Issues/Reports

INFORMATION WILL BE PROVIDED AT THE MEETING.

Marine Fisheries
ENVIRONMENTAL QUALITY

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

BRAXTON C. DAVIS
Director

Nov. 1, 2017

MEMORANDUM **FMP 11-17**

TO: Marine Fisheries Commission

FROM: Catherine Blum, Fishery Management Plan and Rulemaking Coordinator

SUBJECT: Fishery Management Plan Update

This memo provides an overview on the status of the North Carolina fishery management plans for the November 2017 commission meeting. No action is required by the commission.

The advisory committee has been appointed to assist the division in the review of the **Blue Crab Fishery Management Plan**. A meeting was held in September to provide advisers an orientation, review the latest traffic light update and determine a schedule for regular meetings. In the meantime, the division's plan development team is continuing to develop the stock assessment in preparation for the review of the plan.

In preparation for the review of the **Southern Flounder Fishery Management Plan**, work is continuing on the coastwide stock assessment of southern flounder by a group of representatives from North Carolina, South Carolina, Georgia and Florida. The stock assessment is expected to be completed in the first part of 2018, after which the next review of the plan will commence. The advisory committee has been appointed and will meet once the stock assessment process is complete.

While the request for a supplement to the **Estuarine Striped Bass Fishery Management Plan** is under review by the Secretary of the Department of Environmental Quality, stock assessments for the Central Southern Management Area stocks and the Albemarle Sound Management Area and Roanoke River Management Area stock that began in 2017 are continuing. Staff is addressing follow-up tasks that resulted from the data workshops held in September. This is a joint plan with the Wildlife Resources Commission, so all updates and reviews are joint efforts by both agencies.

After completing the annual update in July for the **Striped Mullet Fishery Management Plan**, the stock status was moved from "viable" to "concern" because 2016 commercial landings fell below the minimum landings trigger established in Amendment 1 to the plan. In accordance with the plan, the division reviewed striped mullet data in more detail to determine what factors are responsible for this decline. Additional information is provided in the briefing materials and the commission will receive a presentation at the November meeting.

Marine Fisheries
ENVIRONMENTAL QUALITY

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Nov. 1, 2017

MEMORANDUM

TO: N.C. Marine Fisheries Commission

FROM: Daniel Zapf, Co-lead Striped Mullet Plan Development Team
Tracey Bauer, Co-lead Striped Mullet Plan Development Team

SUBJECT: Recommendations and Update on Preliminary 2016 Striped Mullet Data Analysis.

Amendment 1 to the Striped Mullet Fishery Management Plan established minimum and maximum commercial landings triggers of 1.13 and 2.76 million pounds, respectively. Under Amendment 1, if a trigger is activated, further analysis of striped mullet data will be completed to identify causes of increased or decreased striped mullet commercial landings. If, upon completion of the data analysis, it is determined that additional management is needed, adaptive management will be used to implement management measures needed to maintain sustainable harvest. Any management measures will be developed by the division's plan development team, in conjunction with an advisory committee, and approved by the Marine Fisheries Commission prior to implementation using the proclamation authority of the Fisheries Director.

Striped mullet commercial landings in 2016 were 964,348 pounds, which is below the minimum commercial landings trigger (1.13 million pounds) established in Amendment 1 of the Striped Mullet Fishery Management Plan. Therefore, the division initiated further analysis of available fishery dependent and fishery independent striped mullet data to determine if the decline in commercial landings was the result of decreased fishing effort or a possible stock decline.

The Striped Mullet Plan Development Team met Oct. 2, 2017 to discuss the draft analysis of fishery dependent and fishery independent striped mullet data. Observations from the team included:

- No other state fishery management plan has a review trigger based on a single year. There is always some uncertainty regarding the status of any stock (including striped mullet) that can only be addressed through a stock assessment.
- Fishery independent indices of striped mullet relative abundance should be standardized to account for the impact environmental factors may have in limiting or enhancing the availability of striped mullet.
- In the northern area (Core Sound and north), there is a declining trend in striped mullet commercial landings that is mirrored in fishery independent indices, which includes those used in the 2013 striped mullet stock assessment.

