Altantic States
Marine Fisheries Commission

2022 Report on Atlantic States' Climate Change Initiatives

prepared by

Lisa N. Havel and the ASMFC Habitat Committee

Approved by the ISFMP Policy Board
August 2022

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Background

The Atlantic States Marine Fisheries Commission's (Commission) Habitat Committee (Committee), a branch of the Interstate Fisheries Management Program, was developed to identify, enhance, and cooperatively manage vital fish habitat for conservation, restoration, and protection, as well as support the cooperative management of the Commission and jointly managed species.

In 2016 the Committee identified each state's ongoing practices that address climate change impacts, with a focus on state coastal regulatory planning. In 2018 the Committee built upon the information gathered in 2016, adding new information since the report was produced, as well as identifying gaps in climate change initiatives among states and providing recommendations for the future. That report is available here: http://www.asmfc.org/uploads/file/6318db3eClimateChangeGaps_RecommendationsReport_Feb2018.pdf.

This document is an update to the 2018 report, containing information on current climate change initiatives and identifying high-level progress along the coast since the 2018 publication. It is meant to be informational in purpose, providing a snapshot of initiatives underway in each Atlantic coast state at the time of writing. The initiatives do not necessarily reflect the views of the Commission.

Summary of State Initiatives that Address Climate Change

The state initiative groupings remained unchanged from the 2018 publication to allow for direct comparisons. They are:

1. Established a working group or legislation to reduce carbon output
2. Established a working group or legislation to respond to climate change threats
3. Produced reports on climate change
4. Assesses and monitors the effects of climate change
5. Has mechanisms in place for collaboration among agencies and other organizations
6. Addresses climate change in planning documents
7. Has responded to climate change on the ground
8. Includes climate change in outreach efforts.

As of 2022, each state has implemented 5 - 8 of the initiative categories listed above. Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina currently have practices in place that meet all eight categories. In 2018, this was true for only New Hampshire, New York, New Jersey, and Virginia. A link to a table of each state's practices can be found in Appendix I. Currently, each initiative is being carried out by at least 13 of the 15 states (Figure 1). In 2018, only Initiatives 3, 4, and 6 were being carried out by at least all but two states (of the 14 states that provided data). Since then, all states have also established a working group

or legislation to respond to climate change threats (Initiative 2, up from 8 in 2018), produced reports on climate change (Initiative 6, consistent with 2018, but now includes information from Delaware), and included climate change in outreach efforts (Initiative 8, up from 9 in 2018). All states but one now assess and monitor the effects of climate change (Initiative 4, up from 12 in 2018) and have mechanisms in place for collaboration among agencies and other organizations (Initiative 5, up from 10 in 2018). Establishing a working group or legislation to reduce carbon output (Initiative 1) and responding to climate change on the ground (Initiative 7) still need addressing by two states, but these numbers are much improved from 2018 (only 9 states had initiatives at the time). Overall, there has been a lot of progress on climate action along the Atlantic coast over the last four years.

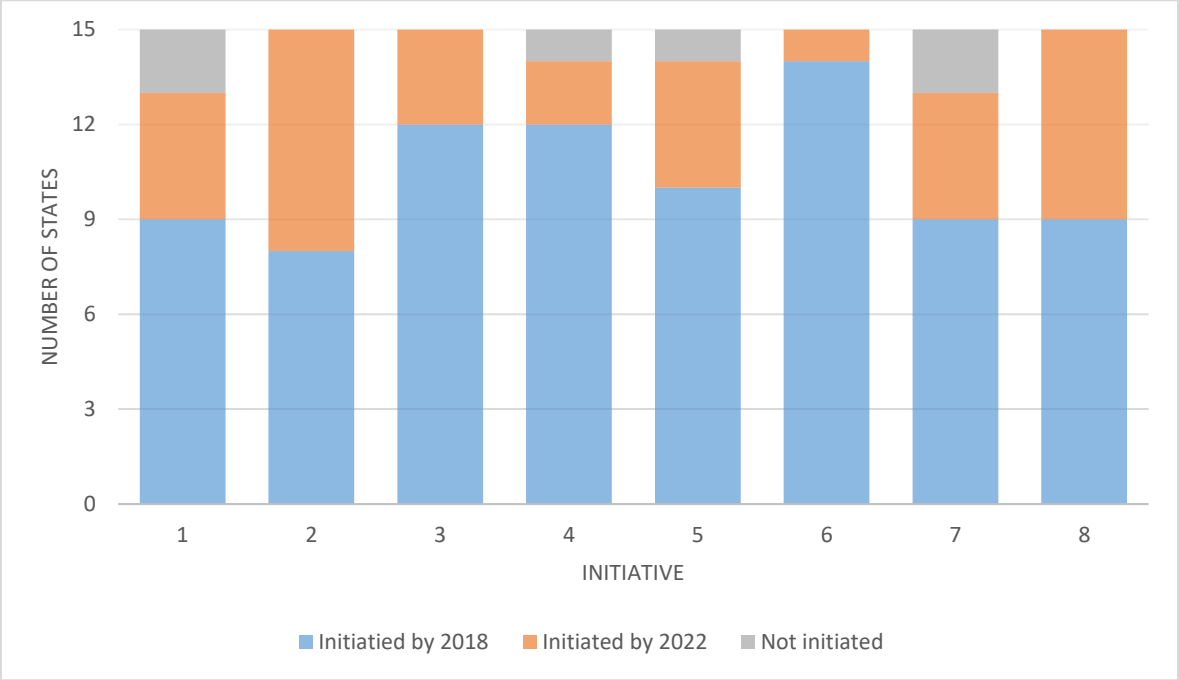

Figure 1. Number of Atlantic coast states carrying out each initiative category in 2022 compared with 2018. Note data were unavailable for Delaware in 2018 but the state is included in the 2022 data. List of categories can be found on page 1.

State Climate Change Initiatives

MAINE

The following is a 2021 update on the on the State of Maine's climate change initiatives, as well as links to documents and websites.

Legislation and Climate Planning

At the initiative and with the leadership of Governor Janet T. Mills, Maine enacted laws in 2019 to reduce emissions by 45% by 2030 and at least 80% by 2050, to increase Maine's renewable energy portfolio standard, to create the Maine Climate Council (MCC), and to develop a climate action plan to be updated every four years.

The MCC was formed in September 2019, structured around multiple, topic-specific working groups (including a coastal and marine group). The Council was informed by a number of commissioned background studies and publications[1]. A two-year participatory process followed, led by Governor Mills' Office of Policy Innovation and the Future resulting in *Maine Won't Wait: A Four-Year Plan for Climate Action*. The Plan presents strategies to mitigate Maine's climate footprint and adapt to anticipated effects of climate change including:

- Accelerating the conversion to electric vehicles (EVs) and reducing vehicle miles driven;
- Improving home and building energy efficiency and modernization;
- Increasing clean energy sources and growing the clean economy sector;
- Supporting resiliency and adaptation by conserving and restoring natural habitats;
- Increasing technical support for community adaptation;
- Investing public dollars; in climate-resilient infrastructure; and
- Increasing communication and awareness about climate change.

Numerous strategies presented in the plan relate directly to coastal communities, working waterfront climate resilience, conserving and restoring coastal and marine habitats, and mapping and modeling climate impacts on habitats and species. Additionally, the Governor's Office of Policy Innovation and the Future is focusing on creating a comprehensive information exchange for coastal and marine climate change monitoring and is developing technical assistance programs for coastal communities and the seafood business sector in partnership with the University of Maine.

