

North Carolina Department of Environmental Quality

2022 Agency Resilience Strategy

Annual Report as Required by the
2020 North Carolina Climate Risk Assessment and Resilience Plan

A Continuing and Updated Strategy for Reducing North Carolina's
Vulnerability to Climate Change



March 2022

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I. Department of Environmental Quality

A. Executive Summary

The *Department of Environmental Quality* (DEQ) continues to make progress in meeting the goals of Governor Roy Cooper’s Executive Order 80 (EO80) and the specific guidance and direction provided in the Climate Risk Assessment and Resilience Plan (RARP). Department Status Reports were provided in 2019, 2020, and 2021 showcasing the efforts made thus far.

DEQ is partnering with other federal, state, and local agencies as well as non-governmental organizations, community groups, and regulated entities to further develop and carryout the strategies laid out in the RARP and this updated strategies document. Each division has highlighted in this report the priorities that help accomplish the base duties and expectations of their programs as outlined by statute, rule, policy, and demand, as well as several priorities that the Department views as critical to moving North Carolina toward resilience and away from reaction.

The North Carolina General Assembly (NCGA) recently supported these efforts in Session Law (S.L.) 2021-180, the 2021 Appropriations Act. DEQ received major appropriations that will enhance ongoing resiliency efforts from landslide mapping and dam safety to coastal resiliency and storm mitigation. DEQ was also tasked with leading the state’s flood mitigation efforts to craft a statewide Flood Resiliency Blueprint.

Additional strategies will be identified and developed over the next few years and will reinforce DEQ’s overall strategy for meeting the objectives of EO80. These efforts will contribute to our responsibilities to be defined in the Priority 2 Challenges Statewide Strategy due in October 2024.

The COVID-19 pandemic has continued to present operational challenges at many levels, however, the Department staff has demonstrated resilience, leadership, and excellence in carrying out our programs and responding to the public’s needs.

As in the past, DEQ was responsible for supporting the Climate Change Interagency Council meetings, dedicated to coordinating with the Interagency Resilience Team to work on cross-sector resilience strategies, and actively leading and participating in the Environmental Preservation Response Support Function group of the State Disaster Recovery Framework. The Department sees all these efforts as necessary to effectively accomplish the resilience goals identified in EO80 and furthered in EO246.

B. Overview

In 2021, DEQ along with other State agencies represented on the Climate Change Interagency Council have worked to continue efforts that we initiated as part of EO80, to understand climate change impacts and build resilience in our operations, policies, and programs. This work proceeded in the face of a global pandemic that made working in person more difficult and impacted our approach to conducting field work, providing education, developing work products, and assisting the public, presenting additional challenges to both our staff and our partners. The success of this year is not only measured in our work products, but also in our ability to overcome challenges.

To guide DEQ's path forward, we will maintain and update the North Carolina Resilience Strategy and provide our State Agency Resilience Strategy update annually as required in the RARP. This strategy document is a compilation of information from multiple divisions within DEQ that:

1. Addresses changes or additions to the agency's latest understanding of its climate vulnerabilities and risks;
2. Outlines the agency's current and planned actions to increase resilience;
3. Includes a range of actions, such as proposed studies and planning activities; and
4. Reports progress on implementing strategies previously identified by the agency.

DEQ is a unique state agency in that it responds to all climate hazards facing North Carolina, especially sea level rise, increased summer heat index values, increased likelihood of annual total precipitation, increased likelihood of hurricane intensity, increased likelihood of severe droughts, and increased likelihood of precipitation and inland flooding. In the RARP, the Department had direct recommendations spanning multiple sectors: Coastal Resources and Infrastructure; Ecosystems; Housing, Buildings, and Support Services; Health and Human Services; Water and Land Resources; and Energy. Resilience activities featured in this report are diverse, comprehensive, and often collaborative with other federal, state, and local partners to meet DEQ's mission: "Providing science-based stewardship for the health and prosperity of *all* North Carolinians."

Highlights of 2021 Efforts

As in 2020, DEQ continued to update and operate under its Continuity of Operations Plan (COOP) due to waves of COVID-19, which required adapting new methods and thought processes to keep staff and community members safe. Despite the challenges of 2021, DEQ staff and state agencies completed the following:

- Updated the 2021 Coastal Habitat Protection Plan Amendment (CHPP), with implementation of recommendations underway in 2022;
- Completed hydrologic and hydraulic (H&H) capacity study of over 249 dams in the Neuse and Lumber River Basins, with a study of dams in the Cape Fear Basin underway;
- Codified temporary disaster debris site approval process;
- Mapped energy resilience with a focus on a replicable framework for North Carolina; and
- Developed resiliency metrics and targets appropriate for North Carolina's grid infrastructure.

C. Key Resiliency Strategies for 2021–2022

North Carolina Risk Assessment and Resilience Plan Implementation

Implementation of the RARP is being led by the North Carolina Office of Recovery and Resiliency (NCORR). Through collaborative efforts between state and local governments, NCORR guides the development and delivery of agency work products. Resilience work has already started at many of the agencies. Key efforts include the following:

- Convening a dedicated Interagency Resilience Team to work on cross-sector resilience strategies.
- Establishing the NC Resilient Communities Program to provide training, expertise, and funding to local government and communities.

The RARP includes sections on the North Carolina Climate Science Report (NCCSR), environmental justice, vulnerability, risk and resilience strategies, nature-based solutions, and a proposed path forward to meeting the challenge. The strategies section of the RARP includes examples of climate threats and potential efforts to adapt or increase resiliency to them. The [2021 Agency Resilience Strategy](#) describes the efforts that were pursued in 2020–2021. This document identifies key strategies that each division within DEQ is initiating or continuing to develop in 2021–2022. The status of these strategies and additional efforts will be described in subsequent annual strategy reports released March 1st of each year.

The following activity charts detail completed, underway, planned, proposed, or ongoing activities across a time horizon: short-term (less than one year), medium-term (one to two years), or long-term (more than two years), with the understanding that needs, priorities, and funding may change.

1. Air Quality

The *Division of Air Quality* (DAQ) works to protect and improve outdoor air quality. It currently meets these objectives by operating a statewide air quality monitoring network to measure pollutant levels, implementing plans to meet future air quality initiatives, ensuring compliance with federal and state rules, and assisting and educating the public about air quality issues. There are several DAQ services and physical assets subject to increased impacts under changing climate conditions. These assets include planning services, ambient monitoring, and wildfire services.

In collaboration with the State Climate Office (SCO), DAQ is co-developing the Ambient Information Reporter (AIR) tool, which will display real-time meteorological and air quality data—including the US Drought Monitor, ambient pollutant concentrations, and real-time fire and smoke analysis—on a web-based mappingsystem, allowing for a robust daily analysis of how meteorology and air quality interact across the state.

Activity	Status	Target Completion Date
<i>Ambient Monitoring Section</i>		
1.1 Evaluate monitoring site locations.	Underway	Long-term
<i>Planning Section</i>		
1.2 Monitor temperature and precipitation changes.	Underway	Long-term
1.3 Monitor, forecast, and communicate about wildfires.	Underway	Long-term
1.4 Increase education and outreach.	Underway	Long-term

Activity Progress

Ambient Monitoring Section

1.1 Evaluate monitoring site locations.

UNDERWAY

The Division of Air Quality has been evaluating air monitoring sites located in low drainage and flood

prone areas. Whenever possible, the division will seek to relocate monitoring sites to higher elevations. If this is not an option, the division will implement a strategy for raising the shelters foundation such that high water will not inundate the shelter and damage expensive electronic scientific equipment.

Planning Section

1.2 Monitor temperature and precipitation changes.

UNDERWAY

In collaboration with the SCO, DAQ has co-developed the Ambient Information Reporter (AIR) tool, which displays real-time meteorological and air quality data—including the US Drought Monitor, ambient pollutant concentrations, real-time fire and smoke analysis—on a web-based mapping system, allowing for a robust daily analysis of how meteorology and air quality interact across the state. DAQ and SCO are also working on the Air Quality Portal (AQ Portal), a comprehensive "one-stop shop" that will serve as a central hub for a variety of North Carolina air quality and climate information tools developed by DAQ and SCO. Along with the AIR tool, the AQ Portal will be home to the DAQ's Ozone Design Value Predictor, DAQ model output tool, and Wind Rose tool. The Portal will feature the DAQ daily air quality forecast for all 100 counties and National Weather Service meteorological forecast for a user's location. DAQ is also working with third parties (e.g., the Weather Channel) that issue air quality forecast information on their websites and mobile device applications to support issuance of high-quality forecast data. DAQ has also been coordinating with DHHS and other state agencies and public and private entities to produce and distribute educational materials to support understanding of air quality impacts and access to air quality data.

1.3 Monitor, forecast, and communicate about wildfires.

UNDERWAY

DAQ continues to maintain an adequate level of staffing and resources to monitor, forecast, and communicate air quality impacts associated with wildfires. The newly designed AIR tool includes satellite-detected smoke and hot spot fire detect analysis, which can provide increased awareness to both air quality professionals and the public when monitors detect elevated pollution levels across the state related to wildfires. For the past several years, DAQ has established relationships with state and federal agencies to coordinate an effective program for communicating wildfire hazards including providing forecasting services, staffing command centers, and supporting deployment of portable PM2.5 monitoring equipment. In addition, DAQ recognizes the important role of prescribed burning for management of forest and wildlife ecosystems and to reduce wildfire fuels. DAQ is actively involved with several initiatives within North Carolina and the southeast to share information with the prescribed burning profession to facilitate understanding of how to mitigate PM2.5 pollution associated with this activity.

1.4 Increase education and outreach.

UNDERWAY

DAQ is increasing its communication and reach to teachers through online workshops in the upcoming year, including new micro-grid activities for middle school students which will further share climate change related information with North Carolina citizens.

