirements for GS, including the development of a new class of wells, Class VI, under the authority of the Safe Drinking Water Act's Underground Injection Control (UIC) program. These requirements, also known as the Class VI rule, are designed to protect underground sources of drinking water. The Class VI rule builds on existing UIC program requirements, with extensive tailored requirements that address carbon dioxide injection for long-term storage to ensure that wells used for geologic sequestration are appropriately sited, constructed, tested, monitored, funded and closed.

**Build and maintain coastal resiliency through Blue Carbon resources:** Communities are looking for solutions to build and maintain resilience to impacts like coastal and inland flooding, sea-level rise, salt-water intrusion, and erosion, while also meeting other goals, such as protecting and improving water quality and habitat for economically important living resources. Wetlands, tidal marshes, and sea grass (SAV) are coastal "blue carbon" resources that represent potential climate change adaptation, mitigation, and coastal resilience solutions for communities. Through the Priority Action, "Build and maintain coastal climate resiliency through Blue Carbon resources" (*see* Chapter 3), EPA Region 3 will not only engage with a community within the Chesapeake Bay watershed to understand the coastal climate adaptation and resilience challenges they face, but also identify, analyze, and ultimately implement solutions incorporating blue carbon resources to address climate mitigation.

## Safeguard and Revitalize Communities

**Tree planting at Lower Darby Creek Area (LDCA) Superfund Site:** For the past several years, SEMD's LDCA Team has been growing trees in an offsite tree nursery for use on an evapotranspirative (EV) cap at the Site as part of the remedial action. After a final tree planting, baseline data, leaf area index, canopy closure and total canopy coverage, will be tracked and can then be equated to $CO_2$ captured. Capturing canopy coverage and leaf area index will take place over the course of several years.

**Sauer Dump Superfund Site:** EPA issued a Proposed Remedial Action Plan (Proposed Plan) in September 2023 (with a Record of Decision anticipated in CY2024) to present its Preferred Alternative for addressing soil and sediment contamination at the Sauer Dump Superfund Site in Dundalk, MD. That preferred alternative combines excavation and off-site transport and disposal of contaminated soil and sediment without the need for institutional controls. The Site, which includes wetlands areas, is located in a residential neighborhood that abuts the Back River. Clim ate change modelling shows that impacts of increasingly severe weather events would impact the protectiveness of the presented alternatives that include capping at the site. Due to the concerns raised by the effects of climate change, the threshold criteria such as overall protectiveness of human health and the environment, as well as various primary balancing criteria such as long-term effectiveness and permanence weigh in favor of its preferred alternative, which could also lead to reduced emissions.

**Reduce Food Loss and Waste and Increase the Recycling of Organic Materials**: Producing food uses significant resources and wasted food contributes to a broad range of environmental impacts,[l] including climate change, air pollutants, water scarcity, biodiversity loss, and soil and water quality degradation. EPA estimates that more food reaches landfills than any other material in municipal solid waste in the United States,[li] making up over 24 percent of municipal solid waste sent to landfills in 2018. In the United States, wasted food is responsible for 58 percent of landfill methane emissions[lii] released to the atmosphere. Globally, food loss and waste generate nearly eight percent of global greenhouse gas emissions.[liii]

Diverting food and other organic waste from landfills is an effective strategy to reduce harmful landfill emissions. More broadly, preventing and reducing wasted food can increase food security, foster productivity and economic efficiency, promote resource and energy conservation, and address climate change. These efforts support the *US Methane Emissions Reduction Action Plan* which identified food waste prevention and organic waste diversion as the top two methane emissions reduction strategies for municipal solid waste.

EPA Region 3 provides funding and technical assistance to support the prevention and reduction of food loss and waste. Efforts include encouraging the recycling of organic materials, through composting and anaerobic digestion, by building awareness, increasing capacity, and encouraging practices to improve soil health.

## Ensure Safety of Chemicals for People and the Environment

**Incorporate climate considerations into Pollution Prevention (P2) Program grants:** The EPA Region 3 P2 Program will award funds to technical assistance providers that assist businesses and address climate change impacts. This will be achieved through providing technical information,

best practices, and networking to reduce toxic chemical use and address climate change impacts. P2 grant programs help to reduce millions of pounds of pollution by funding grant work that aims to conserve natural resources, decrease releases of toxics to the environment, and increase cost savings for businesses and others. Measuring grantee results is one way to determine the success of the technical assistance or training effort that gets carried out. P2 grantees report the environmental results of grants, including reductions in greenhouse gas releases (metric tons of carbon dioxide equivalent: MTCO2e).

## Enforce Environmental Laws and Ensure Compliance

**National Enforcement and Compliance Initiatives (NECIs):** On August 17, 2023, EPA's Office of Enforcement and Compliance Assurance (OECA) announced its selection of six priority areas as the National Enforcement and Compliance Initiatives (NECIs) for Fiscal Years 2024-2027. In selecting initiatives for the FY 2024-2027 cycle, OECA relied upon three criteria: (1) the need to address serious and widespread environmental issues and significant violations impacting human health and the environment, particularly in overburdened and vulnerable communities; (2) a focus on areas where federal enforcement authorities, resources, and/or expertise are needed to hold polluters accountable and promote a level playing field; and (3) alignment with EPA's Strategic Plan.

OECA selected Mitigating Climate Change as one of the six new NECIs because tackling the climate crisis is EPA's top priority, and enforcement and compliance efforts that reduce greenhouse gas emissions will help limit the worst effects of climate change. Climate change poses a substantial threat to public health and safety, water resources, agriculture, infrastructure, and ecosystems. EPA's FY 2022-2026 Strategic Plan prioritizes actions to reduce precursors to climate change. Addressing climate change using OECA's enforcement and compliance tools is critical to EPA's mission of protecting human health and the environment, including overburdened communities that will be most vulnerable to climate change.

EPA Region 3's Enforcement and Compliance Assurance Division and Office of Regional Council will continue to incorporate consideration of climate change mitigation into inspections and enforcement where appropriate.

## Conclusion

There is no single solution to the climate crisis. Creating a decarbonized future where all communities are resilient against the impacts of climate change will be no small task and will require tremendous simultaneous efforts towards both climate mitigation and climate adaptation. Under new and expanding initiatives - and with enhanced expertise - Region 3 will incorporate necessary activities to address these twin goals while setting the Mid Atlantic on a path to robust climate sustainability.

# CHAPTER 10: Leveraging and Utilizing Science for Climate-resilient Decision Making

## Applied Science

Each EPA Region 3 program brings essential, and often unique, scientific capability and capacity to bear on advancing the Agency's mission. That reservoir of talent and expertise will be tapped to ensure that sound and objective science is used to inform programmatic activities towards the goal of advancing the objectives within this CAIP and the Agency's climate objectives more broadly. The Laboratory Services and Applied Science Division (LSASD) serves as a key champion for science within EPA Region 3 and will continue to support regional programs and partners to meet their science, information and knowledge needs by providing laboratory analytical support; data analysis; visualization/mapping; decision-support tool creation; and field-based work including monitoring, biological assessment, and analyses.

Scientific knowledge and its application to decision making are critical in guiding the multitude of actions EPA Region 3 programs take to help our communities and environment adapt, mitigate, and create and maintain resiliency to the effects of climate change. The breadth and complexity of the science and knowledge needed to meet these challenges will require collaboration across disciplines, sectors, programs, agencies, communities, and science and research organizations. It will require us to understand climate change science, integrate research across natural, social, and health sciences and identify knowledge gaps. We also recognize the need to engage the Region's tribal communities and integrate Indigenous Knowledge, consistent with White House guidance and EPA policy, to create a more comprehensive framework for climate solutions.

As such, knowledge synthesis and utilization, including the dialogue that should occur between science and knowledge producers, "translators," and users, are key elements of our approach. An important place for us to begin the dialogue on our collective science and knowledge needs is by asking, "What critical climate change questions do our programs need answers to in order to inform decision-making?" These dialogues will ensure decision makers have the best available knowledge and will keep research efforts aligned with user needs.

However, given the scale and urgency of the challenge, and the pervasive and systemic nature of climate change and its impacts, addressing the science and knowledge needs will require an increasingly integrated, systems-based approach. This approach will need to advance multiple program-specific science questions/priorities; consider cross-programmatic and cumulative effects and impacts in parallel; and integrate social, health, and natural scientific disciplines.

## Collaboration to Maximize Knowledge Production

We will coordinate with EPA's Office of Research and Development (ORD) and EPA National Program Offices on collaboration, networking, and outreach activities to develop a strategic approach to engaging with them, and other agencies and institutions.

