

9. Cross-cutting Water Quality Recommendations to Protect and Restore All CHPP Habitats

9.1 Issue

Maintaining and restoring water quality is essential to the health and productivity of all the habitats that are the focus of the Coastal Habitat Protection Plan (CHPP). While work proceeds with implementing the recommendations contained in other chapters of this updated CHPP, there is an immediate and urgent need to invest in and undertake a range of *voluntary actions*, working with partnering stakeholders that can help reduce or even eliminate the need for mandatory regulatory actions in future years. These actions depend on building strong partnerships with stakeholders, aligning these actions with existing and newly funded programs such as coastal flooding and storm resiliency, and acknowledging that water quality degradation is worsening. Time is of the essence to avert serious and catastrophic fishery habitat declines in the years to come

9.2 Background

The North Carolina Coastal Federation and the Pew Charitable Trusts recognized the value of engaging stakeholders who can help to build public support and implement voluntary management actions in the 2021 CHPP update. They identified an opportunity to convene a small group of varied stakeholders to provide input to the CHPP update through a facilitated workgroup process. They asked Coastwise Partners to facilitate meeting discussions and to interview participants to help identify common concerns and ideas to address those. The stakeholder workgroup met three times during the summer of 2021. Locally knowledgeable expert scientists educated workgroup members on the sources of water quality degradation. The workgroup members and scientists then formulated conclusions and proposed actions that were also informed by their areas of individual expertise. By facilitated consensus, the workgroup arrived at recommendations that, if successfully implemented over the next five years, are expected to help address water quality concerns common throughout the CHPP.

Members of the workgroup included:

- **Paul Cough**, Former Director of the Oceans and Coastal Protection Division, U.S. Environmental Protection Agency
- **Marion Deerhake**, member, North Carolina Environmental Management Commission (EMC) and Water Quality Committee Chairperson
- **Jonathan Hinkle**, Professional Engineer, LSDI
- **Barrett Jenkins**, Mitigation Professional, Restoration Systems
- **Keith Larick**, Natural Resources Director, North Carolina Farm Bureau

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- **Clark Wright**, Attorney, Davis Hartman Wright, PLLC
- **Eugene Foxworth**, Assistant County Manager and Planning Director, Carteret County
- **Brian Kramer**, Town Manager, Town of Pine Knolls Shores
- **Stevenson Weeks**, Attorney, Wheatley Law Group

These meetings were supported by the following people:

Science Advisors:

- Dr. Hans Paerl, Kenan Professor of Marine and Environmental Science, UNC Institute of Marine Sciences
- Dr. Nathan Hall, Assistant Professor, UNC Institute of Marine Sciences
- Dr. Jud Kenworthy, NOAA, retired and member, Science and Technical Committee, Albemarle-Pamlico National Estuary Partnership

Facilitators:

- Rich Batiuk, Coastwise Partners
- Holly Greening, Coastwise Partners

Observers:

- Larry Baldwin, Vice-Chair, Coastal Resources Commission (CRC) and CHPP Steering Committee
- Yvonne Bailey, member, Environmental Management Commission, and Groundwater and Waste Management Committee Chairperson and CHPP Steering Committee
- Martin Posey, member, Marine Fisheries Commission (MFC) and Chair, CHPP Steering Committee
- Jimmy Johnson, Coastal Habitats Coordinator, Albemarle-Pamlico National Estuary Partnership, North Carolina Department of Environmental Quality (DEQ)
- Anne Deaton, Habitat Protection Section Chief, N.C. Division of Marine Fisheries, North Carolina Department of Environmental Quality

Staff Organizers:

- Leda Cunningham, Officer, The Pew Charitable Trusts
- Todd Miller, Executive Director, North Carolina Coastal Federation
- Kelly Garvey, Coastal Habitat Coordinator, North Carolina Coastal Federation

9.3 Discussion

The CHPP stakeholder workgroup made the following *fact-based findings*. It then developed *consensus-based conclusions* based on the findings. The conclusions form the foundation for the workgroup's recommendations for voluntary actions.