2. Albemarle–Pamlico National Estuary Partnership

The mission of the *Albemarle-Pamlico National Estuary Partnership* (APNEP) is to identify, protect, and restore the significant resources of the Albemarle-Pamlico estuarine system. The partnership is a cooperative effort hosted within N.C. DEQ under a cooperative agreement with the U.S. Environmental Protection Agency. APNEP works closely with the Commonwealth of Virginia, as the program area extends across both states. APNEP staff pursues its mission with guidance and support from its overarching Comprehensive Conservation and Management Plan (CCMP) which was created in a stakeholder-driven process with an ecosystem-based management approach and is advised by a Management Conference authorized by North Carolina Governor's Executive Order 26 (2017) and

amended and restated by Executive Order 250 (2022). APNEP's staff works closely with diverse stakeholder committees whose members include community members, university staff, environmental organizations, and local, state, and federal agencies.

In conjunction with its partner organizations, APNEP has a long history of working to protect and restore coastal ecosystems and communities as they face climate and natural hazard challenges, with a focus on estuarine ecosystems and the river basins and surrounding watersheds that flow into the Albemarle-Pamlico estuarine system. The impacts to these resources have been thoroughly described elsewhere in this report.

In addition to supporting research and the development of tools and models to help resource managers and local governments make informed decisions, APNEP’s focuses on protecting and restoring water quality and submerged aquatic vegetation (SAV), protecting natural ecosystems and coastal habitats, supporting the use of natural infrastructure such as living shorelines, and working with local governments and communities to incorporate climate resilience into local planning. These activities align with the coastal resources and infrastructure and ecosystem strategies outlined in the RARP, and Coastal Habitats and Pocosin Wetlands subcommittee actions outlined in the Natural and Working Lands (NWL) Action Plan.

Activity	Status	Target Completion Date
2.1 Implement Phase 1 of the Tribal Coastal Resilience Connections Project.	Completed	Spring 2022
2.2 Implement Phase 2 of the Tribal Coastal Resilience Connections Project.	Underway	Fall 2022
2.3 Continue SAV mapping and monitoring.	Underway	Fall 2022
2.4 Participate in Natural and Nature-Based Features Resilience Project.	Ongoing	Long-term
2.5 Conduct Scuppernong River study.	Underway	2024
2.6 Update Comprehensive Conservation and Management Plan.	Underway	2023

Activity Progress

2.1 Implement Phase 1 of the Tribal Coastal Resilience Connections Project. COMPLETED

APNEP partnered with the North Carolina Commission of Indian Affairs (CoIA), North Carolina State University (NCSU), and Virginia Coastal Policy Center to work with tribal communities in the Albemarle-Pamlico region to develop a strategy for incorporating resilience into tribal planning and community engagement processes. The Tribal Coastal Resilience Team launched a social media campaign, conducted outreach at conferences and events, and created partnerships to build the groundwork for a sustainable program. The team is finalizing the report for Phase I which will document engagement, partnership building, lessons learned, and include the results of the Tribal coastal adaptation plans analysis conducted by NCSU.

2.2 Implement Phase 2 of the Tribal Coastal Resilience Connections Project. UNDERWAY

A scope of work for Phase 2 is being developed which will utilize funds from APNEP to focus on engagement with Tribal communities in the shared waterways of the APNEP region between Virginia and North Carolina (also supporting implementation of APNEP’s Memorandum of Understanding). Phase 2 will build upon a Climate Risk Analysis conducted by the Climate Service for the CoIA in Phase I with the Nottoway Indian Tribe of Virginia and Meherrin Indian Nation and use a geospatial mapping platform to collect water stories and present climate threats and vulnerabilities identified by Tribal communities in this region.

2.3 Continue SAV mapping and monitoring. UNDERWAY

Resilience strategies listed in Chapter 5F (p. 5F-19) (Ecosystems) of the RARP for SAV include mapping and monitoring, water quality improvement and protection, and protection from physical disturbance. APNEP and its partners have made significant contributions towards implementing these strategies through facilitating the SAV Team and supporting research and economic valuation studies to highlight the importance of protecting this critical habitat. APNEP's SAV Team continued to lead efforts to map and monitor SAV and developed a SAV Metric Report and Integrated Monitoring Plan in 2021. APNEP provided funding for an interdisciplinary team of researchers at NCSU and Duke University to research and publish a report that estimated the market and nonmarket economic losses from declines in SAV in the Albemarle-Pamlico estuary. Under APNEP contract, University of North Carolina-Chapel Hill (UNC-CH) Institute of Marine Sciences staff has developed scientifically defensible chlorophyll-a and turbidity threshold concentrations that when considered together are protective of SAV in high-salinity zones. This information will help guide the decisions made through the NC Nutrient Criteria Development Plan and the 2021 Coastal Habitat Protection Plan Amendment.

2.4 Participate in Natural and Nature-Based Features Resilience Project. ONGOING

APNEP continued to participate on a Virginia Institute of Marine Sciences-led team on a National Oceanic and Atmospheric Administration (NOAA)-funded project designed to incentivize the use of Natural and Nature Based Features to increase resilience to storm-driven flooding. A map-based tool housed on ADAPT-VA was developed to assist local governments in identifying coastal habitats and natural infrastructure and restoration techniques that also generate credits in water quality (Total Maximum Daily Loads) and hazard mitigation programs (Federal Emergency Management Agency [FEMA] Community Rating System).

To evaluate the tool's applicability in North Carolina and support development of tools recommended in the RARP and NWL Action Plan, APNEP is working with Wetlands Watch to conduct a needs assessment, build a template resilience tool database, and develop outreach materials and resources that N.C. local government staff can use to compare tools and the types of Natural and Nature Based Features that can meet their needs. These outreach materials will promote the use of natural infrastructure to build community and ecosystem resilience, and complement outreach being conducted for the CHPP and by the Living Shorelines Committee.

2.5 Conduct Scuppernong River study. UNDERWAY

APNEP has partnered with North Carolina State Parks, North Carolina Soil and Water Conservation, US Fish and Wildlife Service, and Washington and Tyrell Counties on a hydrologic study of the northern Albemarle-Pamlico peninsula funded by a planning grant from the Water Resources Development Grant Fund. APNEP is assisting with convening technical partners and stakeholders, grant application preparation, and securing partners and match for the project. APNEP will continue working with these local governments, who have requested assistance from the state with technical and grant administration capacity to address flooding and resilience planning, to conduct a hydrologic study of the headwaters of the Scuppernong River, Lake Phelps, and the surrounding land. The outcomes from the study will be utilized to build a more comprehensive approach to regional water management to create a water budget for the northern Albemarle-Pamlico peninsula, which has been experiencing cycles of flooding and drought in an area that is highly vulnerable to sea level rise. APNEP is participating in NCORR's Regions Innovating for Strong Economies and Environment (RISE) program and anticipates this type of project will be of interest to groups working on developing local and regional approaches to build climate resilience.

2.6 Update Comprehensive Conservation and Management Plan. UNDERWAY

APNEP initiated updates to its CCMP in 2021 and will continue to incorporate consideration of climate impacts when assessing actions needed to identify, protect, and restore the significant resources of the Albemarle-Pamlico region. APNEP will work with partners to integrate actions recommended in the RARP and NWL Action Plan into the CCMP Update.

3. Coastal Management

The *Division of Coastal Management* (DCM) carries out the state's Coastal Area Management Act (CAMA), Dredge and Fill Law, and the rules and policies of the Coastal Resources Commission (CRC), in the state's 20 coastal counties. The CRC is charged under CAMA with the protection, preservation, orderly development, and management of the coastal area of North Carolina, including public trust resources. DCM, which provides staff support to the CRC, is responsible for several programs, including permitting, land use planning oversight, coastal policy, and numerous grant programs. DCM's Coastal Reserve protects and manages more than 44,000 acres of coastal and estuarine land and water for research, education, and compatible traditional uses at ten reserve sites along N.C.'s coast. Four of these sites comprise the National Estuarine Research Reserve, a state-federal partnership between DCM and NOAA.

DCM, in partnership with NCORR and others, designed and launched the Resilient Coastal Communities Program (RCCP) in September 2020. The RCCP is an incentive-based program that funds local governments to implement a community-driven process for setting coastal resilience goals, assessing existing and needed local capacity, and identifying and prioritizing projects to enhance community resilience to coastal hazards. Participating communities walk through a process leading to the development of "shovel-ready" projects.

The RCCP is funded through a disaster recovery appropriation from the NCGA and an Emergency Coastal Resilience Grant from the National Fish and Wildlife Foundation (NFWF). It provides funding to local governments to help overcome barriers in coastal resilience and adaptation planning; boost local government capacity; and support a proactive, sustainable, and equitable approach to coastal resilience planning and project implementation. The program has funding for one three-year cycle.

Activity	Status	Target Completion Date
<i>Policy and Planning Section</i>		
3.1 Implement Phases 1–2 of Resilient Coastal Communities Program.	Underway	May 2022
3.2 Implement for Phase 3 of Resilient Coastal Communities Program.	Planned	December 2022
3.3 Mitigate erosion through beach planning.	Underway	June 2022
3.4 Publish 2021 Coastal Habitat Protection Plan Amendment (CHPP).	Completed	January 2022
<i>Coastal Reserve Office</i>		
3.5 Develop Rachel Carson National Estuarine Research Reserve (NERR) Habitat Resilience Plan.	Underway	June 2023
3.6 Deliver public education and training.	Underway	Ongoing

Activity Progress

Policy and Planning Section

3.1 Implement Phases 1–2 of Resilient Coastal Communities Program. UNDERWAY

DCM, in partnership with NCORR and others, created the Resilient Coastal Communities Program to improve local government planning and preparation for intensifying climate-driven hazards. The RCCP incentivizes communities to meet defined standards for long-term planning, preparedness, and community engagement, and helps them plan shovel-ready projects to capitalize on federal and state funding opportunities. 26 communities have been funded and are nearly finished with Phase 1 (Community Engagement and Risk & Vulnerability Assessment) and Phase 2 (Planning, Project Selection and Prioritization) of the program. As a core component of the RCCP, communities are required to assess the vulnerability of their most disadvantaged populations and identify strategies to

assist them.

