

THE STATE OF NORTH CAROLINA

Wetland Program Plan





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NC DEQ - Division of Water Resources

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*Top image: Cedar Point Tidelands Trail, Croatan National Forest
Front cover images, left to right: Wetland scientists in an urban freshwater marsh in Raleigh;
Great Blue Heron, Yates Mill County Park; Endemic venus flytrap in Boiling Spring Lakes.*

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List of Abbreviations

Abbreviation	Description
APNEP	Albemarle-Pamlico National Estuary Partnership
CAMA	Coastal Area Management Act
C-CAP	Coastal Change Analysis Program
CEF	Core Element Framework
DCM	DEQ Division of Coastal Management
DEMLR	DEQ Division of Energy, Mineral, and Land Resources
DEQ	Department of Environmental Quality
DMF	DEQ Division of Marine Fisheries
DMS	DEQ Division of Mitigation Services
DOT	North Carolina Department of Transportation
DWR	DEQ Division of Water Resources
EMC	Environmental Management Commission
GC	General Certification
NC	North Carolina
NCAC	North Carolina Administrative Code
NCFRB	NC Flood Resiliency Blueprint
NCWAM	North Carolina Wetland Assessment Method
NPDES	National Pollutant Discharge Elimination System
USACE	United States Environmental Protection Agency
USEPA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WOTUS	Waters of the United States
WPP	Wetland Program Plan
WPS	DEQ DWR Water Planning Section
WQPS	DEQ DWR Water Quality Permitting Section
WQROS	DEQ DWR Water Quality Regional Operations Section

Introduction

The United States Environmental Protection Agency (USEPA) encourages states to develop Wetland Program Plans (WPPs) under its Enhancing State and Tribal Programs (ESTP) initiative. North Carolina's WPP is a voluntary planning document that outlines North Carolina Department of Environmental Quality's (DEQ) wetland goals, planned activities through 2030 and the divisions within DEQ with interest in implementing the plan. In addition to guiding internal priorities, the WPP serves as a communications tool to engage stakeholders, the public and other agencies in fostering support and partnerships to achieve shared wetland objectives. It is not a regulatory document and does not impose additional requirements. This plan aligns with USEPA's Core Element Framework (CEF) and reflects input from stakeholders who contributed to its development. The CEF is a technical guide designed to support tribes, states, territories, local governments and intertribal entities across the United States in developing and maintaining comprehensive, sustainable wetland programs. By following the fundamental elements (including monitoring and assessment, regulation, voluntary restoration and protection, and water quality standards for wetlands) North Carolina can build an effective and sustainable program.

The first NC WPP, approved in October 2015, was developed through an extensive stakeholder process to strengthen DEQ's wetland-focused actions. It outlined wetland functions, services and a comprehensive list of activities to guide future projects across the state. These details remain available in the original plan (DWR 2015). An update was approved in 2021 after stakeholder consultations in 2020. This update aimed to create a more concise, accessible plan and highlight changes since 2015, including new priority actions for the next period of five years. Completed and ongoing projects from 2021–2025 are documented in this 2026 plan as a record of progress (Appendix D).

DEQ's goal is to use the WPP process to build lasting relationships that collectively support effective strategies for protecting and managing wetland ecosystems in North Carolina. In 2025, the plan expanded stakeholder representation to include state and federally recognized tribes, additional nonprofits, researchers and federal agencies that had not previously been involved. DEQ recognizes the deep ancestral ties and traditional ecological knowledge that indigenous tribes hold for the lands within the state of North Carolina. Consulting state (Catawba Nation, Coharie Tribe, Haliwa-Saponi Indian Tribe, Meherrin Indian Tribe, Occaneechi Band of Saponi Nation, Sappony, Waccamaw Siouan Tribe) and federally (Eastern Band of Cherokee Indians and Lumbee Tribe of North Carolina) recognized Tribes and urban tribal associations (Cumberland County Association for Indian People, Guilford Native American Association, Metrolina Native American Association, and Triangle Native American Society) in the development of this and future plans will improve the effectiveness of managing and protecting treasured wetlands through inclusive partnerships within the state's boundary (USEPA 2022). Not all tribes and local North Carolina governments were involved in updating this WPP; however, DEQ seeks to continually expand stakeholder participation across government entities and organizations alike to prioritize collective action for wetland conservation. Prior to updating this WPP, DEQ's Division of Water

Resources (DWR) met with NC Commission of Indian Affairs (NCCIA) leadership for guidance on tribal involvement and encourages readers to reference the NCCIA for history and information on tribal governance and tribal associations in North Carolina. Broader participation across backgrounds and expertise ensures a holistic approach to wetland management.

North Carolina's WPP for 2026 builds on the 2021 version and outlines DEQ's projected wetland activities through 2030. The DEQ divisions provided summaries of completed projects (Appendix D) and identified goals for the next five years, organized by USEPA's CEF (Tables 2-6). USEPA's Core Elements include monitoring and assessment, regulatory guidance, voluntary restoration and protection, and water quality standards. Outreach and engagement activities are often interconnected within and across each of the Core Elements; however, this WPP includes a separate section for explicitly listing Education and Outreach priority activities. Aligning NC's programs with these elements ensures a comprehensive approach. DEQ's commitment to updating the WPP every five years allows priorities to evolve and address emerging wetland challenges.



Wetland scientist assessing basin wetland in Croatan National Forest

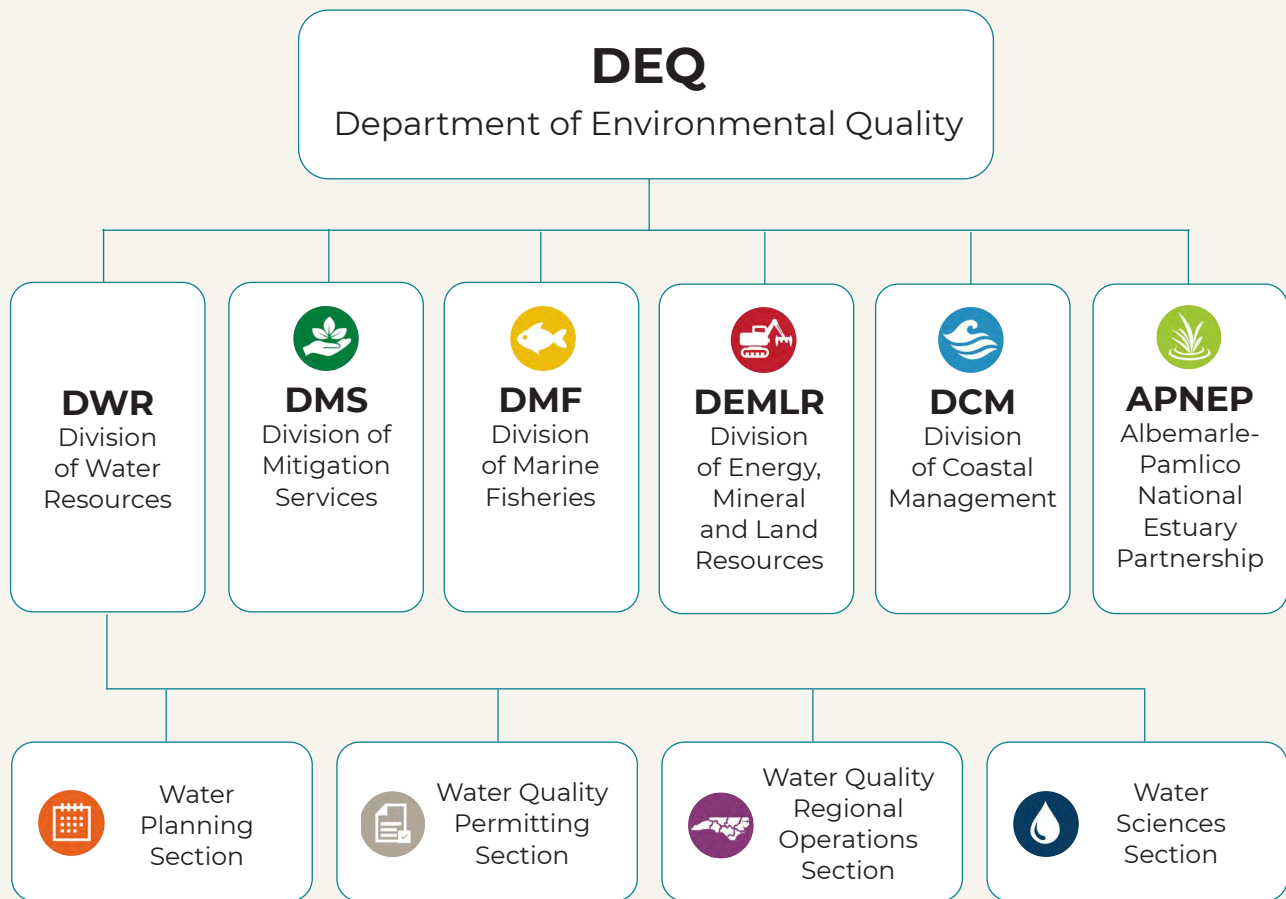


Figure 1: NC Department of Environmental Quality Organization Chart of Division/Sections with NC WPP activities (Division/Section summaries are provided in Appendix A)



Riverine swamp forest along the Black River

Overview of NCDEQ Divisions/Sections



Albemarle-Pamlico National Estuary Partnership (APNEP)

– APNEP is a federally funded program whose mission is to identify, protect, and restore the significant natural resources of the Albemarle-Pamlico estuarine system. APNEP utilizes an ecosystem-based management approach and engages citizens and organizations to ensure a coordinated approach to addressing pressing regional issues.



Division of Coastal Management (DCM)

– NC DCM carries out the state's Coastal Area Management Act (CAMA), the Dredge and Fill Law, and the federal Coastal Zone Management Act of 1972 in the 20 coastal counties. NC DCM also manages public beach and waterfront access and North Carolina Coastal Reserves.



Division of Energy, Mineral, and Land Resources (DEMLR)

– NC DEMLR regulates and provides technical assistance related to mining, dams, sediment and erosion control and stormwater management.



Division of Marine Fisheries (DMF)

– NC DMF regulates the state's marine and estuarine fisheries and habitats.



Division of Water Resources: Water Planning Section (DWR-WPS)

– NC DWR-WPS develops standards, rules and management strategies to protect water quality, carries out water supply planning, provides guidance to local water systems, and monitors drought conditions.



Division of Mitigation Services (DMS)

– NC 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.



Division of Water Resources: Water Sciences Section (DWR-WSS)

– NC DWR-WSS has chemical and biological laboratories that provide DWR with the biological, chemical and technical support required to regulate and manage water quality throughout the state, as well as comply with federal monitoring requirements.



Division of Water Resources: Water Quality Permitting Section (DWR-WQPS)

– NC DWR-WQPS has six branches that are responsible for compliance, expedited permitting, non-discharge effluent land application and beneficial uses of reclaimed water, animal feeding operations, National Pollutant Discharge Elimination System (NPDES) permits for industrial and municipal projects, and 401 and buffer permitting.



Division of Water Resources: Water Quality Regional Operations Section (DWR-WQROS)

– NC DWR-WQROS is the public's first contact with the agency for environmental emergencies, permit acquisition and compliance, and groundwater well permitting and compliance.

The NC WPP stakeholder group was reconvened in 2025-2026. NC DEQ recognizes that including a diverse group of individuals as part of a stakeholder process incorporates expertise and local knowledge to develop a stronger, comprehensive NC WPP. The stakeholder group consisted of representatives from government (local, state, and federal), professional, non-profit, tribal, and academic organizations. Stakeholders shared their group's needs related to NC wetlands, provided feedback on NC DEQ's projected wetland work, and reviewed the proposed NC WPP. Stakeholders responded to surveys and expressed their interest (yes/no) in individual activities proposed by NC DEQ and other stakeholder members. The level of support (percent of total responses) is noted in the DEQ proposed activity tables (Tables 2, 3, 4, 5, and 6) and the "Additional Stakeholder Interests" (p. 25). Given the diversity of interests represented within the stakeholder group, not all stakeholder group members support all the activities listed in the NC WPP.

NC WPP Stakeholder Group Members in 2025-2026

ACADEMIA

Duke University
NC State University
University of North Carolina, Chapel Hill
University of North Carolina, Institute of Marine Science
University of North Carolina, Wilmington

FEDERAL AGENCY

US Army Corp of Engineers
USDA Natural Resources Conservation Service

INDIGENOUS TRIBE

Coharie Tribe / Great Coharie River Initiative
Eastern Band of Cherokee Indians
Lumbee Tribe of North Carolina

NON-PROFIT ORGANIZATION

American Council of Engineering Companies of NC
Carolina Wetlands Association
NC Aggregates Association
NC Chamber
NC Environmental Restoration Association
NC Farm Bureau Federation
NC Home Builders Association
NC Wildlife Federation
NC Coastal Federation
The Nature Conservancy

STATE AGENCY

NC Agriculture and Consumer Services
NC Department of Agriculture
NC Land and Water Fund
NC Natural Heritage Program
NC Wildlife Resources Commission

Wetlands in North Carolina

FACTS AND FUNCTIONS

According to U.S. Fish and Wildlife Service's (USFWS) National Wetland Inventory, North Carolina has approximately 3.9 million acres of wetlands (Figure 2), and 94% of those wetlands occur east of the fall line, where the Coastal Plain and Piedmont ecoregions meet (Gale 2021). Wetlands have always been an indispensable feature of North Carolina's natural history, and the culture and livelihood of its people. Continuing to deepen our understanding of wetland functions, and along with protection of ecologically rich wetland ecosystems, is critical to the health and well-being of all people living in and visiting North Carolina.