[1] These include: *Scientific Assessment of Climate Change and its Effects in Maine* (Maine Climate Council's Science and Technical Subcommittee); *Strengthening Maine's Clean Energy Economy* (Governor's Energy Office and Office of Policy Innovation and the Future); *Assessing The Impacts Climate Change May Have On The State's Economy, Revenues, And Investment Decisions* (Eastern Research Group and Synapse Energy Economics); and *Equity Assessment of Work Group Recommendations* (University of Maine Senator George J. Mitchell Center for Sustainability Solutions).

Multiple Maine state agencies, together with universities, NGOs, and other partners, are charged with implementing the plan.

In addition to this overarching initiative, multiple state efforts have continued or have been recently developed to support climate resilience in coastal and marine areas. Some of these efforts are detailed below.

New Efforts and Resources

- Improved Monitoring. The Department of Marine Resources continues to implement a wide range of fisheries research monitoring activities that both track and document shifting species ranges and are used for stock assessments. The ME/NH nearshore trawl survey provides a time series beginning in 2020. The Department of Marine Resources has also maintained an Environmental Monitoring Program in Boothbay Harbor for over a century. The observations began in March of 1905 and constitutes one of the longest running, continuous series of sea temperature observations for any point on the North American Atlantic Coast. In 2020, the Department added continuous monitoring of pH, dissolved oxygen, and carbon dioxide to monitor ocean acidification (OA) over time. Observations of air temperature, barometric pressure, sea surface temperature, relative humidity, wind speed, and wind direction are recorded at daily intervals. Finally, species-specific monitoring and commercial fisheries data provide long-term datasets that are used in climate forcing models.
- Climate Change and Biodiversity in Maine: Vulnerability of Habitats and Priority Species (2014) classified the vulnerability of the species and habitats to climate change.
- Maine State Wildlife Action Plan (WAP) (2015) addresses the full array of Maine's wildlife across all taxa groups and habitats and identifies 378 Species of Greatest Conservation Need. The WAP provides species-specific and habitat-based actions to help prevent further species declines over the next 10 years.
- The Maine Stream Connectivity Work Group, led by the Department of Marine Resources, is working to minimize the impacts of road crossings on Maine's aquatic systems, through the development of best management practices, sharing of technical resources, project identification and implementation, development of outreach and training materials and workshops, and direct project technical assistance.
- The Stream Smart Program works with contractors, landowners, and other professionals responsible for freshwater road-stream crossings to construct culverts that maintain fish and wildlife habitat while protecting roads and public safety. The Maine Stream Habitat Viewer provides a starting point for towns, private landowners, and others to learn more about stream habitats across the state.
- The CoastWise Approach for Tidal Crossing Design. CoastWise provides a voluntary set of best practices, decision-making tools, and path for designing safe, cost-effective, ecologically supportive, and climate-resilient tidal crossings. The new Tidal Restriction Atlas is a tool that shows which crossings are tidal now or likely to be in the coming decades. Pilot projects are underway that 1) demonstrate appropriate methods for assessing tidal crossings in light of sea level rise (SLR) including tidal hydrodynamic modeling, 2) assist communities with weighing best solutions and reaching community consensus, sound design, and funding for restoration.
- Sentinel Marsh Monitoring Sites. During 2017-2018, the Maine Coastal Program/Department of Marine Resources and its partners established sentinel monitoring sites at 11 marshes spanning the coastline to document changes in salt marshes over time through monitoring elevation using deep Rod Surface Elevation Tables (RSETs), tidal inundation and duration, and vegetation change at 11 marshes spanning the coastline. The Maine Geological Survey and Maine Natural Area Program have

developed new coastal inundation models due to SLR and storm surges, and have created simulations of potential marsh migration under several different SLR scenarios.

- Maine Blue Carbon Mapping. *Maine Won't Wait* calls for a comprehensive inventory of potential Blue Carbon resources in Maine. The Maine Department of Environmental Protection will be conducting regular (every five years) state-wide mapping of salt marsh and eelgrass habitats. The mapping program will update knowledge of eelgrass distribution along the approximately 75% of Maine's coastline that has not been surveyed for as many as 18 years. The Maine Coastal Carbon Group also formed in 2020 to support and expand research, conservation, and management actions for blue carbon ecosystems.
- Living Shorelines Regional Pilot Project. In collaboration with the National Oceanic and Atmospheric Administration (NOAA) and The Nature Conservancy (TNC), the states of Maine, New Hampshire, Connecticut, Massachusetts, and Rhode Island are participating in projects to build and monitor living shorelines. Maine's pilot includes three sites in Casco Bay. Monitoring at each site is providing data about efficacy of the treatments and habitat impacts and will assist Maine in providing a regulatory path for increased use of living shorelines where conditions allow.
- Offshore Wind Initiative. Launched in June 2019 by Governor Janet Mills, Maine is exploring opportunities for thoughtful development of offshore wind energy in the Gulf of Maine and determining how to best position Maine to benefit from an industry expected to generate $1 trillion in global investment by 2040. The Initiative aims to balance development of the industry with the impacts on Maine's commercial fishing heritage and other existing marine uses. Other aspects of Maine's work on offshore wind (OSW) are:
  - Formation of Maine Offshore Wind Roadmap – a participatory process to engage multiple stakeholders to identify how to foster an offshore wind industry that works for Maine's people, Maine's economy, and Maine's heritage. Maine Department of Marine Resources co-chairs the Roadmap's Fisheries Working Group.
  - State of Maine application to Bureau of Ocean Energy Management (BOEM) for the country's first offshore floating wind research array in the Gulf of Maine (anticipated in winter/spring 2022).
  - Participation in the regional BOEM Task Force to identify potential opportunities for renewable energy leasing and development on the Outer Continental Shelf in the Gulf of Maine.

NEW HAMPSHIRE

The New Hampshire Fish and Game Department (NHFG) is addressing climate change through four different avenues: planning, science, outreach, and communication.

The NHFG's 2015 WAP Update specifically recognized climate change as a risk factor for both habitats and species. Because of this, species and habitat profiles include their sensitivity to climate change-related parameters, and the weighted risk of those species and habitats in regards to impacts such as SLR, changes in precipitation, increased storm activity, changes to air and sea temperature, etc.

The Great Bay National Estuarine Research Reserve (NERR, part of NHFG) continuously monitors salt marsh distribution and condition along with information about the salinity of pore water and marsh elevation. Periodically, tidal water levels are also measured. High resolution tidal wetland maps have been completed for New Hampshire and will be evaluated for shifts over time. Over time, this information will help inform if and how SLR is impacting salt marsh health at three sites around Great

Bay. NHFG also has detailed habitat maps for Great Bay and the whole coastal region. These are considered baseline maps from which to compare future changes. The Sea Level Affecting Marsh Migration Model (SLAMM) was run for all of coastal New Hampshire as a part of the WAP, predicting how salt marsh distribution is likely to change under different SLR scenarios and where there is potential for migration. This information was combined with current condition information to determine where the highest quality marsh is likely to migrate, and where restoration opportunities are likely to be valuable in light of potential SLR. Great Bay NERR conducts eco-tone monitoring to see how the upland edge of tidal wetland are changing, and has deployed picture posts, soundscape monitoring, eDNA and wildlife cameras to observe shifts in biological communities and phenology changes over time.

The Great Bay NERR participates in a Coastal Adaptation Workgroup – a group of outreach professionals that coordinate to bring the best climate-related science to local communities. Much of this revolves around wise planning to protect both natural and built assets. The Great Bay NERR hosts a Climate Summit each spring (topics this year include: living shorelines, presentations about the WAP, fisheries impacts in the Gulf of Maine, impacts on groundwater along the coast, culvert assessment work, dune restoration, city planning case studies, etc.). NHFG is also incorporating climate-related messages into their K-12 and teacher education programs. Teacher training workshops are focused on how protected places can be observed to determine climate-related impacts over time; and volunteers conduct a phenology program to track changes at the Great Bay Discovery Center.