3.2 Implement Phase 3 of Resilient Coastal Communities Program. PLANNED

DCM is preparing to start Phase 3 of the Resilient Coastal Communities Program, Engineering and Design, to continue improving local government preparation for intensifying climate-driven hazards. DCM will issue a Request for Applications in February 2022, and eligible communities will be those that have successfully completed Phases 1 and 2 through the RCCP, or their equivalent. Funding is available for up to the 26 communities enrolled in Phases 1 and 2, from the NCGA and the NFWF.

3.3 Mitigate erosion through beach planning. UNDERWAY

To mitigate the impacts of erosion and sedimentation, DCM is working with the Coastal Resources Commission to adopt rules that encourage and incentivizing long-term beach planning, development siting, and beneficial use of dredged material. DCM is also engaging with the Army Corps of Engineers, NOAA, the Bureau of Ocean Energy Management, and other agencies to identify sources of sand for beach nourishment, and strategies for managing the sand for maximum benefit.

3.4 Publish 2021 Coastal Habitat Protection Plan Amendment (CHPP). COMPLETED

DCM partnered with other state agencies and stakeholders via the CHPP to identify strategies to protect and enhance coastal habitat and address the degradation and loss of natural infrastructure. The CHPP has been adopted by all the regulatory commissions, and implementation is underway. One of DCM's actions is to identify priority conservation and restoration sites, and to seek funding for acquisitions, and for project design and construction. Related to this strategy, DCM is providing funding and technical assistance through the RCCP to incentivize communities to protect, enhance, and restore natural infrastructure that can provide flood protection, ecosystem, and economic benefits. DCM is also continuing to work with the CRC to simplify rules to make certain nature-based projects easier to permit.

Coastal Reserve Office

3.5 Develop Rachel Carson NERR Habitat Resilience Plan. UNDERWAY

The Coastal Reserve is developing a habitat resilience plan for its Rachel Carson NERR that identifies and prioritizes areas for resilience projects based on known vulnerabilities and hazards. The reserve will also complete engineering and design for two shovel-ready projects. The plan is funded by the NFWF with match from the NCGA.

3.6 Deliver public education and training. UNDERWAY

DCM's Coastal Training Program continues to deliver resilience-related trainings to coastal decision-makers on nature-based strategies to reduce coastal hazards, barrier island development, and low impact development basics for water quality protection. The Reserve is developing curricular activities for K-12 teachers and non-formal educators to support resilience and climate change education.

4. Energy, Mineral, and Land Resources

The *Division of Energy, Mineral, and Land Resources* (DEMLR) is responsible for environmental permitting and compliance activities and development that include mining and mine reclamation, dam safety, stormwater quality, sedimentation and erosion control, landslide mapping and response, and geologic mapping. The division's strategies to enhance resiliency include the recommendation and implementation of regulations designed to protect the land quality, surface water quality, natural and geologic resources, and the lives, health, and property of the people of North Carolina.

DEMLR has identified several threats caused by climate change impacts identified in the NCCSR and

RARP. These threats and impacts require that DEMLR focus on issues related to heavy precipitation; stormwater runoff affecting water quality; flooding; erosion and sedimentation of our land and surface waters; dam overtopping and failure and response; and landslide mapping and response. Division programs and management efforts are being modified and updated to incorporate more extreme scenarios into our plans, preparations, resilience, and continuation of operations (COOP) playbooks. This will improve response to these issues as well as to build statewide resilience to these threats.

Activity	Status	Target Completion Date
<i>Land Quality Program: Dam Safety Program</i>		
4.1 Conduct hydrologic and hydraulic capacity study of dams—Neuse and Lumber River Basins.	Completed	Fall 2021
4.2 Conduct hydrologic and hydraulic capacity study of dams —Cape Fear River Basin.	Underway	Summer 2022
4.3 Perform dam breach model development.	Underway	Long-term
4.4 Administer Rehabilitation of High Hazard Potential Dam (HHPD) Grant.	Underway	Long-term
4.5 Study risk informed prioritization of NC High Hazard Dams.	Underway	Long-term
4.6 Update Probable Maximum Precipitation study.	Planned	December 2023
<i>Land Quality Program: Sedimentation and Erosion Control Program</i>		
4.7 Produce design and developer and local program education workshops.	Underway	Long-term
<i>Land Quality Program: Stormwater Program</i>		
4.8 Produce design and developer education workshops.	Underway	Long-term
<i>Geological Survey Section: Landslide Program</i>		
4.9 Complete landslide mapping and modeling.	Underway	Long-term

Activity Progress

Land Quality Program: Dam Safety Program

4.1 Conduct hydrologic and hydraulic capacity study of dams —Neuse and Lumber River Basins. COMPLETED

This included the study of hydrologic and hydraulic (H&H) capacity of large and very large dams identified in the Neuse and Lumber River Basins. The DEMLR Dam Safety Program developed H&H models to determine the differing amounts of rain that would cause over 249 large and very large dams to overtop. Dam overtopping is a sign of inadequate spillway capacity but more importantly is a characteristic of dams in stress, which could lead to failure of the dam and possibly cause public health, loss of life, flooding, and property impacts. The information gained in this study will allow state and local governments to prioritize emergency response to dam threats (overtopping or failure) given limited personnel resources as well as monitor the need for dam modifications in the future. Published reports covering the Neuse and Lumber River basin dams of the study population from SL 2016-124 4.1 (9) have been provided to DEQ, Department of Public Safety/Emergency Management (DPS/NCEM) and to Local Emergency Management and Planning.

4.2 Conduct hydrologic and hydraulic capacity study of dams—Cape Fear River Basin. UNDERWAY

This is an identical study to the one performed in the Neuse and Lumber River basins. This study will include 301 large and very large dams. DEMLR Dam Safety has completed modeling approximately 50 percent of the dams in this study under S.L. 2019-224 § 2.1(3) with plans to complete this project by July 2022.

4.3 Perform dam breach model development. UNDERWAY

Continue to perform and develop dam breach models of Intermediate and High Hazard dams to confirm hazard classifications and determine the impacts if failure were to occur. Breach model development is in partnership with DPS/NCEM's efforts in developing dam breach models throughout the state. Breach models are used by DEQ, DPS, NCDOT, local emergency management staff, and dam owners to identify property, lives, and infrastructure subject to impact. This information assists in the development of access and evacuation routes.

4.4 Administer Rehabilitation of High Hazard Potential Dam (HHPD) Grant. UNDERWAY

FEMA started a new grant program over two years ago for the rehabilitation of High Hazard dams. This grant provided \$395,000 to local government dam owners and DEQ in 2021 and an additional \$600,000+ in 2022 for local government dam owners and DEQ to develop plans to determine dam risk and repair needs to address deficiencies to ensure improved infrastructure, reduce risk, and increase resilience within their communities. The DEMLR Dam Safety Program is the administrator for this FEMA grant program. This grant strategy targets owners of publicly owned dams to rehabilitate, repair or modify their deficient dams thus removing the increased risk and threat to downstream properties due to safety deficiencies. This is especially necessary with changing climate impacts. It is DEMLR's duty to identify qualifying "at-risk" dams and to work with the owners through the repair approval process to improve safety and future resilience of these qualifying dams.

4.5 Study risk informed prioritization of NC High Hazard Dams. UNDERWAY

The DEMLR Dam Safety Program is developing a risk-informed Assessment Prioritization of the High Hazard Dams in North Carolina. This initial study assessment of 57 dams developed a screening level risk assessment protocol for all High Hazard Dams in North Carolina. These assessments will allow DEMLR, other state agencies including EM and NCDOT, local governments, and dam owners to set priorities for these dams and the areas in breach inundation zones in setting repair, maintenance, and resilience plans and identifying resource needs for risk, resilience, and emergency response. This study is continuing into 2022 and beyond to qualify North Carolina and more of its dam owners for future FEMA grants such as the HHPD grant previously described. It is also anticipated that the study process developed will be applicable to all dam hazard classifications and be used for every dam that is inspected to improve consistency and provide updated dam condition assessments annually.

4.6 Update Probable Maximum Precipitation study. PLANNED

DEMLR is supporting NCDOT, NCORR and NCSU in their efforts to update NOAA's Atlas 14 and develop a pilot project to use climate scenarios to establish future projected rainfall statistics. DEMLR is also planning to update the Probable Maximum Precipitation (PMP) Model for NC. These projects are resilience tools identified in the RARP as being fundamental tools to be used by all government entities, planners, developers, and emergency response agencies to design, develop and build a resilient infrastructure for all public and private efforts. DEMLR has obtained funding through NCORR and the US Department of Housing and Urban Development's Community Development Block Grant (CDBG) Program for this effort and are currently completing the execution of a Memorandum of Agreement with NCORR that will allow us to begin this project in the first quarter of 2022.

Land Quality Program: Sedimentation and Erosion Control Program

4.7 Produce design and developer and local program education workshops. UNDERWAY

The DEMLR Sedimentation Control Program will continue to produce workshops for design professionals, developers, contractors, local government programs, universities, and interested parties to address wide ranging erosion and sedimentation control issues in North Carolina. This capability will improve resilience throughout the state on construction sites during and after construction. These three to 10 workshops held each year, educate and provide technical assistance to stakeholders on topics such as innovative design, ongoing research, regulatory updates, consistency between jurisdictions, benefit-cost analysis, use of natural systems, and native vegetation.

Land Quality Program: Stormwater Program

4.8 Produce design and developer education workshops.

UNDERWAY

The DEMLR Stormwater Program will continue to produce workshops for design professionals, developers, contractors, local governments, universities, and interested parties to address wide ranging stormwater quality and control issues in multiple programs which include Post-Construction, National Pollutant Discharge Elimination System (NPDES) Construction, NPDES Industrial, Water Supply-Watershed and Municipal Separate Storm Sewer Systems components of the agency. This capability will improve resilience and impacts to water quality throughout the state on development and re-development sites. These workshops held monthly, educate and provide technical assistance to all stakeholders on topics such as updates in innovative design, ongoing research, regulatory updates, consistency between jurisdictions, benefit-cost analysis, and use of natural systems.