- In the southern area (Bogue Sound and south) striped mullet commercial landings have generally declined, but not to the extent of northern areas, and fishery independent indices in the south increased in 2016.
- Success in other fisheries in 2016, particularly shrimp, may have impacted participant numbers and associated effort in the striped mullet fishery. To better understand the impact shifts in effort may have had on 2016 striped mullet commercial landings, further analysis needs to be completed examining commercial fishing trips that specifically targeted striped mullet.
- Since 1972, hurricanes have had minor impacts on striped mullet landings, but may have significantly impacted landings in 2016.
- The striped mullet commercial fishery in North Carolina is primarily a roe-based fishery targeting spawning females and is susceptible to overfishing, potentially leading to poor recruitment.
- There is currently no fishery independent survey that provides a juvenile abundance index for striped mullet; therefore, there is no way to monitor annual year class strength.
- Results of the 2013 striped mullet stock assessment indicated both recruitment and spawning stock biomass were declining in the last few years (2007-2011) of the assessment period.

The division recommends the following:

- Further analysis of commercial landings from trips that specifically targeted striped mullet and standardization of fishery independent indices to account for the impact environmental factors may have in limiting or enhancing the availability of striped mullet needs to occur in early 2018. The addition of commercial landings and fishery independent data through 2017, a year with no major hurricane, will allow for better assessment of trends in the striped mullet fishery and striped mullet stock abundance.
- The division recommends the Marine Fisheries Commission take no management action at the November 2017 business meeting, as further updates will be provided in February 2018 that will incorporate additional data and analysis. Since most of the striped mullet commercial harvest occurs in October and November the regulatory impact window will have passed for 2017. However, with the commission's 2018 meeting schedule, there is sufficient time to enact management measures to have an impact on the 2018 striped mullet harvest and beyond.

At the February 2018 Marine Fisheries Commission meeting, the division will present the completed analysis including preliminary 2017 striped mullet commercial landings as well as fishery independent data analysis through 2017.

Marine Fisheries
ENVIRONMENTAL QUALITY

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
BRAXTON C. DAVIS
Director

October 20, 2017

MEMORANDUM **RS 11-17**

TO: Marine Fisheries Commission

FROM: Kathy Rawls, Fisheries Management Section Chief

SUBJECT: Rule Suspensions

Attached is the temporary rule suspension information for the November 2017 meeting. In accordance with the North Carolina Division of Marine Fisheries Resource Management Policy Number 2014-2, the North Carolina Marine Fisheries Commission will vote on any new rule suspensions that have occurred since the last meeting of the commission. No new rule suspensions have occurred since the August 2017 meeting, therefore, no action is necessary at this time. In accordance with the policy the division will provide a verbal reminder of all current rule suspensions at each November meeting of the commission. The current rule suspensions are as follows:

- Continued suspension of North Carolina Marine Fisheries Commission Rule 15A NCAC 03M .0516 Cobia, allows the division to manage the commercial and recreational cobia fisheries in accordance with management actions taken by the commission and in accordance with Framework Amendment 4 to the federal Coastal Migratory Pelagics Fishery Management Plan. This suspension was continued in Proclamation FF-32-2017.

- Continued suspension of portions of North Carolina Marine Fisheries Commission Rule 15A NCAC 03J .0301 Pots, for an indefinite period of time. This suspension allows the division to implement the crab pot escape ring requirements adopted by the commission in the May 2016 Revision to Amendment 2 of the North Carolina Blue Crab Fishery Management Plan. This suspension was effective Jan. 15, 2017, implemented in Proclamation M-11-2016.

- Continued suspension of portions of North Carolina Marine Fisheries Commission Rule 15A NCAC 03L .0201 Crab Harvest Restrictions, and portions of 03L .203 Crab Dredging, for an indefinite period of time. This continued suspension allows the division to implement the blue crab harvest restrictions adopted by the commission in the May

2016 Revision to Amendment 2 of the North Carolina Blue Crab Fishery Management Plan. These suspensions were implemented in Proclamation M-11-2016.

- Continued suspension of portions of North Carolina Marine Fisheries Commission Rule 15A NCAC 03J .0501 Definitions and Standards for Pound Nets and Pound Net Sets, for an indefinite period of time. Suspension of portions of this rule allows the division to increase the minimum mesh size of escape panels for flounder pound nets in accordance with Supplement A to Amendment 1 of the North Carolina Southern Flounder Fishery Management Plan. This suspension was implemented in Proclamation M-34-2015.