ORD and the National Program Offices have developed Climate Adaptation Implementation Plans in parallel to the EPA Region 3 Climate Adaptation Implementation Plan. The ORD Plan specifically identified climate-related science needs as a focus area and is incorporating those needs into Strategic Research Action Plans (StRAPs), which serve as blueprints for structuring and

coordinating research activities. A major element of our approach will be to work together with our Regional Science Liaison (RSL) and ORD to identify and share our science and knowledge needs. We have already provided early climate-specific science needs input to ORD during the current round of StRAP planning.

We will also take advantage of collaborative opportunities like the Regional-ORD Applied Research (ROAR) Program to fulfill the needs identified by our regional programs. (*see* Summary of Key Actions below for a list of Priority Actions supported by ROAR funding.)

Furthermore, Region 3 has already taken advantage of ORD's new Integrated Climate and Social Science Division (ICSD) which is advancing two new, climate-centered initiatives: the Interdisciplinary Climate Assessment Program (ICAP) and the Regional Climate Assistance Network (RCAN).

**Interdisciplinary Climate Assessment Program (ICAP):** delivers quantitative assessments of climate damages in support of Agency needs to assess the costs of climate change and the benefits of national, state, and local actions to control greenhouse gases (GHGs) and inform metrics such as the Social Cost of Carbon (SCC).

**Regional Climate Assistance Network (RCAN):** provides a central hub for regional climate adaptation, resilience and mitigation needs, while fostering community-engaged research and translational science for solving real-world climate and EJ problems. RCAN will provide a range of services to regional offices including:

- Curated climate information tailored to regional needs,
- Technical assistance to inform adaptation planning and resilience strategies,
- Regionally relevant assessments of climate-related impacts (e.g. on air, water, land and human health) with a focus on environmental justice,
- Workshops and training opportunities,
- Co-production of research for climate change adaptation and resilience in frontline communities, and
- Potential for technical support for mitigation efforts under the Inflation Reduction Act (IRA).

Through RCAN, ORD is responding to requests for climate related technical assistance given the science needs and Priority Actions described in the CAIPs. This response includes matching regional needs to ORD expertise; scoping future research needs; aligning cross-regional research needs; and arranging more tailored engagements with regional staff around specific issues. RCAN will also help connect other federal agencies' expertise and products to the Regions, including NOAA Climate Adaptation Partnerships, USGS Climate Adaptation Science Centers, and USDA Climate Hubs.

Region 3 has already engaged extensively with the RCAN team and will continue to work collaboratively with them to inform our adaptation planning and resilience strategies and access their network of experts.

Given the volume of scientific research being conducted and supported by other federal agencies, state agencies, academic institutions, and non-governmental organizations (NGOs), a key element of our science approach is to establish partnerships with these groups. Primarily, we want to ensure we are aware of what other groups are doing so we can: leverage and not duplicate effort; inform others of our needs and work collaboratively to have them filled; and ensure information and products produced are useable by regional staff, decisionmakers, and our partners and stakeholders, so as to integrate climate adaptation into our programs and assist our partners in integrating adaptation into their programs.

EPA Region 3 is also fortunate to have an existing example of a strong and effective approach to networking and partnering with other agencies and organizations in the Chesapeake Bay Program Partnership. The Chesapeake Bay Program Office (CBPO) (*see* Chapter 5) will be engaged to bring lessons learned and insights to partnering to the regional level.

Lastly, to ensure integration of climate adaptation science and knowledge into our, and our partners', day-to-day operations and programs, we will need to be aware of and facilitate climate science training and knowledge transfer. Chapter 11 further details how this capacity building will be an aspect of our interaction and collaboration with all our regional programs and partners. Examples may include:

- Becoming an internal and external resource for key climate-related science areas.
- Transferring science, including training and outreach, to regional program staff to ensure the latest research is being applied in programmatic decision making.
- Attending training and events hosted by other agencies and entities to build internal scientific capacity and foster collaboration.
- Creating outreach and knowledge transfer opportunities for potential partners and stakeholders to create engagement opportunities.
- Fostering intra-Agency sharing of relevant research and lessons learned with other EPA Regions and programs to avoid redundancy and maximize resources.

## Opportunities for Climate Action

Although many science and knowledge needs exist, there is already a strong knowledge base on which to build. The urgency of the climate crisis means that decision makers should not and cannot wait for identified science needs to be met prior to initiating action. Climate action must continue in parallel with research activities, drawing on existing knowledge and incorporating new insights as they become available. To assist with integrating and applying new and existing science results and knowledge into programmatic activities, and to identify additional needs through knowledge application, the development of an adaptive management approach to ensure science needs are routinely evaluated and updated will be initiated.

Science needs are identified essential elements of many of the Priority Actions articulated in this CAIP. These needs are thematically aligned as follows:

- Geospatial representation of key climate-related data and related data analytics
    - Floodplain maps, satellite imagery, weather-related metrics, industrial source/infrastructure mapping, health indicators, etc.

- Assessment tool development and application
    - Sea-level Exploration and Assessment (SEA) Tool
    - NPL Flood Vulnerability Tool
- Sector-specific and community-based technical assistance
    - Resilient infrastructure
    - Disaster mitigation
    - Health and welfare impacts

Several years ago, EPA Region 3 proactively initiated a process for identifying and compiling an inventory of science and research needs for our divisions and programs led by the Regional Science Council (RSC), which is made up of scientists from each of the Region's divisions. In 2021, the existing inventory of regional science needs was augmented to categorize climate-related and environmental justice science needs. Currently, the list contains approximately 60 different climate-related science needs. The RSC members reached out to their respective divisions to compile the list; and going forward, the RSC will lead and be heavily engaged in maintaining, updating, and helping to fulfill the identified science needs. As mentioned, EPA Region 3 shared this list with ORD in the fall of 2021. The EPA Region 3's top 3 climate science and research needs as identified in our science need inventory are:

- Climate vulnerability and resiliency assessments using Mid-Atlantic-specific climate scenarios on:
    - Water quality and particularly the design/function of water quality Best Management Practices (BMPs). This aligns with the Chesapeake Executive Council Directive No. 21-1: Collective Action for Climate Change, which aims to "update best management practice design standards to account for the impacts of climate change, using leading predictive models and tools, to ensure investments made today continue to yield benefits even as the climate changes."
    - EPA regulated facilities and associated communities.
    - Science that assists in identifying potential adaptation and resiliency measures.
- Impacts to and design considerations for wetland, stream and terrestrial monitoring restoration under Mid-Atlantic-specific climate scenarios.
- Framework and standardized parameter values/thresholds for assessing social, economic, and psychosocial disruptions to communities from present/future climate change such as increased storms, sea-level rise and heat waves. Particular attention to vulnerable communities that would be severely impacted with an emphasis on children's health.

The science needs specifically identified in Priority Actions within this CAIP will be added to the EPA Region 3 comprehensive science needs inventory. The inventory of existing and emerging science needs directs and informs our efforts, including funding research projects through the Regional-ORD Applied Research (ROAR) Program. The internal EPA ROAR Program, established in 2021, provides funding to collaborative ORD-Regional research projects. Proposals are submitted to the funding selection process through one of two tracks:

1. Regional track- Proposals support applied, near-term regional science needs and are selected by each Region.
2. Office of Science Advisor, Policy and Engagement (OSAPE) track- Each Region can submit up to 2 proposals that align with one or more OSAPE track topics identified in the annual ROAR solicitation.

Climate change has been an OSAPE track topic since the ROAR program's inception. As the proposals and track options allow, we will continue to select sound ROAR projects that use innovative approaches to address climate priorities, enhance the knowledge base surrounding climate change and its impacts, and include a high level of engagement with states, tribes, and communities. The selected ROAR projects related to climate change will be included in Chapter 3's Priority Actions.

### Summary of Key Actions:

- Maintain an updated list of regional climate science and knowledge needs, including consideration of cross-program and system-based needs.
- Enlist the RSC's assistance in investigating a potential adaptive management approach to identifying and integrating science and knowledge into our programmatic activities.
- Work with our RSL on sharing and incorporating regional science and knowledge needs into ORD's planning processes and make connections to relevant ORD research and programs (e.g., the ROAR Program). ROAR projects have contributed to a number of the Priority Actions listed in Chapter 3, including:
    - Resilience Capacity Building in Environmental Justice/Social Justice communities for climate change planning.
    - Developing Next-Generation Intensity-Duration-Frequency (NGIDF) curve data for EPA Region 3.
    - Understanding carbon storage/sequestration implications of local decision-making.
    - Innovative Advancements in Lake and Wetland Monitoring with Imagery and Machine Learning Modeling.
    - Develop a fine-scale stream network temperature model for Chesapeake Bay Watershed.
    - Expanding the Wetland Regional Monitoring Program.
- Provide science-based support and assistance to regional programs and partners and serve as a conduit of needs to other science providers.
- Share and utilize insights learned from the vast experience of the CBPO collaborating and networking to meet science and knowledge needs.