Geological Survey Section: Landslide Program

4.9 Complete landslide mapping and modeling.

UNDERWAY

The Landslide Mapping Program is partially funded by appropriations under SL 2018-5 5.6(b)(2) a. and by new permanent funding for staffing in the Asheville Regional Office to continue the functions of this important program. The program is implemented by NC Geological Survey's (GS) Landslide Mapping Unit in the Asheville Regional Office with contracted partners Appalachian Landslide Consultants, PLLC, and UNC-Asheville's National Environmental Modeling and Analysis Center. The GS updates and maintains a landslide geodatabase, and this data is accessible in a public interactive web map viewer. The landslide program will continue to collect landslide data and conduct landslide modeling on a county-wide basis to identify areas vulnerable to landslides, especially those triggered by excessive rainfall events and seismic activity. Field mapping of landslides in Polk County and Rutherford County is complete with over 2,500 landslide features mapped. Field mapping of landslides in Transylvania County is underway. Preliminary landslide susceptibility modeling is complete for 22 counties in western North Carolina. The interactive landslide data viewer can be found at: [WNC Landslide Hazard Data Viewer](#). The GS continues to respond to requests for technical assistance on landslides from emergency managers, NCDOT, local government agencies, the private sector, and the public. Since the program was fully staffed in June 2019, the GS has responded to over 150 landslides in 13 counties throughout western NC. Landslide data, maps and reports are generated as part of the response effort. The GS has implemented Unmanned Aerial Systems technology for routine use in landslide mapping and analysis. Collaborative research with US Geological Survey (USGS), UNC-CH Institute for the Environment, and the US Department of Agriculture (USDA)-Forest Service is underway on landslides related to drought-induced wildfires. The GS has completed reports and maps on post-wildfire landslides in the Nantahala River Gorge (Swain County) and in Hickory Nut Gorge (Rutherford County). It also operates nine landside-rainfall monitoring sites in cooperation with the USGS and the USDA-Forest Service. This information and response capability is and will remain important to the people of western North Carolina for planning, infrastructure, emergency response and life and property safety.

5. Environmental Assistance and Customer Service

The Division of Environmental Assistance and Customer Service (DEACS) provides non-regulatory

technical services to help customers navigate regulatory and permitting challenges, improve environmental performance through sustainable practices and recognition programs, and promote recycling and materials management programs. The Division accomplishes its legislative pollution prevention and waste reduction directives through technical assistance, education, reporting, grant-making, and administrative support. DEACS contributes to the state’s resiliency efforts through continuing and expanding support of resource efficiency, waste reduction, sustainable economic growth, and environmental leadership. Communities with robust waste reduction, recycling, and composting programs are less dependent on disposal options and more resilient to the impacts of climate change and debris following significant storm events. For example, as storms become more frequent and severe, increasing storm debris (vegetative debris, building damage, animal mortalities, etc.) will place a heavier burden and pressure on existing landfills. DEACS’s Recycling and Materials Management Section (RMMS) staff will be increasingly called upon to provide technical assistance in organics management in mass animal mortality events, storm debris clean-up, and for recycling business and local government assistance as communities work to manage materials appropriately and recover as much as possible from landfilling. Communities with robust waste reduction, recycling, and composting programs will be less dependent on disposal options and more resilient to the impacts of climate change and debris following significant storm events.

Activity	Status	Target Completion Date
<i>Environmental Stewardship Initiative</i>		
5.1 Support organizations in pollution prevention strategies.	Ongoing	Long-term
5.2 Host annual conference including NCORR.	Completed	Fall 2021
<i>Recycling and Materials Management</i>		
5.3 Promote food waste diversion and composting.	Ongoing	Long-term
5.4 Support composting following storm events.	Ongoing	Long-term

Activity Progress

Environmental Stewardship Initiative

5.1 Support organizations in pollution prevention strategies. ONGOING
 DEACS promotes and supports efforts by businesses and organizations to implement pollution prevention strategies including environmental management systems and incorporate sustainability and resiliency into strategic planning and core business functions. DEACS also assists businesses in developing goals to reduce energy, water, waste generation, and resource consumption. DEACS will continue to offer educational opportunities and events to share information and best practices in the areas of environmental and energy management systems, energy efficiency, hazardous materials reductions, environment risk management and other sustainability related topics.

5.2 Host annual conference including NCORR. COMPLETED
 DEACS hosted the annual 2021 North Carolina Environmental Stewardship Initiative Conference, where NCORR’s Chief Resilience Officer spoke on the state’s new resiliency program to businesses and organizations in attendance.

Recycling and Materials Management

5.3 Promote food waste diversion and composting. ONGOING
 DEACS coordinates between producers and consumers of organic waste including businesses, local

governments, and higher education institutions to reduce food waste and organics entering landfills through encouraging source reduction, donation of edible food, and composting. DEACS supports the use of compost on farms and urban soils to sequester carbon and improve the state's soil health. DEACS also promotes the expansion of anaerobic digestion, compost, and mulch operations through grant opportunities and technical assistance.

5.4 Support composting following storm events. ONGOING

DEACS provides technical support as needed following significant storm events regarding vegetative storm debris, onsite composting at farms impacted by mass animal mortalities, and sourcing of recycled woody bulking agents needed for the process. Landfills are increasingly hard to site and increasing storm debris from more frequent severe storms will place a heavier burden and pressure on existing landfills. With more severe storms, staff will be increasingly called upon to provide technical assistance in organics management for storm debris clean-up and mass animal mortalities.

6. Environmental Justice

The Environmental Justice (EJ) Program at DEQ works to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations, and policies.

The EJ Program works diligently on integrating this perspective into the core mission of the department, along with the legal and scientific lens guiding how DEQ employees pursue their work. DEQ’s mission, “Provide science-based environmental stewardship for the health and prosperity of all North Carolinians,” can only be accomplished if EJ is part of every DEQ activity.

Activity	Status	Target Completion Date
6.1 Update sociodemographic mapping to newest data.	Ongoing	Long-term
6.2 Continue enhanced engagement strategies for potentially underserved communities and translation and interpretation services for non-English speakers.	Ongoing	Long-term

Activity Progress

6.1 Update sociodemographic mapping to newest data. ONGOING

The EJ Program has advised and will continue to work with colleagues within DEQ to map climate risks as data-driven projections are made available. The EJ Program Team has updated the original maps from RARP Chapter 4 with the 2019 American Community Survey data to determine which Census Block Groups in North Carolina meet the criteria for “underserved populations,” generally defined as disproportionately nonwhite and disproportionately experiencing poverty (page 4-5 of the RARP). This information will help inform DEQ to target underserved communities for improving engagement (see next item), providing additional resources, and prioritizing collaborative efforts with sister agencies. This map has also been published to the open data DEQ ArcGIS Online website for ease of access to information and transparency.

6.2 Continue enhanced engagement strategies for potentially underserved communities and translation and interpretation services for non-English speakers. ONGOING

Robust communication strategies are key to successful EJ programming. The EJ Program Team has implemented the Public Participation Plan across multiple program activities associated with recovery and resiliency advancements to provide enhanced engagement and participation opportunities to underserved communities. Some of these programs include RCCP and ARPA funding opportunities for DAQ, the State Energy Office (SEO), and the Division of Water Infrastructure (DWI).

7. Information Technology

The *Department of Information Technology* (DIT) administers data centers and communication transmission infrastructure at and for state property and buildings which support emergency management communications capabilities, public safety services, medical facilities and services communications, sensors and monitoring tools, and non-government emergency services. Information technology (IT) can be vulnerable to climate impacts. In DEQ alone, IT supports functions such as emergency response and public safety for all central office and regional office staff. When climate or pandemic impacts affect the department, IT responds to address, at minimum, these threats: COOP, primary work location compromise, and power interruptions.

Activity	Status	Target Completion Date
7.1 Lead Continuity of Operations.	Completed	Spring 2021
7.2 Develop primary work location compromise.	Completed	March 2021
7.3 Identify power interruptions.	Underway	March 2023

Activity Progress

7.1 Lead Continuity of Operations.

COMPLETED

IT takes the lead for activation of the COOP and its current strategies to prepare more planning and development of “Playbooks” for use by the Division Programs. IT trains the division COOP representatives on how to update their COOP playbooks and then ensures the playbooks are updated.

7.2 Develop primary work location compromise.

COMPLETED

IT has positioned DEQ’s computing environment that allows employees to work anywhere, at any time and with any device. IT developed a strategy to fully leverage DIT’s Microsoft O365 environment that allows secure access to email, collaboration, storage, and a vast array of productivity applications. This environment can be securely accessed from anywhere and any device that has an Internet connection. These capabilities were able to create a much smoother transition for employees to work from home during the pandemic. DEQ has been working successfully remotely and has embraced the technologies and continued to be productive.

7.3 Identify power interruptions.

UNDERWAY

IT has identified networking and computing equipment that do not have a battery back-up. These batteries are commonly referred as Uninterruptable Power Sources and are meant to provide key equipment with power during a short (less than 30 minute) power outage. This can keep key equipment powered on for a seamless transition to a back-up power source with minimal loss to operations or data. IT has purchased and installed approximately 90 percent of identified assets.

8. Marine Fisheries

The *Division of Marine Fisheries* (DMF) is dedicated to ensuring sustainable marine and estuarine fisheries and habitats for the benefit and health of the people of North Carolina. This includes the management of North Carolina’s marine and estuarine fisheries out to three miles offshore, and monitoring the State’s fisheries habitat, encompassing all 2.9 million acres of coastal waters (marine and estuarine) and over 412,000 miles of coastline. The DMF carries out the rules and policies of the Marine Fisheries Commission, which is charged with managing, restoring, developing, cultivating, protecting, and regulating the State's marine and estuarine resources. The DMF is comprised of seven sections that collectively carry out this mandate including: 1) Fisheries Management (FM) Section - conducts fisheries and gear research, resource monitoring, and collection of biological information, 2) Marine Patrol (MP) Section - ensures compliance with conservation regulations and protect the state's fisheries resources, 3)

Habitat and Enhancement (HE) Section - manages a wide range of programs, including aquaculture permitting, shellfish leases, habitat mapping, the CHPP, oyster restoration, and artificial reefs, and 4) Shellfish Sanitation and Recreational Water Quality (SSRWQ) Section - protects public health by monitoring shellfish and swimming waters for pollution. Other sections include Administration, License and Statistics, and Administrative and Maintenance Services. Climate change impacts such as salinity changes and saltwater intrusion, increasing water temperatures, shifts in currents and tides, decreased water quality from increased storm runoff, and sea level rise all impact North Carolina’s coastal habitats and marine organisms.