Findings on Coastal Habitats:

1. Healthy and sustainable fisheries depend on suitable water quality and productive fisheries habitats. These natural resources are the focus of the North Carolina Coastal Habitat Protection Plan.
2. Productive fishery habitats, including submerged aquatic vegetation (SAV), depend on coastal waters that are not degraded by excess nutrients, sediments, pathogens, and other pollutants, and which maintain the appropriate balance of fresh and salt waters that are characteristic of natural conditions in North Carolina's estuaries.
3. SAV and other coastal fishery habitats are becoming increasingly degraded in many estuaries.
4. SAV are declining in quality and extent because most of the important shallow water habitats are not receiving enough sunlight for long term survival. The lack of sunlight is attributed to water quality degradation that includes excessive levels of algae and turbidity.

Findings on water quality, quantity, and flow:

1. There is an overall decline in coastal water quality in North Carolina despite management efforts implemented for several decades to control sediment, nutrients, sediment, pathogens, and other pollutants. However, our state has made progress on reducing some forms of nitrogen, the most stimulatory nutrient for algal growth.
2. While some inorganic nitrogen loads have declined, recent water quality monitoring indicates that organic nitrogen is rising.
3. More intensive rainfall due to climate extremes exacerbates coastal water quality degradation by increasing surface runoff.
4. Rapid population growth is leading to more intensive urban and rural land use which changes watershed hydrology. This results in greater volumes and rates of surface runoff transporting nutrients, sediment, pathogens, and other pollutants downstream to estuaries.

Findings on pollutant loading and delivery to the estuaries:

1. Non-point sources within the watershed are the largest contributors to nutrient, sediment, pathogen, and other pollutant loadings to the estuaries.
2. In other states, there are locations where such nutrient, sediment, pathogen, and other pollutant loadings reached a "critical pollutant load" that resulted in major declines in healthy and productive fishery habitats such as SAV. However, coastal habitats can recover if adequate actions are taken to improve water

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quality. Over the past decade, actions in the Chesapeake Bay to restore SAV have been successful.

Based upon these findings, the CHPP stakeholder workgroup agreed to the following conclusions.

Conclusions:

1. Strategic uses of existing public and private expertise; federal, state, and local government programs; financial resources; and community stakeholders are key to building new momentum to address ongoing threats to fishery habitats which are attributable to water quality degradation.
2. Habitat protection and restoration measures prioritized by the CHPP need to leverage a broad array of increasingly available financial resources appropriated to help urban areas and rural working lands become more resilient to extreme weather.
3. Progress made in reducing point source pollution is becoming overshadowed by the impacts of nonpoint source pollution.
4. There is a need to prevent and restore degraded water quality to maintain and enhance fishery habitats and fish stocks.
5. Watershed management plans that evaluate water quality monitoring data and identify ways to mimic and restore natural hydrology. These plans are essential for: (1) providing a roadmap to target investments strategically, and (2) taking management actions in the most cost-effective manner.
6. CHPP-recommended actions need to include widespread use of nature-based strategies that protect water quality, help reduce flooding, and make coastal communities more resilient to climate extremes.
7. There is strong scientific and stakeholder agreement that too many pollutants are currently entering our coastal estuaries, presenting an immediate and significant threat to their fishery habitats. It is much more cost-effective to prevent major declines in fishery habitats than it is to restore them, so time is of the essence.
8. Natural processes that once assimilated pollutants on the landscape no longer protect coastal water quality as effectively because of changes in hydrology on the landscape (i.e., loss of wetlands, pipes and ditches, etc.).
9. Some areas of North Carolina such as portions of Albemarle Sound appear to have reached a critical pollutant loading threshold. North Carolina needs to guard against exceeding critical pollutant loads. The state should act promptly to adopt effective management measures that will reduce water quality degradation and stabilize aquatic systems.