- Develop and initiate an approach to interact and collaborate with other federal agencies, states, NGOs, academic institutions, and Native American communities.
- Identify and support training and knowledge transfer opportunities for regional programs and our state and local government, NGO partners, tribes, and communities.

# CHAPTER 11: Developing Climate Leaders for Tomorrow

Tackling an existential global environmental crisis such as climate change requires informed and energized leadership today. The arc of the global community's response to climate change began decades ago and will require a sustainable cadre of climate leaders well into the future. A fundamental step toward that goal is for EPA Region 3 to focus on building the capacity of our existing staff; recruiting a climate-educated workforce; and providing opportunities for Agency staff to practice and share their knowledge within the communities in which they live and serve.

## Education and Capacity Development

For well over 20 years, EPA Region 3 has been providing opportunities for its staff to build individual and programmatic capacity around a full suite of climate-related topics. Much of that early work focused on raising the climate awareness of all staff, regardless of their specific position or organizational function. This type of general capacity-building needs to be maintained as part of our everyday business for both existing and new staff – every one of us has a role to play.

While the entire EPA Region 3 workforce must attain a sound basic understanding of the impacts of climate change and means for making a difference, an ever-growing cohort of regional staff will need to build advanced technical knowledge and capacity. Again, EPA Region 3 is by no means starting at square one with regard to its native technical capacity. Across the Region, seasoned, as well as more junior staff possess an impressive level of climate-specific technical expertise and experience. The Region must continue to build on that strong foundation by developing and sustaining deliberate and coordinated opportunities to enhance our collective knowledge base around such topics as:

- Atmospheric and terrestrial climate change science
- Greenhouse gas generation and mitigation
- Media-specific climate impacts
- Climate adaptation
- Legal and regulatory approaches to greenhouse gas control and mitigation
- Associated knowledge in demographics, community health, ecosystem services
- Proficiency in data science, GIS, modeling, etc.
- Emerging technologies and strategies

Reaching staff to deliver foundational knowledge on climate change can be achieved through a variety of channels. Substantial passive resources exist on EPA's website and through its library services. Both provide opportunities for self-learners to navigate themselves to a wide array of similar external resources. Formal trainings delivered across a variety of platforms will provide staff with a more active and participatory educational experience. Much of the content for such trainings readily exists and can be leveraged to create and deliver general climate education.

Other education modalities will continue to be used and adapted to provide basic climate content to staff. These include program-specific training being developed by EPA National Program Offices; mandatory/non-mandatory on-line training, including Office of Policy's Climate

Conversations series; leadership messaging; the Region's electronic bulletin board ("R3 in the Know"); social media; in-office signage; computer desktop "signage;" etc.

In developing and sustaining our existing technical prowess, we can leverage the learning opportunities described above. It will also require a continuation and expansion of specialized and targeted educational and capacity building strategies. The Regional Science Council (RSC) has a long track record of coordinating and delivering technical training to staff. Its more recently deployed "Regional Science Council Presents" (RSCP) training program provides an ideal platform to routinely deliver learning events. (*see* PRIORITY ACTION: Partner with the Regional Science Council to host climate-focused webinars for both internal and external audiences) Each month, at a minimum, the RSCP conducts an educational event focused on a particular topic relevant to the work and lives of the staff. The infrastructure of the RSCP will be leveraged to develop a climate-specific training agenda that will provide content that will target technical learners, as well as more broad-based participants. On a related note, it is envisioned that the RSCP platform will, as appropriate, be utilized as part of the Region's coincident efforts to develop environmental justice leaders of tomorrow. There will be ample opportunity to provide coordinated and integrated content on these two important and interwoven challenges.

The RSCP represents only one means to bring the necessary technical education resources to regional staff. The Region's long-standing human resources-based training program will continue to focus on staff development and will pursue the types of formal internal and external training events that staff have benefited from for years. This will include procuring training conducted in-house for large audiences, as well as supporting individualized training provided by external entities such as academic institutions and non-governmental organizations.

Another essential means for developing technical capacity is through on-the-job training opportunities. The Region should continue to provide staff with opportunities to build their knowledge basis and expertise through cross-program and cross-agency temporary work assignments and details. This type of knowledge transfer will exponentially expand the collective expertise while having the collateral benefit of forging new collaborative relationships with important partners in addressing the climate change challenge.

In a similar fashion, the Agency's and Region's formal Science Program provides unique opportunities for staff to immerse themselves into the pursuit of highly technical science and research. Each year, EPA Region 3 (like each of the other EPA Regions) has the opportunity to identify priority research needs and to pursue those needs in collaboration with the Office of Research and Development (ORD). (*see* Chapter 10) These rigorous research projects allow regional staff to develop skills and expertise while creating the science to help the Region address important environmental challenges. Now, and in the future, the challenges of climate change and environmental justice will play a central role in the Region's decision-making process for prioritizing where to apply its limited research resources. The Regional Science Program provides staff with other opportunities to develop essential technical skills through the Regional Research Partnership Program (R2P2) and the Regional/ORD Community of Science Networking Program (ROCS-Net).

### Recruiting and Sustaining Climate Leadership

It is not enough to ensure existing on-board staff are climate aware and trained. The Agency and the Region must seek to recruit and retain within its ranks a workforce that comes to us with advanced education and abilities specific to addressing climate change. In much the same way the Agency pursues an ever more diverse and representative workforce, we must emphasize the need for skills and aptitude in the foundational challenges of today and tomorrow such as climate change and environmental justice. The Region's talented human resources staff will prove to be effective agents in helping the Region meet this objective. Likewise, all hiring officials will be aware of the priority to seek recruits that bring these attributes.

In support of the pursuit of climate-ready new hires, regional leadership and human resources staff can look for innovative ways to adapt existing recruitment and hiring strategies. This includes targeting higher education institutions that emphasize the development of the skills we are seeking. We should expand our recent efforts to implement a formal intern program (Pathways Internships) that will allow us to mentor future employees and perhaps encourage them to develop the types of skills we need while they are still pursuing their higher education.

The expansive and ever-evolving nature of the climate change challenge necessitates a broader suite of talents and educational experiences. The Region should also consider expanding the traditional list of occupational series for which it recruits. Economists and accountants may be needed to devise and implement market-based solutions. Educators and marketers may support programming to change public behavior. We should be seeking problem solvers from across the entire occupational spectrum.

A hiring and retention strategy specific to recruiting and retaining climate expertise and leadership will be developed and provided to the regional management team as a resource.

### External Engagement on Education and Capacity Building

In alignment with this plan's broader communications and engagement strategy (*see* Chapter 12), the Region will seek to engage with our community partners where we can bring value to enhancing awareness and understanding about climate change. Often, we can seek to deliver capacity building that integrates climate and environmental justice educational resources and opportunities. Many of the same tools that provide learning opportunities to our own staff can be used in the community setting. The Agency should continue to make significant investment in developing publicly accessible climate change content through its online and social media platforms. The Region can develop strategies to amplify and draw attention to these resources during engagement with our local community partners. This would include tailoring the Region's outward facing messaging and communications to highlight the connections between our activities and programs and how they are making a difference on climate change.

The Region can also continue its legacy of being active educators in the community, particularly in partnership with local schools. We will also continue to leverage our prized Environmental Education Grant program to support environmental education projects that promote environmental awareness and stewardship and help provide people with the skills to take responsible actions to protect the environment.

A climate educated EPA Region 3 workforce can also be a tremendous asset in advancing climate awareness principles within our own communities, giving us all an opportunity to put into practice our knowledge and expertise and to be agents of change where we live.

Throughout all of these activities, we must ensure that we implement engagement strategies that are inclusive of all of our communities and that are tailored to meet community members on their terms and within the context of their lives. Particular emphasis and energy should be focused on reaching those communities that are most impacted by, and least resilient to, the impacts of climate change. Achieving climate justice requires acknowledging and addressing the specific challenges faced by low-income residents, the elderly, minority communities, and other underserved and underrepresented communities.

Activities that advance external engagement and capacity building can be integrated into the Region's broader external engagement strategies.

**To develop climate leaders for tomorrow, EPA Region 3 will take the following actions:**

41. Assess resources and curricula for capacity development.
42. Develop a recruitment and retention strategy to build climate expertise and leadership in the EPA Region 3 workforce.
43. Build external capacity.