Major threats that the SSRWQ Section monitors include water quality impacts from wastewater treatment plant failures, public health impacts from increased stormwater runoff, harmful algae blooms (HAB) due to increased nutrient loading and water temperature, and water quality issues impacting the suitability of shellfish for harvest. Major threats that the HE Section is working to better understand include severe storm impacts on the shellfish aquaculture industry and resulting marine debris, water quality impacts on SAV due to changes in salinity, water temperature, and water clarity, water quality impacts from inflow and infiltration associated with wastewater infrastructure, and water quality degradation due to nonpoint source pollution and wetlands impacts from environmental rule non-compliance. The HE Section also manages wetland loss due to sea level rise and development impacts which effects wetland migration, fisheries, water quality, and stormwater buffering capacity. Major threats that the FM Section is working to better understand include climate change increases in variability of ecosystem factors impacting the distribution of fish species and resulting management. To address these threats, the SSRWQ, HE, and FM sections developed strategies to better manage for the continuing impacts from climate change.

The RARP and status reports identify numerous strategies that DMF is continuing to develop and implement to address impacts from climate change including the following recommended strategies per chapter: **Chapter 5C—Coastal Resources and Infrastructure:** 1) Coastal Habitat Protection 2) Coastal Habitat Conversation and Restoration, 3) Map, Assess, and Monitor, 4) Natural and Nature-based Solutions, 5) Climate Change Integration; **Chapter 5F—Ecosystems:** 1) Mapping and Monitoring, 2) Water Quality Improvement and Protection, 3) Translocation and Propagation; **Chapter 5K—Water and Land Resources:** Stormwater Control Measures; and **Appendix B—NWL Action Plan 3.6.1 Protect Coastal Habitats:** Protect Strategies 1-2 and Restore Strategy 1.

Activity	Status	Target Completion Date
<i>Shellfish Sanitation and Recreational Water Quality Section</i>		
8.1 Develop Wastewater Assessment Training Program.	Planned	Short-term
8.2 Pursue acquisition of Northern Laboratory.	Underway	Short-term
8.3 Address stormwater impacts on shellfish growing areas.	Planned	Medium-term
8.4 Enhance HAB Rapid Response Protocols.	Planned	Medium-term
<i>Habitat and Enhancement Section</i>		
8.5 Complete 2021 CHPP Amendment.	Completed	
8.6 Implement 2021 CHPP Amendment.	Underway	Long-term
8.7 Develop and implement CHPP Outreach Plan.	Underway	Medium-term
8.8 Implement DMF Headquarters Campus Resilience Plan.	Proposed	Long-term
8.9 Continue coastal habitat restoration at Cedar Island.	Ongoing	Long-term

8.10 Implement Shellfish Aquaculture Storm Management Plan.	Underway	Short-term
8.11 Create, coordinate, and lead development of Resilience Clearinghouse.	Underway	Medium-term
<i>Fisheries Management Section</i>		
8.12 Implement Fisheries Management resilience strategies.	Underway	Long-term

Activity Progress

Shellfish Sanitation and Recreational Water Quality Section

8.1 Develop Wastewater Assessment Training Program. PLANNED

DMF allows for improved assessment of the impacts of wastewater treatment plant failures on surrounding shellfish harvesting and recreational swimming areas through a Wastewater Assessment Training Program. DMF will develop protocols for integrating its drone fleet into pollution source assessments to provide improved data collection and more effective visual representation of impacts for public education purposes.

8.2 Pursue acquisition of Northern Laboratory. UNDERWAY

DMF continues to pursue acquisition of a facility to house the northern regional Shellfish Sanitation and Recreational Water Quality laboratory. The State Properties Office is prepared to sign the lease with a projected opening in Spring or Summer 2022. This acquisition of lab space will help to increase DMF's ability to respond to water quality issues that may impact the suitability of shellfish for harvest, particularly following storm impacts.

8.3 Address stormwater impacts on shellfish growing areas. PLANNED

DMF initiated collaborative projects with federal and academic partners to further management plans. This continued to enhance DMF's ability to address potential public health impacts of increased stormwater runoff through research and development of updated shellfish growing area management plans. Staff have also worked with local municipalities to help develop town- and city-wide stormwater management plans that effectively balance public health considerations alongside concerns about safety and property damage due to flooding.

8.4 Enhance HAB Rapid Response Protocols. PLANNED

DMF implemented sentinel site monitoring, collection, and processing for harmful algae species in shellfish growing waters throughout the coast. This continued to enhance DMF monitoring capacity through equipment acquisition, staff training, and more formalized collaboration with other state and federal entities with responsibilities in this field. DMF also began development of standard protocol and contingency plans for HAB response to integrate not only Shellfish Sanitation and Recreational Water Quality staff, but also the DMF drone fleet to allow for more rapid response to reported issues.

Habitat and Enhancement Section

8.5 Complete 2021 CHPP Amendment. COMPLETED

DMF staff, in conjunction with APNEP and other DEQ divisions, completed the 2021 CHPP Amendment which was approved by the three regulatory commissions at their business meetings in November 2021, approved by DEQ in January 2022, and included resilience strategies with priority issues including: 1) Environmental Rule Compliance to Protect Habitat; 2) Habitat Monitoring to Assess Status and Regulatory Effectiveness; 3) SAV Protection and Restoration, with Focus on Water Quality Improvements; 4) Wetland Protection and Enhancement, with Focus on Nature-Based Methods; and 5) Reducing Inflow and Infiltration associated with Wastewater Infrastructure to

Improve Coastal Water Quality. A chapter on Climate Change and Coastal Resilience is also included in the CHPP Amendment. This chapter references the NCCSR, the RARP, and the NWL Action Plan including the recommendations from the reports.

8.6 Implement 2021 CHPP Amendment.

UNDERWAY

DMF staff, in conjunction with APNEP and other DEQ divisions, are working to implement recommendations from the 2021 CHPP Amendment to address water quality impacts on SAV due to changes in salinity, water temperature, and water clarity; wetland loss due to sea level rise and development impacts (e.g., wetland migration, fisheries, water quality, stormwater buffering capacity); water quality impacts from inflow and infiltration associated with wastewater infrastructure; and water quality degradation due to nonpoint source pollution from environmental rule compliance. This includes the formation of a private public partnership for further community engagement.

8.7 Develop and implement CHPP Outreach Plan.

UNDERWAY

DMF staff, in conjunction with APNEP, drafted the CHPP Outreach Plan with strategies for increased public understanding of North Carolina’s important coastal habitats, community engagement, and habitat protection and restoration benefits including enhancing ecosystem and community resilience. DMF is in the process of forming a private public partnership for further community engagement.

8.8 Implement DMF Headquarters Campus Resilience Plan project.

PROPOSED

DMF drafted the “DMF HQ Campus Resilience Plan” that includes recommendations to enhance community and ecosystem resilience through building a living shoreline, rain gardens, and other Nature-Based Solutions to help mitigate impacts of storms, floods, and other natural hazards to state property or infrastructure and the surrounding environment. Initial phases of the Plan were approved through the Office of State Construction and DMF is in the process of applying for state and federal funding to complete the project.

8.9 Continue coastal habitat restoration at Cedar Island.

ONGOING

DMF continued oyster restorations at Cedar Island Oyster Sanctuary (6.3 acres built with approximately 18,500 tons of material) to offset habitat loss and water quality degradation expected from climate change, increase ecosystem and community resilience, and improve water quality. DMF continues maintaining and restoring oyster reefs that increase coastal resiliency by helping protect critical wetlands and other coastal habitats while providing other beneficial ecosystem services.

8.10 Implement Shellfish Aquaculture Storm Management Plan.

UNDERWAY

Implemented sentinel site monitoring, collection, and processing for harmful algae species in shellfish growing waters throughout the coast. Continued to enhance DMF monitoring capacity through equipment acquisition, staff training, and more formalized collaboration with other state and federal entities with responsibilities in this field. Began development of standard protocol and contingency plans for HAB response to integrate not only Shellfish Sanitation and Recreational Water Quality staff, but also the DMF drone fleet to allow for more rapid response to reported issues.

8.11 Create, coordinate, and lead development of Resilience Clearinghouse.

UNDERWAY

DMF staff are working on a project in collaboration with DEQ and NCORR to develop a Resilience Clearinghouse that will be an all-encompassing resilience resource guide for North Carolina with multiple components to help bring organizations/stakeholders together to coordinate parallel efforts to decrease redundancies. Staff are helping to organize the Resilience Clearinghouse Steering Committee to coordinate and provide leadership in developing the clearinghouse. A grant proposal was funded through the NWL US Climate Alliance Technical Assistance Fund in January 2022 to provide resources for the project.

Fisheries Management Section

8.12 Implement Fisheries Management resilience strategies. UNDERWAY

Climate change increases the variability of ecosystem factors impacting the distribution, abundance, and productivity of fish populations and resulting management. DMF addresses climate change impacts as fishery management opportunities allow through the development of fishery management strategies that are flexible and support easier entry and exit into new fisheries and out of those that are declining, to prevent overfishing. DMF continues to support interstate and federal cooperative management, stock assessments, and fishery management plan guidelines by incorporating climate change in vision statements and/or strategic plans and fishery management plans.