10. Nutrient-reducing management actions are necessary throughout sensitive watersheds that drain into North Carolina's coastal waters. For marine systems which have somewhat small watersheds (e.g., Bogue, Stump and Topsail Sounds), management actions need to be focused near the estuary. For Albemarle and Pamlico Sounds, it is necessary to reduce nutrient inputs from the river basins that drain from hundreds of miles inland.
11. In the next five years, North Carolina should consider the benefits of developing more protective water quality standards in tandem with nonregulatory actions to decrease nutrient, sediment, pathogen, and other pollutant loadings to coastal estuaries.

9.4 Recommended Actions

A set of ambitious and meaningful voluntary actions to help protect and restore water quality and safeguard all CHPP habitats need to be implemented with a sense of urgency over the next five years. All these actions taken together represent a comprehensive, voluntary pollution reduction strategy that can create sufficient momentum to begin to control and reduce nutrient, sediment, and pathogen loadings into the state's estuaries. The goal is for this CHPP update to result in the timely implementation of these voluntary measures so that the damage to coastal habitats caused by water quality degradation will begin to subside and become less severe rather than worsen. To develop and implement these recommended actions, this workgroup recommends the EMC, CRC, and MFC

1. Encourage the CHPP Steering Committee and DEQ to form a public/private partnership to work with stakeholders to further refine and begin to implement the strategy in 2022, and then to continually evaluate and refine the strategy as it's used [1]; and
2. Implement the following actions:
 - (a) Request that the Governor issue an executive order that directs state agencies to work with the CHPP Steering Committee, DEQ, business, industry, agriculture, federal agencies, non-government organizations (NGOs), universities, N.C. Water Resources Research Institute (WRRI), N.C. Sea Grant, and local governments to implement water quality actions that control and reduce nutrient, sediment, pathogen, and other pollutant loadings in coastal estuaries, and to seek to align those actions whenever feasible with statewide climate resiliency strategies that are being promoted by the Administration.[2]
 - (b) Expand financial incentives and technical assistance to encourage many more communities to voluntarily prepare and routinely update local watershed management and restoration plans. These plans should encourage and enable residents and public and private landowners to identify, plan, and implement cost-effective, nature-based projects and measures that protect, restore and

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- mimic natural hydrology to reduce polluted runoff and flooding, as well as to protect and restore coastal fishery habitat. [3]
- (c) Focus and prioritize plans and stormwater retrofits funded by the N.C. General Assembly to ensure that coastal fish habitats are protected and restored. [4]
 - (d) Support and promote a financial incentives program that encourages public and private waterfront property owners to use living shorelines to mitigate bank erosion and naturally treat and reduce runoff. [5]
 - (e) Promote use of nature-based stormwater practices in state-funded construction in coastal counties and throughout the river basins that flow to coastal habitats. [6]
 - (f) Develop and implement a voluntary SAV protection and restoration plan for Bogue Sound. [7]
 - (g) Maximize the protection of fishery habitats by encouraging N.C. Department of Transportation (DOT) as well as municipal transportation agencies to adopt nature-based stormwater strategies for highway infrastructure they design, build, and maintain. [8]
 - (h) Expand access to financial and technical cost-share assistance and incentives that will help landowners, farmers, foresters, Department of Defense (DOD), and other property owners protect coastal fishery habitats. [9]
 - (i) Prioritize nutrient management as a coastal habitat protection strategy to protect and restore the health and productivity of coastal estuaries. [10]

These endnotes relate to the recommendations summarized above and provide specific ideas for how to implement these actions.