## Assess resources and curricula for capacity development.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** | | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *A climate educated staff and stakeholder community is an essential foundational component of a strategic effort to make meaningful progress on the full scope of climate adaptation objectives and goals.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *An assessment of current and existing training and educational resources will be conducted to identify gaps and opportunities. A compendium of those resources will be developed, and broad-based access will be provided. Companion training curricula will be developed and tailored for targeted audiences.* | | | | | | | | | |
| **Metric(s):** | • *Initial performance metrics will focus on the developmental timeliness and quality of the capacity building products and processes.*<br>• *Secondary metrics will be developed to assess training penetration and knowledge acquisition.* | | | | | | | | | |
| **Project Challenges:** | *Curating an accessible, effective, and relevant suite of resources from the vast array of existing materials will require challenging assessment and decision-making. Ensuring that the resources and curricula are appropriately inclusive will require input from all of the relevant programs. The resources to develop, coordinate, and deliver educational content will require broad-based staff support.* | | | | | | | | | |
| **Co-benefits:** | *Capacity building and training will provide opportunities for cross-media awareness and collaboration.* | | | | | | | | | |
| **Owner Email:** | *Campbell.Dave@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* | | | | | |
| **Science Needs** | | | | | | | | | | |
| *No unique science needs are associated with the training effort. Of course, the majority of the training will be science-based.* | | | | | | | | | | |

## Develop a recruitment and retention strategy to build climate expertise and leadership in the EPA Region 3 workforce.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** | | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *The recruitment, development and retention of climate-focused staff and leaders is an essential foundational component of a strategic effort to make meaningful progress on the full scope of climate adaptation objectives and goals.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *An assessment of current and existing hiring practices will be conducted to identify best practices for the recruitment of targeted professionals. A strategic hiring plan will be developed and implemented to recruit climate professionals and leaders. A development and retention strategy specific to climate professionals will be developed and implemented.* | | | | | | | | | |
| **Metric(s):** | • *Initial performance metrics will focus on the timeliness and quality of the assessment and hiring and retention strategies.*<br>• *Secondary metrics will be developed to assess the success of the strategies using hiring and retention statistics.* | | | | | | | | | |
| **Project Challenges:** | *The development and successful implementation of recruitment and hiring practices and strategies are complex and challenging exercises. They often require the integration of a variety of hiring goals and objectives. Likewise, they require commitment and support from corporate leadership in order to effectuate culture change within the recruitment process.* | | | | | | | | | |
| **Co-benefits:** | *Novel recruitment practices and pursuit of non-traditional professionals can bring new talents and expertise to the Region that can be leverage against other organizational priorities.* | | | | | | | | | |
| **Owner Email:** | *Campbell.Dave@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* | | | | | |
| **Science Needs** | | | | | | | | | | |
| *No unique science needs are associated with the recruitment and retention effort.* | | | | | | | | | | |

## Build external capacity.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** | | | | | | | | |  | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *A climate educated stakeholder community is an essential foundational component of a strategic effort to make meaningful progress on the full scope of climate adaptation objectives and goals.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *An assessment of current and existing training and educational resources will be conducted to identify gaps, opportunities and relevance and appropriateness for public accessibility. A compendium of those resources will be developed, and a broad-based accessibility and communication strategic plan will be developed in coordination with the broader external engagement strategy.* | | | | | | | | | |
| **Metric(s):** | • *Initial performance metrics will focus on the developmental timeliness and quality of the assessment and accessibility and communication strategy.*<br>• *Secondary metrics will be developed to assess training penetration and knowledge acquisition.* | | | | | | | | | |
| **Project Challenges:** | *Curating an accessible, effective, and relevant suite of resources from the vast array of existing materials will require challenging assessment and decision-making. Ensuring that the resources and curricula are appropriately inclusive will require input from all of the relevant programs. The resources to develop, coordinate, and deliver educational content will require broad-based staff support.* | | | | | | | | | |
| **Co-benefits:** | *Capacity building and training will provide opportunities for greater community engagement and collaboration.* | | | | | | | | | |
| **Owner Email:** | *Campbell.Dave@epa.gov* | | **New Work?** | *Yes* | | **Resources Available?** | *Yes* | | | |
| **Science Needs** | | | | | | | | | | |
| *No unique science needs are associated with the external capacity building effort. Of course, the majority of the training will be science-based.* | | | | | | | | | | |

# CHAPTER 12: Communication and Engagement Strategy

## Working together

Region 3 recognizes that effective communication and engagement with key stakeholders throughout the MidAtlantic will be critical to the overall success of adaptation action. EPA's Climate Adaptation Action Plan directs this implementation effort to communicate and engage with tribes, states, territories, local governments, environmental justice organizations, community groups, businesses, and other federal agencies to strengthen adaptive capacity and increase the resilience of the nation, with a particular focus on advancing environmental justice.

As climate change continues to alter the environment, these stakeholders, including the many diverse communities located throughout the Mid-Atlantic region, may need assistance to develop strategies to adapt accordingly. To succeed, Region 3 will communicate our priorities, but also develop strategies to hear and understand the needs of our communities, providing the foundation for more effective engagement and collaboration over the long-term.

Region 3 has focused our initial engagement with the public sector partners in the states, cities, and local communities that are often at the vanguard of climate adaptation. Region 3 will identify those communities that are already addressing and planning for climate adaptation to coordinate efforts, avoid duplication, identify gaps and provide support. This includes, but is not limited to, coordinating with local sustainability offices, non-governmental organizations, citizen advisory committees, and local municipalities. This also included EPA Region 3 offering consultation to the seven Region 3 federally recognized tribes and the Seneca Nation of Indians on the draft Regional Climate Adaptation Implementation Plan.

## Listening to Vulnerable Communities

In addition, the Region will need to identify and engage with the vulnerable populations throughout the Mid-Atlantic that may be disproportionately impacted by climate change and other environmental harms, including children, pregnant women, the elderly, minorities, low-income communities, communities of color, medically vulnerable people, tribal and indigenous peoples, and people with limited access to information, or limited English proficiency. The Region will work with the new Environmental Justice, Community Health, & Environmental Review Division (EJCHERD) to identify communities that may experience direct impacts from climate change, including extreme weather events, increased and more intense rain events, flooding, sea-level rise, more frequent heat waves, increased use of pesticides due to changes in insect habitats, among other effects.

Region 3 will continue to collect data on vulnerable communities, research effective adaptation strategies and best management practices, and will synthesize this information into mapping tools and other resources to provide to the public through its website, trainings, workshops, forums and other forms of community engagement. The Region will also continue to build partnerships with the public, connecting communities with resources and information needed for adaptation. This means both maintaining existing partnerships and making new partnerships with regional environmental and climate justice coalitions, local communities, neighborhood and community advocacy groups, tribes, non-governmental organizations, private entities and industry, the agricultural sector, state agencies, and other federal agencies to collaborate and

find solutions to continue to protect the environment and public health in the face of climate change.

### Top-down and Bottom-up Engagement

The region's overall strategy for meeting these engagement objectives will be a combination of (a) top-down engagement with leadership at the relevant federal, state, and local organizations paired with support for the (b) bottom-up engagement developed with individual actions in this plan.

The top down, more centralized engagement at the leadership level will allow us to share information from this plan and learn about the priorities and actions of partner organizations in order to determine areas for collaboration. With the launch of this planning process, we will start our engagement with the organizations that we typically work with as partners with a shared mission, particularly federal agencies, states, tribes, and local governments. The objectives of such engagement include:

- Seek high level engagement at the state secretary, director level, and then specific program, as needed, as well as high-level level engagement with other members of the federal family.
- Share information on each organization's climate adaptation priorities.
- Identify areas where priorities and actions could be aligned to leverage resources and outcomes to work together now to increase adaptive capacity.
- Clarify ongoing issues or questions that require additional discussion or follow-up for future planning efforts.

The bottom-up, more distributed engagement will need to develop over time as the individuals and teams working on aspects of this plan determine types of engagement necessary to implement the priority actions identified in the program specific chapters. Communications and engagement with the public are woven into many of the Priority Actions referenced in this report and several Priority Actions specifically focus on external engagement, including:

- Building external capacity by assessing and compiling existing and needed training and educational resources as part of our external facing climate website, which includes an archive of state, local and tribal climate plans that have been published for localities in Region 3;
- Including climate change messages in the broad suite of communication channels used by Region 3 to effectively engage the public. This includes a mix of technological and traditional tools such as social media, live streamed video content and targeted advertising, as well as print, television, and radio-based media. These formats will be utilized collaboratively to ensure information is equitably shared with the public regardless of disability or access to technology;
- Engaging Region 3 tribes in a meaningful dialogue on climate change adaptation and resilience by hosting a climate adaptation workshop for federally recognized tribes, participating in the Regional Tribal Operations Committee, exchanging information with

the National Tribal Science Council, and supporting and encouraging the use of General Assistance Program grants for climate adaptation;
- Engaging with communities to mitigate health impacts after adverse events by proactively connecting vulnerable and overburdened populations to essential resources;
- Enhancing mapping capabilities to identify communities that have potential environmental justice concerns in climate vulnerable areas; and
- Building stronger partnerships and relationships with Superfund communities to address climate concerns.