NHFG participates in cross-state agency climate and sustainability coordination and is a key partner in efforts to promote updated climate science in local decision making. Specifically, Great Bay NERR represents NHFG on state efforts to update coastal climate science and policy recommendations as continual follow up to a 2014 Coastal Hazards and Risks Commission.

Additional Links:

The NH Fish and Game Department's Wildlife Action Plan:
http://www.wildlife.state.nh.us/wildlife/wap.html

The State of New Hampshire website: https://www.nh.gov/index.htm

The NH Department of Environmental Services: https://www.des.nh.gov/climate-and-sustainability

MASSACHUSETTS

In 2008 Massachusetts passed a Global Warming Solutions Act to reduce emissions, increase green infrastructure, and to analyze strategies for adapting to predicted changes in climate. The Massachusetts Climate Change Adaptation Report was released in September 2011 by the Executive Office of Energy and Environmental Affairs (EEA) and includes an overview of anticipated impacts and key adaptation strategies to increase resilience and preparedness. The report provides practical adaptation strategies for predicted changes in climate in Massachusetts, including support for improving existing public health, health care, local health infrastructure, and community resilience programs. In 2017 the MA Municipal Vulnerability Preparedness (MVP) Grant Program was created to provide support for cities and towns to identify climate hazards, assess vulnerabilities, and develop action plans to improve resilience to climate change. Communities that complete the MVP Planning Grant process become designated as an MVP Community and are eligible for MVP Action Grant funding to implement

the priority actions identified through the planning process. MVP Action Grants administered by EEA provide support for communities to plan and design adaptations to climate change hazards, which also protect public health. MVP Action Grants can address heating and flooding, extreme weather, SLR, and other climate-related issues. In 2018, Massachusetts passed an act promoting climate change, environmental and natural resource protection, and investment in recreational assets and opportunity. The Act established a special legislative commission to investigate and study OA. The OA Commission released their Report on the Ocean Acidification Crisis in Massachusetts in 2021 urging fast action to address increasing OA and to protect the region's economically important shellfish industry. Also in 2018, the first State Hazard Mitigation and Climate Adaption Plan, was released, combining the five-year update of the Federal Emergency Management Agency (FEMA) State Hazard Mitigation Plan with climate change projections and adaptation information.

Massachusetts sits on the boundary of two biogeographic provinces, the Gulf of Maine and the Mid-Atlantic Bight and has documented shifts in species range distributions of several species, including black sea bass, American lobster, and northern shrimp. Additional shifts in the distribution and abundance of important commercial and recreation fish species are expected as a result of climate change. To monitor changing environmental conditions in state waters, the MA Division of Marine Fisheries (DMF) has been compiling bottom temperature data, at 60-70 sites across the state since 1987 into a database, collecting over two million temperature readings to date. Additionally, DMF also has trawl survey data back to the 1970's.

DMF's Fisheries Habitat Program continues to develop and execute research and restoration projects that demonstrate aquatic habitat benefits, address cumulative impacts, and focus on climate change. Projects undertaken since 2015 include examining the use of dredged rock material for shoreline protection and fisheries habitat enhancement, shading impacts of docks and piers on salt marsh, and addressing impacts of conventional vs. conservation moorings on eelgrass habitats.

DMF continues its participation in multiple wind-energy activities, including conducting technical review of projects in the Massachusetts Wind Energy Area (WEA), attending offshore wind research and monitoring priorities workshops and meetings, and fulfilling advisory roles for research and stakeholder engagement efforts. DMF also reviews marine resource and habitat monitoring plans, impact assessments, and permits for offshore export cables in Commonwealth waters. Topics of concern include species vulnerabilities in Nantucket Sound and compensatory mitigation for affected fisheries.

RHODE ISLAND

In July 2014, the Rhode Island General Assembly approved the Resilient RI Act (RIGL §42-6.2), which formally established the Executive Climate Change Coordinating Council, as well as set specific greenhouse gas (GHG) reduction targets, and incorporated consideration of climate change impacts into the powers and duties of all state agencies. The Coordinating Council is comprised of Directors and Commissioners from nine state agencies/offices and is supported by an Advisory Board and Science and Technical Advisory Board. It is charged with leading and coordinating state agencies in responding to the challenges posed by climate change in a timely and effective manner, focusing in particular on:

- assessing, integrating, and coordinating efforts throughout state agencies to reduce GHG emissions, strengthen the resilience of communities, and prepare for the impacts of climate change;

- improving our understanding of the effects climate change will have in RI;
- working in partnerships to identify, develop, and implement strategies to be better prepared, and reduce risk and losses.

There are several projects underway that will provide information to support future Coordinating Council recommendations. A few coastal-related projects include the following. As first step in helping to reduce Rhode Island's GHG emissions is the completion of the 30-Megawatt Block Island Offshore Wind Project. This was the first offshore wind project in the country. Located approximately three miles southeast of Block Island, the project, which started construction in 2015, is now complete. The spatial planning and fisheries-related research and monitoring used to guide this work may provide a blueprint for other states and coastal communities.

To assess the effects climate change in Rhode Island the Executive Council's Science and Technical Advisory Board prepared a brief synopsis of the state of knowledge of the following manifestations of climate change: SLR, warming air temperatures, warming water (marine and fresh) temperatures, storm frequency and intensity, biodiversity (changes in species and habitats), and precipitation and inland flooding. The information summarized in this report will assist state agencies, decision-makers, and the public understand the real impacts RI is already experiencing due to a changing climate.

The Coastal Resources Management Council continues work on the Shoreline Change Special Area Management Plan, developing scientifically based data and tools to aid in coastal hazard adaptation planning. The Management Council has completed revised Shoreline Change Maps for the south shore communities showing how Rhode Island's shoreline has changed over time due to erosion, and how we might expect it to change in the future. Additional tools and other key resources are available from the website to aid the state and municipalities in supporting sound policy decisions which address coastal erosion, SLR, and storm surge inundation problems.

The Department of Environmental Management has also addressed considerations related to climate change throughout the recently updated State WAP. In short, WAP reviewed vulnerability assessments for several species of great concern, identified threats to species and their habitats, and proposed actions to reduce these threats. In addition, the Division of Fish and Wildlife's Marine Fisheries Section continues to conduct long-term monitoring programs and collaborate on several local and regional research projects investigating the effects of climate change on managed species and the state's marine resources. State WAPs also have to specifically take into account climate change adaptation. Climate change is primarily in Chapters 1 (species), 2 (habitats), 3 (threats), and 4 (actions to abate threats to species and habitats).

In October 2015, the State Planning Council voted to adopt Rhode Island's new State Energy Plan "Energy 2035" as an element of the State Guide Plan, codifying the Plan as the state's formal long-term, comprehensive energy strategy. The Plan, produced by the Office of Energy Resources in collaboration with the Division of Planning, represents Rhode Island's first data-driven energy planning and policy document. Its vision is to provide energy services across all sectors—electricity, thermal, and transportation—using a secure, cost-effective, and sustainable energy system.

In January 2016, the Management Council adopted amendments to Section 145 - Climate Change and Sea Level Rise of the Coastal Resources Management Program to update SLR projections for short-, mid- and long-term timelines of 2035, 2050, and 2100 respectively, as calculated using the current NOAA methodology, and based on the Newport, RI NOAA tide gauge.

In early 2016, Rhode Island Office of Energy Resources launched the state's first ever EV rebate program to support adoption of EVs by Ocean State drivers: Driving RI to Vehicle Electrification (DRIVE). The program made $200,000 available for qualified RI residents interested in purchasing or leasing an EV to apply for a financial rebate of up to $2,500, based upon vehicle battery capacity. Modeled closely on existing rebate programs offered in other states, DRIVE offers the potential to increase the total number of EVs on RI roadways by 20-35%.