1. Over the history of the CHPP (adopted 1997), the Steering Committee and DEQ have formed several private/public partnerships to encourage stakeholders to help develop and implement CHPP actions. These partners have provided additional financial and staff resources to assist with public participation, plan documents and videos, and perform monitoring, research, and policy evaluation. Forming such a partnership to help engage stakeholders is essential so that a nutrient, sediment, pathogen, and other pollutant management strategy can be fully refined and implemented by the end of 2022 at the very latest.
2. An Executive Order by the Governor of this nature can help prioritize this issue among the state cabinet agencies. Non-cabinet agencies such as the North Carolina Department of Agriculture and Consumer Services (NCDACS) will need to be consulted and encouraged to partner on this effort.
3. Watershed plans have already been developed by numerous coastal communities and land management groups (including Hyde County, Mattamuskeet Drainage Association, Pine Knoll Shores, Atlantic Beach, Swansboro, Cedar Point, City of Wilmington). These plans provide a competitive advantage in identifying cost-effective projects that reduce the volume and rate of runoff. They help attract federal, state, local, and private funds for projects'

design and construction. To make steady progress in developing and carrying out these plans, this workgroup recommends the CRC, EMC and MFC:

- (a) Encourage the DEQ Secretary to identify and charge one of the Department's divisions with the responsibility of organizing a work group of public and private partners to facilitate the development and implementation of local watershed plans. This DEQ work group should:
 - i. Prioritize which estuarine watersheds are in most urgent need of five-year plans to help protect and restore fishery habitats from water quality degradation;
 - ii. Identify and define cross-cutting purposes for these plans to achieve multiple needs, including enhanced water quality, reduced flooding, and improved fishery habitats, while making communities and their associated working lands more resilient to extreme weather;
 - iii. Work with DEQ and other state agencies, the Governor, and the N.C. General Assembly to secure financial resources for local watershed plan development and implementation; and
 - iv. Identify ways to increase technical assistance to communities for watershed planning and implementation programs.
 - (b) Draft and enact a joint resolution to be sent to public and private funders, stressing the need for local watershed plans aimed at protecting and restoring coastal fishery habitats. Ask them to help secure financial resources to develop and implement local watershed plans.
 - (c) Invite federal and state agencies that oversee and manage coastal resiliency programs and funds to routinely brief Commission members about their programs. Encourage them to work with commissions' staff and private partners to create new opportunities to advance coastal fishery habitat protection and restoration needs as one element of the state's climate resiliency planning.
4. This workgroup recommends the EMC advise and work with DEQ staff to ensure that the stormwater retrofits the State helps to finance address coastal habitat protection needs through the following actions:
- (a) Encourage DEQ staff to devise program guidance to ensure that a significant portion of appropriated funds target watersheds where water quality needs to be protected and improved to maintain and restore coastal fishery habitat
 - (b) Encourage DEQ to solicit input from the CRC and MFC, their divisions, and the public about which watersheds should be prioritized for stormwater management funds.
 - (c) Allocate a portion of available planning and retrofit funds to determine how to upgrade existing coastal stormwater permitted systems that were designed before the most recent updates to the state's coastal stormwater rules (2008 and later). Many of these older systems have designs that aren't as protective

- of water quality and have chronic compliance and maintenance issues. The aim is to bring these systems into compliance working with owners to incorporate the latest and most effective stormwater management designs, including nature-based strategies, to the maximum extent practical.
5. Living shorelines are an effective long-term erosion control practice that enhances coastal fishery habitats by reducing pollution and safeguarding water quality. This workgroup recommends the CRC, EMC and MFC:
 - (a) Draft and enact a joint resolution that encourages the N.C. General Assembly, the N.C. Land and Water Fund, the Community Conservation Assistance Program, and other state, federal, and private environmental funders to provide ongoing and consistent support for cost-share programs that offer financial incentives to install living shorelines.
 - (b) Encourage all design professionals and marine contractors that seek and receive authorizations for bank stabilization projects under each commission's laws and rules to obtain training in the use of living shorelines and to work with their clients to consider living shoreline installation at appropriate locations.