The National Wetland Inventory layer in Figure 2 displays the abundance of estimated wetland land cover within the NC boundary based on imagery from 1985-2022 depending on location in the state.

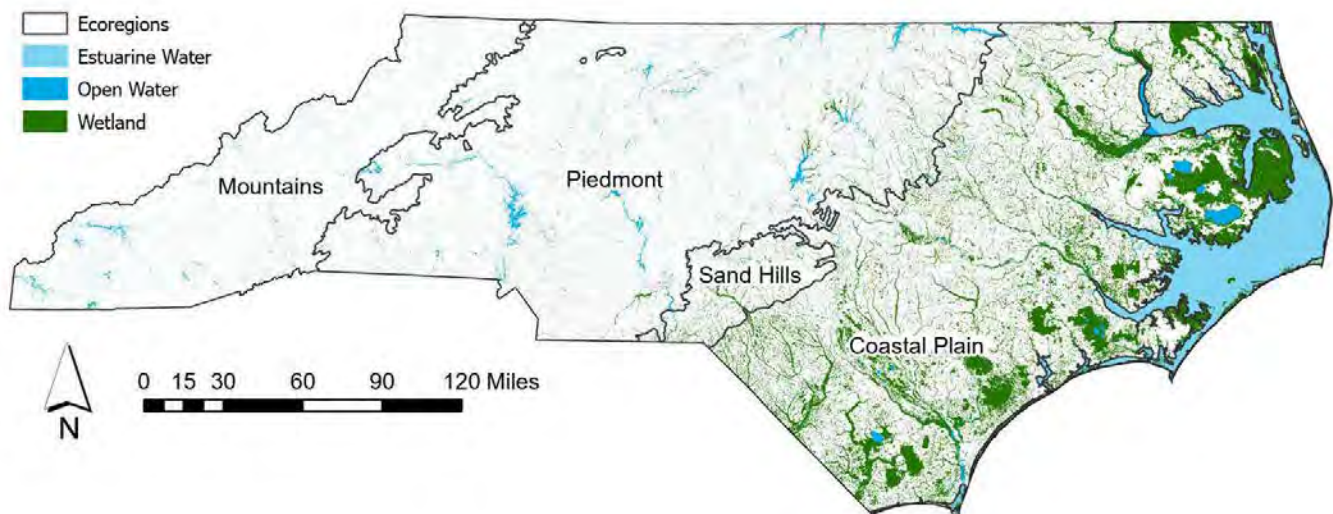


Figure 2. Estimated wetland areas occurring in North Carolina from the US Fish and Wildlife Service's National Wetlands Inventory (USFWS 2004). Approximately 94% of wetlands (in green) across the state are in the Coastal Plain and Sand Hills ecoregions (labeled and outlined in black). Although difficult to see on this map, wetlands are prevalent features spread across the Piedmont (~5.5% of wetlands in NC) and lesser so in the Blue Ridge Mountain (~0.5% of NC wetlands) ecoregions. Estuarine water, rivers and lakes are displayed in blue. Map created by S.M. Anderson (March 2026).

Wetlands provide a wide array of important functions. The assessed value of a wetland depends on factors such as its type, size, and location, the functions it performs, the ecosystem services it offers, and the needs of the individuals or communities occupying and/or evaluating it (Figure 3). To better assess and manage wetland ecosystems, tools like the NC Wetland Assessment Method (NCWAM 2016) and the Floristic Quality Index (FQI) have enhanced DEQ's ability to track wetland changes over time and estimate function and quality.

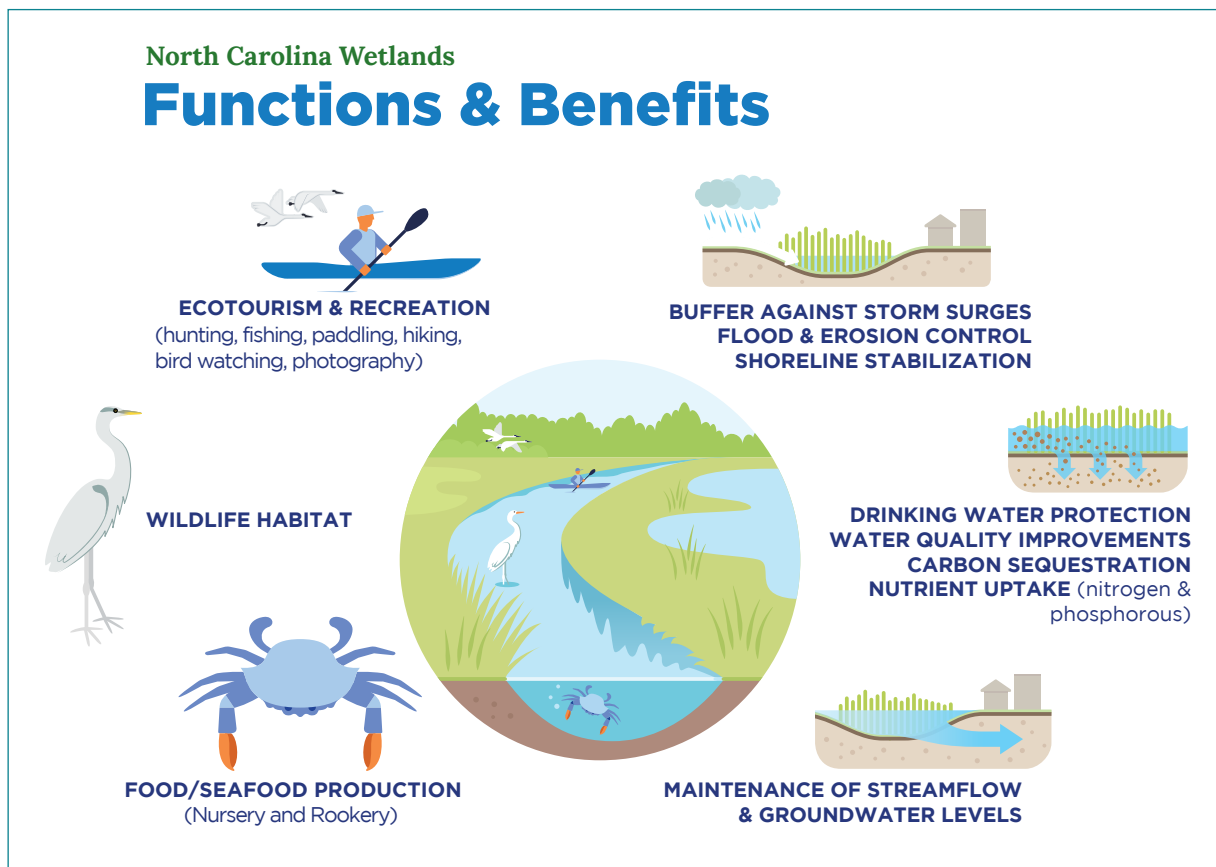


Figure 3. Wetlands provide numerous functions and benefits to the people and wildlife in North Carolina (ncwetlands.org).

NCWAM classifies wetlands into 16 types that are found across North Carolina, from the mountains to the coast. The method is used by state agencies (like the North Carolina Department of Transportation and DEQ) and environmental contractors to consistently assess the health of a wetland based on a reference quality wetland of the same type in a comparable geography. Within each wetland type, there is incredible diversity of natural wetland plant assemblages critical for wildlife habitat and water management (Schafale 2024). Not all 16 wetland types are in every part of the state since elevation, soil type and hydrology control what types of plants can survive there. However, no matter where you are in the state, wetlands do provide extraordinary benefits to North Carolina’s communities through cultural and spiritual reverence, recreation and mental health and water filtration and storage (Maund et al. 2019).

NCWAM Wetland Types

- Basin
- Bog
- Bottomland Hardwood Forest
- Estuarine Woody Wetland
- Floodplain Pool
- Hardwood Flat
- Headwater Forest
- Non-riverine Swamp Forest
- Non-tidal Freshwater Marsh
- Pine Flat
- Pine Savanna
- Pocosin
- Riverine Swamp Forest
- Salt/brackish Marsh
- Seep
- Tidal Freshwater Marsh

Wetland benefits to the residents of NC depend on their location; however, many functions they perform are beneficial to all North Carolinians in some form or fashion. Wetlands provide wildlife with habitats that residents and visitors also enjoy for serenity through ecotourism, recreation (fishing, hunting and hiking) and seafood production. Wetlands also provide residents with lesser-known, but critical services like protecting drinking water sanitization and quality, reducing nutrients (like nitrogen and phosphorus) in streams, rivers and lakes, and controlling flooding and erosion during storm events (Gourevitch et al. 2026).

WHAT IS THE CURRENT STATE OF WETLANDS?

Alterations to North Carolina's wetlands occur due to human activities and natural processes. Ongoing land-use changes including development (e.g., for transportation, residential, industrial, multiuse), logging and farming are compounded by increased pollution and shifting climate (e.g., sea level rise, frequent drought and storm events) (Figure 4). These impacts cause changes in wetland plant community structure, hydrology, and water quality.



Figure 4. Some causes of human-induced and natural changes to North Carolina wetlands (ncwetlands.org)

Wetlands on the South Atlantic coast are expected to experience some of the greatest losses in the contiguous United States, most notably in the Albemarle-Pamlico estuarine complex, as a result of sea level rise and climatic changes (Osland et al. 2022). In this case, wetland loss is often a decline in certain wetland types. For example, when forested wetland soil becomes saltier, trees die and marsh plants become more abundant (or migrate) inland, resulting in the expansion of salt-tolerant plant species (Gianopulos 2026). North Carolina is projected to have the third highest potential for wetland loss/conversion in the United States, and has greater potential for marsh migration behind Louisiana and Florida (Figure 5).

Trends of wetland loss have continued in forested wetlands along North Carolina's Outer Coastal Plain. In places where wetlands are changing the most, 50-90% of tree canopy cover species have been lost as wetlands experience saltwater intrusion (DWR 2024, Gianopulos 2026). Historically, freshwater forested wetlands are converted to brackish marshes, shrub-dominated wetlands or open water as trees are dying due to rising sea levels and increasing saltwater concentrations (DWR 2024). However, higher elevation wetlands further inland from estuarine and ocean waters have continued to mature and retained their natural plant assemblages.



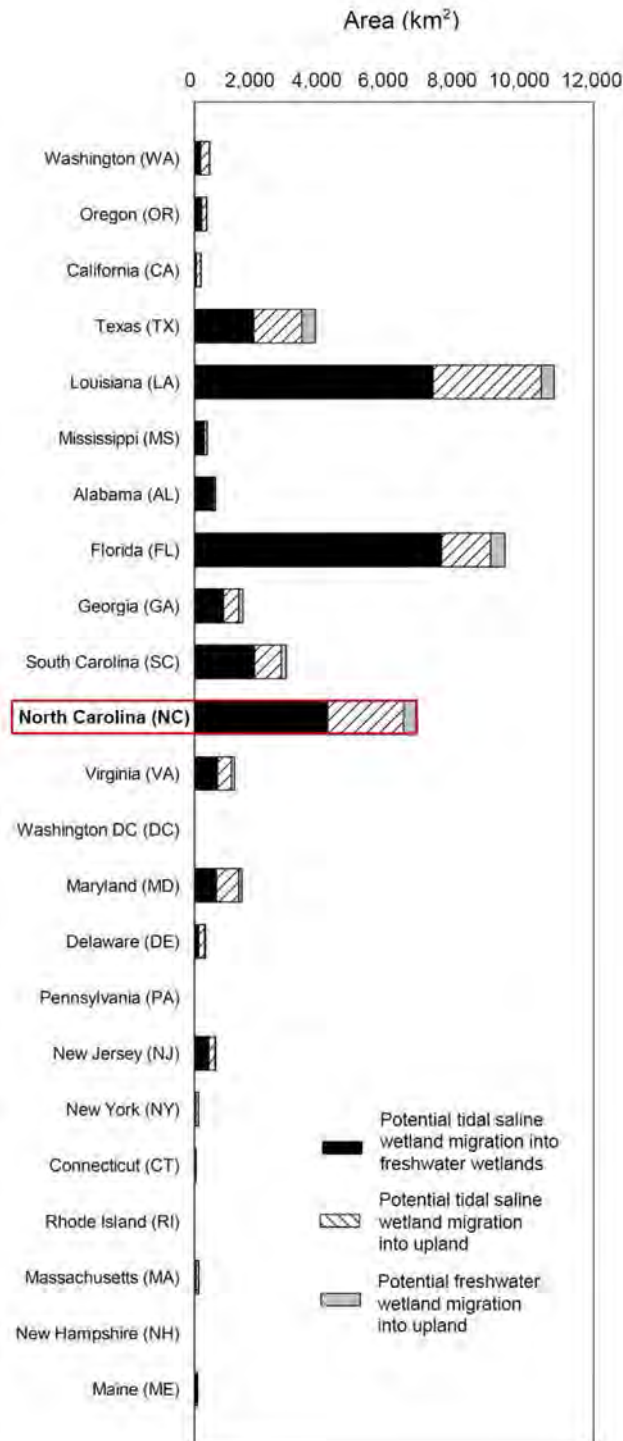


Figure 5. Landward migration of coastal wetlands in response to sea level rise across the conterminous United States, by state from west to east, modified from Osland et al (2022). Osland et al. (2022) found that North Carolina has the third greatest wetland area available for wetland migration. They presented data for 22 coastal states and Washington, DC in three categories—tidal saline wetland migration into freshwater wetlands, tidal saline wetland migration into uplands, and freshwater wetland migration into uplands. Current wetland migration estimates assume a sustained level of development, no efforts to slow or impede salt marsh encroachment into agricultural or forested uplands and no major ecological or geological changes.