CONNECTICUT

Recently the Connecticut's Governor issued an Executive Order on climate. Executive Order No. 21-3 calls for 23 actions that were proposed by the Governor's Council on Climate Change (GC3) in its January 2021 report. These actions cut across state agencies and sectors in the following areas:

- Buildings and infrastructure;
- Clean transportation;
- Community climate resilience;
- Health, equity, and environmental justice;
- Jobs and the economy; and
- Natural and working lands.

In the General Assembly, the Public Act 490 Program Extended was extended to Aquaculture. The new law extended Connecticut's PA 490 program to certain aquaculture operations, including underwater farmlands and waterfront property used for commercial shellfishing. The PA 490 program allows farm, forest, open space, and maritime heritage land to be assessed for property tax purposes based on current use value rather than fair market value. In exchange for the reduced assessment, the property owner cannot change the land's use for a period of time. By law, if the use changes within 10 years of ownership or classification, a conveyance tax penalty is charged to the owner (PA 21-24, effective October 1, 2021, and applicable to tax assessments on and after that date).

Sections 1 and 2 of this Public Act allow the Commissioner of Agriculture to contract for the use of a shell recovery vessel to collect and deposit shell on shellfish beds. By updating these statutes, the Department of Agriculture is authorized to pursue alternative funding for this program--including any private, state, or federal grants.

Other major acts of the 2021 legislative session can be found here.

NEW YORK

Legislative Updates

On July 18, 2019, the Climate Leadership and Community Protection Act (CLCPA) was signed into law. New York State's Climate Act is among the most ambitious climate laws in the nation and requires New York to reduce economy-wide GHG emissions 40% by 2030 and no less than 85% by 2050 from 1990

levels. The law creates a Climate Action Council charged with developing a draft scoping plan that serves as an initial framework for how the State will reduce GHG emissions and achieve net-zero emissions, increase renewable energy usage, and ensure climate justice. The CLCPA amended the Climate Risk and Resiliency Act of 2014 to expand the list of State permit programs covered by the law, as well as the scope of climate hazards that must be considered in these permit programs.

The Community Risk and Resiliency Act (CRRA), as enacted in 2014, included five major provisions. The 2019 Climate Leadership and Community Protection Act amended the CRRA as noted below:

- **Official SLR Projections** - CRRA required the Department of Environmental Conservation (DEC) to adopt science-based SLR projections by regulation.
  - Projections of SLR for three geographic regions of the state relative to a year 2000-to-year-2004 baseline are available here**.**

- **Consideration of future physical climate risk** - As originally enacted, the CRRA required applicants for permits or funding in several specified programs to demonstrate that future physical climate risk due to SLR, storm surge, and flooding had been considered in project design, and that DEC consider incorporating these factors into certain facility-siting regulations. The CLCPA amended the CRRA to include all permits subject to the Uniform Procedures Act. The CLCPA also expanded the scope of the CRRA to require consideration of all climate hazards, not only SLR, storm surge, and flooding, in these permit programs.

- **Smart Growth Public Infrastructure Policy Act Criteria** - CRRA added mitigation of risk due to SLR, storm surge, and flooding to the list of smart-growth criteria to be considered by state public infrastructure agencies.
  - DEC has released Guidance for Smart Growth Public Infrastructure Assessment. This document is intended to guide state agencies as they assess mitigation of SLR, storm surge, and flooding in siting and design of public infrastructure projects.

- **Guidance on Natural Resilience Measures** - The CRRA required DEC, in consultation with the Department of State (DOS), to develop guidance on the use of natural resources and natural processes to enhance community resilience.
  - Natural resilience measures are actions that conserve, restore, or mimic natural landforms and processes to reduce climatic risks. DEC and DOS have released Using Natural Measures to Reduce the Risk of Flooding to serve as a guide to selection and planning of natural resilience measures.
  - DEC and DOS have released the State Flood Risk Management Guidance (SFRMG). The SFRMG recommends flood risk management guideline elevations that incorporate possible future conditions, including the greater risks of coastal flooding presented by SLR and enhanced storm surge, and of inland flooding expected to result from increasingly frequent extreme precipitation events.

- **Model Local Laws Concerning Climate Risk** - CRRA required DOS, in cooperation with DEC, to develop model local laws to increase community resilience.
  - Released in November 2020, these model laws provide guidance on specific measures that localities can take to reduce flood risk by managing development in high-risk areas and

preserving natural features like wetlands and dunes that provide protection against flooding.

Observed and Projected Climate Change in New York State: An Overview

Disadvantaged Communities Barriers and Opportunities Report assesses why some communities are disproportionately impacted by climate change and air pollution and have unequal access to clean energy. This report identifies barriers faced by disadvantaged communities and recommends actions for New York State agencies to design climate mitigation and adaption programs through a lens of justice.

NY State Climate Impacts Assessment

In partnership with leading academic institutions, science organizations, community leaders, and others, New York State is undertaking a comprehensive research effort to better understand and document how climate change is affecting our state, what future impacts may be, and how we can prepare for them. The New York State Climate Impacts Assessment development effort was launched in June 2021 and is scheduled to be completed by early 2023. The goal of this assessment is to provide the science and information that will allow decision makers at all levels to make informed choices about their future: whether that's a local municipality, state agency, or individual business or landowner.

Offshore Wind

Under New York's Clean Energy Standard and the Climate Leadership and Community Protection Act, New York State is committed to providing 70% of New York State's electricity from renewable sources such as wind, solar, and hydroelectric power by 2030 and be 100% carbon free by 2040. To help reach this goal, New York State has committed to developing 9,000 megawatts of offshore wind by 2035, which is enough to power up to 6 million homes.

The New York State Energy Research and Development Authority (NYSERDA) has held two competitive solicitations for offshore wind energy, bringing totals to over 4,300 megawatts under active development statewide.

During the 2018 solicitation, NYSERDA selected and contracted with two offshore wind projects totaling nearly 1,700 megawatts:

- **Empire Wind 1:** (816 megawatts, Equinor Wind LLC) Located 11.5 nautical miles (nm) from Jones Beach, NY, encompassing the western portion of the lease area.
- **Sunrise Wind:** (880 megawatts, Ørsted A/S and Eversource Energy) The project area is approximately 30 miles east of Montauk Point.

During the 2020 solicitation, Equinor was provisionally awarded two other offshore wind projects totaling 2,490 megawatts:

- **Empire Wind 2** (1,260 megawatts) Located 11.5 nm from Jones Beach, NY, encompassing the eastern portion of the lease area.
- **Beacon Wind** (1,230 megawatts) Located 60 miles east of Montauk Point.

Climate Smart Communities Program

Climate Smart Communities (CSC) is a New York State program that helps local governments take action to reduce GHG emissions and adapt to a changing climate. Communities can become registered by committing to act and passing the CSC pledge, or can become certified by going beyond the CSC pledge, completing and documenting a suite of actions that mitigate and adapt to climate change at the local level. There are currently 350 registered CSCs in New York; 80 of these are certified.

The Climate Smart Communities Grant Program, established in 2016, is a 50/50 matching grant program that supports municipalities seeking to become certified Climate Smart Communities and/or implement projects that advance New York's goals to reduce GHG emissions and adapt to the ongoing impacts of climate change by reducing flood risk, increasing natural resiliency, and relocating or retrofitting critical infrastructure. In the first five years of this grant program, DEC has awarded more than $50 million to municipalities in support of local climate mitigation and adaptation projects.