 6. Nature-based stormwater practices that protect, restore or mimic natural hydrology provide for both water quality enhancements as well as reduce the volume and rate of surface runoff. This workgroup recommends the CRC, EMC and MFC:
 - (a) Draft and enact a joint resolution that encourages the Governor, N.C. General Assembly, state agencies, and public and private funders to promote the use of hydrologic matching (defined in the DEQ stormwater design manual as Low Impact Development (LID)) in state construction projects when such practices are feasible and cost-effective.
 - (b) Encourage the CRC to adopt guidelines to ensure that public water and beach access facilities it helps to finance through grants use nature-based stormwater control measures (SCMs) and provide sanitary bathroom facilities to the maximum extent practicable, and that these facilities serve to set the example for such practices. Through its guidelines, the CRC could encourage informative, educational signage about any nature-based practices used at these access facilities.
 - (c) Encourage the N.C. Parks and Recreational Trust Fund to adopt guidelines to ensure that recreational and park facilities it helps finance include nature-based SCMs and sanitary bathroom facilities to the maximum extent practicable, and that these facilities serve to set the example for such practices. Through its guidelines, the Trust Fund should encourage informative, educational signage about any nature-based practices used at these access facilities.

- (d) Commend and request that the N.C. Wildlife Resources Commission continue and expand its policy of using nature-based SCMs to the maximum extent practicable at its boating access facilities and educate the public about the use of such practices with informative, educational signage at its access facilities.
7. Recent state monitoring by the Albemarle-Pamlico National Estuary Partnership indicates that SAV in Bogue Sound is declining. This workgroup recommends the CRC, EMC and MFC:
- (a) Work with Carteret County, Pine Knoll Shores, and other local governments, as well as private and public partners, to develop and implement a voluntary program designed to protect and restore SAV in Bogue Sound. The program should promote the use of existing and new sources of technical assistance and financial incentives by public and private property owners to encourage them to install living shorelines and nature-based stormwater strategies to reduce sedimentation caused by shoreline erosion, as well as polluted runoff.
 - (b) Encourage scientific monitoring and analysis of this focused SAV restoration program's performance to determine lessons learned so it can be a model for other estuaries where intensifying land use patterns and boating may cause SAV declines.
8. DOT and municipal transportation agencies operate the largest stormwater drainage systems in N.C. This workgroup recommends the CRC, EMC and MFC:
- (a) Encourage DOT and municipal transportation agencies to use nature-based stormwater strategies in their transportation infrastructure when they are practical, technically feasible, and cost-effective.
 - (b) Evaluate their own permitting and authorization processes and rules to ensure they are not creating unnecessary regulatory roadblocks that discourage the use of nature-based strategies (stormwater and living shorelines) in transportation infrastructure.
 - (c) Ask DOT and Commission staff to evaluate and brief the commissions on laws and regulations relevant to their stormwater management programs. This will help identify regulatory hurdles that may discourage the use of nature-based strategies to control stormwater and bank erosion and sedimentation in transportation infrastructure. Work with DOT to seek to remove or reduce hurdles without compromising legally mandated environmental or other goals.
 - (d) Ask DOT to report annually to the EMC, CRC, and MFC on its nature-based stormwater initiatives and adoption progress.
9. This workgroup recommends the CRC, EMC and MFC:

- (a) Provide encouragement and policy assistance to private non-profits (conservation and trade organizations) and mitigation companies to establish a voluntary program through partnerships, funded by entities interested in improving fisheries productivity, water quality, and coastal resiliency, that financially support use of best management practices and other activities that:
 - i. Reduce and remove nutrients from estuaries that experience, or are subject to experiencing, excessive growth of microscopic or macroscopic vegetation that are harmful to fishery habitats;
 - ii. Reduce other pollutants in estuaries that are harmful to fishery habitats; and
 - iii. Make the coastal economy and its residents more resilient to extreme weather. Establish this program as a public/private partnership that will attract financial support from private and public funders interested in maintaining productive fisheries, water quality, and coastal resiliency.
- (b) Encourage the DEQ Secretary to identify and charge one of the Department's divisions with the responsibility of organizing a work group of public and private stakeholders to analyze the need to expand state-funded cost-share assistance for enhanced protection and restoration of coastal fishery habitats. Based on the findings of the Secretary's work group, draft and pass a joint resolution that requests the N.C. General Assembly increase state funds for state-funded cost-share programs that protect and restore water quality and coastal fishery habitats.
- (c) Include the protection of coastal fishery habitats as a priority in the Conservation Plan for North Carolina adopted by the US Department of Agriculture Natural Resources Conservation Service (USDA NRCS). Each year NRCS seeks help from its state and local agency partners, as well as private stakeholders, to identify target areas and priorities where it should focus its conservation funding. Coastal fishery habitats are not currently included in NRCS's Conservation Plan as a specific funding priority. This workgroup recommends the CRC, EMC and MFC:
 - i. Designate a member of each Commission to serve on the NRCS State Technical Committee to help facilitate the use of NRCS's resources to implement the CHPP. These designees would: (1) meet with NRCS state staff and leadership to explore and identify opportunities to help focus NRCS conservation practices and funds on helping to protect and restore coastal fish habitats, and (2) report routinely to their Commissions on how NRCS programs are being focused, aligned, and successfully used to protect and restore fishery habitats.
 - ii. Based upon these discussions, draft and enact resolutions that are sent to the Technical Committee and the NRCS State Conservationist requesting NRCS's help to protect and restore fishery habitats as a priority conservation need in North Carolina. Each joint resolution should include a request that NRCS develop specific programs,