9. Mitigation Services

The *Division of Mitigation Services* (DMS) is a state initiative that restores and protects wetlands and waterways for future generations while offsetting unavoidable environmental damage from economic development. DMS offers four In-Lieu Fee mitigation programs designed to assist private and public developers in meeting state and federal compensatory mitigation requirements for streams, wetlands, riparian buffers, and nutrients. DMS utilizes receipts from these programs to restore streams, wetlands, and forested buffers by working with state and local partners, including willing landowners to concentrate mitigation resources in areas where they will have the greatest watershed benefit. The Natural Infrastructure Flood Mitigation Program was added to the Division mission in June 2020. This program will procure nature-based solutions for flood mitigation projects to aid in flood resilience.

Activity	Status	Target Completion Date
9.1 Develop a geodatabase paired with a SQL database to evaluate trends in restoration project performance and water quality.	Underway	Fall 2023
9.2 Programmatic monitoring of nonpoint source pollutants and transient storage in preconstruction and post construction stream and wetland restorations.	Underway	Fall 2022, Winter 2023
9.3 Support DMS Natural Infrastructure Flood Mitigation Program (NIFMP).	Underway	Long-term
9.4 Develop Statewide Flood Resiliency Blueprint.	Underway	December 2023 (Draft)

Activity Progress

9.1 Develop a geodatabase paired with a SQL database to evaluate trends in restoration project performance and water quality. UNDERWAY

Over the lifespan of DMS (previously known as Ecosystem Enhancement Program and Wetland Restoration Program), the Division has made consistent adjustments in restoration design and implementation standards to incorporate resilience. Specifically, DMS projects must be resilient to changes in watershed conditions that may alter runoff rates, pollutant delivery, discharge and/or water retention. Improvement in standards will continue; the DMS databases will function to track and evaluate project performance and the potential effects of climate change. These evaluations will also allow DMS to detect and analyze changes over time and implement data-driven corrections as needed. The development of the databases was initiated prior to climate change activities and schemas have been updated in the last two years to reflect additional needs. The DMS data team was formed in 2019. During 2020 and 2021, the team completed the integration between the geodatabase, the SQL database, and the financial database (i.e., Customer Relationship Management).

9.2 Programmatic monitoring of nonpoint source pollutants and transient storage in preconstruction and post construction stream and wetland restorations. UNDERWAY

Programmatic monitoring of water quality (WQ) is managed through the Science and Analysis Unit (S&A) within DMS. Data collected and analyzed in the program will support the efficacy of water quality improvements resulting from restoration activities and will provide data to analytically detect increases and decreases in nonpoint source pollutants given potential changes in runoff and/or drought. Automatic samplers were installed at six sites across three restoration projects between 2018 and 2021 to collect base and stormflow samples; an additional five sites are currently being installed and sampling will begin in early February 2022. WQ parameters (nitrogen, phosphorous, suspended solids, fecal coliform) are being quantified for data analysis. New research: S&A is currently designing a project to capture the hydrologic effects of stream restoration through the direct measurement of transient storage. This metric indicates the hydrologic “storage” area available within a given reach and represents the area within the channel that is responsible for delaying the downstream transport of water and is directly relevant to the attenuation of flooding. S&A staff will begin this research at three sites in February 2022 to collect pre-restoration data. Post restoration data collection will begin after construction throughout 2022 and early 2023 (exact dates depend on construction schedules).

9.3 Support DMS Natural Infrastructure Flood Mitigation Program (NIFMP). UNDERWAY

DMS received legislative authority (June 2020) to develop a program (NIFMP) to create and address flood storage using nature-based solutions. The Natural Infrastructure Flood Mitigation Team within the Division is in the process of establishing an Advisory Board and developing a scope of work for design and implementation of a flood resilience pilot project in the Stoney Creek Watershed in Goldsboro, North Carolina. Additionally, the team has initiated outreach to stakeholders (e.g., Wayne County, City of Goldsboro, Environmental Defense Fund) and coordination is ongoing. These efforts will help determine the goals, strategies, and funding sources for the NIFMP and help determine ways of expanding current restoration projects to maximize resilience.

9.4 Develop Statewide Flood Resiliency Blueprint. UNDERWAY

The NCGA allocated \$20 million to DEQ to develop a Flood Resiliency Blueprint (S.L. 2021-180). The Blueprint is a statewide watershed planning effort to establish a framework and tools to assist local communities in decision-making related to reducing flood risk and increasing resilience. In late January 2022, the Natural Infrastructure Flood Mitigation Team within DMS released a formal Request for Information to solicit current knowledge, programs, and information relating to development of the Blueprint. DMS also released an Invitation for Bid to prequalify and shortlist organizations eligible to respond to a scope of work to be advertised in Spring 2022. DEQ is required to provide a status report to the Joint Legislative Commission on Governmental Operations and the Fiscal Research Division in summer of 2022. The Blueprint draft will be completed by December 2023. More information on the Blueprint can be found at:

<https://deq.nc.gov/about/divisions/mitigation-services/flood-resiliency-blueprint>.

10. State Energy Office

North Carolina’s energy infrastructure, with its diversified generating plants, robust transmission and distribution infrastructure, fuel pipeline systems, and renewable resources, is susceptible to both natural and man-made incidences that may result in local or statewide energy emergency events. While the State Energy Office (SEO) does not have direct responsibility for the state’s energy infrastructure, pursuant to the Clean Energy Plan and RARP, SEO is dedicated to helping create a modern, resilient, and low-carbon electrical energy system in the state.

The Clean Energy Plan and RARP identify numerous strategies for SEO to reduce vulnerabilities and risks to achieve a reliable supply of energy. These include hardening and modernizing the grid; targeted

undergrounding and renewing existing assets with automations; installing intelligent devices and controllers; identifying alternative or lower volume water resources; and alternative fuel infrastructures and hardening existing fuel pipelines, terminals, and distribution infrastructure. Since the publication of the RARP in 2020, the SEO has focused attentions on developing strategies and actions related to two primary objectives, which incorporate many of the above-mentioned strategies:

- Enhance the energy-efficiency and resiliency of State-owned buildings and energy infrastructure; and
- Foster the development of modern and resilient electricity systems.

To further these two objectives, the SEO is deploying multiple strategies to reduce the risk of damage to energy infrastructure from intense storms and severe weather events, such as inland and coastal flooding. The identified activities align with strategies in the RARP and will result in energy resiliency frameworks, funding mechanisms for energy efficiency and energy infrastructure projects, and streamlined decision-making pathways.

Additionally, multiple activities involve shared strategies for interagency coordination; state and local government partnerships; and robust stakeholder and community engagement processes. In 2021, the SEO contributed as an active stakeholder for: (1) Duke Energy’s Transmission and Distribution Climate Risk and Resilience Working Group; (2) NC Department of Natural and Cultural Resources’ NWL Stakeholder Group; (3) NC Office of Recovery and Resiliency’s Climate Risk Resilience Toolbox. More information regarding SEO’s resiliency efforts can be found at: deq.nc.gov/energy-and-climate.

Activity	Status	Target Completion Date
<i>All Programs</i>		
10.1 Assist low-to-moderate income communities with obtaining energy resilience and other benefits.	Underway	September 2022
<i>Resilience Program</i>		
10.2 Map energy resilience with a focus on a replicable framework in North Carolina.	Completed	September 2021
10.3 Design and test a microgrid solution that reduces customer outage time and enhances grid resiliency.	Underway	May 2024
10.4 Incorporate energy resiliency into government buildings and power grid infrastructure.	Underway	Long-term, with interim deadline October 2022
10.5 Enhance resilience and energy security in North Carolina’s coastal communities.	Underway	Long-term
<i>State Energy Program</i>		
10.6 Develop resiliency metrics and targets appropriate for North Carolina’s grid infrastructure.	Underway	February 2022
10.7 Plan for storm resilience to alternative fuel infrastructure.	Underway	September 2022

Activity Progress

All Programs

10.1 Assist low-to-moderate income communities with obtaining energy resilience and other benefits. UNDERWAY

The SEO’s State Energy Program and Weatherization Assistance Program are expected to receive

approximately \$13 million as part of the ARPA under the Low Income Home Energy Assistance Program, a 40-year initiative by the US Department of Health and Human Services. Approximately 20 percent of projects will focus on solar photovoltaic, battery storage, and community microgrid solutions that support energy resilience, shed peak load, and increase customer savings. Ultimately, these efforts are opportunities to foster long-term partnerships and self-sustaining demand for programs that rapidly target disadvantaged communities in North Carolina’s rural Tier 1 and 2 counties.

Resilience Program

10.2 Map energy resilience with a focus on a replicable framework in North Carolina.

COMPLETED

As part of the Coronavirus Aid, Relief, and Economic Security (CARES) Act, the SEO partnered with New Hanover County, UNC Asheville, and FernLeaf Interactive to complete a pilot project that assessed community vulnerabilities and potential impacts from extreme flooding, heat events, and storm-related disruptions to energy assets. The project identified disproportionate impacts to households with low-to-moderate incomes, communities of color, and other overburdened or under-resourced groups in NC’s coastal communities. The results of this study will be used to leverage future funding for energy resilience solutions and serves as a replicable resilience framework for other local communities.

10.3 Design and test a microgrid solution that reduces customer outage time and enhances grid resiliency.

UNDERWAY

In May 2021, the SEO partnered with UNC Charlotte’s Energy Production and Infrastructure Center, NCSU’s NC Clean Energy Technology Center, utility providers, and other academic institutions on the Solar Energy Technologies Office project, “Resilient Community Microgrids with Dynamic Reconfiguration to Serve Critical Loads in the Aftermath of Severe Events.” The project goal was to design and test an advanced microgrid solution using a variety of utility-owned and behind-the-meter distributed energy resources that reduces customer outage time and enhances resiliency of the grid. SEO has provided matching funds and personnel support to project steering and community engagement tasks.