Estuary Program Support and Ongoing Research

New York continues to support and work closely with several National Estuary Programs and NERR sites within the state. Research and monitoring performed or supported by these groups is integrated into climate change management plans and state WAPs, ultimately affecting how we manage resources. In 2019, coastal vulnerability assessments were released for Long Island Sound and the Peconic Estuary. These reports assess at-risk natural resources and infrastructure, develop adaptation strategies, support low impact development and green infrastructure, and include wetland migration pathway modeling to advise management decisions.

New York participates in a variety of monitoring networks and ongoing research studies. These include climate sentinel monitoring projects, sediment elevation tables, water quality and tide gauge monitors, tidal wetland rapid health assessments, and marsh loss trend analyses. The State funds and provides support for many conservation and wetland restoration efforts and for the acquisition of open space to support habitat connectivity and promote the resiliency of these critical habitats in the face of a changing climate.

NEW JERSEY

In a continuous effort towards a stronger New Jersey, Governor Phil Murphy signed Executive Order No. 89 on October 29, 2019 appointing a Chief Resilience Officer establishing and a Climate and Flood Resilience Program within the New Jersey Department of Environmental Protection (DEP) and directing development of New Jersey's first Scientific Report on Climate Change. Further, it establishes an Interagency Council on Climate Resilience to develop a Statewide Climate Change Resilience Strategy to promote the long-term mitigation, adaptation and resilience of New Jersey's economy, communities, infrastructure, and natural resources.

The 2020 New Jersey Scientific Report on Climate Change summarizes the current and predicted future impacts of climate change that are specific to our natural and built environments and is intended to inform state and local decision makers as they seek to understand and respond to the impending impacts. This report identifies and presents the best available science and existing data regarding the

current and anticipated environmental effects of climate change globally, nationally, and regionally. The report received the 2021 Notable Document award from the Legislative Research Librarians section of the National Conference of State Legislatures: http://tinyurl.com/NCSLnotabledocs.

The Interagency Council on Climate Resilience (Interagency Council), comprised of 17 state agencies, was established to develop short- and long-term action plans that will promote the long-term mitigation, adaptation, and resilience of New Jersey's economy, communities, infrastructure, and natural resources. In addition to these coordinated efforts, the Interagency Council will support the development and implementation of the draft Climate Change Resilience Strategy that will guide and inform State actions to address the impacts of climate change.

New Jersey's first Statewide Climate Change Resilience Strategy provides a suite of forward-looking policy options to promote the long-term resilience of New Jersey to climate change. As a framework for policy, regulatory, and operational changes, the Resilience Strategy presents actions that New Jersey's Executive Branch can take to support the resilience of the state's communities, economy, and infrastructure. The Draft Resilience Strategy includes 127 recommended actions across six priority areas.

The Global Warming Response Act (GWRA) GWRA 80x50 Report was written in response to the mandate in the GWRA, to reduce New Jersey's GHG emissions by 80% from their 2006 levels by 2050. This report builds on the State's previous efforts to address and reduce GHG emissions and serves as the third element of a comprehensive plan that evaluates New Jersey's GHG emissions from both energy and non-energy systems, providing guidance, policies, and regulatory and legislative recommendations to meet the State's GHG emission reduction goals.

Other NJ climate change initiatives are:

- Regional Greenhouse Gas Initiative (RGGI): https://www.state.nj.us/dep/aqes/rggi.html#/
- Resilient NJ- Climate Change Toolkit: https://experience.arcgis.com/experience/9daab51c2f5542969d50437522e012c4
- Coastal Ecological Restoration and Adaptation Plan (CERAP): https://www.nj.gov/dep/climatechange/docs/cerap-factsheet.pdf
- NJ DEP SLR Guidance: https://www.nj.gov/dep/slr/
- Stormwater Infrastructure Toolkit: https://www.nj.gov/dep/floodresilience/toolkit.html
- NJ is a member of the OA Alliance: https://www.oaalliance.org/
- NJ Protecting Against Climate Threats (PACT): https://www.nj.gov/dep/njpact/
- Shore Protection Fund - https://www.nj.gov/dep/shoreprotection/funding.htm

PENNSYLVANIA

The Pennsylvania Fish and Boat Commission (PFBC) recognizes the current and anticipated impacts of climate change on fish and fish habitat in its Strategic Plan and has adopted *Resilience* as a guiding principle to help achieve its "mission to protect, conserve, and enhance aquatic resources and provide fishing and boating opportunities," even amidst changing environmental conditions.

The Pennsylvania Climate Change Act of 2008 requires the Pennsylvania Department of Environmental Protection (DEP), to produce: 1) a report detailing the impacts of climate change and 2) a report outlining the state's Climate Action Plan, both to be updated every three years. In the most recent

Climate Impacts Assessment (2021), the effects of increased water temperature and the concomitant decrease in dissolved oxygen in the freshwater tidal portion of the Delaware Estuary were recognized (p. 47). Similarly, the assessment outlined the impacts of SLR and increased salinity on Pennsylvania's portion of the Delaware Estuary, highlighting potential changes in community composition and alterations to tidal wetlands (p. 96). To address these impacts, the commonwealth's Climate Action Plan identifies several strategies designed to help mitigate the impacts of climate change. Strategies relevant to Pennsylvania's portion of the Delaware Estuary include: 1) conserving and enhancing fish habitat and habitat connectivity (pp.46, 95), 2) implementing living shoreline programs (pp.46, 95), 3) reviewing regulatory structures that govern fisheries habitats and identifying ways to improve their ability to address the impacts of climate change (pp.46, 99), and 4) improving fish passage across the state (pp.47, 112).

In addition to the Commonwealth's Climate Change Impact Assessment and Climate Change Action Plan, the 2015-2025 Pennsylvania WAP outlines the potential threats that climate change poses to Species of Greatest Conservation Need including American eel (*Anguilla rostrata*), river herring (blueback herring; *Alosa aestivalis* and alewife; *Alosa pseudoharengus*), American shad (*Alosa sapidissima*), and Atlantic sturgeon (*Acipenser oxyrhynchus*). Although not a regulatory document, the plan recommends the expansion and development of "sentinel sites" to help monitor the impact of climate change on Species of Greatest Conservation Need and their habitats (Appendix 4.3, 4-140).

DELAWARE

Governor John Carney released Delaware's Climate Action Plan in November 2021. The main goals of the Climate Action Plan are to reduce GHG emissions and to better prepare for the impacts of climate change by prioritizing clean energy and improved energy efficiency, providing support to state agencies in resilience efforts, and increasing research and monitoring.

Through Governor Carney's commitment to the U.S. Climate Alliance, Delaware has adopted a goal of reducing the state's GHG emissions by 26 to 28% by 2025 from 2005 levels. A Delaware Climate Action Plan was developed to meet that goal, plan for further emissions reductions in the years beyond, and determine priority areas to continue building the state's resilience to climate change impacts.