funding mechanisms, and technical assistance to engage directly in protecting and restoring marine fisheries habitats that are the focus of the CHPP.

- iii. Ask NRCS to substantially increase its financial and technical support for protecting and restoring coastal fishery habitats and provide annual progress report presentations to each Commission.
 - iv. Seek ways to help publicize and encourage participation by oyster farmers in the NRCS cost-share program that is currently available. This is a new funding program that should be promoted in the CHPP, and the MFC and other partners should work with NRCS to grow this program substantially over the next five years.
 - v. Encourage NRCS to work with public and private partners to form a Regional Conservation Partnership to promote coordination between NRCS, state agencies, NGOs, and private landowners and businesses to deliver conservation assistance and program contracts or easement agreements that advance the protection and restoration of marine fishery habitats.
- (d) Support through resolutions and letters of support efforts by the U.S. Department of Defense and its private conservation partners to obtain federal funds for land acquisitions and conservation easements that enable projects to prevent incompatible land uses that conflict with military training operations, and which can help to protect and restore water quality and coastal fishery habitat.
- (e) Endorse resiliency projects undertaken by the DOD that use nature-based stormwater practices and living shorelines to make military installations and operations in neighboring communities more resilient to extreme weather while at the same time improving water quality and reducing the volume and rates of runoff to the estuary.
- (f) Request adequate reoccurring appropriations for Community Conservation Assistance Program (CCAP) for water quality practices that control and reduce nutrient, sediment, pathogen, and other pollutant loadings to coastal estuaries.

10. This workgroup recommends the CRC, EMC and MFC:

- (a) Ask the N.C. Attorney General for an opinion if coastal fishery habitats fall within the meaning of “existing use” under the Federal Clean Water Act.
- (b) Support through Commission resolutions increased funding for robust water quality and habitat monitoring programs. These programs should include those already conducted by state agencies as well as work by expert third parties that help to determine the status and trends in water quality and the health of fishery habitats. Water quality monitoring in the estuary should be expanded to include chlorophyll-a, nutrients, and other pollutant concentrations where important data gaps exist. The CHPP Steering Committee should review and evaluate the adequacy of monitoring program

- at least once annually and transmit its findings to the public and state leadership.
- (c) Ask the Albemarle-Pamlico National Estuary Partnership, and other federal, state, or local, and non-profit organizations and the public to provide information during the early stages of the EMC's Triennial Review process about any water quality-related declines in fishery habitats they have documented.
 - (d) To minimize the need for future mandates for regulatory actions under the Clean Water Act, encourage timely use of non-regulatory actions (such as those identified in these recommendations) to address water quality impairments that degrade coastal fishery habitats.

9.5 Literature Cited

Dr. Hans Paerl, Dr. Nathan Hall and Dr. Jud Kenworthy presented their water quality and SAV monitoring data to the stakeholder workgroup and cited the following published papers and reports.

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