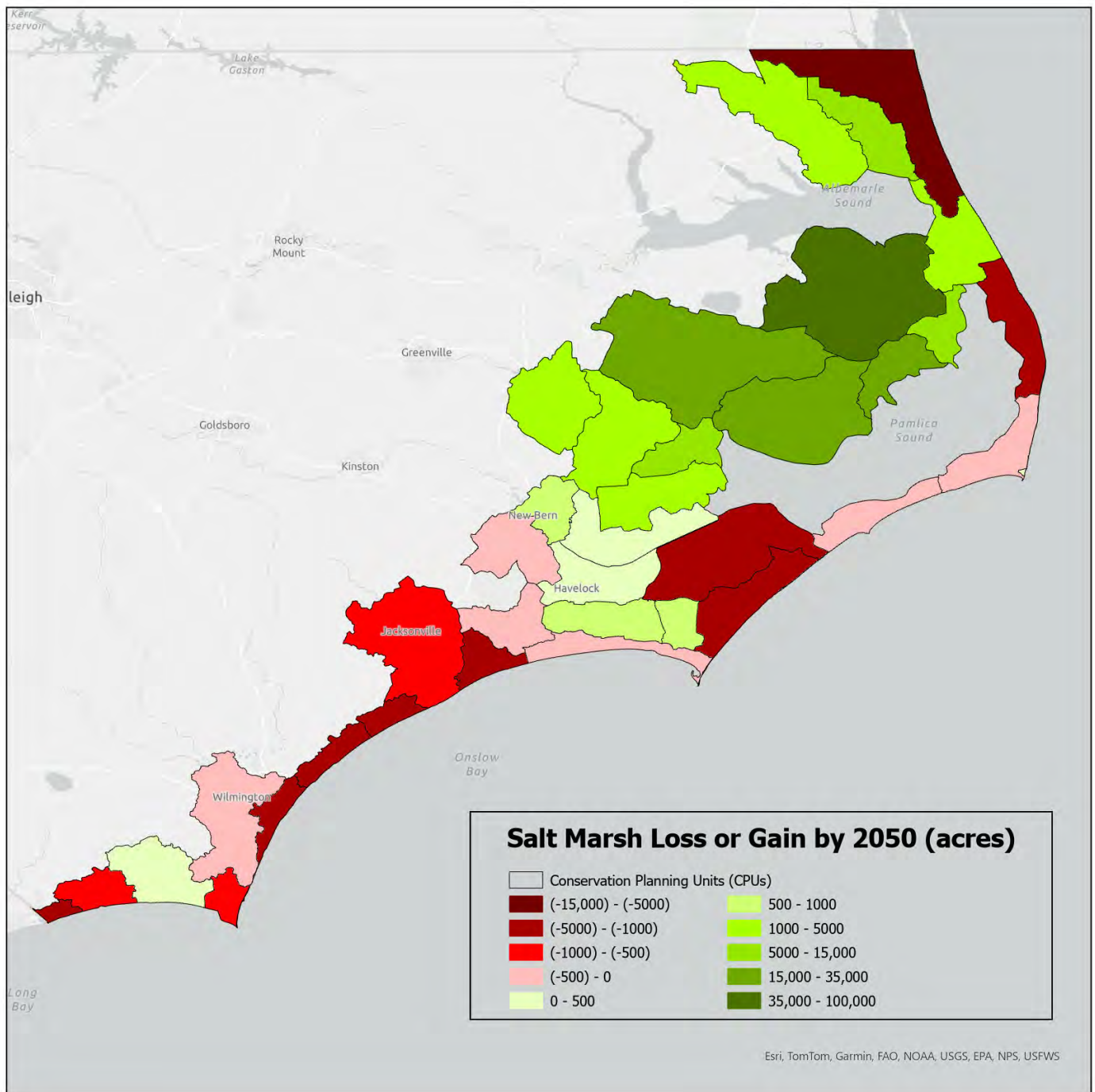


Figure 6. The NC Salt Marsh Action Plan (2023) by the North Carolina Coastal Federation identifies areas of marsh loss and gain across the North Carolina Coastal Plain. The coastal region is subdivided into conservation planning units (CPUs) where salt marsh currently exists or is projected to occur by 2050 under an intermediate sea-level rise scenario of 1.5 feet relative to 2010 conditions. The map illustrates the projected net change in salt marsh acreage from 2025 to 2050, with each CPU colored according to its expected net gain or loss, assuming no major future developmental or geomorphological disruptions.

The Neuse-Pamlico and Roanoke-Chowan River basins, which make up the Albemarle-Pamlico region, had 1,421 km² of forested wetlands in protected areas of NC in 1996 (Figure 7; White et al. 2021). Between 1996 and 2017, a shifting climate has caused forested wetlands to decline 1.3% annually and become a different wetland type (White et al. 2021). Some of these changes to wetlands are naturally occurring; however, alteration of natural landscapes for expansion of human infrastructure often speeds up the process and worsens the impacts of a changing climate. Several examples include hardened shorelines, groundwater withdrawals, and ditching or filling.

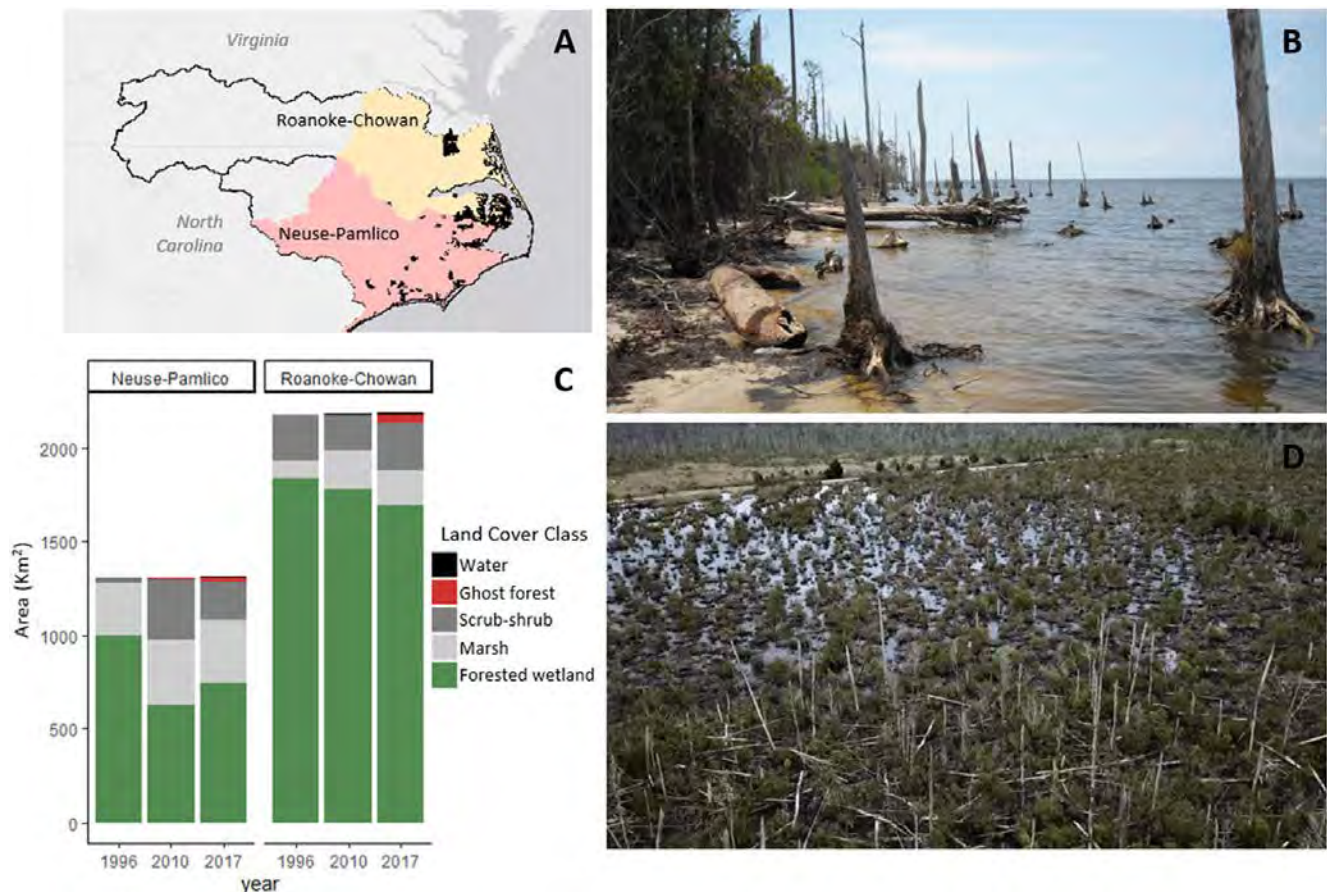


Figure 7. From 1996 to 2017, forests in protected areas of the Neuse-Pamlico and Roanoke-Chowan subregions (C) were most likely to transition to scrub-shrub or marsh habitat (D). Transitions into open water were far less common (B). Figure is from White, E.E. et al. (2022).

Photo Credit: top right M. Ardon, bottom right L. Groskin.

Coastal wetlands are not the only vulnerable ecosystem. Freshwater rivers and streams further inland are subject to similar threats (like expanding human infrastructure and shifting climate patterns) which can lead to further wetland degradation in riverine and coastal ecosystems downstream.

In addition to the Coastal Plain, the Sandhills, Piedmont and Blue Ridge ecoregions of the rest of North Carolina are vulnerable to the changing climate, and the encroachment of human infrastructure and development due to rapid population growth. North Carolina's population grew by nearly 2.4 million (28%) people between 2000 and 2020 with signs of further growth from 2020 to 2030 (U.S. Census Bureau, 2020). Additionally, the severity of seasonal storms and hurricanes has put increased strain on remaining wetlands to process and retain flood waters. Fluctuations from severe drought to intense precipitation reduce wetlands' ability to hold flood waters and cause increased nutrient run-off and sediment to streams and rivers downstream.

Wildfire is an important disturbance for wetland functions in pine savannas and is conversely detrimental to drained peatlands (also referred to as groundfires). Decades of fire suppression combined with increased frequency of drought, shifting precipitation patterns and water management practices make wetlands vulnerable to change (Swails et al. 2022). This is especially important for North Carolina wetland treasures like peatlands that are critical for carbon stores in the United States (NCDEQ, 2024). Prescribed fire has been a critical land stewardship practice in North Carolina wetlands to reduce wildlife risk and maintain structure for millennia.

Statewide between Jan. 1, 1990, and Dec. 31, 2025, a total of 18,864 acres of human-induced wetland impacts were permitted through 14,947 issued 401 certifications and Isolated Wetlands and Waters permits (17% of permits were from 2020 to 2025) (Anderson 2026; Figure 8). Since 1990, most of the permitted impacts have occurred in Coastal Plain wetlands, due in part to the majority of the state's wetlands occurring there (Figure 1). Large, permitted impacts in Beaufort, Carteret, Lenoir and Wilson counties are attributed to mining, aquafarming, industrial/commercial development, and reservoir creation, respectively. The total acres of permitted wetland impacts have steadily decreased over the past three decades due to a decrease in the number of requested permits and fewer proposals for very large projects (e.g., mining, aquafarming, reservoirs). Wetland impacts that require permits have also become more restricted over the last decade, because of various federal and state regulatory changes, so it is important to understand that many wetland impacts are not being tracked.

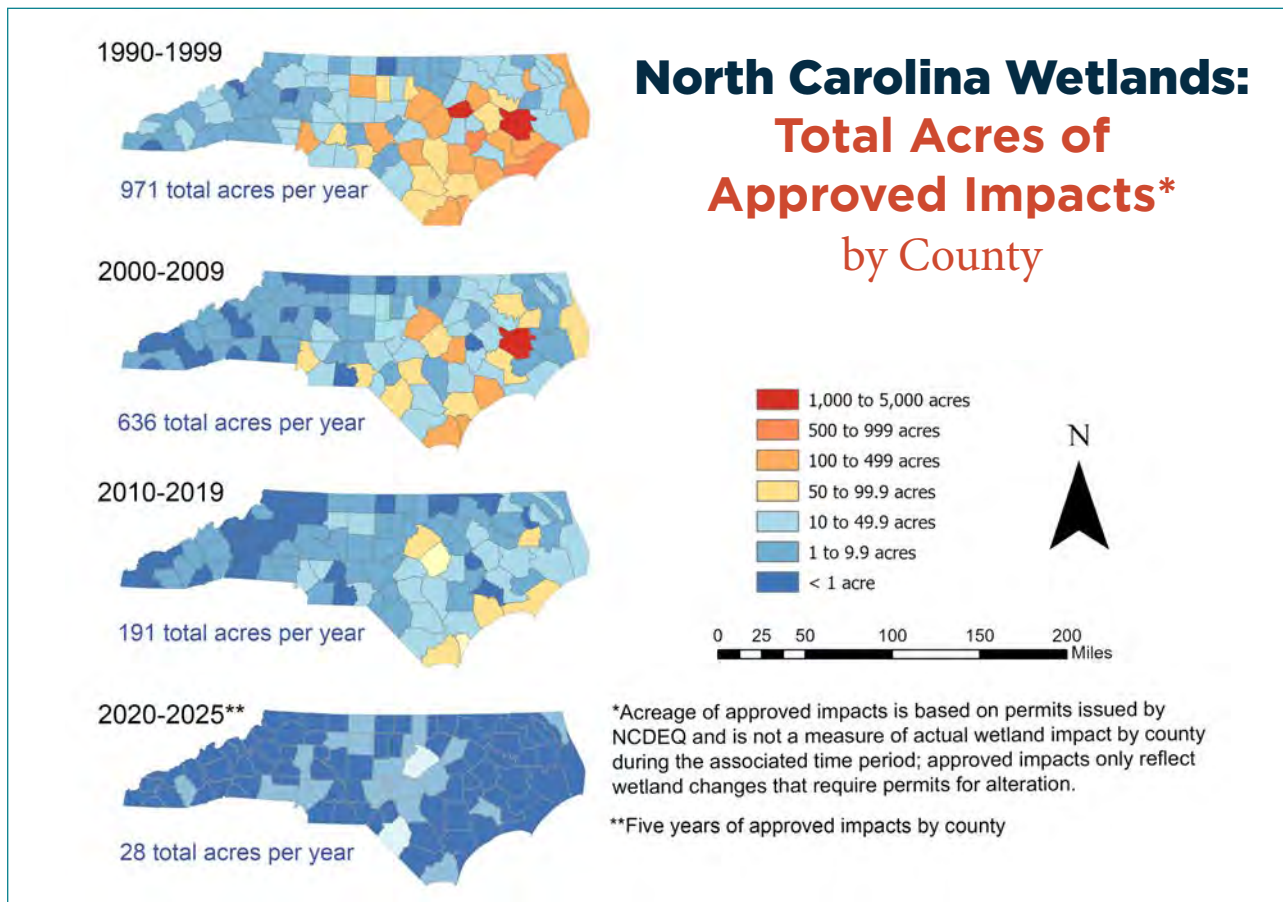


Figure 8. Total acres of wetland impacts approved under DWR 401 certifications or Isolated Wetlands and Waters permits. Individual North Carolina county maps include 1990-1999, 2000-2009, 2010-2019, and 2020-2025. Note that the first three maps between 1990-2019 include total acres of approved wetland impacts every 10 years, and the last map for 2020-2025 is a 5-year total. Figure was modified from 2021-2025 NC Wetland Program Plan by S. M. Anderson in May 2026.