Delaware's past and present actions to minimize emissions have focused on the areas of clean and renewable energy, energy efficiency, transportation, and reducing "high global warming potential" GHGs. Examples include:

- **Delaware's Renewable Energy Portfolio Standards Act**: A 2005 law requiring the state's utilities to get an increasing percentage of electricity from renewable sources
- **Code for Energy Conservation**: Delaware updated building energy codes in 2020, which aim to improve energy efficiency and cost savings
- **Renewable Energy and Energy Efficiency Incentive Programs**: This includes Delaware Department of Natural Resources and Environmental Control (DNREC) programs like the Green Energy Program and Energy Efficiency Investment Fund
- **DNREC's Clean Transportation Incentive Program**: Individual and business rebates to offset the cost of purchasing zero-emission vehicles and related charging infrastructure

- **DNREC's "Cool Switch" Low Impact Refrigerant Program**: Incentives to switch from hydrofluorocarbon refrigerants to those with more limited climate change impacts

Delaware's past and present actions to maximize resilience have focused on the areas of policy, planning, and regulations; capacity-building for state and local governments; and developing research, data, and tools. Examples include:

- **SLR Planning**: A five-year effort, starting in 2009, provided a vulnerability assessment, recommendations for adaptation, and planning scenarios for the state
- **Climate Framework for Delaware**: This 2014 report outlined state agency actions to adapt to climate change; a related output was a flood avoidance guide for state assets
- **Technical Assistance and Funding**: Initiatives like the Resilient Community Partnership, Coastal Training Program, Strategic Opportunity Fund for Adaptation, and Sustainable Communities Planning Grant Program support local or state government climate action
- **Delaware Climate Change Impact Assessment**: This report, compiled in 2014, provides climate change projections for heat and precipitation to the year 2100
- **Coastal Inundation Maps**: The Delaware Geological Survey developed maps in 2017 to inform infrastructure, facility, land use, and capital spending planning for SLR

Identified through analysis and stakeholder input throughout the development of the climate action plan, DNREC identified four strategies to prioritize to minimize emissions and seven strategies to maximize resilience:

Strategies to Minimize GHG Emissions

1. **Clean and renewable energy** expansion, which has the greatest potential to reduce emissions in the long term;
2. **Energy efficiency** measures, which can be put in place relatively quickly and implemented through existing programs;
3. **Transportation** sector transitions to zero-emission vehicles and more efficient transportation systems; and
4. **High global warming potential GHG** reduction and management of GHGs other than carbon dioxide.

Strategies to Maximize Resilience

1. **Update or create state regulations** that address protection and conservation of vulnerable and impacted resources;
2. **Support for communities and stakeholders** in the form of trainings, resources, and technical assistance;
3. **Management plans** for natural resources, emergency response, state facilities, and agency equipment;
4. **Facility design and operation** that accounts for future climate conditions;
5. **Research and monitoring** that studies the impacts of climate change and methods of adapting;
6. **Outreach and education** on climate change impacts and adaptation; and
7. **Agency support** that provides the resources to implement the resilience actions.

For complete information on the items referenced above and strategy for the path forward to meet these climate initiatives please visit Delaware's Climate Action Plan website.

MARYLAND

Maryland has made a strong commitment to reducing GHG emissions in the state and has taken a number of actions to plan for and adapt to a changing climate. The 2030 Greenhouse Gas Reduction Plan was finalized in 2020, which charts a path towards a 40% reduction of 2006 level GHG emissions by 2030 and carbon neutrality by 2045. The goal has since been expanded by Governor Hogan to a 50% reduction by 2030. This plan meets the requirement of the 2009 Greenhouse Gas Emissions Reduction Act, which required a reduction of GHG emissions by 25% by 2020 and the 2016 legislative update requiring the 40% reduction by 2030. The plan considers how all sectors' (energy, transportation, agriculture, etc.) can contribute to reducing emissions and has more than 150 programs and initiatives to address carbon emissions related to energy, construction, fisheries, forestry, etc. The final 2020 GHG inventory for the state will not be released until the end of 2021 but preliminary results indicate Maryland will have achieved the 25% emissions reduction goal.

Maryland, via the Adaptation and Resiliency Working Group (ARWG) of the Maryland Commission on Climate Change is evaluating and updating the state's adaptation strategy by developing the Maryland Climate Adaptation and Resilience Framework: 2021- 2030 Framework. The intent of the Framework is to guide and prioritize action over the next 10 years, specifically in vulnerable and under-served communities. In 2020, ARWG identified five key sectors: natural resources, working lands and resources-based economies, human health, water resources - quality and quantity, and protecting critical infrastructure, and three focus areas that will be integrated into all of the sectors: diversity and environmental justice, climate jobs and training, and local government action and state service delivery. Bringing together over 80 experts from state and local government, and partner organizations, the Framework effort has begun the initial steps towards development of a guiding framework for climate adaptation in the state.

A Maryland Coastal Climate Adaptation Report Card which includes a suite of 15 indicators that measure adaptation progress in Maryland has been developed by University of Maryland Center for Environmental Sciences - Integration and Application Network. The report card provides high-level synthesis of findings, including individual indicator scores, and an overall grade for the coastal zone in Maryland and will be used to inform management decisions moving forward. The Report Card will be released by the end of 2021.

Maryland solicits and funds community-based resilience projects through the Community Resilience Grant Program. The program leverages federal dollars with state "Resiliency through Restoration" capital funding to promote and support comprehensive, holistic planning and implementation projects that address both water quality and quantity issues. Through these projects, the Maryland Department of Natural Resources (MDNR) is helping Maryland communities become more resilient to flood risks, and enhance the protection and management of the state's resources including the bay and the ocean. This work continues a decade-long effort to provide support to local communities to assess risk, plan risk-reduction efforts, and implement projects.

After the publication of the Nuisance Flood Plan Development Guidance in October of 2019, MDNR and Maryland Department of Planning received nuisance flood plans from nine coastal counties and Baltimore City and have three pending submissions.

Maryland has finalized a policy and supporting processes to proactively identify environmentally- and economically-sound beneficial use of dredged material practices to improve coastal resiliency. Through the development of a mapping tool - Beneficial Use: Identifying Locations for Dredge (BUILD) - project managers will be able to quickly identify beneficial use opportunities. BUILD has been merged into the Maryland Coastal Atlas where the data are now available.

The Coast Smart Construction Program siting and design guidelines were updated in 2020 and include the expanded scope and applicability per Chapters 628 and 629 of the 2018 Laws of Maryland and Chapter 442 of the 2019 Laws of Maryland. Additionally, the vulnerable areas within which the Program applies was updated to include areas outside of the Special Flood Hazard Area. This new boundary, the Coast Smart Climate Ready Action Boundary, conveys resiliency by adding a vertical extent above the Base Flood Elevation and is currently the most technologically feasible and accurate approach to achieve resiliency within the scope of the Coast Smart Program. The Coast Smart Project Screening Form provides projects with a form to use when applying the Program requirements. The siting and design guidelines, screening form and additional information can be found at the Coast Smart Councils website https://dnr.maryland.gov/climateresilience/Pages/cs_Council.aspx.

VIRGINIA

Virginia – Early Steps

Virginia's initial focus on climate change included the Governor's Commission on Climate Change, which published A Climate Change Action Plan in 2008. This included the effects of climate change (on the built environment, insurance, natural systems, etc.), recommendations, and commission deliberations. In December of 2014, the state published Virginia Accomplishments Since the 2008 Climate Action Plan Release. One year later, in December 2015, the Governor Terence R. McAuliffe's Climate Change and Resiliency Update Commission published the Report and Final Recommendations to the Governor, which includes the top five recommendations to address climate change in the state: 1) establishing a climate change and resilience resource center, 2) creating a new Virginia bank for energy and resiliency, 3) establishing a renewable energy procurement target for Commonwealth agencies, 4) adopting a zero emission vehicle program, and 5) leveraging federal funding to make coastal communities more resilient. During the 2016 legislative session Virginia created the Commonwealth Center for Recurrent Flooding Resiliency, a joint venture of Old Dominion University, the College of William & Mary and the Virginia Institute of Marine Science. With an initial budget allocation of $2 million in state support these institutions have worked together to provide critical research, policy, and outreach to protect natural resources and create resilient communities across the Commonwealth.