Other Priority Actions within this plan include communication and engagement components, including, but not limited to:

- Providing training on and encouraging the use of web tools to map vulnerable communities and to help states and local governments normalize the adoption of mitigation strategies and encourage investment in resilient infrastructure;
- Providing technical assistance and training for water and wastewater treatment systems to improve climate resilience;
- Engaging with a community in the Chesapeake Bay watershed to incorporate blue carbon resources to address local challenges;
- Partnering with federal facilities to achieve resiliency goals;
- Facilitating a workshop to incorporate climate adaptation into water quality and quantity planning at the watershed scale for federally recognized tribes, states, territories, local governments, and communities;
- Developing outreach events that incorporate climate adaptations for brownfields grantees;
- Consulting and partnering with states, tribes, territories, local governments, environmental justice organizations, community groups, businesses, and other federal agencies to strengthen adaptive capacity and increase their resilience by applying Sustainable Materials Management;
- Expanding the scope of enforcement to capture more EJ communities by using EJ Screen in innovative ways to target enforcement inspections and
- Fostering relationships with state and local communities to assist in monitoring landfill emissions and compliance.

**The following Priority Actions will contribute to the buildout of the EPA Region 3 communications and engagement strategy:**

- Support climate resilient infrastructure
- Build and maintain coastal climate resiliency through Blue Carbon Resources
- Engage Region 3 tribes in a meaningful dialogue on climate change adaptation and resilience.
- Engage Superfund communities on climate.

- Create an annual engagement plan and toolkit of communication and engagement resources.
- Convene a quarterly meeting with Region 3 jurisdictions to coordinate across the Mid-Atlantic on climate issues.
- Resilience capacity building in Environmental Justice/Social Justice Communities for climate change planning.
- Convene a "Watershed Partnerships Workshop" to address climate adaptation at the watershed scale.
- Advance understanding of and engage with partners on the environmental impacts of wasted food and the beneficial uses of compost application on soil.
- Pilot project to streamline interagency coordination on federally supported climate resilience efforts in selected Region 3 communities.

# CHAPTER 13: EPA Region 3 Managed Facilities & Operations

The Region's goal is to ensure that our facilities are climate resilient to minimize the effects of climate-related impacts on all facets of regional operations, including infrastructure, supply chains, acquisition, and the workforce that supports the mission. Currently EPA Region 3 occupies four physical locations, each supporting the overall regional and national mission of the agency. The Region has recently relocated some of these offices and has used that opportunity to take climate change adaptation concerns into consideration during the relocation process.

The geographic setting and programmatic responsibilities create a unique set of climate vulnerabilities at each location. For instance, all locations may be subject to heavy rain events, flooding, heat waves, or other weather events that may impact the ability to reach locations via mass transit. EPA Region 3 facilities include the following locations:

- **Philadelphia Regional Headquarters Office**: located at 4 Penn Center, Philadelphia, Pennsylvania
- **Environmental Science Center (ESC)**: located at 701 Mapes Road, Fort Meade, Maryland
- **Wheeling Field Office**: located at 1060 Chapline Street, Wheeling, West Virginia
- **Chesapeake Bay Program Office**: located at 1750 Forest Drive, Annapolis, Maryland

In alignment with the EPA 2021 Climate Adaptation Action Plan, EPA Region 3 will assess risks and reevaluate its current posture to ensure that stated goals are realistic with respect to current and future climate impacts. The regional and national plans will ensure that:

- EPA will conduct additional facility-specific climate resiliency assessments to identify new vulnerabilities and determine best practices for withstanding severe weather events, enhancing Information Technology (IT) security, ensuring resilient power supplies, and continuing EPA's mission-related work in the event its buildings or operations are compromised by extreme weather events due to climate change.
- EPA will continue to audit its facilities for safety, physical security, and sustainability opportunities such as energy reduction, water conservation, and fleet efficiency to reduce the Agency's greenhouse gas emissions and climate change impacts. EPA will also use its master planning process, which revisits facility plans every five years, to consider renovations and other projects to enhance resilience and reduce the greenhouse gas emissions associated with its operations.

EPA Region 3 will support the agency's efforts to implement Executive Order (E.O.) 14057, Catalyzing Clean Energy Industries and Jobs through Federal Sustainability. E.O. 14057 outlines a coordinated, whole-of-government approach, along with individual agency goals and actions, to transform Federal procurement and operations to reduce greenhouse gas (GHG) emissions and environmental impacts and secure a transition to clean energy and sustainable technologies. It establishes that the Federal Government will lead by example to achieve a carbon pollution-free electricity sector by 2035 and net-zero emissions economy-wide by 2050. The Region will evaluate its workforce (including federal employees, contracted staff, grantees, and Senior Environmental Employment (SEE) Program staff), supplies, and equipment to ensure that there

is minimal risk that climate-change events would degrade our ability to carry out our delegated responsibilities.

## Facility Enhancements

EPA Region 3 has recently relocated the Philadelphia and Annapolis offices and is in the process of relocating the Wheeling office and boat warehouse. Floodplain considerations were incorporated into the site location criteria. The new facilities reduce the physical footprint of the Region by 40% and incorporate energy efficient and sustainable materials. Construction and cleanout of the old facilities emphasized recycling and reuse including an 82% diversion of construction waste from the Philadelphia facility.

The design of all the new facilities includes open workspace with lower workstation panels to optimize natural light. Energy efficient fixtures, including a daylight harvesting system, provide up to 65% energy savings for lighting at both the Philadelphia and Annapolis facilities. WaterSense fixtures and hands-free faucets are also incorporated to reduce water usage. The Annapolis facility includes a large skylight that brings in natural sunlight, reducing the need for artificial lighting and saving electricity. It also creates a greater sense of space and improves air quality through better ventilation. State of the art AV systems in the new facilities optimize virtual meetings and Microsoft Teams capabilities, providing seamless integration of in-person and remote participants. The Philadelphia facility is located close to public transit and includes a bike room to support individuals minimizing fossil fuels and using a pollution-free mode of transport.

While the Region designs the office space in the new location in Wheeling, WV Office, it will take into consideration these same types of facility improvements. More modern spaces reduce the overall risk of facility downtime because equipment is significantly newer and far from the end of its useful life.

## New & Improved Climate Adaptation Practices

Battery recycling, composting, paper shredding, reduction of printers and emphasis on electronic files are additional climate adaptation efforts being incorporated in Region 3 operating procedures to maximize diversion of waste across all of the Region 3 facilities.

- “K-cup recycling” that began in fall of 2023 has seen over 200 pounds of Keurig cups be diverted from landfills as of spring 2024.
- In the first month of the region’s composting pilot program, nearly 243 pounds of organic matter was collected.
- Our paper shredding contract has significantly reduced paper waste at all three of our facilities.
- Significant recycling efforts including recycling contract in place for regular pick-ups of excessed IT equipment and a 90% waste diversion rate at the ESC, including 1 ton of lab materials/supplies donated to Historically Black Colleges and Universities.
- Region 3 is transitioning to a primary electronic filing system and has reduced records storage by 89% in our facilities. Electronic files reduce paper usage, printing and support remote and telework capabilities.

- When designing the new office space, Region 3 reduced the number of printers/copiers in the Philadelphia office from 111 to 39. This same effort has been undertaken in all office relocations for our Region. The reduction in printers/copiers has reduced our electric consumption as well as our need for consumables that are associated with printing: ink, toner, paper, drums, fusers etc. Using less ink/cartridges reduces the release of Volatile Organic Compounds (VOC) and heavy metals that are used in the printing process.
- Region 3 has implemented a secondary fleet pick up at the COOP facility which reduces commute into Philadelphia for car pick up and provides a secondary location if an emergency prevented use of the Philadelphia vehicles.

## Future Considerations

Region 3 facility management will continue to analyze operations and pursue better climate adaptation practices wherever possible.

- As part of the 2021 Climate Adaptation Action Plan, the agency recently conducted a climate resiliency assessment at the ESC. The hazards with the highest likelihood of occurring from 2023 to 2053 at ESC include straight-line/high winds, hail, tornado and extreme precipitation. The highest priority projects to address vulnerabilities include roof replacement, retrofit of HVAC system and consideration of carbon pollution-free electricity generation technologies. The roof replacement is currently under contract, and EPA is awarding an Energy Saving Project Contract (ESPC) for the ESC.
- The ESPC will assess and implement energy saving upgrades throughout the facility.
- Expand paper shredding to all of our facilities.
- Installation of an Electric Vehicle charging station at the Annapolis facility.