- Continued suspension of portions of North Carolina Marine Fisheries Commission Rule 15A NCAC Shad and 03Q .0107 Special Regulations: Joint Waters, for an indefinite period of time. Suspension of portions of these rules allows the division to change the season and creel limit for American shad under the management framework of the North Carolina American Shad Sustainable Fishery Plan. These suspensions were implemented in Proclamation FF-59-2016.

NORTH CAROLINA'S COASTAL HABITAT PROTECTION PLAN

2018 - 2020

BIENNIAL IMPLEMENTATION PLAN

North Carolina Department of Environmental Quality,

North Carolina Marine Fisheries Commission,

North Carolina Coastal Resources Commission, and

North Carolina Environmental Management Commission

November 2017

Introduction

The legislative goal of the NC Coastal Habitat Protection Plan (CHPP) is the long-term enhancement of coastal fisheries associated with coastal habitats. The plan was first completed and approved in 2004 and is updated on approximately five year cycles. It was last updated in 2016. Since 2004, North Carolina's environmental agencies and commissions have been working together to achieve this goal through the development of biennial implementation plans that work toward achieving the goals and recommendations of the CHPP.

Agencies statutorily required to be involved with plan development and implementation include NC Department of Environmental Quality (DEQ) Divisions of Marine Fisheries (DMF), Coastal Management (DCM), Water Resources (DWR), and Energy, Mineral, and Land Resources (DEMLR). Other agencies that voluntarily participate in CHPP implementation include Albemarle Pamlico National Estuary Program (APNEP), DEQ Division of Mitigation Services (DMS), Wildlife Resource Commission (WRC), and Sea Grant. Under the Department of Agriculture and Consumer Services (NCDA&CS) (formerly organized under what is currently referred to as DEQ), the Forest Service (DFR), and Division of Soil and Water Conservation (DSWC) participate. Some federal agencies and universities have been engaged with the CHPP process as needed.

The first implementation plan covered the 2005-2007 period. This document serves as the guidance for implementation of the CHPP recommendations during the 2018-2020 period.

Each division was charged with developing implementation actions that address the goals and recommendations of the CHPP. The 2018-2020 implementation plan contains some ongoing or modified actions from previous plans as well as new actions.

By working together on complicated, multi-jurisdictional issues, the CHPP Steering Committee (CSC) has played a key role in accomplishing or making substantial progress on several environmental issues over the past six years. This included improving compliance on existing environmental rules, completion or major progress on mapping of shell bottom, SAV, and wetland shorelines, restoration of subtidal oyster reefs, increasing public awareness on environmental issues, supporting research and conducting analyses to identify Strategic Habitat Areas for focused protection, increasing scientific understanding on the benefit of living shorelines and public awareness of this alternative option to shoreline hardening, and passing of the coastal stormwater rules.

Successful implementation of CHPP recommendations can only be achieved through continued commitment to improving coastal habitats and water quality, interagency cooperation, and funding. There is a clear economic benefit to protecting and enhancing healthy ecosystems that reach far beyond the fishing industry. With that in mind, the CSC remains committed to moving forward to protect our estuarine resources through execution of the 2018-2020 Implementation Plan.

Over the next two years, implementation will focus on four identified priority issues:

- **Restoring oyster reef habitat**
- **Encouraging use of living shorelines**
- **Reducing sedimentation impacts in estuarine creeks**
- **Developing metrics on habitat trends and management effectiveness**

While these issues are a priority, other existing actions continue to be worked on. Habitat and water quality degradation has occurred from many sources over time, and therefore requires a diversity of strategies to fully achieve protection and restoration of fish habitat. Specific implementation actions are listed in the tables below by agency and priority issue, followed by other actions.