STRATEGIES FOR STEWARDSHIP AND MANAGEMENT

Currently, wetland impacts of 0.10 of an acre (4,356 ft²) or greater, require mitigation, depending on the wetland type. Projects with permitted wetland impacts above this established threshold require compensatory mitigation according to administrative code rule 15A NCAC 02H .1305(c). The acres of required compensatory mitigation (i.e., preservation, enhancement, restoration, creation, mitigation banks, in-lieu fees) for 2010-2019 were less than the acres of permitted impacts, but the acres of required compensatory mitigation for 1990-1999, 2000-2009, and 2020-2025 were greater than the acres of permitted impacts. For example, between 2020 and 2025, DWR approved 567 permits accounting for 139 acres of wetland impacts, resulting in 457 acres of wetland mitigation required. However, data used to calculate total acres of wetland impacts approved under DWR 401 certifications or Isolated Wetlands and Waters permits indicates a decrease in approved impacts over time (Figure 8). This trend likely reflects an increase in smaller projects that fall below permitting thresholds and isolated wetlands losing regulatory protections. This disconnect is expected to continue. The wetland

impacts associated with approved permits do not account for human-induced wetland impacts that are not reported or fall below reporting/application thresholds, and they do not account for natural wetland changes, losses or conversions to different types. These additions of non-tracked wetland impacts can vastly increase the estimated acres of wetland change and loss.

Strategies for mitigating wetland losses by natural change across the state are accomplished primarily through voluntary wetland restoration and protection initiatives since no mandatory program for natural losses currently exists. There is growing interest from multiple agencies and organizations throughout the state to support wetland protection efforts and explore innovative techniques and policies for ensuring effective conservation of the numerous ecosystem services wetlands provide to the residents of North Carolina. Many of these approaches are highlighted in this plan (see Voluntary Restoration and Protection Goals and Activities, and Table 2).

Advances in satellite imagery are improving our ability to classify land cover types in North Carolina. The U.S. National Oceanic and Atmospheric Administration's Coastal Change Analysis Program (C-CAP) is one product that provides nationally standardized, raster-based inventories of land cover for the coastal areas of the US using remotely sensed imagery. In 2024, the Division of Marine Fisheries (DMF), Division of Coastal Management (DCM), DWR, DEQ State Energy Office and Albemarle-Pamlico National Estuary Partnership (APNEP) combined monetary resources alongside South Carolina agencies to fund an update to C-CAP land cover classification for the entire state of North Carolina using 2022 imagery at one meter resolution. It is expected that improved C-CAP and other mapping products led by other departments like DOT, and global radar imagery (like surface water and ocean topography) will enable North Carolina to better identify wetland change and flooding patterns across the entire state. Widespread impacts of Hurricane Helene in September 2024 on wetlands in the Blue Ridge ecoregion are still unknown; however, efforts for mapping and tracking wetland changes in the Blue Ridge are of upmost importance and will become increasingly more likely as new imagery and analysis becomes available.



Floodplain wetlands along the Coharie River

Summary of DEQ WPP Key Goals

Below are DEQ's key WPP goals for 2026–2030, organized around the CEF defined by the USEPA. These goals were reviewed and supported by members of the WPP stakeholder group, and any updates from the previous plan are noted here. Given the diversity of interests represented within the stakeholder group, not all stakeholder group members support all the activities listed in this plan.

For more than a decade, USEPA's CEF has guided DEQ in shaping and improving the WPP. The DWR aims to tailor this plan for the current needs, ensuring North Carolina's wetland programs are both comprehensive and sustainable. Because the WPP is designed to be broad, it offers flexibility and encourages collaboration across elements—activities in one area often support progress in others (USEPA 2008, 2023). DEQ intends for the activities outlined in this plan to close information gaps and improve state policies and management decisions for North Carolina's wetlands moving forward.

Monitoring and Assessment:

1. Collect, analyze, compare, and disseminate measurements across North Carolina wetland types
2. Evaluate status and trends in wetland acreage, ecological condition and functional components for quantifying restoration success and sustainability

Regulations:

1. Provide a clear understanding of the jurisdictional scope of NC's regulatory program
2. Evaluate regulatory activities to ensure regulatory compliance and intended environmental quality protection
3. Administer regulatory activities efficiently and consistently to enforce North Carolina's wetland requirements
4. Work with North Carolina residents to wisely manage and restore the state's wetland resources

Voluntary Restoration and Protection:

1. Provide guidance and promote statewide wetland restoration and protection goals (including wetland acres, condition, and functions)
2. Assist with public outreach and education for voluntary restoration efforts

Water Quality Standards for Wetlands: (also incorporated with regulations)

1. Support and provide consistency in applying the narrative wetland standards

USEPA Core Elements and NC DEQ'S Proposed Activities **MONITORING AND ASSESSMENT**

The USEPA Core Element Framework (Wetland) Monitoring and Assessment document states: "Monitoring is the systematic observation and recording of current and changing conditions, while assessment is the use of that data to evaluate or appraise wetlands to support decision-making and planning processes." Collection of monitoring data is critical for obtaining an accurate assessment of wetland conditions in the state.

Since 2003, DWR has been monitoring various wetlands to describe current conditions and to assess the status and trends of wetlands across the state; however, monitoring data has only been collected on a project-by-project basis. Beyond periodically participating in the USEPA's National Wetland Condition Assessment, DEQ does not currently have a systematic wetland monitoring network where reoccurring monitoring is conducted. Short-term (less than 5 years), and on a few wetlands, long-term (greater than 5 years) monitoring, has been conducted to measure water quality and hydrology, and assess biological diversity like plants, amphibians and aquatic macroinvertebrates. Many wildlife species benefit from and rely on wetland habitats for shelter, food and reproduction, which makes these species reliable indicators of wetland type and quality. Some wetland indicator species include the American alligator, rainbow snake, marsh rabbit, king rail, and black rail, prothonotary warbler, wood duck, many-lined salamander, and Carolina gopher frog. DEQ wetland monitoring grant projects have focused on certain wetland types (e.g., natural, restored, isolated, headwater) including Unique Wetlands (special designation for wetlands defined in the state water quality standards), reference and disturbed wetlands, wetlands in focused watersheds and regions, specific wetland characteristics (e.g., amphibian usage, hydrology, connectivity), and wetland assessment tools.

DEQ's wetland monitoring and assessment data have many potential uses throughout the state and can continue to be integrated into other state programs through various partnerships, collaborations and sharing of data. Platforms and tools for encouraging collaboration and standardized monitoring and assessment among and between disciplines and sectors are a DEQ priority. Raw data (<http://www.ncwetlands.org/research/wetland-raw-data>) and project summaries/final reports (<http://www.ncwetlands.org/research/wetland-project-summaries>) produced by DWR's Wetland Science and Outreach team are publicly accessible at [ncwetlands.org](http://www.ncwetlands.org).

Future Direction:

While much work continues to be done on wetland monitoring and assessment throughout North Carolina, standardized wetlands data collection is increasingly critical as wetland acreage is lost year after year and as wetland protection regulations are revised at the federal and state level. Wetland types in North Carolina that are particularly vulnerable to loss are peatlands/pocosins, Carolina Bays, bottomland hardwood forests, coastal marsh and other geographically isolated wetlands. Many of these are no longer protected under state or federal laws. Reoccurring monitoring of ecologically and culturally significant wetlands in North Carolina is important to determine baseline conditions and evaluate statuses and trends in wetland habitat quantity and quality as they relate to natural or human-induced events and longer-term chronic stressors like sea level rise, extreme storm events, and fire. Monitoring wetlands statewide in areas prone to expansion of human infrastructure and strong climatic events can provide valuable information for addressing the effects of natural and anthropogenic changes, like flooding and water contamination.

Currently, DEQ does not have a statewide wetland monitoring network that provides long-term, site-specific data for different wetland types and their quality. Other programs within DWR—such as the Ambient Monitoring System, Biological Assessment Branch, and Ambient Lakes Monitoring Program—focus on monitoring

water quality in lakes/reservoirs, rivers, streams, and estuaries, as well as the biological communities that inhabit them. There is an ever-growing interest in pursuing systematic monitoring for tracking wetland health in North Carolina, particularly in reference quality systems, but it has not yet been funded or implemented.

Primary Monitoring and Assessment Goals:

1. Collect, analyze, compare and disseminate measurements across North Carolina wetland types
2. Evaluate status and trends in wetland acreage, ecological condition and functional components for quantifying restoration success and sustainability

Proposed Monitoring and Assessment Activities:

The proposed DEQ monitoring and assessment activities are listed and associated with their respective USEPA Phase and Action below. Some activities may be applicable to more than one Core Element. The divisions/sections within DEQ working on the activities are noted by the adjacent icons. When appropriate, activities have been combined and all relevant divisions/sections noted. Since not all stakeholders supported every activity, a hat (^) or asterisk (*) by an activity denotes the extent of 2025 WPP stakeholder members agreeing that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents. A hat (^) by an activity denotes greater than 70% support, and an asterisk (*) by an activity denotes 50-70% support, from 2025 NC WPP stakeholder members who agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents.



Table 1: DEQ Monitoring and Assessment Activities

ID	DEQ Monitoring and Assessment Activities	USEPA Core Element Action ¹	DEQ Divisions/Sections
A [^]	Assess wetland status, regulatory effectiveness, and evaluate change over time through improved mapping and monitoring, tool development, and additional data collection across wetland types, with a focus on Unique Wetlands, unprotected, and vulnerable wetlands (e.g., wetlands critical for flood reduction and groundwater recharge like geographically isolated wetlands and bottomland hardwood forests)	Phase 1, Action D Phase 2, Action E Phase 3, Action D	    
B [^]	Standardize statewide data collection and assessment methods to ensure compatibility and robustness for decision-making and centralize wetland monitoring data in accessible databases	Phase 2, Action A	  
C [^]	Support state, tribal, and federal reoccurring data collection and monitoring efforts, particularly with the goal of establishing a state-supported wetland monitoring strategy and monitoring network	Phase 2, Action B	  
D [^]	Monitoring of coastal marsh habitat and subsidence in response to sea level rise and extreme weather events to direct effective conservation efforts	Phase 2, Action E	 
E [^]	Prioritize understanding drivers of wetland loss and identify strategies to mitigate threats and strengthen protective factors	Phase 1, Action B Phase 2, Action E	   
F [*]	Develop maps the public can access that display wetland-specific information like wetland condition, conservation easements, assets, and monitoring data interface	Phase 3, Action D	     
G [*]	Advance data-driven assessment of flood mitigation strategies that expand flood storage through nature-based solutions like restored and constructed wetlands (like the NC Flood Resiliency Blueprint)	Phase 3, Actions A & D	  
H [*]	Evaluate the effectiveness of biological or non-chemical methods for invasive species control in wetlands through field monitoring and outcome-based metrics	Phase 2, Action B	
I [*]	Assess changes in the quantity and quality of coastal wetlands (e.g., sea level rise, wetland migration, general data, hotspots, landowners, and constitutional, financial, and legal implications)	Phase 2, Action E	    
J [*]	Support tribe-led efforts to document, monitor, and manage wetlands and culturally significant species used for traditional and medicinal purposes	Phase 1, Action B	  
K [*]	Pursue funding opportunities with agency and research partners to develop a comprehensive statewide ambient monitoring program for all NC wetland types	Phase 1 (All) Phase 2 (All)	 
L [*]	Seek improvements for wetland predictive mapping; utilize NC's extensive field data to test and refine remote sensing methods to monitor wetland health and resilience	Phase 1, Action C	  
M [*]	Support development of voluntary wetland monitoring programs to measure conditions through data collection and engage the public through experiential learning and outreach	Phase 1, Action B Phase 2 (All)	 

¹ USEPA Core Element Framework: Monitoring and Assessment Objectives and Actions (USEPA 2023a) can be viewed at <https://www.epa.gov/wetlands/wetlands-monitoring-and-assessment-document>

[^] Greater than 70% of the 2025-2026 NC WPP stakeholder members agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents (based on a 2025 DWR questionnaire).