# Appendix A: Discontinued Priority Actions

The following is a list of discontinued Priority Actions. Explanations for why each of these has been discontinued can be found in the "Traceable Accounts" text following each Priority Action.

## Engage with communities to address health impacts after adverse events.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Impact(s):** | | |  |  | |  |  |  | | |
| **Overarching Goal(s):** |  | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *This action relates to extreme weather events that can affect residential access to grid power, principally hurricanes and major flooding episodes, but also heat waves which can also cause blackouts.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Support the management of health needs in vulnerable and overburdened communities by engaging at-risk communities and connecting them with resources to address:*<br>• *safe use of backup generators to maintain medications and medical devices.*<br>• *best practices to cope with health impacts related to adverse weather events.* | | | | | | | | | |
| **Metric(s):** | • *Communities/individuals engaged* | | | | | | | | | |
| **Project Challenges:** | *Need for FTE, data on market for generators and existing population of units.* | | | | | | | | | |
| **Co-benefits:** | *Possible increased used of more efficient generators, or reduced need if alternative resources are available.* | | | | | | | | | |
| **Owner Email:** | *Riley.Alison@epa.gov* | | **New Work?** | *Yes* | | **Resources Available?** | *No* | | | |
| **Science Needs** | | | | | | | | | | |
| *Data on generation, identification of communities at highest risk (high rates of diabetes, heart disease, and in flood plains or other vulnerable locations).* | | | | | | | | | | |

***Additional Narrative:***

***Traceable Accounts***

*"Engage with communities to address health impacts after adverse events," "Engage climate vulnerable EJ communities," and "Review vulnerability of agency and regulated community facilities located in low-lying areas" have been merged into a new Priority Action entitled "Maintaining open communication with community stakeholders to share resources and identify climate concerns." In the October 2022 version of the Region 3 Climate Adaptation Implementation Plan, this action was listed in CHAPTER 4: Ensure Clean and Healthy Air for All Communities.*

## Engage climate vulnerable EJ communities.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Climate Impact(s):** | | |  | | |  | | | |
| **Overarching Goal(s):** |  | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | FY24 | | FY25 | FY26 | | |
| **Climate Vulnerability** | | | | | | | | | |
| *This action relates to extreme weather events that can affect human health and housing conditions, principally hurricanes and major flooding episodes, but also heat waves.* | | | | | | | | | |
| **Action** | | | | | | | | | |
| **Description:** | *Draft a plan to identify and engage high-risk EPA Region 3 communities with EJ concerns or experiencing disproportionate adverse impacts to inform our community engagement efforts. This would build upon work already completed, overlaying existing maps with maps of flood plains, heat islands, neighborhoods with older housing stock, etc.* | | | | | | | | |
| **Metric(s):** | • *Successful completion of mapping project.* | | | | | | | | |
| **Project Challenges:** | *Access to data, software, and expertise.* | | | | | | | | |
| **Co-benefits:** | *Information could be useful for a wide array of regional and national programs and activities, to help target resources at areas of highest need.* | | | | | | | | |
| **Owner Email:** | *Riley.Alison@epa.gov* | **New Work?** | *No* | **Resources Available?** | *No* | | | | |
| **Science Needs** | | | | | | | | | |
| *Existing maps, access to specific vulnerability maps, other data.* | | | | | | | | | |

***Additional Narrative:***

***Traceable Accounts***

*"Engage with communities to address health impacts after adverse events," "Engage climate vulnerable EJ communities," and "Review vulnerability of agency and regulated community facilities located in low-lying areas" have been merged into a new Priority Action entitled "Maintaining open communication with community stakeholders to share resources and identify climate concerns." In the October 2022 version of the Region 3 Climate Adaptation Implementation Plan, this action was listed in CHAPTER 4: Ensure Clean and Healthy Air for All Communities.*

## Review vulnerability of agency and regulated community facilities located in low-lying areas.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Impact(s):** | | |  | | |  |  |  |  | |
| **Overarching Goal(s):** |  | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *This action relates to extreme weather events that can affect human health and housing conditions, principally hurricanes and major flooding episodes, but also heat waves.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Identify Region 3's facilities (in the regulated community, as well as agency assets and infrastructure) located in low-lying areas that could be subject to severe weather and those located near shorelines that pose a hazard to public health and the environment.* | | | | | | | | | |
| **Metric(s):** | • *Facilities engaged/evaluated.* | | | | | | | | | |
| **Project Challenges:** | *Access to internal and external data, cooperation from external partners and stakeholders.* | | | | | | | | | |
| **Co-benefits:** | *Partnership building, potential prevention of hazardous incidents.* | | | | | | | | | |
| **Owner Email:** | *Riley.Alison@epa.gov* | | **New Work?** | *Yes* | | **Resources Available?** | *No* | | | |
| **Science Needs** | | | | | | | | | | |
| *Listings of Vulnerable facilities, Maps, possible need to create mapping.* | | | | | | | | | | |

***Additional Narrative:***

***Traceable Accounts***

*"Engage with communities to address health impacts after adverse events," "Engage climate vulnerable EJ communities," and "Review vulnerability of agency and regulated community facilities located in low-lying areas" have been merged into a new Priority Action entitled "Maintaining open communication with community stakeholders to share resources and identify climate concerns." In the October 2022 version of the Region 3 Climate Adaptation Implementation Plan, this action was listed in CHAPTER 4: Ensure Clean and Healthy Air for All Communities.*

## Apply the Adaptation Design Tool to climate-smart permitting.

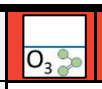
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** | | | | |  | | | | | |
| **Overarching Goal(s):** | | | | |  | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | | LTPG 2 | | | LTPG 3 | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *Water quality impacts from climate change include variations in streamflow, water temperature and saltwater intrusion, which will have to be accounted for while writing and reviewing National Pollutant Discharge Elimination System (NPDES), UIC and wetlands permits. Changes to aquatic ecosystems and the composition and distribution of species are likely due to climate-driven changes interacting with water management practices and land-use changes within individual watersheds.* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *The Adaptation Design Tool (ADT) was created to help coral reef managers incorporate climate change adaptation into management plans using existing planned actions as a starting point, and to identify additional climate-smart strategies as needed. The tool works by guiding users through a series of worksheets that address three interrelated questions about climate impacts to the stressors of concern for ecosystem management actions, climate impacts on planned ecosystem management actions, and implications for designing adaptation actions that successfully address resulting vulnerabilities.*<br>*This project will repurpose the ADT framework to address climate considerations in Water Division permitting. The result will be an application that allows users to produce consistent, thorough, climate-smart comments during permit review. ADT's guiding questions will be reimagined to fit a permitting context.* | | | | | | | | | |
| **Metric(s):** | • *In FY23 a tool will be developed to easily incorporate relevant climate considerations into permit writing and review.*<br>• *Number of external partners that have contributed input to the development of the tool.*<br>• *Percentage of permits that incorporate comments using the tool.* | | | | | | | | | |
| **Project Challenges:** | *Completion of this project is predicated upon receiving funding through an EPA Regional-ORD Applied Research Program (ROAR) grant. Potential challenges to project implementation include how to proceed without additional funding.* | | | | | | | | | |
| **Co-benefits:** | *This project will include collaboration with ORD researchers. One of the co-benefits is partnership building between EPA Region 3 and ORD.* | | | | | | | | | |
| **Owner Email:** | *Konfirst.Matthew@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *No* | | | | | |
| **Science Needs** | | | | | | | | | | |
| *Given the Office of Research and Development (ORD)'s role in developing and promoting the Adaptation Design Tool (ADT), partnership with ORD will be a critical factor in the success of this project.* | | | | | | | | | | |

***Additional Narrative:***

***<u>Traceable Accounts</u>***

*This Priority Action is being discontinued. Office of Water will be addressing climate policy in permitting.*