Virginia Update

In 2018 Governor Ralph Northam issued Executive Order 24 "Increasing Virginia's Resilience to Sea Level Rise and Natural Hazards," which set the Commonwealth on a course toward addressing its risk and resilience to natural hazards, including flooding. Executive Order 24 designated the Commonwealth's first Chief Resilience Officer (Secretary of Natural Resources, Matthew Strickler). The Order also directed

the integration of unified SLR projections, development of minimum freeboard standards, and a review of the vulnerability of State-owned buildings. Importantly, the Order directed the Chief Resilience Officer and the Special Assistant to the Governor for Coastal Adaptation (Rear Admiral Ann Phillips, United States Navy) to develop the Virginia Coastal Resilience Master Planning Framework, published in October 2020. This Framework lays out the Commonwealth's approach to coastal protection and adaptation and is being utilized to create the Coastal Resilience Master Plan. The primary objective of the Master Plan will be to improve the Commonwealth's resilience and ability to adapt to rising seas, increased nuisance flooding, and more frequent and intense storms that result from climate change and threaten our coastal communities and marine resources. Virginia has also joined the RGGI, a regional cap-and-trade program designed to reduce climate pollution. Proceeds generated from the program will fund resiliency projects recommended through the Coastal Resilience Master Plan. Lastly, the Virginia 2020 General Assembly considered Senate Bill 776 and House Bill 504 resulting in legislation that required the Virginia Marine Resources Commission and the Department of Environmental Quality to update tidal wetland and riparian buffer regulations to ensure the protection and conservation of sensitive coastal habitat from SLR and coastal hazards. In the summer of 2021, Virginia agencies updated their Tidal Wetlands Guidelines and Chesapeake Bay Preservation Area regulations and enforceable policies with additional standards that now require localities to allow, to the maximum extent possible, for the landward migration of existing vegetation for all permissible uses of tidal wetlands and riparian buffers.

NORTH CAROLINA

Throughout North Carolina, impacts from climate change, including SLR, will affect all coastal habitats and species. In 2018, after the devastation brought about by Hurricane Florence, NC's Governor Roy Cooper signed Executive Order 80 "NC's Commitment to Address Climate Change and Transition to a Clean Energy Economy" (EO80) directing all cabinet agencies to integrate climate adaptation and resiliency planning into their policies, programs, and operations. As part of EO80, the Climate Change Interagency Council was created which included members from all of the cabinet agencies. The Department of Environmental Quality (DEQ) was tasked to serve as the lead agency with the Secretary of DEQ serving as Council chair. Staff from all DEQ divisions were active on the Council and associated working groups.

These working groups, along with federal and university partners, developed a state-specific NC Climate Science Report, assessed hazards and risks associated with climate change, and compiled a Natural Working Lands Report. These efforts were incorporated into the 2020 NC Risk Assessment and Resilience Plan with strategies and recommendations to increase carbon sequestration and resiliency of coastal habitats and communities. Implementation began in 2021. Governor Cooper's EO80 is the driving force behind much of NC's approach to coastal resiliency and climate change planning.

Also in 2018, the North Carolina Office of Recovery and Resilience (NCORR) was established within the NC Department of Public Safety to administer funds received by the state through the U.S. Department of Housing and Urban Development's Community Development Block Grants for Disaster Recovery Program. In 2019, Governor Cooper appointed a state Chief Resilience Officer to lead NCORR's resilience staff and direct the state's initiative to help storm-impacted communities rebuild smarter and stronger in the face of future natural disasters and long-term climate change.

NCORR has been tasked with leading the state's future resilience efforts. NCORR supports coordination among state agencies and maintains productive relationships and partnerships between state, local, and regional governments, business and non-profit partners, and community stakeholders. Collaboration and interaction among partners inside and outside of state government helps all entities leverage expertise throughout the state to build a more resilient North Carolina.

NC's Clean Energy Plan (CEP) was written by the DEQ as directed by Governor Cooper's EO80. DEQ was tasked with the creation of a CEP to encourage the use of clean energy resources and technologies to foster the development of a modern and resilient electricity system. The purpose of the CEP is to outline policy and action recommendations that will accomplish these goals. The CEP uses best available data, analysis, and stakeholder input to examine what our electricity system should look like in 2030. It identifies achievable goals, proposes modern policies and strategies to achieve the goals, and identifies activities needed to adjust the regulatory framework to accommodate 21st century customer expectations, public policy goals, energy needs, economic development opportunities, and societal outcomes related to climate change. The CEP can be viewed here: https://files.nc.gov/governor/documents/files/NC_Clean_Energy_Plan_OCT_2019_.pdf.

Late in 2021, an amendment was approved to North Carolina's Coastal Habitat Protection Plan (CHPP) by the three regulatory commissions with jurisdiction over the plan. As part of the five-year review, the state's Coastal Resources Commission, Environmental Management Commission and Marine Fisheries Commission adopted the 2021 CHPP Amendment with unanimous votes. The amendment focuses on five priority issues, several of which have implications regarding climate change and SLR. The five priority issues are: 1) Submerged aquatic vegetation protection and restoration through water quality improvements, 2) Wetland protection and restoration through nature-based solutions, 3) Environmental rule compliance to protect coastal habitats, 4) Wastewater infrastructure solutions for water quality improvement, and 5) Coastal habitat mapping and monitoring to assess status and trends. To view the 2021 CHPP Amendment and the source document from 2016, go to: https://deq.nc.gov/about/divisions/marine-fisheries/habitat-information/coastal-habitat-protection-plan.

In 2021, NC's Division of Water Resources (DWR) began sampling for an Environmental Protection Agency (EPA) grant called "The Assessment of Change in North Carolina Coastal Plain Wetlands." This assessment will be comparing wetland sites previously not surveyed with wetland sites surveyed five, 10, and 30 years ago. In addition, North Carolina State University continued the long-term monitoring of a few sites previously monitored by DWR from 2014 through 2018/2019. DWR has been awarded funds from the EPA to initiate a statewide wetland mapping project and a more accurate, publicly available wetland mapping tool for North Carolina. These maps and the corresponding tool will be critical for planning as the climate changes and the seas rise.

The Albemarle-Pamlico National Estuary Partnership (APNEP) and NC Coastal Federation are co-leading the NC Living Shoreline Steering Committee. This committee was established in 2018 and acts as APNEP's Living Shoreline Action Team. The committee brings together federal and state agencies, non-governmental organizations, and universities to communicate and collaborate on education and outreach, research, and implementation of living shorelines. In 2021, this committee promoted and published its partner's accomplishments achievements from 2018 through 2020 and can be found at: https://www.nccoast.org/wp-content/uploads/2021/09/LS-report-2018-2020.pdf?fbclid=IwAR1LDKPbCLdeAiRCq7T4jV5ldd_NTM7h6xVjUhWomQRyLKTfstl-yBzRXmo.

APNEP is collaborating as a project partner on a NOAA Coastal Resilience Grant awarded to the Virginia Institute of Marine Science. The project is focused on increasing the use of natural and nature-based features to increase resilience of coastal communities to flooding caused by storms and extreme weather events associated with climate change. The project is designed to include interaction with local government officials as the target audience for project-generated data and guidance. APNEP staff are working with Wetlands Watch to solicit feedback from North Carolina agency personnel, local governments, and other partners to develop an evaluation of opportunities and limitations to extension of the project outputs beyond Virginia in 2021. You may view the project website at: https://www.vims.edu/ccrm/research/climate_change/adaptation/nnbfs/index.php.

SOUTH CAROLINA

There have been two recent pieces of state legislation that relate to climate change. The 2020 Disaster Relief and Resilience Act established the South Carolina Office of Resilience which is tasked with developing and implementing a Strategic Statewide Resilience and Risk Reduction Plan to coordinate efforts across agencies to increase resilience and recover from natural disasters. Addressing flooding is a major focus area within this effort, which is still in its early stages. The 2019 Energy Freedom Act helped remove barriers to increasing solar energy capacity in the state.

In the 2018 South Carolina Hazard Mitigation Plan, the South Carolina Emergency Management Division (SCEMD) reported county-level inundation areas based on three different modeled SLR scenarios. SCEMD is working to develop a more hazard-specific discussion of climate change for the 2023 Hazard Mitigation Plan.