^{*} Between 50-70% of the 2025-2026 NC WPP stakeholder members agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents (based on a 2025 DWR questionnaire).

REGULATION

Regulation, as expressed in the USEPA CEF, provides a mechanism for states to protect their aquatic resources by authorizing impacts to aquatic resources and assuring compliance with permit conditions and applicable laws. An effective regulatory program requires clear explanation and consistent application of the regulations.

Certain wetlands in North Carolina are protected by a combination of rules, regulations and policies at the federal, state and local levels. This combination affords protection of wetlands, allows opportunities for permitting unavoidable wetland impacts and establishes compensatory mitigation requirements for permitted wetland impacts that are above designated thresholds. Three river basins (Neuse, Tar-Pamlico, and portions of the Catawba) and three watersheds (Jordan Lake, Randleman Lake and Goose Creek) in North Carolina have riparian buffer rules applied

to protect streams from excess nutrients and sediment, control erosion, moderate water temperature and to provide habitat. Natural buffers also provide flood control and protect property. Wetlands themselves are not subject to buffer rules; however, wetlands adjacent to buffered waterbodies are protected within the buffer area (in most cases, 50 feet from the bank on each side of the stream or waterbody).

Unavoidable impacts to jurisdictional wetlands are reviewed under Section 401 of the Clean Water Act which is carried out by the DWR. DWR works closely with the US Army Corps of Engineers (USACE) to coordinate Section 401 with the federal level's counterpart, the Section 404 permitting mechanism. The USACE dictates which activity types are covered under each Nationwide Permit (i.e., commercial development, residential development, restoration, etc.) and the corresponding 401 General Certification (GC) covers those same activities. Every five years, the Nationwide Permits are renewed and the DWR rectifies the GCs with any necessary updates.

Each GC contains thresholds that determine whether written approval from DWR is required for the impacts to waters. The GCs also contain conditions detailing how and what can be covered under the GCs or an Individual Certification approval letter. There

Rules, Regulations, and Policies Relevant to North Carolina Wetlands

FEDERAL:

- **Clean Water Act (Sections 401 & 404)**
- **Food Security Act of 1985**
- **Agricultural Act of 2014**
- **Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (USACE 33 CFR Parts 325 & 332, EPA 40 CFR Part 230)**

STATE:

- **Wetland Standards (15A NCAC 02B)**
- **Procedures for Permits (15A NCAC 02H)**
- **Isolated Wetland and Water Rules (15A NCAC 02H .1300, IWGP100000)**
- **Coastal Area Management Act (§113A Article 7)**
- **Areas of Environmental Concern (15A NCAC 07H)**
- **Sedimentation Pollution Control Act of 1973 (§113A-50 to §113A-69)**
- **Sedimentation Control (15A NCAC 04)**
- **Stormwater Rules (15A NCAC 02B and 02H, various Session Laws)**

LOCAL ORDINANCES

are thresholds and conditions specifically for wetlands in the GCs. The goal of the 401 Permitting program is to avoid, minimize and mitigate impacts to waters of the state including wetlands. Reviewers prioritize avoidance and minimization of impacts, and best practices applied to projects to protect wetlands. When impacts to wetlands surpass the GC thresholds, then compensatory mitigation may be required to offset losses to wetlands and their functions. Wetland mitigation can be achieved through approved mitigation banks, an in-lieu fee program (administered by DMS), and in some rare cases, permittee-provided mitigation projects.

The newest iteration of the General Certifications took effect on March 15, 2026. The updates were meant to increase efficiency of internal processes while maintaining wetland protections. Therefore, more conditions were included in the GCs themselves instead of relying on individual certifications to cover those conditions. With more projects covered under GCs and the issuance of Certifications of Coverage, administrative efficiencies should increase and staff can prioritize the review, outreach and enforcement parts of their jobs, leading to better maintenance of state wetland standards.

Future Direction:

North Carolina will continue to work with the regulatory community to evaluate the wetland regulatory program to improve areas of concern (e.g., clarity, consistency and efficiency in program operations). Biennial assessments of permitting activities, average review times, compliance visits and other factors will continue (DEQ 2025). DEQ will continue to work with the NC Environmental Management Commission (EMC) and stakeholders to appropriately respond to federal rule changes (e.g., Clean Water Act Section 401 Certification Rule [USEPA 2020]; Navigable Waters Protection Rule's federal definition of "Waters of the United States" [WOTUS; USACE 2023]). On November 20, 2025, the USEPA and USACE proposed rule "Updated Definition of 'Water of the United States'" was published in the Federal Register.

DWR adapts to evolving federal and state policy and regulation, while prioritizing effective policies and procedures for wetlands on the ground. For example, with the change in what qualifies as a jurisdictional wetland after the US Supreme Court case *Sackett v. USEPA* and the corresponding state response in the 2023 NC Farm Act, adopting the more limited definition to jurisdictional wetlands, DWR continues to educate people on the benefits of all types of wetlands and tracks impacts to non-jurisdictional wetlands when possible. DWR is already preparing for potential further changes to the Clean Water Act, WOTUS and USEPA 401 as well as state level issues.

Primary Regulation Goals:

1. Provide a clear understanding of the jurisdictional scope of North Carolina's regulatory program
2. Evaluate regulatory activities to ensure regulatory compliance and intended environmental quality protection
3. Administer regulatory activities efficiently and consistently to enforce North Carolina's wetland requirements
4. Work with North Carolina residents to wisely manage and restore the state's wetland resources

Proposed Regulation Activities:

Proposed DEQ regulation activities are listed and associated with their respective USEPA Objective and Action below. Some activities may be applicable to more than one Core Element. The divisions/sections within DEQ working on the activities are noted by the adjacent icons. Since not all stakeholders supported every activity, a hat (^) or asterisk (*) by an activity denotes the extent of 2025 WPP stakeholder members agreeing that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents. A hat (^) by an activity denotes greater than 70% support, and an asterisk (*) by an activity denotes 50-70% support, from 2025 NC WPP stakeholder members agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents.

Table 2: DEQ Regulation Activities

ID	DEQ Regulation Activities	USEPA Core Element Action ²	DEQ Divisions/Sections
A*	Collaborate with EMC and WPP stakeholders to address changes to the 'Waters of the United States' definition and provide clear guidance to the regulated community	Phase 1, Action A	  
B*	Collaborating on permitting projects that affect wetlands, streams, and buffers across NC (supported by DEMLR and DWR Memorandum of Understanding)	Phase 2, Action E	    
C*	Implement and support compensatory mitigation projects, and their effectiveness, to offset permitted wetland impacts and reduce loss of wetland functions	Phase 2, Action F	 
D*	Enforce stormwater control measures, as required by current laws and rules, before discharge into streams and wetlands, unless low-flow exemptions apply	Phase 2, Action B	 
E*	Review wetland mitigation reports and actively participate in the Interagency Review Team to support effective mitigation oversight	Phase 3, Action C	  
F*	Enforce NC wetland standards and continue managing Clean Water Action Section 401 certifications, buffer authorizations, and permits for jurisdictional wetlands and waters	Phase 3, Action B	
G*	Evaluate the use of wetland mitigation and stormwater wetlands to meet nutrient reduction requirements for existing development	Phase 2, Action F	  
H*	Explore the use of wetland restoration and constructed stormwater wetlands to mitigate flooding impacts and to meet the nutrient reductions required for managed lands and existing developed areas	Phase 3, Action C	  
I*	Review and comment on federal wetland rule changes to inform state policy and implementation	Phase 3, Action B	   
J*	Support tribal, local, and regional state governments to consider developing mitigation banks	Phase 2, Action F Phase 3, Action C	
K*	Coordinate with DEQ regional offices on stream and wetland delineations within riparian buffers that require certification for sediment and erosion control measures	Phase 2, Action E	 

Table 2: DEQ Regulation Activities

ID	DEQ Regulation Activities	USEPA Core Element Action ²	DEQ Divisions/Sections
L*	Review NC's Wetland General Certifications every five years to ensure consistency with current laws and practices that directly affect wetland among other waters.	Phase 2, Action C Phase 3, Action C	
M*	Promote the use of living shorelines as the preferred regulatory alternative for bank stabilization	Phase 3, Action C Phase 3, Action E	 
N*	Implement the Coastal Area Management Act regulations	Phase 2, Action C	
O*	Facilitate the classification of eligible wetlands as Unique Wetlands to support their long-term protection	Phase 2, Action A	 
P*	Protect marine fisheries by minimizing wetland impacts via commenting on environmental permits near coastal waters	Phase 2, Action C	 
Q*	Revise DCM's Program Assessment and Strategy and the NC WPP every five years to align with evolving priorities and regulatory needs (see Appendix E)	Phase 1, Action D	  
R*	Encourage living shoreline feasibility analysis before approving permits for hardened shoreline structures	Phase 2, Action C	
S*	Complete updates to and support of the Coastal Habitat Protection Plan (CHPP), including issue papers that recommend actions to ensure environmental rule compliance and to promote wetland habitat and water quality protection and enhancement using nature-based methods	Phase 1, Action D	      

² USEPA Core Element Framework: Regulation Objectives and Actions (US USEPA2023c) can be viewed at <https://www.epa.gov/wetlands/wetlands-regulatory-core-elements-framework>

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VOLUNTARY RESTORATION AND PROTECTION

Voluntary restoration and protection include improvements in, and protection of, wetlands that are not required by state or federal laws or mandates. Voluntary restoration and protection in North Carolina are encouraged and implemented on federal, state, local and public-private partnership levels. The goals of the projects may include, but are not limited to, improvements in habitat, flood and stormwater management, recreation and/or water quality. Efforts made to restore or protect wetlands using voluntary methods may include compensating landowners for changing land altering practices (e.g., cultivation, grazing), purchasing of wetland land titles or easements by various land trust groups, or removing invasive species and/or planting native vegetation within or near wetlands.

Independent work as well as consolidated efforts can be combined to ultimately contribute to the increase in amount, function, services, value, and/or condition of the aquatic resources across the state.

Voluntary protection and restoration of wetlands throughout the state can provide additional storm buffers, prevent erosion, help abate flooding, moderate groundwater levels and stream flow levels, filter and assimilate nutrients, improve water quality, provide economic benefits, increase recreational and aesthetic values, improve wildlife habitat and accomplish watershed goals.

Future Directions:

North Carolina agency support for voluntary restoration and protection includes project guidance, low-interest loans and grant funding for proposed projects. For example, DCM actively seeks to support these efforts through the Coastal and Estuarine Land Conservation Program and with support to local governments through the Resilient Coastal Communities Program. Additionally, DMS is responsible for the development

Potential Partners for Voluntary Restoration and Protection

FEDERAL:

- United States Army Corps of Engineers
- United States Department of Agriculture
- United States Fish and Wildlife Service

STATE:

- Albemarle-Pamlico National Estuary Partnership
- Department of Justice
- Division of Coastal Management
- Division of Soil and Water Conservation
- Division of Water Infrastructure
- Division of Water Resources
- North Carolina Land and Water Fund
- Wildlife Resources Commission

ADVOCACY AND CONSERVATION:

- Carolina Wetlands Association
- Defenders of Wildlife
- Ducks Unlimited
- Environmental Defense Fund
- NC Coastal Federation
- NC land trusts (multiple organizations)
- NC Sierra Club
- NC Wildlife Federation
- Southern Environmental Law Center
- The Nature Conservancy

and implementation of the North Carolina Flood Resiliency Blueprint (NCFRB) (<https://www.deq.nc.gov/energy-climate/flood-resiliency-blueprint>). The NCFRB is a planning and prioritization tool that allocates \$22 million in state funds to implement flood resilience projects in six priority river basins, completing the draft NCFRB and releasing the draft Neuse River Basin Action Strategy. The NCFRB encourages wetland protection and restoration. The tool is used for identifying priority conservation areas and potential restoration opportunities among other implementation projects.

DEQ plays a vital role in guiding and supporting the implementation of effective restoration and protection strategies that improve and retain wildlife habitat and water quality across North Carolina. Over the next five years, additional monitoring and assessment data will be essential for developing transferable frameworks that measure restoration success, including pre- and post-restoration conditions. This work will help promote restoration practices that demonstrate long-term benefits.

State agency staff will continue to use their expertise to support outreach and education efforts and to encourage the adoption of nature-based solutions that advance wetland protection and restoration goals throughout the state.

Primary Voluntary Restoration and Protection Goals:

1. Provide guidance and promote statewide wetland restoration and protection goals (including wetland acres, condition, and functions)
2. Assist with public outreach and education for voluntary restoration efforts

Proposed Voluntary Restoration and Protection Activities:

Proposed DEQ Voluntary Restoration and Protection activities are listed and associated with their respective USEPA Objective and Action below. Some activities may be applicable to more than one Core Element. The divisions/sections within DEQ working on the activities are noted by the adjacent icons. Since not all stakeholders supported every activity, a hat (^) or asterisk (*) by an activity denotes the extent of 2025 WPP stakeholder members agreeing that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents. A hat (^) by an activity denotes greater than 70% support, and an asterisk (*) by an activity denotes 50-70% support, from 2025 NC WPP stakeholder members agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents.