## Identify reasons for relocation of facilities.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Hazard(s):** |  | | | | |  |  | | | |
| **Overarching Goal(s):** | | |  | |  | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| *Interactions of sulfur, nitrogen, and mercury deposition within ecosystems; Vulnerability and uncertainty related to impacts to water in the Region; Restoring and preserving land; Use of toxic chemicals; Storage of toxic chemicals; Exposure to toxic chemicals from demolition/ renovation activities* | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *Attempt to identify instances where facilities may move from one area, with heavy community involvement and public pressure to comply, to another neighborhood or geographic area with a less sophisticated community. Review if the new area lacks community engagement and its EJ Screen score is significant, to better understand and potentially mitigate and/or prevent this type of physical move to a new location.* | | | | | | | | | |
| **Metric(s):** | • *Number of facilities that moved from a non-EJ or barely EJ area to one that is EJ* | | | | | | | | | |
| **Project Challenges:** | *Identify data tools that would allow staff to easily identify facilities with new addresses* | | | | | | | | | |
| **Co-benefits:** | *EJ, community partnership, effective permitting* | | | | | | | | | |
| **Owner Email:** | *Hall.Kristen@epa.gov* | **New Work?** | *Yes* | **Resources Available?** | *Yes* | | | | | |
| **Science Needs** | | | | | | | | | | |
| *ECHO Notify for multiple programs showing changes at facility level; review of other federal and state agency data sets, like the Department of Labor and state permitting amendments* | | | | | | | | | | |

***Additional Narrative:***

***Traceable Accounts***

*This action is being discontinued due to the difficulty of accurately tracking facilities that move from areas with low environmental justice concerns to ones with significant environmental justice concerns because of slight changes to the names of the facilities over time. Additionally, in most cases it would fall outside of EPA's authority to prevent facilities from relocating, so the information would be of limited use.*

## Develop and update a targeted outreach and engagement workplan.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Threat(s):** |  | | | | | | | | | |
| **Overarching Goal(s):** |  | | | | | | | | | |
| **Performance Goal(s):** | LTPG 1 | | | LTPG 2 | | | LTPG 3 | | | |
| **Activity Timeframe:** | FY22 | | FY23 | | FY24 | | FY25 | | FY26 | |
| **Climate Vulnerability** | | | | | | | | | | |
| All relevant Vulnerabilities currently listed in this report and additional future vulnerability, if determine within the engagement process. | | | | | | | | | | |
| **Action** | | | | | | | | | | |
| **Description:** | *The Region 3 Climate Collaborative, working with the Climate Steering Committee will develop and keep updated a targeted outreach and engagement workplan for the Climate Adaptation and Implementation Plan that highlights opportunities to collaborate at the federal, state, tribal and local levels. The workplan should include a focus on communities that are underserved and disproportionally at risk from climate change.* | | | | | | | | | |
| **Metric(s):** | • *Initial performance metrics will be related directly to LTPG 2 and LTPG 3 since effective engagement with stakeholders will be necessary to influence and then determine how and when an external partner has taken an action to anticipate, prepare for, adapt to, or recover from the impacts of climate change.*<br>• *Secondary performance metrics will support relevant outreach and engagement objectives in each action or priority action.* | | | | | | | | | |
| **Project Challenges:** | *Where possible, this the plan should use existing communications tools (ex. social media, Summits) and established channels (ex. Priority engagement communities) to help with engagement and be cautious about making plans to develop new tools – make the focus on a commitment to understand and honestly engage with various communities across the region.* | | | | | | | | | |
| **Co-benefits:** | *There may be opportunities to develop specific engagement actions for future workplans based on what we learn in the priority actions.* | | | | | | | | | |
| **Owner Email:** | Dunn.Michael@epa.gov | | **New Work?** *Yes* | | | **Resources Available?** *Yes* | | | | |
| **Science Needs** | | | | | | | | | | |
| *Understanding the science needs of partners and delivering science and technical tools and information to our partners will be a key role of the engagement process.* | | | | | | | | | | |

***Additional Narrative:***

***<u>Traceable Accounts</u>***

*This Priority Action was merged with "Create a toolkit of communication and engagement resources" and is now called "Create an annual engagement plan and a toolkit of communication and engagement resources."*

# References


[i] Jay, A., Reidmiller, D.R., Avery, C.W., Barrie, D., DeAngelo, B.J., Dave, A., Dzaugis, M., Kolian, M., Lewis, K.L.M., Reeves, K., & Winner D. (2018). Overview. In D.R. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, & B.C. Stewart (Eds.), *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (pp. 33–71). U.S. Global Change Research Program, Washington, DC, USA. DOI: 10.7930/NCA4.2018.CH1

[ii] Kunkel, K.E., Frankson, R., Runkle, J., Champion, S.M., Stevens, L.E., Easterling, D.R., Stewart, B.C., McCarrick, A., & Lemery, C.R. (Eds.). (2022). *State Climate Summaries for the United States 2022*. NOAA Technical Report NESDIS 150. https://statesummaries.ncics.org/ Note: Summaries for Delaware, Maryland, Pennsylvania, Virginia and West Virginia were used.

[iii] USGCRP. (2018). *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (D.R. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, & B.C. Stewart, Eds.). U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. DOI: 10.7930/NCA4.2018.

[iv] USDA. (2021). *Action Plan for Climate Adaptation and Resilience*. https://www.sustainability.gov/pdfs/usda-2021-cap.pdf

[v] Denman, K.L., Brasseur, G., Chidthaisong, A., Ciais, P., Cox, P.M., Dickinson, R.E., Hauglustaine, D., Heinze, C., Holland, E., Jacob, D., Lohmann, U. Ramachandran, S., da Silva Dias, P.L., Wofsy, S.C. & Zhang, X. (2007). Couplings Between Changes in the Climate System and Biogeochemistry. In S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (Eds.), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 499-587). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[vi] Nolte, C.G., Spero, T.L., Bowden, J.H., Sarofim, M.C., Martinich, J., & Mallard, M.S. (2021). Regional temperature-ozone relationships across the U.S. under multiple climate and emissions scenarios. *Journal of the Air & Waste Management Association, 71*(10). 1251-1264, DOI: 10.1080/10962247.2021.1970048

[vii] Nolte, C.G., Dolwick, P.D., Fann, N., Horowitz, L.W., Naik, V., Pinder, R.W., Spero, T.L., Winner, D.A., & Ziska, L.H. (2018) Air Quality. In: D.R. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, & B.C. Stewart (Eds.), *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (pp. 512–538). U.S. Global Change Research Program, Washington, DC, USA. DOI: 10.7930/NCA4.2018.CH13

[viii] Chen, J., Avise, J., Lamb, B., Salathé, E., Mass, C., Guenther, A., Wiedinmyer, C., Lamarque, J.-F., O'Neill, S., McKenzie, D., & Larkin, N. (2009). The effects of global changes upon regional ozone pollution in the United States. *Atmospheric Chemistry and Physics, 9*, 1125-1141.

[ix] World Meteorological Organization. (2010). *Scientific Assessment of Ozone Depletion: Global Ozone Research and Monitoring Project—Report No. 52*. https://csl.noaa.gov/assessments/ozone/2010/report.html Note: the word "expected" is used in the report to characterize projected climate change impacts on the stratospheric ozone layer. For purposes of this vulnerability assessment, the word "likely" has been used as a proxy for "expected."

[x] Committee on Environment and Natural Resources of the National Science and Technology Council. (2008). *Scientific Assessment of the Effects of Global Change on the United States*. http://www.climatescience.gov/Library/scientificassessment/Scientific-AssessmentFINAL.pdf

[xi] EPA Press Office (2023). EPA Statement on Wildfire Smoke. https://www.epa.gov/newsreleases/epa-statement-wildfire-smoke#:~:text=EPA%20June%207%20Desk%20Statement,of%20the%20Upper%20Great%20Lakes

[xii] Dreessen, J., Sullivan, J., & Delgado, R. (2015). Observations and impacts of transported Canadian wildfire smoke on ozone and aerosol air quality in the Maryland region on June 9–12, 2015. *Journal of the Air and Waste Management Association, 66*(9), 842-862. https://www.tandfonline.com/doi/full/10.1080/10962247.2016.1161674

[xiii] Institute of Medicine of the National Academies. (2011). *Climate Change, the Indoor Environment, and Health*. https://www.nap.edu/catalog/13115/climate-change-the-indoor-environment-and-health

[xiv] IPCC. (2012). Summary for Policymakers. In C.B. Field, V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, & P.M. Midgley, (Eds.), *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation - A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change* (pp. 1-19). Cambridge University Press, New York, NY, USA.

[xv] Institute of Medicine of the National Academies. (2011). *Climate Change, the Indoor Environment, and Health*. https://www.nap.edu/catalog/13115/climate-change-the-indoor-environment-and-health

[xvi] Ibid.

[xvii] Zhao, N. (2018, August 27). *Age of Housing Stock by State*. National Association of Homebuilders Eye on Housing. https://eyeonhousing.org/2018/08/age-of-housing-stock-by-state-2/

[xviii] Ibid.

[xix] Ibid.