10.4 Incorporate energy resiliency into government buildings and power grid infrastructure.

UNDERWAY

The SEO continued to foster connections between securing energy resilience in government buildings and power grid infrastructure with larger discussions on hazard mitigation policy. In 2021, SEO worked with the NCORR to analyze the scope of Recovery Support Function 5: Transportation and Infrastructure. In 2022, SEO will coordinate with NCEM to identify critical infrastructure or essential functions that may be included in North Carolina’s Enhanced Hazard Mitigation Plan (HMP) update that is due to the FEMA by October 2022. Without proactively including key infrastructure or essential functions into the HMP, funding proposals from governmental entities may not be eligible for FEMA programs such as the Building Resilient Infrastructure and Communities (BRIC) grant program. Collectively, these efforts will assist with strengthening future funding proposals to enhance the energy-efficiency and resiliency of North Carolina’s government and power grid infrastructure.

10.5 Enhance resilience and energy security in North Carolina’s coastal communities.

UNDERWAY

The SEO assisted coastal community partners with developing a project that builds on North Carolina’s resilience strategy and supports NCORR’s core objectives by addressing: (1) community capability and capacity building activities; and (2) the selection of mitigation projects. Under community capacity building, targeted communities, businesses, and government operations are

planned to be engaged from a top-down and bottom-up perspective to reduce or eliminate risk and damage from future natural hazards, increase resiliency of tangible assets, align with modern building code requirements, and promote a culture of preparedness. Based on these assessments, solutions that result in the analysis, design, and the deployment of energy infrastructure (i.e., electricity system hardening, microgrid applications at critical facilities, and providing backup generators), energy-efficiency measures, and other distributed energy solutions will be implemented. Phase 1 will consist of a stakeholder-led planning activity and implementation of at least one resiliency solution through detailed design, request for proposal issuance, construction, and deployment stage. Phase 2 of the project will focus on the development and implementation of additional resiliency projects as funds become available.

State Energy Program

10.6 Develop resiliency metrics and targets appropriate for North Carolina’s grid infrastructure. UNDERWAY

The SEO continued to examine storm-related impacts and the costs and benefits of different investments in grid resiliency with UNC Charlotte’s Energy Production and Infrastructure Center and NCSU’s Clean Energy Technology Center. In 2021, the “Planning an Affordable, Resilient, and Sustainable Grid in North Carolina” project conducted its final stakeholder meetings where SEO staff facilitated discussions with approximately 48 stakeholders on community engagement needs and methods for valuing greater resilience. In early 2022, the team will submit its final report. Results of this study inform key energy planning processes and provide state officials, utility providers, and other stakeholders with new social and cultural metrics to evaluate modern resiliency options.

10.7 Plan for storm resilience to alternative fuel infrastructure. UNDERWAY

The SEO worked with private, academic, governmental, and utility stakeholders on a competitively funded project by the US Department of Energy to analyze storm-induced disruptions to alternative fuel infrastructure. During 2021, the project team inventoried the incidence of storm-induced disruptions for petroleum, alternative fuel, and utility infrastructure in the Carolinas. In addition, partners conducted surveys with stakeholders to assist with developing the initial draft of the “Carolina Alternative Fuel Infrastructure for Storm Resilience Plan.” This plan will provide the roadmap to reduce the impacts of disruptions to key infrastructure, transportation operations, utility restoration, and other recovery initiatives.

11. Waste Management

The *Division of Waste Management* (DWM) is responsible for proper solid waste disposal, hazardous waste management, underground storage tank installation and operation, and Superfund cleanups throughout the state. DWM’s Solid Waste Section ensures the proper management and disposal of all solid waste, including debris generated from hurricanes and floods, for the purposes of protection of public health and the environment. DWM’s Underground Storage Tank (UST) Section is responsible for ensuring that petroleum releases (above and below ground) are properly cleaned up and/or restored as closely as possible to previous conditions. These agencies play key roles in lowering the direct costs of clean up and recovery and in protecting soil, groundwater, and surface water within impacted communities by promoting pre-planning efforts, efficient and timely management of debris generated from hurricanes and floods and petroleum releases from USTs.

DWM has been active in initiating resiliency efforts including:

- Codifying the temporary disaster debris site approval process providing for consistent statewide requirements for management of debris and to assist local, state, and federal public entities with public assistance eligibility requirements, while maintaining protection of public health and the environment. The rules became effective January 1, 2021.

- Effecting changes to Imminent Hazard legislation to allow certain solid waste permit conditions, such as hours and days of operation, tons of waste allowed to be disposed of per day or year, and service area of waste to be relaxed during and after an emergency event such as hurricane or mass animal mortality. Changes became effective July 1, 2020.
- Implementing multiple strategies, both pre- and post-storm, to identify DWM sites located in flood-prone areas that may be impacted. Agencies make that information available to field response teams through tablets and a GIS-based Incident Management System that is compatible with the system already in use by US Environmental Protection Agency (EPA) nationwide through two hurricane seasons (DWM in association with EPA and NCEM).
- Collaborating with County Emergency Management Coordinators and Local Emergency Planning Committees through meetings and listening sessions to identify areas where DEQ/DWM and counties can create partnerships and assist in training.

Activity	Status	Target Completion Date
<i>Solid Waste Section</i>		
11.1 Codification of temporary disaster debris site approval process.	Completed	January 2021
11.2 Streamline approvals for temporary disaster debris sites.	Underway	May 2022
11.3 Disseminate outreach and guidance related to approval, operation, and closure of temporary disaster debris sites.	Underway	December 2022
11.4 Maintain local government debris management planning.	Planned	Medium-term
11.5 Improve recycling and reuse strategies for disaster debris.	Ongoing	Medium-term
<i>Underground Storage Tank Section</i>		
11.6 Provide outreach and guidance related to spill prevention from USTs and ASTs.	Ongoing	December 2024 (continue outreach to AST owners and update database)
11.7 Implement strategies for enhanced preparedness.	Ongoing	Long-term
11.8 Continue state and local partnerships.	Ongoing	Long-term
11.9 Designate response coordination.	Ongoing	Long-term

Activity Progress

Solid Waste Section

11.1 Codification of temporary disaster debris site approval process. COMPLETED
 DWM was successful in codifying the debris site approval process providing for consistent statewide requirements for management of debris and to assist local, state, and federal public entities with public assistance eligibility requirements while maintaining protection of public health and the environment. The rules were effective January 1, 2021.

11.2 Streamline approvals for temporary disaster debris sites. UNDERWAY
 DWM is developing an online Laserfiche forms process to streamline approvals for temporary disaster debris sites. The Division anticipates that the online evaluation form will be available by May 1, 2022. DWM will continue to work with local, state, and federal partners to participate in and conduct training, and to provide guidance via division webpages. DWM field staff have continued to work with local governments on an individual basis to establish new disaster debris sites.

11.3 Disseminate outreach and guidance related to approval, operation, and closure of temporary disaster debris sites. UNDERWAY

DWM updated its website to announce new debris site rules. The Division is working with local governments on an individual basis to establish, activate, and close temporary sites for managing disaster debris from extreme weather events.

11.4 Maintain local government debris management planning. PLANNED

While many local governments have debris management plans in place, the efforts are primarily voluntary in nature. A recommendation would be for a statutory requirement that all city and county governments, either individually or jointly in resolution with one another, be required to develop and maintain a debris management plan as part of their Emergency Operations Plan in support of the NCEOP. This would also assist in their compliance with existing Statute 130A-309.09A for solid waste planning purposes, which includes debris management.

11.5 Improve recycling and reuse strategies for disaster debris. ONGOING

DWM will work with local, state, and federal entities, and waste and recycling facilities to improve and/or develop and implement strategies that promote the proper management of storm debris and its impacts to statewide communities by:

- Increasing waste segregation efforts that facilitate reuse, recycling, and proper disposal of the various waste streams;
- Expediting the removal of disaster-related waste from impacted communities;
- Maximizing reuse and recycling opportunities available to impacted communities;
- Growing waste reduction programs to maintain landfill capacity to withstand periodic influx of storm related debris;
- Promoting local ordinances in building practices that eliminate exposure risks resulting in less waste being generated during storm events; and
- Working with public and private waste management facilities to ensure their acceptance of disaster-related waste.

Underground Storage Tank Section

11.6 Provide outreach and guidance related to spill prevention from USTs and ASTs. ONGOING

DWM will continue to work with local, state, and federal partners to prevent spills from aboveground and underground storage tanks (ASTs and USTs). DWM will participate in and conduct training and provide current guidance on Division webpages to prevent releases of petroleum to the environment. To improve and/or implement strategies to properly manage petroleum storage, we have been engaged in the following:

- Continue to attend training events and Area Contingency Plan meetings with US Coast Guard;
- Continue to collaborate with US EPA, NCEM, DWR, and DAQ to improve notification and response time to spills reported to the National Response Center and/or NCEM; and
- Identify unpermitted petroleum ASTs, focusing within flood zones, but including all of North Carolina facilities, in an outreach program consisting of awareness and preparation prior to hurricane season.

11.7 Implement strategies for enhanced preparedness. ONGOING

DWM/EPA staff in association with NCEM were successful in implementing multiple strategies, both pre- and post-storm, to identify sites located in flood-prone areas that may be impacted. Agencies make that information available to field response teams through tablets and a GIS-based Incident Management System that is compatible with the system already in use by EPA nationwide through

two hurricane seasons. This allows DWM to maximize efficiency and shorten response times by identifying and prioritizing those sites and permitted facilities that are more likely to require preparation, communication, or response, and by identifying sites that will not need to be visited by field-response teams after a flood event.

11.8 Continue state and local partnerships. ONGOING

DWM will continue to collaborate with County Emergency Management Coordinators and Local Emergency Planning Committee through meetings and listening sessions to identify areas where DEQ/DWM and Counties can create partnerships and assist in training.

11.9 Designate response coordination. ONGOING

DWM designated additional responsibilities for two current staff members (one for solid waste and one for UST). The staff can request and authorize Mission Statements and serve as contacts for Hazardous Substances and Petroleum releases to soil resulting in enhanced spill response times.