The South Carolina Department of Natural Resources (SCDNR) compiled a report in 2013 entitled Climate Change Impacts to Natural Resources in South Carolina. The following two sentences from the report highlight the goal the agency had in writing it: "The Department of Natural Resources is taking a lead role among South Carolina state agencies to advance the scientific understanding of the vulnerability of South Carolina's vital natural resources during an era of changing climate. This will enable the agency, its partners, constituents, and all Palmetto State citizens to avoid or minimize the anticipated impacts while protecting South Carolina's natural resources." The report identifies a number of concerns for the state's natural resources including SLR, OA, and temperature rise effects. The state has a high proportion of the coastline that is comprised of marshes, barrier islands, and hammock islands. Many of these lands are owned by state and federal entities. The document has various strategies for research and for developing and protecting land to provide for migration.

In the 2015 State WAP, Climate Change was added as a Conservation Action Area. Strategies within this action area include: 1) Prioritize areas for conservation actions using updated mapping capabilities (for example, conduct SLAMM modeling of the state's coastline as needed to identify potential conservation focus areas for marsh migration inland); 2) Identify monetary and staff resources for addressing management needs as they relate to climate variability; 3) Create a centralized information area with data and tools to support decision making; 4) Conduct climate-related monitoring of species and habitats as needed (run species- or habitat-based vulnerability index assessments as needed for priority species); 5) Collaborate with neighboring states to address species/habitat range shifts due to climate change; and 6) Foster partnerships within the state and nationwide to address climate change in South Carolina.

New and Ongoing Resources and Efforts

- In 2021, as a result of an ongoing collaboration between SCDNR and the state coastal regulatory agency, living shorelines were added to coastal zone regulations.
- SCDNR is implementing living shorelines to mitigate SLR.
- SCDNR is conducting research on the effects of fluctuating climatic variables on key fishery species and estuarine habitat quality.
- The SC Sea Grant Consortium, a state agency made up of eight member institutions, plays a convening and facilitation role, funds research, and provides technical assistance on climate issues.
- The Carolinas Integrated Sciences and Assessments (CISA) team is based at the University of South Carolina. CISA organizes a biennial Carolinas Climate Resilience Conference which supports on-the-ground climate resilience efforts by providing managers and regional experts an opportunity to share lessons learned and discuss resources and tools for incorporating climate information into their work.
- The SC State Climatology Office is monitoring climatological trends and variability across the State (1900 – present) and hosted two climate related workshop series (in 2012 and 2017) in collaboration with CISA and the SC Water Resources Center.
- SCDNR Coastal Reserves and Outreach discusses SLR and coastal flooding in most of their outreach programs. For example, the SCDNR/ACE Basin NERR offers multi-day Teachers on the Estuary and Climate Explorers programs that directly address climate change research and monitoring.
- In 2021, the SC Department of Education added climate change to the state science standards.

GEORGIA

In 2016, The Georgia Coastal Management Program/Georgia Department of Natural Resources held the first ever Georgia climate conference, Climate Conference - *Prepare, Respond, and Adapt: Is Georgia Climate-Ready?* The conference focused many aspects important to coastal Georgia including habitat and impacted species and many other relevant issues. In 2021 a second climate conference was held, Georgia *Climate Conference 2021 – Minimizing Georgia's Risk, Maximizing Georgia's Future*. The 2021 conference had many updated discussions on the topics of the 2016 conference and included specific sessions on Marine Fisheries and Habitat and Impacted Species. The conference agenda can be seen at GeorgiaClimateConference.org.

Also in 2016, the Post-Disaster Recovery and Redevelopment Planning document was created. This document has led to all the coastal counties in Georgia developing post-disaster plans. The county specific plans can be seen on the Disaster Recovery and Redevelopment Plans page of the Coastal Resources Division/Georgia Department of Natural Resources website.

Georgia's Coastal Management Program Coastal Incentive Grant has funded 37 climate-related projects that have produced reports, tools, and plans. Also, funding has been provided from NOAA, EPA, Georgia Emergency Management and Homeland Security Agency, and several other partners.

These include:

- Application of SLAMM to the Georgia Coastline
- Georgia Coastal and Marine Planner (G-CAMP)
- Georgia Wetlands Restoration Access Portal (G-WRAP)
- Georgia Coastal Hazards Portal (GCHP)
- Private-Sector Recovery and Redevelopment Guidance
- Coastal Resilience with Green Infrastructure
- Coastal Bird SWG 2020 Interim Report

The Georgia Department of Natural Resources developed the Georgia's State WAP. The WAP uses the best available data to provide a comprehensive, adaptable assessment of conservation needs and the best ways to address them. Congress requires an approved WAP for state agencies to receive State Wildlife Grants, the main federal funding source for states to conserve non-game animals not legally fished for or hunted. The plan contains a section on climate change adaptation.

There are eight SLR and habitat monitoring sites along Georgia's coast. Climate Change Capacity Assessments have been completed for all 11 coastal counties. Completed vulnerability assessments for the six ocean-facing counties began in 2021.

Along with the Georgia Coastal Hazards Community of Practice the state hosts a Living Shoreline Working Group and partners on the Georgia Climate Project team, the Southeast and Caribbean Disaster Resiliency Partnership.

FLORIDA

The Florida Fish and Wildlife Commission (FWC) led a stakeholder summit on Climate Change in 2008. A report was generated in 2009 from this summit titled, "Florida's Wildlife: On the front line of climate change." As a result of this summit and due to the resulting recommendations, the FWC established Climate Change Oversight Team and developed adaptive strategies to address identified climate change threats to fish and wildlife and their habitats. Climate change considerations have been integrated into Florida's Strategic WAP, and funding has been provided to aquatic habitat projects supporting climate change adaptive strategies, such as living shoreline projects and regional climate change effects mitigation planning efforts. Funding opportunities for aquatic habitat restoration and enhancement projects supported by FWC ensure evaluation of climate change adaptation in all project proposals submitted.

Florida has also worked with partner organizations, such as TNC, to implement projects addressing resiliency and plan for coastal climate change. This has been a key focus of South Florida, which is generally recognized as being one of the most vulnerable regions in the Commission management area to SLR. Partners have developed shoreline resiliency and coral reef teams including the Shoreline Resiliency Working Group and Southeast Florida Coral Reef Initiative, which are focused on assessing and addressing the effects of climate change on coastal habitats. The Governor's South Atlantic Alliance sponsored a southeast U.S. Living Shorelines Summit in Jacksonville, Florida in 2016, which specifically addressed coastal habitat resiliency in the face of accelerated SLR. This effort has resulted in the development of a number of different regional resources, including a living shoreline training academy, which provides managers and the public with a certification in living shoreline design and implementation. As part of the strategy to enhance coastal resilience to SLR, FWC led the development

of a partner-based living shoreline website https://floridalivingshorelines.com/ for private property owners as a one-stop-shop for all things related to regional living shoreline construction. This partnership effort recently extended to the development and implementation of a living shoreline contractor's training and certification course, which is conducted 2-3 times a year in various regions around the state. This training comes complete with continuing education credits for participants and is designed to expand the use of natural materials in living shoreline applications.

Most recently, the Florida Department of Environmental Protection established the Florida Resilient Coastlines Program thought the Office of Resilience and Coastal Protection, established by the 2021 Florida legislature and Governor. This program provides $10s of millions with appropriations up to $100 million starting in fiscal year 2022-2023 for planning and vulnerability assessments and natural infrastructure development to address SLR to Florida Counties and Municipalities. https://floridadep.gov/rcp/florida-resilient-coastlines-program

Appendix I

Climate Change Actions by State