[xx] The City of Philadelphia Office of Sustainability. (2021). *Philadelphia Climate Action Playbook*. https://www.phila.gov/media/20210113125627/Philadelphia-Climate-Action-Playbook.pdf

[xxi] Dahl, K., Spanger-Siegfried, E. Licker, R., Caldas, A., Cleetus, R., Udvardy, S., Declet-Barreto, J., & Worth, P. (2019). *Killer Heat in the United States: Climate Choices and the Future of Dangerously Hot Days*. Union of Concerned Scientists. https://www.ucsusa.org/resources/killer-heat-united-states-0

[xxii] Institute of Medicine of the National Academies. (2011). *Climate Change, the Indoor Environment, and Health*. https://www.nap.edu/catalog/13115/climate-change-the-indoor-environment-and-health

[xxiii] USGCRP. (2009). *Global Climate Change Impacts in the United States*. (T.R. Karl, J.M. Melillo, & T.C. Peterson, Eds.). United States Global Change Research Program. Cambridge University Press, New York, NY, USA. https://nca2009.globalchange.gov/index.html

[xxiv] Auffhammer, M., Baylis, P., & Hausman, C.H. (2017). Climate change is projected to have severe impacts on the frequency and intensity of peak electricity demand across the United States. *Proceedings of the National Academy of Sciences of the United States of America, 114*(8), 1886-1891.

[xxv] Burns, D.A., Lynch, J.A., Cosby, B.J., Fenn, M.E., Baron, J.S., & US EPA Clean Air Markets Division. (2011). *National Acid Precipitation Assessment Program Report to Congress 2011: An Integrated Assessment*. https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/2011_napap_508.pdf

[xxvi] Lall, U., Johnson, T., Colohan, P., Aghakouchak, A., Brown, C., McCabe, G., Pulwarty, R., & Sankarasubramanian, A. (2018). Water. In D.R. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, & B.C. Stewart (Eds.), *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (pp. 145–173). U.S. Global Change Research Program, Washington, DC, USA. DOI: 10.7930/NCA4.2018.CH3 Note: This is Key Message 2 from Chapter 3.

[xxvii] Clarke, L., Nichols, L., Vallario, R., Hejazi, M., Horing, J., Janetos, A.C., Mach, K., Mastrandrea, M., Orr, M., Preston, B.L., Reed, P., Sands, R.D., & White, D.D. (2018). Sector Interactions, Multiple Stressors, and Complex Systems. In D.R. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, & B.C. Stewart (Eds.), *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (pp. 638–668). U.S. Global Change Research Program, Washington, DC, USA. DOI: 10.7930/NCA4.2018.CH17

[xxviii] Dupigny-Giroux, L.A., Mecray, E.L., Lemcke-Stampone, M.D., Hodgkins, G.A., Lentz, E.E., Mills, K.E., Lane, E.D., Miller, R., Hollinger, D.Y., Solecki, W.D., Wellenius, G.A., Sheffield, P.E., MacDonald, A.B., & Caldwell, C. (2018) Northeast. In D.R. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, & B.C. Stewart (Eds.), *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (pp. 669–742). U.S. Global Change Research Program, Washington, DC, USA. DOI: 10.7930/NCA4.2018.CH18

[xxix] Ibid.

[xxx] Ibid.

[xxxi] Paul, M.J., Coffey, R., Stamp, J., & Johnson, T. (2019). A review of water quality responses to air temperature and precipitation changes 1: flow, water temperature, saltwater intrusion. *Journal of the American Water Resources Association, 55*(4), 824-843. https://pubmed.ncbi.nlm.nih.gov/34316251/

[xxxii] Coffey, R., Paul, M., Stamp, J., Hamilton, A., & Johnson, T. (2018). A review of water quality responses to air temperature and precipitation changes 2: nutrients, algal blooms, sediment, pathogens. *Journal of the American Water Resources Association, 55*(4), 844-868. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8048137/#__ffn_sectitle

[xxxiii] Paul, M.J., Coffey, R., Stamp, J., & Johnson, T. (2019). A review of water quality responses to air temperature and precipitation changes 1: flow, water temperature, saltwater intrusion. *Journal of the American Water Resources Association, 55*(4), 824-843. https://pubmed.ncbi.nlm.nih.gov/34316251/

[xxxiv] Coffey, R., Paul, M., Stamp, J., Hamilton, A., & Johnson, T. (2018). A review of water quality responses to air temperature and precipitation changes 2: nutrients, algal blooms, sediment, pathogens. *Journal of the American Water Resources Association, 55*(4), 844-868. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8048137/#__ffn_sectitle

[xxxv] Ibid.

[xxxvi] Ibid.

[xxxvii] University of Delaware. (2008). *Technical Summary: State of the Delaware Basin Report – A report on the health of the 13,539-square-mile Delaware River Basin in Delaware, New Jersey, New York, and Pennsylvania*. https://www.wrc.udel.edu/wp-content/uploads/2020/10/State-of-the-Delaware-Basin-Report-2008.pdf

[xxxviii] Dupigny-Giroux, L.A., Mecray, E.L., Lemcke-Stampone, M.D., Hodgkins, G.A., Lentz, E.E., Mills, K.E., Lane, E.D., Miller, R., Hollinger, D.Y., Solecki, W.D., Wellenius, G.A., Sheffield, P.E., MacDonald, A.B., & Caldwell, C. (2018). Northeast. In D.R. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, & B.C. Stewart (Eds.), *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (pp. 669–742). U.S. Global Change Research Program, Washington, DC, USA. DOI: 10.7930/NCA4.2018.CH18 Note: Most of this section is condensed and edited from Chapter 18 of NCA4.

[xxxix] Hayhoe, K., Wuebbles, D.J., Easterling, D.R., Fahey, D.W., Doherty, S., Kossin, J., Sweet, W., Vose, R. & Wehner, M. (2018). Our Changing Climate. In D.R. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, & B.C. Stewart (Eds.), *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (pp. 72–144). U.S. Global Change Research Program, Washington, DC, USA. DOI: 10.7930/NCA4.2018.CH2

[xl] Chesapeake Bay Program. (Accessed 2022, February 16) *Facts and Figures*. Discover the Chesapeake. https://www.chesapeakebay.net/discover/facts

[xli] NOAA. (2017). *NOAA Technical Report NOS CO-OPS 083.Global and Regional Sea Level Rise Scenarios for the United States*. https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf

[xlii] Food and Agriculture Organization of the United Nations (2015). *Food wastage footprint & climate change*. https://www.fao.org/3/bb144e/bb144e.pdf

[xliii] United Nations Environment Programme (2024). *Food Waste Index Report 2024*. https://www.unep.org/resources/publication/food-waste-index-report-2024

[xliv] U.S. EPA (2021). *From Farm to Kitchen: The Environmental Impacts of U.S. Food Waste*. https://www.epa.gov/system/files/documents/2021-11/from-farm-to-kitchen-the-environmental-impacts-of-u.s.-food-waste_508-tagged.pdf

[xlv] U.S. EPA (2020). *Advancing Sustainable Materials Management: 2018 Fact Sheet*. https://www.epa.gov/sites/default/files/2021-01/documents/2018_ff_fact_sheet_dec_2020_fnl_508.pdf

[xlvi] U.S. EPA (2024, April 1). *Basic Information about Landfill Gas*. https://www.epa.gov/lmop/basic-information-about-landfill-gas

[xlvii] U.S. EPA. (2024, April 1). *Quantifying Methane Emissions from Landfilled Food Waste*. https://www.epa.gov/land-research/quantifying-methane-emissions-landfilled-food-waste

[xlviii] U.S. EPA, Environmental Value of Compost (currently draft; soon to be published)

[xlix] Wilson, A., Reich, B.J., Nolte, C.G., Spero, T.L., Hubbell, B., Rappold, A.G. (2016). *Climate change impacts on projections of excess mortality at 2030 using spatially-varying ozone-temperature risk surfaces. Journal of Exposure Science & Environmental Epidemiology, 27*(1), 118-124. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5621597/

[l] U.S. EPA. (2024, April12). *From Farm to Kitchen: The Environmental Impacts of U.S. Food Waste*. https://www.epa.gov/land-research/farm-kitchen-environmental-impacts-us-food-waste

[li] U.S. EPA (2020). *Advancing Sustainable Materials Management: 2018 Fact Sheet*. https://www.epa.gov/sites/default/files/2021-01/documents/2018_ff_fact_sheet_dec_2020_fnl_508.pdf

[lii] U.S. EPA. (2024, April 1). *Quantifying Methane Emissions from Landfilled Food Waste*. https://www.epa.gov/land-research/quantifying-methane-emissions-landfilled-food-waste

[liii] United Nations Environment Programme. (2021). *UNEP Food Waste Index Report 2021*. https://www.unep.org/resources/report/unep-food-waste-index-report-2021