DIVISION OF MARINE FISHERIES

ACTIONS TO RESTORE OYSTER REEF HABITAT

Action #	Implementation Action	Agency	Issue
Recommendation 2.1. Support assessments to classify habitat value, condition, and status through mapping and monitoring.			
2.1b.1	Facilitate mapping of deep (>15 ft) estuarine bottoms, starting with lower Neuse River. To do this, seek funding to hire staff to side scan key areas in Pamlico Sound and post-process the data.	**DMF**	O
Recommendation 3.1a. Expand habitat restoration including increasing subtidal and intertidal oyster habitat through restoration.			
3.1a.1	Identify the size and number of sanctuaries needed, and whether constructed intertidal reefs should be incorporated into the sanctuary network.	**DMF**	O
3.1a.2	Continue expanding the oyster sanctuary program.	**DMF**	O
3.1a.3	Establish a long-term monitoring program (oyster survival, growth, condition, recruitment) of oyster sanctuaries and cultch planting sites to assist with future siting, design, and management decisions.	**DMF**	O
3.1a.4	Identify alternative substrates for cultch and oyster sanctuary projects that are appropriate for larval settlement at intertidal and subtidal sites; compare the costs and benefits of them.	**DMF**	O
3.1a.5	Cooperate with university researchers on new siting tools (eg. larval distribution and transport models) and monitoring protocols to maximize oyster restoration success.	**DMF**	O
3.1a.6	Work with university researchers to monitor fish/invertebrate use of oyster sanctuaries and effect of oysters on local water quality.	**DMF**	O
3.1b.2	Work with the Corps of Engineers and the Department of Transportation on innovative mitigation projects and an appropriate crediting system for them under the DMS. Such projects may include the protection and restoration of SAV and oyster beds, and the removal of certain dams and other aquatic organism barriers, and enhancing wetlands through construction of living shorelines.	**DMS,** DEQ, DMF, DCM, DWR	O, L
Recommendation 3.3. Protect habitat from adverse fishing gear effects through improved compliance.			
3.3.1	Evaluate through the FMP process the need for further restrictions of bottom-disturbing gear.	**DMF**	O

ACTIONS TO DEVELOP METRICS ON HABITAT TRENDS AND MANAGEMENT EFFECTIVENESS

Action #	Implementation Action	Agency	Issue
Recommendation 1.2a. Coordinate and enhance monitoring of water quality, habitats, and fisheries			
1.2a.2	The Department, through the APNEP, will develop a comprehensive monitoring plan for the estuarine system within the APNEP region.	**APNEP**, DMF	M
Recommendation 1.2b. Coordinate and enhance assessment and monitoring of effectiveness of rules established to protect coastal habitats.			
1.2b.1	Investigate development of performance criteria for measuring success of management actions (eg. stormwater rules, BMPs).	**DEMLR, DWR, DCM**, DMF, APNEP	M
Recommendation 1.6. Enhance management of invasive species with existing programs. Monitor and track status in affected waterbodies.			
1.6.1**	Assess invasive SAV in the APNEP region annually and continue to coordinate invasive SAV treatment with DMF and APNEP.	**DWR**, APNEP, DMF	M
1.6.2	Monitor and track invasive catfish through an information cooperative identifying data sources, current research, and research needs.	**DMF**	M
Recommendation 2.1a. Support assessments to classify habitat value and condition by coordinating, completing, and maintaining baseline habitat mapping (seagrass, shell bottom, shoreline)			
2.1a.1	Map SAV on five year cycles.	**APNEP**, **DMF**	M
2.1a.2	Establish sentinel sites in the five SAV regions and monitor annually.	**APNEP**, **DMF**	M
2.1a.3	Seek dedicated funding for the state SAV mapping program.	**DEQ,** DMF, APNEP	M
Recommendation 2.1b. Support assessments to classify habitat value and condition by selectively monitoring the condition and status of those habitats.			
2.1b.2	Modify shellfish mapping program to establish and monitor sentinel sites for shell bottom habitat condition. Develop shell bottom metrics to monitor.	**DMF**	M
2.1b.3	Develop indicator metrics for the six fish habitats; data to be used to establish habitat thresholds and conduct habitat assessments.	**DMF, APNEP,** DWR, DCM	M
2.1b.4	Develop a coastwide sampling protocol to collect metric data and seek funding to accomplish it.	**DMF, APNEP**, DWR, DCM	M
2.1b.5	Implement data collection of habitat metrics.	**DMF, APNEP,** DWR, DCM	M
Recommendation 2.2. Continue to identify and field groundtruth strategic coastal habitats.			
2.2.2	Conduct fish and habitat sampling in SHA Region 3 to validate SHA selections and develop indicators.	**DMF**	M
2.2.3	Complete SHA Region 4 analysis	**DMF**	M
Recommendation 3.5b. Protect and restore habitat for migratory fishes by restoring fish passage through elimination or modification of stream obstructions, such as dams and culverts.			
3.5b.2	Survey previously identified Albemarle Sound river herring spawning areas to estimate current condition and spawning function, identify stream obstructions on river herring spawning streams, and prioritize obstructions for herring-friendly replacement.	**DMF**, WRC	M