12. Water Infrastructure

The *Division of Water Infrastructure* (DWI) administers state and federal funding associated with water and wastewater infrastructure across the state. Funding programs include the Clean Water State Revolving Fund, Drinking Water State Revolving Fund, State Reserve Program (SRP), CDBG-Infrastructure funds, and the Viable Utility Reserve (VUR) program. SRP funding may be used for construction projects, the Asset Inventory and Assessment (AIA) grant program or the Merger/Regionalization Feasibility (MRF) grant program. DWI is also responsible for administering funding made available through the American Rescue Plan Act (ARPA). All ARPA funds will either be through the SRP, VUR, or a new stormwater funding program that is being developed in 2022. The Division also provides support to the politically appointed State Water Infrastructure Authority (Authority). The Division and the Authority work to provide funding to utilities to rehabilitate and replace water and sewer infrastructure.

Activity	Status	Target Completion Date
12.1 Address decaying infrastructure.	Ongoing	Long-term
12.2 Implement program on utility non-viability.	Ongoing	Mid-term
12.3 Manage reactive utility management program.	Ongoing	Mid-term

Activity Progress

12.1 Address decaying infrastructure. ONGOING

The Authority approved modifications to project priority points systems to prioritize projects that relate to resiliency. The Division began developing an APRA administration plan with all funds to be expended by December 31, 2026.

12.2 Implement program on utility non-viability. ONGOING

The Authority continued to fully fund all complete and eligible MRF applications. The Authority and DWI continued implementing the VUR program that was signed into law in July 2020 (S.L. 2020-79). As required by statute, the Authority works in conjunction with the Local Government Commission.

12.3 Manage reactive utility management program. ONGOING

The Authority continued funding roughly 25 percent of all eligible and complete applications for the AIA program. This program remains a very competitive program.

13. Water Resources

The *Division of Water Resources* (DWR) is responsible for surface and groundwater quantity and quality throughout the state. DWR issues pollution control permits, monitors permit compliance, evaluates environmental water quantity and quality, and carries out enforcement actions for violations of environmental regulations. The Division’s primary ability to enhance resiliency will be implementing and affecting compliance with regulations designed to protect water supply and water quality in the State’s surface and groundwater.

DWR identified several impacts as a result of the potential changes in climate identified in the NCCSR. In many cases, these impacts are more extreme variations of issues that DWR is already focused on such as nonpoint source runoff and drought. Existing management efforts can be modified to incorporate more extreme scenarios. Strategies which are ongoing or will be initiated are provided in the following table.

DWR staff are coordinating with the Environmental Management Commission to identify where existing program rules or processes can be modified to protect water supply and water quality while supporting the goals of EO80. DWR added additional elements to the 319 Grant RFP application and the scoring criteria in 2021 to address how proposed activities will address climate change resilience as well as assisting underserved communities. Regional offices are facilitating the development of and subsequent approval of Emergency Floodwater Pumping Plans for coastal communities. The Division is also working with the Falls Lake stakeholders on an alternative approach to Existing Development rule compliance that would provide flexibility to do more multi-benefit practices.

Activity	Status	Target Completion Date
<i>All Sections</i>		
13.1 Coordinate rules revisions.	Underway	2024
<i>Regional Offices</i>		
13.2 Complete 2021 CHPP Amendment.	Completed	November 2021
13.3 Facilitate emergency floodwater pumping plan development.	Ongoing	Long-term
13.4 Support groundwater management project.	Ongoing	Long-term
<i>Planning Section</i>		
13.5 Chair the Water Resources Management Committee.	Ongoing	Long-term
13.6 Identify potential for water scarcity.	Underway	Fall 2025
13.7 Revise scoring of 319 Grants.	Completed	January 2022
13.8 Add flexibility to stormwater requirements.	Underway	November 2021
13.9 Provide training in adaptation strategies to reduce nonpoint source runoff.	Underway	Fall 2022
13.10 Conduct stakeholder education.	Ongoing	Long-term
13.11 Identify infrastructure needs.	Underway	Fall 2023
13.12 Include climate change impacts in basin plans.	Underway	2022–2027
<i>Public Water Supply Section</i>		
13.13 Perform risk assessments and emergency response plan facilitation.	Underway	Spring 2023

Activity Progress

All Sections

13.1 Coordinate rules revisions.

UNDERWAY

DWR coordinates with the Environmental Management Commission to identify areas where existing rules need to be modified to support EO80.

Regional Offices

13.2 Complete 2021 CHPP Amendment.

COMPLETED

DWR assisted with contributions to the most recent update to the 2021 CHPP Amendment. Regional offices are providing guidance on groundwater management projects under consideration to control groundwater levels to address site specific and regional scale needs. As sea levels and groundwater levels increase, management of stormwater in coastal areas becomes more and more challenging. As coastal communities work to develop plans and implement solutions to deal with stormwater (and floodwater) needs, groundwater management is more often being recognized as a factor to be considered and playing a role in the matter.

13.3 Facilitate emergency floodwater pumping plan development.

ONGOING

Regional offices are facilitating the development of and subsequent approval of Emergency Floodwater Pumping Plans for coastal communities. The pre-approved plans enable timely authorization of incident specific pumping needs related to specific storm events, chronic rainfall situations, or similar weather conditions that create coastal flooding conditions.

13.4 Support groundwater management project.

ONGOING

Many coastal areas are moving through a transition phase associated with increasing water levels and more frequent storm events. Changes in waterbody characteristics and that of adjacent lands are also being observed. DWR is providing project review, approval, or comment on adaptation efforts such as shoreline stabilization and repair projects to mitigate shoreline erosion and flooding impacts.

Planning Section

13.5 Chair the Water Resources Management Committee.

ONGOING

DWR staff chairs the Water Resources Management Committee for the Association of Clean Water Administrators to stay involved in federal regulation and policy shifts on climate change, adaptive management, and mitigation that affect state, interstate, and territorial water quality agencies.

13.6 Identify potential for water scarcity.

UNDERWAY

DWR is coordinating with USGS and other stakeholders to recalculate 7Q10 and other flow statistics statewide. The project will perform an assessment of changes to 7Q10 values to understand potential future dry weather flows. 7Q10 is used to calculate wasteload allocations from NPDES permitted facilities, determine water supply availability, and assess ecosystem habitat. Funding was identified to begin a statewide effort in 2022.

13.7 Revise scoring of 319 Grants.

COMPLETED

DWR added additional elements to the 319 Grant RFP application and the scoring criteria in 2021 to address how proposed activities will address climate change adaptation as well as assist underserved communities. All applicants were asked to describe potential vulnerabilities of the proposed project to climate change and what adaptations will be used to add resiliency to the project.

13.8 Add flexibility to stormwater requirements.

UNDERWAY

DWR is encouraging green infrastructure development in urban areas to reduce stormwater runoff and related flooding. This may include adding flexibility to requirements and guidance to allow for a broader range of activities and approaches to meet multiple objectives. For example, the Jordan Lake One Water initiative is designing an implementation approach that would enable compliance

flexibility and incentivize multi-benefit “One Water” actions, including resilience and greater environmental value. Additionally, working with Falls Lake stakeholders on an alternative approach to Existing Development rule compliance would provide flexibility to increase multi-benefit practices, including those with less clear nutrient benefit but co-benefits for flood mitigation, water quality, and other environmental value. The January 2021 EMC approved this model program, and local governments will begin implementation in July concurrent with submitting local plans.

13.9 Provide training in adaptation strategies to reduce nonpoint source runoff. UNDERWAY
The Nonpoint Source Branch is working with EPA Region 4, which is providing a series of training sessions on addressing climate change in state Nonpoint Source Management Programs and 319 grant-funded activities.

13.10 Conduct stakeholder education. ONGOING
DWR is periodically sharing climate change resilience-related educational materials and funding opportunities among external stakeholder audiences utilizing various NPS Branch listservs.

13.11 Identify infrastructure needs. UNDERWAY
DWR is coordinating with DWI to provide funding for repair and improvements to water treatment and wastewater collection systems to improve climate resilience and water quality.

13.12 Include climate change impacts in basin plans. UNDERWAY
DWR is working to incorporate climate resiliency as the standard goal in all Watershed Action Plans, including Total Maximum Daily Loads implementation. Strategies developed in the pilot plan include:

- Increasing natural infrastructure;
- Maximizing and optimizing plantings in restoration areas for carbon storage;
- Preserving and enhancing existing undeveloped and open space; and
- Working with a multi-agency group to evaluate the strategies and develop measurable objectives for each strategy.

Public Water Supply Section

13.13 Perform risk assessments and emergency response plan facilitation. UNDERWAY
Section 2013 of America's Water Infrastructure Act of 2018 requires community water systems serving greater than 3,300 people to develop or update risk assessments and emergency response plans. This includes planning for and preparing to respond to risks related to climate change. The Public Water Supply Section has been contacting water systems to make them aware of the requirements and putting them in touch with EPA.

D. Conclusion

The Department's progress in the past year built upon a strong foundation of inter-governmental coordination (federal, state, and local), environmental design studies and research, federal grants (e.g., BRIC, HHPD, National Dam Safety Program, Section 106, Section 319, NFWF), nongovernmental organization and private stakeholder involvement, staff training, public workshops, emergency response, implementation of nature-based solutions, and technology improvements. In the past, many of these early successes have been budget neutral or resourced through state and federal disaster recovery funds.

In 2022, DEQ is excited to undertake new resilience initiatives while continuing its ongoing efforts. Flood and storm mitigation will consider statewide impacts and coordinate with multiple levels of stakeholders. Coastal resiliency initiatives, landslide mapping, and dam safety solutions will move beyond emergency response and consider long-term recovery and preparedness. This work will be tracked with other resilience resources in a statewide Resilience Clearinghouse, coordinated by DEQ staff and NCORR. Recommendations and lessons learned from DEQ projects will be incorporated into the state update of the Hazard Mitigation Plan. Overall, DEQ's future work will continue implementing RARP recommendations on equitable and nature-based strategies across divisions, agencies, and other partners, and will integrate resilience efforts from the mountains to the coast of North Carolina.