Table 3: DEQ Voluntary Restoration and Protection Activities

ID	DEQ Voluntary Restoration and Protection Activities	USEPA Core Element Action ³	DEQ Divisions/Sections
A [^]	Provide guidance to voluntary restoration programs that engage local governments and non-governmental organizations in grant applications (e.g., 205(j), 319, Water Resources Development Grants) proposing wetland restoration measures	Phase 2, Action C	  
B [^]	Restore, enhance, and preserve wetlands to improve stream and wetland water quality	Phase 2, Action C	  
C [^]	Collaborate with incentive-based programs and develop voluntary measures to incentivize restoring, enhancing (e.g., beneficial use of dredge material) and protecting natural wetlands that improve ecological function	Phase 3, Action B	 
D [^]	Promote wetland restoration and preservation to improve water quality through DWR Watershed Action Plans	Phase 1 (All)	 
E [^]	Promote voluntary wetland protection by assisting landowners and partners in designating sites as Dedicated Nature Preserves or Registered Heritage Areas under the State Nature Preserves Act	Phase 2, Action C	
F [*]	Work with federal, state, and local governments and NGOs to secure additional state and federal funding for large-scale wetland restoration opportunities in the coastal plain	All Phases	  
G [*]	Work with the Natural Resources Conservation Service to provide/secure additional funding to promote enhancement of wetland restoration projects	Phase 1, Action B	
H [*]	Partner with tribes to support protection and management of culturally significant wetlands identified through indigenous knowledge and traditional ecological knowledge, in alignment with monitoring and water quality improvement or protection efforts	Phase 1, Action B	 
I [*]	Promote and collaborate on voluntary wetland preservation and restoration projects that prioritize carbon sequestration benefits and conservation of biodiversity	Phase 1 (all)	
J [*]	Map and assess locations where infrastructure barriers impede coastal marsh migration and establish priority areas for implementation of strategies to support migration. (e.g., barrier removal projects on private and public land, policy changes, land conservation easements and buy-outs in coastal areas)	Phase 1, Action B	 
K [*]	Pursue opportunities to support and secure funding for voluntary protection and conservation of coastal wetlands through land acquisition (e.g., NC Land and Water Fund, U.S. Fish and Wildlife Coastal Wetland Conservation Grant)	Phase 2, Action C	  

¹ USEPA Core Element Framework: Voluntary Restoration and Protection Objectives and Actions (US USEPA2023c) can be viewed at <https://www.epa.gov/wetlands/voluntary-wetland-restoration-and-protection-core-element-framework>

[^] Greater than 70% of the 2025-2026 NC WPP stakeholder members agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents (based on a 2025 DWR questionnaire).

^{*} Between 50-70% of the 2025-2026 NC WPP stakeholder members agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents (based on a 2025 DWR questionnaire).

WATER QUALITY STANDARDS FOR WETLANDS

North Carolina's water quality standards for wetlands (15A NCAC 02B .0231) are narrative in nature (non-numeric) and were designed to protect, preserve, restore and enhance the quality and uses of wetlands and other waters of the state that are influenced by wetlands. These designated uses are maintained and/or enhanced through narrative standards that have provided DEQ with the basic regulatory structure needed to protect wetlands from various detrimental activities (15A NCAC 02B .0231(b)). Due to the wide variety of wetland types, sizes, locations, hydrologic conditions, vegetation structures and flow patterns, narrative standards (see the feature box below) have been utilized for North Carolina wetlands instead of the discrete numeric standards that are used for North Carolina's Class C waters (e.g.; "Chlorophyll a [corrected]: not greater than 40 µg/l..., Dissolved oxygen: not less than 6.0 mg/l for trout waters..." [(15A NCAC 02B .0211)]. DCM and DWR enforce these standards through compliance visits, responding to citizen reports, establishing discharge regulations, and monitoring water quality. The Designated Wetland Uses in the NC Wetland Standards feature box provides more information on wetland water quality standards.

Future Directions:

North Carolina utilizes the existing wetland-specific, narrative water quality standards as part of its regulatory program and agency decision-making process. It is important to continue to ensure that the state's wetland water quality standards provide the best protection of these aquatic resources.

Designated Wetland Uses in the NC Wetland Standards (15A NCAC 02B .0231)

- Storm and flood water storage/retention
- Hydrologic functions such as groundwater discharge and groundwater recharge
- Filtration/storage of pollutants
- Shoreline protection
- Habitat for the propagation of wetland-dependent aquatic organisms and other wildlife species.

Use Standards for NC Coastal Wetlands (15A NCAC 07H .0205)

- First Priority: conserve existing coastal wetlands
- Second Priority: development that requires water access (e.g., utility easements, fishing piers, docks, some agricultural)
- Some mowing and cutting allowed
- Unacceptable land uses (e.g., businesses, residences, parking lots, private roads)

NC Narrative Wetland Standards Designed to Protect Designated Wetland Uses (15A NCAC 02B .0231)

- Liquids, fill or other solids or dissolved gases may not be present in amounts which may cause adverse impacts on existing wetland uses
- Floating or submerged debris, oil, deleterious substances, or other material may not be present in amounts which may cause adverse impacts on existing wetland uses
- Materials producing color, odor, taste or unsightliness may not be present in amounts which may cause adverse impacts on existing wetland uses
- Concentrations or combinations of substances which are toxic or harmful to human, animal or plant life may not be present in amounts which individually or cumulatively may cause adverse impacts on existing wetland uses
- Hydrological conditions necessary to support the biological and physical characteristics naturally present in wetlands shall be protected to prevent adverse impacts on:
 - Water currents, erosion or sedimentation patterns
 - Natural water temperature variations
 - Chemical, nutrient and dissolved oxygen regime of the wetland
 - Movement of aquatic fauna
 - The pH of the wetland; and
 - Water levels or elevations.
- The populations of wetland flora and fauna shall be maintained to protect biological integrity as defined at 15A NCAC 02B .0202.



Tricolored heron at the Emerald Isle boat ramp

Primary Water Quality Standards for Wetlands Goal:

1. Support and provide consistency in applying the narrative wetland standards

Proposed Water Quality Standards for Wetlands Activities:

Proposed DEQ water quality standards for wetlands activities are listed and associated with their respective USEPA Objective and Action below. Some activities may be applicable to more than one Core Element. The divisions/sections within DEQ working on the activities are noted by the adjacent icons. Since not all stakeholders supported every activity, a hat (^) or asterisk (*) by an activity denotes the extent of 2025 WPP stakeholder members agreeing that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents. A hat (^) by an activity denotes greater than 70% support, and an asterisk (*) by an activity denotes 50-70% support, from 2025 NC WPP stakeholder members agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents.



Tidal marsh wetlands in Goose Creek State Park

Table 4: DEQ Water Quality Standards for Wetlands Activities

ID	Water Quality Standards for Wetlands Activities	USEPA Core Element Action ⁴	DEQ Divisions/Sections
A [^]	Assess the consistency and effectiveness of NC wetland standard enforcement	Phase 3, Action A	  
B [^]	Provide support to tribal partners in their formulation of narrative criteria aimed at enhancing protection and restoration of culturally and ecologically significant wetlands	Phase 2, Actions A-D	 

¹ USEPA Core Element Framework: Water Quality Standards for Wetlands Objectives and Actions (US USEPA2023c) can be viewed at <https://www.epa.gov/wetlands/wetland-water-quality-standards>

[^] Greater than 70% of the 2025-2026 NC WPP stakeholder members agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents (based on a 2025 DWR questionnaire).

^{*} Between 50-70% of the 2025-2026 NC WPP stakeholder members agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents (based on a 2025 DWR questionnaire).

OUTREACH AND EDUCATION

While wetland outreach and education are not a separate USEPA Core Element, it is an important part of the USEPA's CEF. Several of DEQ's proposed activities cross multiple USEPA Core Elements and are best described as outreach and education.

DEQ's mission is: "Providing science-based environmental stewardship for the health and prosperity of ALL North Carolinians." Outreach and education are critical components of successfully achieving that mission. Education at all levels and in all locations is important for helping all North Carolinians understand the value of their natural surroundings, including wetlands, and the importance of ensuring their sustainability into the future. Outreach is important for sharing up-to-date information on work being done in North Carolina's wetlands to avoid duplication and facilitate future collaborations.

Future Directions:

DEQ recognizes that much excellent work is being done for North Carolina's wetlands; however, improvements can be made in communications and coordination. DEQ is working to improve communications among state agencies, with the larger research and academic community and with the public at large.

DEQ's Proposed Outreach and Education Activities:

Proposed DEQ outreach and education activities are listed and associated with their respective USEPA Objective and Action below. Some activities may be applicable to more than one Core Element. The divisions/sections within DEQ working on the activities are noted by the adjacent icons. Since not all stakeholders supported every activity, a hat (^) or asterisk (*) by an activity denotes the extent of 2025 WPP stakeholder members agreeing that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents. A hat (^) by an activity denotes greater than 70% support, and an asterisk (*) by an activity denotes 50-70% support, from 2025 NC WPP stakeholder members agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents.

Table 5: DEQ Outreach and Education Activities

ID	DEQ Outreach and Education Activities	USEPA Core Element Action ⁵	DEQ Divisions/Sections
A [^]	Engage and inform landowners about financial and technical incentives available for voluntary wetland restoration	Vol. Res. & Prot. Phase 1, Action C Phase 2, Action C	 
B [^]	Update the publicly accessible wetlands database, mapper and educational materials, ensuring clear interpretation of the tool's purpose and content	Regulation Phase 3, Action E	
C [^]	Strengthen outreach by partnering with North Carolina agencies (e.g., NC Cooperative Extension) and university environmental programs	Regulation Phase 3, Action E	   
D [^]	Expand wetland outreach and education for professionals, local governments, students and under-resourced communities – especially where wetland quality offers greater benefits and during CAMA Land Use Plan updates	Regulation Phase 3, Action E	   
E [^]	Include wetlands as part of sustainability models (i.e., long term balance of social, environmental and economic impacts) for watersheds and local communities	Regulation Phase 3, Action D	
F [*]	Continue outreach and education efforts to raise awareness of the societal, cultural and ecological benefits of wetland protection and restoration	Regulation, Phase 3, Action E Vol. Res. & Prot. Phase 1, Action B	  
G [*]	Coordinate and share wetland-related efforts across government, education and non-profit sectors through workshops, symposia and newsletters	Regulation Phase 3, Action E	 
H [*]	Partner with state agencies and tribes to advance wetland planning efforts	Mon. & Assess. Phase 3, Action D Vol. Res. & Prot. Phase 1, Action B	   
I [*]	Partner with organizations to distribute wetland education materials from ncwetlands.org through events, outreach campaigns and digital platforms	Regulation Phase 3, Action E	  
J [*]	Support tribal interest in wetland mitigation banking by facilitating access to training, technical assistance and educational partnerships	Vol. Res. & Prot. Phase 2, Action F	 
K [*]	Support field-based experiential learning programs that engage North Carolina residents in wetland knowledge, monitoring and data collection to build understanding of ecosystem services	Mon. & Assess. Phase 1, Action B Phase 2 (All)	 
L [*]	Track progress of the NC Wetland Program Plan (2026–2030) to evaluate implementation and outcomes and inform the EMC about existence and purpose of the plan	All	  
M	Facilitate coordination and communication across key stakeholders doing wetlands work in North Carolina (e.g., government agencies, educators, non-profits) by hosting meetings and tracking project progress	Vol. Res. & Prot. Phase 3 (All) Regulation Phase 3, Action E	

¹ USEPA Core Element Framework: Objectives and Actions (US USEPA2023c) can be viewed at https://www.epa.gov/system/files/documents/2023-02/EPA_Core_Elements_Framework_February_2023.pdf

[^] Greater than 70% of the 2025-2026 NC WPP stakeholder members agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents (based on a 2025 DWR questionnaire).

^{*} Between 50-70% of the 2025-2026 NC WPP stakeholder members agreed that DEQ's pursuit of that activity would be beneficial to their organization's members or constituents (based on a 2025 DWR questionnaire).



Basin wetland in the Croatan National Forest

Additional Stakeholder Interests

While DEQ serves a primary role in protecting North Carolina's wetlands through activities listed in this plan, inclusive partnerships among government agencies (local, state and federal), tribes, non-government organizations, academics, private sector, etc. are necessary to make substantial progress. DEQ surveyed the stakeholders to discover their wetland interests. In addition to stakeholder interests noted within the DEQ proposed activities (Tables 2, 3, 4, and 5), there was strong stakeholder interest in DEQ addressing the activities listed below in Table 6. Since not all stakeholders supported every activity, each suggested activity is followed by the percentage of stakeholder group members that believed pursuit of that activity would be beneficial to their organization's members or constituents (based on a 2025 DWR survey). These suggested activities will be shared with DEQ staff for consideration in future project planning.



Wetlands along the lake in Lake Waccamaw State Park

Table 6. Additional activities that stakeholders shared throughout meetings or submitted feedback, but received less support from the broader stakeholder group or no DEQ divisions or sections indicated interest in the activity over the next five years.

Activity	Percentage of Stakeholder Support	USEPA Core Element Action Examples	DEQ Division/Section
Design and implement innovative incentive programs that encourage stormwater control, wetland restoration and long-term preservation by landowners and developers, in addition to that required by regulations implement innovative incentive programs that encourage stormwater control, wetland restoration and long-term preservation by landowners and developers, in addition to that required by regulations	70%	Vol. Res. & Assess. Phases 1-3	No DEQ effort planned between 2026-2030
Ensure that watershed restoration plans prioritize future wetland restoration projects and hydrology restoration to enhance water quality and reduce flooding	60%	Vol. Res. & Assess. Phases 1-3	No DEQ effort planned between 2026-2030
Establish statewide restoration and protection goals by watersheds, ecoregions, wetland types, etc.	55%	Regulation	
Consider increasing the value assigned to urban wetlands, and urban wetland mitigation, because of their rarity and limited capacity to perform ecosystem services, which are of particularly high value in urban ecosystems	45%	Vol. Res. & Assess. Phases 1, Action C	No DEQ effort planned between 2026-2030
Compare ecosystem services between constructed wetlands in urban areas and restored wetlands in rural areas	40%	Regulation Phase 3, Action E WQ Std. Phase 2, Action B	No DEQ effort planned between 2026-2030
Create or update outreach and education materials highlighting the importance of Southern Appalachian bogs and fens	35%	Regulation Phase 3, Action E	 
Create incentive programs for discouraging new development in flood-prone areas and maintaining infrastructure outside of flood-prone areas.	*	Vol. Res. & Assess. Phases 2, Action C	No DEQ effort planned between 2026-2030

Table 6

Activity	Percentage of Stakeholder Support	USEPA Core Element Action Examples	DEQ Division/ Section
Define designated uses for unique wetland types based on their ecological value, climate resilience, and carbon sequestration potential. Use monitoring and mapping to track changes and inform management decisions.	40%	Mon. & Assess. Phase 1, Action B WQ Std. Phase 2, Action A-D	
Examine how channel dredging and deepening affects resilience of forested freshwater wetlands	*	Regulation Phase 3, Action E	
Continue to collect data on wetland condition and fish use at selected sites as part of the Strategic Habitat Area (SHA) validation study	50%	Mon. & Assess. Phase 2, Action B	<i>No DEQ effort planned between 2026-2030</i>
Research successful shoreline stabilization alternatives, with an emphasis on living shorelines	45%	Mon. & Assess. Phase 2, Action B	 
Support development of urban stream restoration projects that investigate reconnection of incised streams to adjacent floodplain wetlands	45%	Mon. & Assess. Phase 1 (All)	 
Monitor and map designated uses of unique wetland types (based on their ecological value, climate resilience, and carbon sequestration potential) to track changes and inform management decisions	35%	Mon. & Assess. Phase 1, Action B and C	 
Watch for potential impacts to upstream and downstream wetlands from low and intermediate hazard dam removal projects that are exempt from state permitting	25%	Mon. & Assess. Phase 2, Action E	
Investigate current dam safety practices and sediment impacts on wetlands and streams above and below existing dams	20%	Mon. & Assess. Phase 2, Action E	 

* Activities submitted by stakeholders after the full stakeholder group completed its prioritization votes for each Core Element. Because these were added later by members, they do not have percentage support from the stakeholder group.



Carnivorous pitcher plants grow in low-nutrient wetlands

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NC Title 15A, Chapter 02H – Procedures for Permits: Approvals (15A NCAC 02H) of the North Carolina Administrative Code provides the requirements and procedures for applying for and issuance of State permits, including wetland impacts and mitigation requirements. Section .1300 addresses “Discharges to Isolated Wetlands and Isolated Waters.”

NC Title 15A, Chapter 04 – Sedimentation Control (15A NCAC 04) of the North Carolina Administrative Code with Subchapter 04B addressing “Erosion and Sediment Control.”

NC Title 15A, Chapter 07H, Section .0205 – Coastal Wetlands (15A NCAC 07H .0205) of the North Carolina Administrative Code Addresses Coastal Wetlands as one of the areas of Environmental Concern covered under Chapter 07H – State Guidelines for Areas of Environmental Concern.

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US EPA. 40 CFR Part 121 – Clean Water Act Section 401 Certification Rule

US EPA. 40 CFR Part 230 – Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material.



Tree frog on a red chokeberry leaf in Goose Creek State Park

Appendix A: DEQ Division/Section Summaries & Agency Contact Information



Albemarle-Pamlico National Estuary Partnership (APNEP)

APNEP is a federally funded program whose mission is to identify, protect and restore the significant natural resources of the Albemarle-Pamlico estuarine system with guidance and support from its overarching Comprehensive Conservation and Management Plan (CCMP, <https://apnep.nc.gov/about-us/comprehensive-conservation-and-management-plan>), the Management Conference (advisory groups), and regional partners. APNEP was among the first 28 National Estuary Programs established by the Clean Water Act in the late 1980s and is hosted by DEQ under a cooperative agreement with the U.S. EPA.

APNEP works closely with the Commonwealth of Virginia on water resources that start in the headwaters of the Virginia Mountains and cross state boundaries to ultimately reach the Albemarle-Pamlico estuary. APNEP utilizes an ecosystem-based management approach and engages citizens and organizations, through communication and collaboration, to ensure a coordinated approach to addressing pressing regional issues.

2025-2026 Representative(s): Bill Crowell and Dean Carpenter
(919) 707-8362 • 217 West Jones St. • Raleigh, NC 27604
<https://apnep.nc.gov>



Division of Coastal Management (DCM)

DCM works to protect, conserve and manage North Carolina's coastal resources through an integrated program of planning, permitting, education and research. DCM carries out the state's Coastal Area Management Act, the Dredge and Fill Law and the federal Coastal Zone Management Act of 1972 in the 20 coastal counties, using rules and policies of the NC Coastal Resources Commission. DCM is responsible for several programs, including permitting and enforcement, CAMA land-use planning, public beach and waterfront access, North Carolina Coastal Reserves and grants for marine sewage pump out (<https://deq.nc.gov/about/divisions/coastal-management>).

2025-2026 Representative(s): Jonathan Lucas
(252) 808-2808 • 400 Commerce Ave. • Morehead City, NC 28557
<https://deq.nc.gov/about/divisions/coastal-management>



Division of Energy, Mineral, and Land Resources (DEMLR)

DEMLR seeks to promote the wise use and protection of North Carolina's land and geologic resources. The division regulates and provides technical assistance related to mining, dams, sediment and erosion control and stormwater management. (<https://deq.nc.gov/about/divisions/energy-mineral-land-resources>)

2025-2026 Representative(s): Graham Parrish and Mike Lawyer
(919) 707-9220 • 512 N. Salisbury St., 5th Floor • Raleigh, NC 27604
<https://deq.nc.gov/about/divisions/energy-mineral-land-resources>

Appendix A: DEQ Division/Section Summaries & Agency Contact Information



Division of Marine Fisheries (DMF)

DMF is responsible for the stewardship of the state's marine and estuarine resources. DMF's jurisdiction encompasses all coastal waters and extends to 3 miles offshore. They are responsible for recreational and commercial fishing licenses and permits; finfish, crustaceans and shellfish programs; artificial reefs program; fisheries management; habitat enhancement; and the Coastal Habitat Protection Plans (CHPP). (<https://deq.nc.gov/about/divisions/marine-fisheries>)

2025-2026 Representative(s): Charlie Deaton and Michelle Brodeur
(252) 726-7021 • 3441 Arendell Street • Morehead City, NC 28557
<https://deq.nc.gov/about/divisions/marine-fisheries>



Division of Mitigation Services (DMS)

DMS restores and protects wetlands and waterways while offsetting unavoidable environmental damage from economic development. DMS also oversees the development of the conceptual framework and strategic plan for the Natural Infrastructure Flood Mitigation Program (NIFMP) to support projects that enhance or restore flood storage capacity. 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. DMS works hard to ensure that cost effective mitigation alternatives succeed in improving the state's water resources.

2025-2026 Representative(s): Kelly Williams
(919) 707-8976 • 217 West Jones St. Suite 3000A • Raleigh, N.C. 27603
<https://deq.nc.gov/about/divisions/mitigation-services>



Division of Water Resources: Water Planning Section (DWR-WPS)

DWR's Water Planning Section develops standards, rules and management strategies to protect water quality, carries out water supply planning, provides guidance to local water systems, and monitors drought conditions. The section develops basin-wide plans; manages the Central Coastal Plain Capacity Use Area; prepares and administers rule-making for stream classifications, nutrient sensitive waters, and unique wetlands; reviews and develops surface and ground water standards and administers rulemaking to adopt standards in rule; administers grants; creates reports on surface and ground waters of the state; and develops Total Maximum Daily Loads for waters with high pollutant sources.

2025-2026 Representative(s): Elizabeth Kountis, Bridget Shelton, and Christopher Ventaloro, Virginia Baker
(919) 707- 3630 • 512 N. Salisbury St., 11th Floor • Raleigh, NC 27604
<https://deq.nc.gov/about/divisions/water-resources/planning>

Appendix A: DEQ Division/Section Summaries & Agency Contact Information



Division of Water Resources: Water Quality Permitting Section (DWR-WQPS)

DWR's Water Quality Permitting Section has six branches that are responsible for compliance, expedited permitting, non-discharge effluent land application and beneficial uses of reclaimed water, animal feeding operations, National Pollutant Discharge Elimination System (NPDES) permits for industrial and municipal projects, and 401 and buffer permitting. The 401 & Buffer Permitting Branch is responsible for the implementation of state waters, wetlands, and riparian buffer regulatory programs.

2025-2026 Representative(s): Catherine Otero

(919) 707-3631 • 512 N. Salisbury St., 9th Floor • Raleigh, NC

<https://deq.nc.gov/about/divisions/water-resources/water-resources-permits>



Division of Water Resources: Water Quality Regional Operations Section (DWR-WQROS)

DWR's Water Quality Regional Operations Section focuses on the protection and enhancement of the state's surface and groundwater. The regional office personnel are often the public's first contact with the agency for environmental emergencies, permit acquisition and compliance, and groundwater well permitting and compliance. There are seven regional offices across North Carolina.

2025-2026 Representative(s): Kristina Morales

(919) 707-9129 • 512 N. Salisbury Street • Raleigh, NC (or Individual Regional Office)

<https://deq.nc.gov/about/divisions/water-resources/water-quality-regional-operations>



Division of Water Resources: Water Sciences Section (DWR-WSS)

DWR's Water Sciences Section has chemical and biological laboratories that provide DWR with the biological, chemical and technical support required to regulate and manage water quality throughout the state as well as comply with federal monitoring requirements. The section conducts ambient and intensive survey monitoring of estuaries, lakes and reservoirs, rivers, streams and wetlands. Water chemistry, aquatic toxicology and biological assessments (e.g., macroinvertebrates, amphibians, fish communities and tissues, plants and algae) provide valuable data on North Carolina's various aquatic ecosystems.

2025-2026 Representative(s): Steven Anderson and Kristie Gianopulos

(919) 743-8409 • 4401 Reedy Creek Rd. • Raleigh, NC 27607

<https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page>

Appendix B: NC Wetland Assessment Method Wetland Classifications

There are many different classification schemes to categorize wetlands into different types. Some schemes like the National Wetlands Inventory use descriptions of hydrology and vegetation to classify wetlands. Others rely primarily on the identification of plant communities or landscape setting. All schemes must deal with the difficulties of categorizing wetlands, which occur along a continuum, into discrete categories. Because of the diversity of wetlands, it is inevitable that observers will encounter examples that do not fit well into established categories.

The types primarily align with those outlined in the NC Wetland Assessment Method (NCWAM 2016). The information included here is intended to increase understanding of each type in terms of hydrology, vegetation, soils and landscape position.

Within the NCWAM classification, wetland types are generally categorized as non-riparian or riparian (associated with a stream or river), and as freshwater or salt influenced as shown in Table 8.



Table 8. List of North Carolina wetland types and NCWAM wetland classifications. NCWAM classification = wetland type included in the North Carolina Wetland Assessment Method

Category	Wetland Type	NCWAM Classification
1. Freshwater Riparian – associated with a stream or river		
	Headwater forest	X
	Riverine swamp forest	X
	Bottomland hardwood forest	X
	Floodplain pool	X
	Bog	X
	Shrub/herb bog subtype	
	Forest bog subtype	
	Non-tidal freshwater marsh	X
	Tidal freshwater/oligohaline marsh	X
2. Freshwater Non-riparian – not associated with a stream or river		
	Pocosin	X
	Slope seep	X (As Seep)
	Piedmont/Mountain slope seep subtype	
	Coastal Plain slope seep subtype	
	Basin wetland	X
	Shrub-herb basin wetland subtype	
	Forest basin wetland subtype	
	Wet flat	
	Pine subtypes (Pine savanna and disturbed pine flat)	As Pine Savanna and Pine Flat
	Hardwood flat subtype	As Hardwood Flat
	Non-riverine swamp forest	X
3. Salt-influenced		
	Salt marsh	Combined as Salt/Brackish Marsh
	Oligohaline/Brackish marsh	
	Estuarine woody wetland	X

Table 9. Characteristics of freshwater riparian wetland types

1. Freshwater Riparian – associated with a stream or river		
Category & Wetland Type	Location	Characteristics
Headwater Forest	In upper parts of drainage basins where small streams begin to form; statewide, most in Coastal Plain	• Moist/saturated most/all year • Spawn streams • Plants resemble bottomland hardwood forests, with rich and diverse trees, shrubs, and herbs • Variety of mineral soils, generally with underlying clay or shallow rock
Riverine Swamp Forest	Along floodplains & rivers; mostly Coastal Plain, rare in Piedmont, basically absent from Mountains	• Seasonally to semi-permanently flooded, sometimes deep • Well-developed tree layer; little to no shrubs and herbs (water tolerant species) • Organic or fine-textured mineral soils
Bottomland Hardwood Forest	In floodplains of medium to large streams and rivers; statewide, rare in upper Piedmont and Mountains	• Irregularly to seasonally flooded • Vegetation varies according to river type • Predominantly mineral soils
Floodplain Pool	Generally small, depressions within floodplains; often abandoned stream channels or depressions near toes of slopes; statewide	• Semi-permanently inundated • Typically support vegetation only on their periphery • Typically on mineral soils
Bog	Generally in flat, poorly drained valley bottoms; Mountains and western Piedmont.	• Semi-permanently to permanently saturated but not inundated; may have small streams flowing through • Defined by accumulation of peat • Acidic from sphagnum moss • Organic or mucky mineral soils
<i>Shrub/Herb Bog Subtype</i>		Dense herbaceous or mixed shrub/ herbaceous vegetation. Herbs usually small, grass-like plants and forbs; scattered or absent trees; sphagnum moss often present
<i>Forest Bog Subtype</i>		Trees cover much of wetland area; dense herb cover in small openings; sphagnum moss often present
Non-Tidal Freshwater Marsh	Along fringes of streams, rivers, large open waters; somewhat rare in Mountains; common elsewhere statewide	• Semi-permanently to permanently inundated or flooded • Typically not subject to flooding by tides, including wind tides • Mineral or organic soils • Vegetation predominantly herbaceous

1. Freshwater Riparian – associated with a stream or river

Tidal Freshwater Marsh	On margins of estuaries and lower reaches of streams and rivers; Coastal Plain only	• Saturated most of the time; subject to flooding by tides, including wind tides • Salinities typically below 0.5 ppt to 5 ppt; storm events can temporarily raise salinity • Mineral or organic soils • Vegetation predominantly herbaceous • Regularly varying water levels select for wetland plants that can handle this variation
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Table 10. Characteristics of freshwater non-riparian wetland types

2. Freshwater Non-Riparian Wetlands – not associated with a stream or river

Category & Wetland Type	Location	Characteristics
Pocosin	Flat areas between streams and in depressions such as Carolina bays; Coastal Plain	• Seasonally to semi-permanently saturated or inundated • Usually deep, organic muck or peat soils or sandy mineral soils with organic surface layers. • Dense, waxy, evergreen shrubs with scattered pond pine; a more substantial tree canopy of pond pine and bays may occur. Sphagnum moss often present
Basin Wetland	In depressions surrounded by uplands; may also occur on fringes of small open waters (less than 20 acres in size)	• Water levels fluctuate; typically, saturated and can be permanently or seasonally flooded; seasonal waterlines often appear on vegetation • Lack permanent inlets/outlets • Variety of mineral soils
<i>Shrub-Herb Basin Wetland Subtype</i>		• Herbaceous plants, scattered shrubs; sometimes dominated by shrubs
<i>Forest Basin Wetland Subtype</i>		• Water-tolerant tree species; may also have understory of shrubs and herbaceous plants

2. Freshwater Non-riparian – not associated with a stream or river

Slope Seep	On sloping hillsides leading down to wet places or at the base of slopes down to floodplains, where impermeable layers force groundwater to the surface; statewide	• Semi-permanently to permanently saturated (by groundwater), not inundated • No surface flow channels • Mineral or organic soils, frequently shallow with an underlying layer of rock or clay • Vegetation ranges from small non-woody plants to large hardwood trees; usually heterogenous
<i>Mountain/ Piedmont Slope Seep Subtype</i>		• Vegetation variable • Cooler temperatures and saturated soil allow peat to accumulate • Underlying granite and mafic rocks make the groundwater acidic
<i>Coastal Plain Slope Seep Subtype</i>		Often dense shrub layers; sphagnum moss and pitcher plants develop in more acidic conditions; may resemble pocosins
Wet Flat	On poorly drained flat areas between streams, with little water storage; on sites remote from rivers and not subject to overland flooding	• Seasonally saturated or intermittently to seasonally inundated • No hummocks; no natural channels (may be ditched) • Mineral soils or slightly organic soils with subsurface layers of clay or silt
Pine Dominated (Sandhills and Coastal Plain)		
<i>Disturbed Pine Flat Subtype</i>		• Usually successional by nature; low plant diversity; includes pine plantations • Mineral soils
<i>Pine Savanna Subtype</i>		• Scattered pines; extremely diverse herbaceous layer, maintained by frequent, low intensity fires • Mineral soils
Hardwood Dominated (Northern portion of Coastal Plain only)		
<i>Hardwood Flat Subtype</i>		• Well-developed tree layers, variable shrub layers, and sparse herbs
Non-Riverine Swamp Forest	On poorly drained, flat areas between streams; away from influence of streams, rivers, or estuaries; Coastal Plain only	• Seasonally to semi-permanently inundated, often with shallow water • Hummock ground surface • Mucky mineral or organic soils

Table 11. Characteristics of salt-influenced wetland types

3. Salt-influenced Wetlands		
Category & Wetland Type	Location	Characteristics
Brackish marsh	Margins of sounds and estuaries, somewhat removed from direct connection with ocean and inlet saline waters; eastern fringe of the Coastal Plain	• Irregularly or regularly flooded by brackish water and freshwater • Organic (occasionally mineral) soils • Herb layer heavily dominated by salt meadow cordgrass and black needle-rush; no trees/shrub layers • Salinity at or greater than 5 ppt (to as high as 25 or 30 ppt)
Salt marsh	Margins of sounds and estuaries in areas subject to regular or occasional flooding by saltwater tides, including wind tides; coastal fringe of the Coastal Plain	• Predictably flooded by full strength sea water (salinities of 30+ ppt) during lunar tides • Sand or silt soils • Herb layer heavily dominated by saltmarsh cordgrass; no trees, few shrubs
Estuarine woody wetland	On higher elevation areas on the margin of estuaries and sounds; transitional in nature; eastern fringe of the Coastal Plain	• Irregularly saturated or inundated by wind tides; occasionally flooded by salt or brackish water • Organic or mineral soils • Plant community adapted to disturbance = variable vegetation composition/structure • Well-developed tree and/or shrub layers as compared to other salt-influenced wetlands

Appendix C: Wetland and Stream Related Programs Offered by the U.S. Government and the State of North Carolina

The State of North Carolina and the United States governments offer a variety of voluntary wetland restoration and protection programs that provide technical assistance and financial support to landowners, local governments and organizations. However, it can be challenging for landowners to navigate and identify all the available opportunities to steward water resources for wildlife habitat preservation, community resilience and recreation. Below is a comprehensive list of active programs for supporting wetland stewardship and management in North Carolina.

Table 12. Comprehensive list of active programs for supporting wetland stewardship and management in North Carolina

Program Name	Host	More Information
Conservation Reserve and Enhancement Program	NC Department of Agriculture & Consumer Services	https://www.ncagr.gov/divisions/soil-water-conservation/programs-initiatives/crep
NC Conservation Tax Credit	NC Natural Heritage Program	https://www.ncnhp.org/conservation/conservation-tax-credit
NC Land & Water Fund	NC Department of Natural & Cultural Resources	https://nclwf.nc.gov/
NC Wildlife Conservation Land Program	NC Wildlife Resources Commission	https://www.ncwildlife.gov/wildlife-habitat/private-lands-management/wildlife-conservation-land-program
North American Wetlands Conservation Act	U.S. Fish and Wildlife Service	https://www.fws.gov/program/north-american-wetlands-conservation
Wetland Reserve Easements & Enhancement Partnership	U.S. Department of Agriculture	https://www.nrcs.usda.gov/programs-initiatives/
205(j) Water Quality Management Planning Grant	NCDEQ Division of Water Resources	https://www.deq.nc.gov/about/divisions/water-resources/water-planning/nonpoint-source-planning/205j-water-quality-management-planning-grant
Clean Water Act Section 319 Non-point Source Grant Funding	NCDEQ Division of Water Resources	https://www.deq.nc.gov/about/divisions/water-resources/water-planning/nonpoint-source-planning/319-grant-program
Water Resources Development Grants	NCDEQ Division of Water Resources	https://www.deq.nc.gov/about/divisions/water-resources/water-resources-grants/water-resources-development-grant-program

Appendix D: Wetland Projects Conducted Between 2021 and 2025

*Projects completed or performed in response to the
2021-2025 NC Wetland Program Plan*

Table 13. Wetland projects completed during, or initiated in response to, the 2021-2025 NC Wetland Program Plan timeframe. These are projects funded by the USEPA through Wetland Program Development Grants (WPDG) or other multipurpose grants.

Year(s)	Project Title	USEPA Grant #	Primary Investigator	Link to Project Information
2019-2021	Assessment of the accuracy of National Wetland Inventory Maps for North Carolina	AA-01D03020 MPG	DWR-WSS	http://www.ncwetlands.org/project/nwi_accuracy
2019-2023	Assessment of water quality benefits of urban wetlands in Raleigh's Walnut Creek Watershed	CD-00D65017	DWR-WSS	http://www.ncwetlands.org/project/urban-wetland-water-quality/
2018-2024	Development and testing of wetland hydrology performance criteria for restoration sites	CD-00D83918	NC State University Dr. Michael Vepraskas	http://www.ncwetlands.org/project/external-wpdg/
2020-2025	Assessment of change in North Carolina Coastal Plain wetlands	CD-00D98120	DWR-WSS	https://www.ncwetlands.org/project/coastal_change/
2022-2026	Quantifying urban riverine wetland flood storage capacity and duration in Raleigh, NC	CD-02D16922	DWR-WSS	https://www.ncwetlands.org/project/flood-storage-in-wetlands/
2019-2024	NC Volunteer Wetland Monitoring Program Pilot Program	CD-00D98919	NC State University, Carolina Wetlands Association & RTI International	https://www.carolinawetlands.org/pilot-volunteer-wetlands-monitoring-program
2024-2026	Update NC Wetland Program Plan & Field Guide to North Carolina Wetlands	CD-03D16124	DWR-WSS	https://www.ncwetlands.org/north-carolina-wetland-program-plan/ ; https://www.ncwetlands.org/project/wetlandfieldguide/
2022-2026	Urban Wetland Flooding Storage	CD-02D16922	DWR Steven Anderson	https://www.ncwetlands.org/flood-storage-in-wetlands/
2024-2026	Refinement and expansion of a Volunteer Wetland Monitoring Program across the Carolinas	CD-03D16224	NC State University & Carolina Wetland Association	https://www.carolinawetlands.org/pilot-volunteer-wetlands-monitoring-program

Table 14. Wetland projects were conducted in response to the 2015 NC WPP. These were projects funded by the USEPA through Wetland Program Development Grants (WPDG) or other multipurpose grants.

Year(s)	Project Title	USEPA Grant #	Primary	Link to Project Information
2016	Statewide wetland assessment through USEPA 2016 National Wetland Condition Assessment	N/A	DWR-WSS	http://www.ncwetlands.org/nwca/ or https://www.epa.gov/national-aquatic-resource-surveys/nwca
2006	Identification and designation of Strategic Habitat Areas for marine and coastal fishery species (Cape Fear River Basin)	N/A	DCM	https://www.deq.nc.gov/about/divisions/marine-fisheries/habitat-information/coastal-habitat-protection-plan/strategic-habitat-areas
2014-2020	Assessment of 16 long-term wetland monitoring sites	CD-00D25014	NCSU Dr. Michael Burchell	https://www.bae.ncsu.edu/people/mrburche/
2016-2019	Development of North Carolina wetland educational materials through ncwetlands.org	CD-00D51216	DWR Kristie Gianopulos & Amanda Mueller	http://www.ncwetlands.org/
2019-2021	Assessment of the accuracy of National Wetland Inventory Maps for North Carolina	AA-01D03020 MPG	DWR Susan Gale	http://www.ncwetlands.org/nwi_accuracy/

Appendix E: Links to Entities and References for Wetland-Focused Work

Table 15. Entities and references mentioned in this plan and/or helpful for wetland-focused efforts in North Carolina

Entity and References	Website Link
APNEP Comprehensive Conservation Management Plan	https://apnep.nc.gov/resources/publications-and-reports/comprehensive-conservation-and-management-plan
USDA Farmable Wetlands Program	https://www.fsa.usda.gov/programs-and-services/environmental-cultural-resource/water-resources/farmable-wetlands
The Nature Conservancy, Carolina Bay Strategic Plan	Coming soon in 2026/2027
DEQ Division of Coastal Management, Program Assessment and Strategy (2026-2030)	https://www.deq.nc.gov/draft-nc-section-309-assessment-and-strategy-2026-2030pdf/open
Environmental Management Commission	https://deq.nc.gov/about/divisions/water-resources/water-resources-commissions/environmental-management-commission
Natural and Working Lands Action Plan (2025-2030)	https://www.dncr.nc.gov/2025-2030-natural-and-working-lands-action-plan/open
NC Priority Climate Action Plan	https://www.deq.nc.gov/energy-climate/state-energy-office/inflation-reduction-act/climate-pollution-reduction-grant/priority-climate-action-plan
NC Coastal Habitat Greenhouse Gas Inventory	https://www.ncnhp.org/nc-blue-carbon-inventory-september-2023/open
NC Coastal Habitat Protection Plan (CHPP)	https://www.deq.nc.gov/about/divisions/marine-fisheries/habitat-information/coastal-habitat-protection-plan
NC Commission of Indian Affairs (NCCIA)	https://www.doa.nc.gov/boards-commissions/commission-indian-affairs
NC Salt Marsh Action Plan	https://www.nccoast.org/resource/nc-salt-marsh-action-plan-2024/
NC Wetland Program Plan 2015-2020	https://www.ncwetlands.org/wp-content/uploads/Final-NC-WPP-submittal-to-EPA-03072016.pdf
NC Wetland Program Plan 2021-2025	https://www.ncwetlands.org/wp-content/uploads/NC-Wetland-Program-Plan-2021-to-2025-Final-web.pdf
Currituck Sound Coalition Marsh Conservation Plan	https://media.audubon.org/2026-02/currituck_sound_marsh_conservation_plan_202109_final_2_0.pdf
SECOORA Surface Elevation Table Community of Practice	https://secoora.org/surface-elevation-table-community-of-practice/



Cypress trees in Three Sisters
Swamp on the Black River

Cypress trees in Three Sisters Swamp on the Black River



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<http://www.ncwetlands.org/>