OTHER ACTIONS

Action #	Implementation Action	Agency
GOAL 1. IMPROVE EFFECTIVE OF EXISTING RULES AND PROGRAMS PROTECTING COASTAL FISH HABITAT		
1.1.1	Cross train Marine Patrol officers to take note of and report violations of EMC rules and permits in Coastal Waters to appropriate agencies.	**DCM**, DMF
1.3.2	Promote habitat conservation by incorporating habitat information into division outreach efforts, including, 1) creating interactive materials for events highlighting life history, habitat use, and threats of species; 2) setting up fish habitat aquarium displays for longer events; 3) seeking funding for additional displays	**DMF**, DCM, Sea Grant
1.4.2	Identify any Primary Nursery Areas (PNA) that are not currently designated as High Quality Waters (HQW), and work to reclassify to HQW.	**DMF, DWR**
GOAL 2. IDENTIFY AND DELINEATE STRATEGIC COASTAL HABITATS		
2.2.1	Work with agencies to include strategic coastal habitat (SHA) priorities within DMS local watershed plans, and other restoration programs.	**DMF**, DMS, DEQ
GOAL 3. ENHANCE AND PROTECT HABITATS FROM ADVERSE PHYSICAL IMPACTS		
3.1b.3	Obtain funding to restore streams and associated wetlands designated as anadromous fish spawning areas in the Albemarle Sound area as implementation steps for the River Herring Fishery Management Plan.	**DMF, APNEP, DMS, WRC**
3.1c.1	Work with researchers to establish methods to restore SAV.	**DMF, APNEP**, DMS, DWR
3.5a.1	Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.	**DMF, WRC,** DWR, DMS
3.5b.1	Encourage research to determine the minimum acceptable culvert dimensions and characteristics that will allow passage of river herring and whether there are other causes inhibiting river herring from migrating upstream past culverts.	**DMF, APNEP,** DOT, WRC
GOAL 4. ENHANCE AND PROTECT WATER QUALITY		
4.1a.1	Identify research priorities regarding impacts of endocrine-disruptors and other chemicals to blue crabs and oysters.	**DMF, DWR**

DIVISION OF COASTAL MANAGEMENT

ACTIONS TO ENCOURAGE USE OF LIVING SHORELINES

Action #	Implementation Action	Agency	Issue
Recommendation 3.1b. Expand habitat restoration, including re-establishing of riparian wetlands and stream hydrology.			
3.1b.2	Work with the Corps of Engineers and the Department of Transportation on innovative mitigation projects and an appropriate crediting system for them under the DMS. Such projects may include the protection and restoration of SAV and oyster beds, and the removal of certain dams and other aquatic organism barriers, and enhancing wetlands through construction of living shorelines.	**DMS,** DEQ, DMF, DCM, DWR	O, L
Recommendation 3.4. Improve management of estuarine and public trust shorelines and shallow water habitats by revising shoreline stabilization rules to include consideration of site specific conditions and advocate for alternatives to vertical shoreline stabilization structures.			
3.4.1	Encourage waterfront property owners to utilize the shoreline stabilization technique recommended for their shoreline type.	**DCM,** DWR	L
3.4.2	Encourage alternatives to vertical shoreline stabilization methods through permit requirements, fees, and process simplification, including but not limited to refining rule 15A NCAC 07H .2700 GP for Marsh Sills and coordinating permit process changes with the Corps of Engineers (USACOE).	**DCM**, DWR	L
3.4.3	Promote efforts to educate the public and waterfront property owners on living shoreline benefits by 1) seeking funding and partnerships to increase the number of highly visible demonstration projects; 2) developing case studies as guidance for property owners; 3) engaging with contractors, realtors, and Homeowners Associations regarding design and benefits of living shorelines; and 4) enhance marketing and education initiatives to build public demand for living shorelines.	**DCM**	L
3.4.4	Promote research and monitoring of living shorelines to 1) examine effectiveness of natural and other materials of erosion control and ecosystem enhancement; 2) examine long-term stability of living shorelines and vertical structures, particularly after storm events; 3) map areas where living shorelines would be suitable for erosion control; and 4) investigate use of living shorelines as a BMP or mitigation option.	**DCM,** DWR, DMF	L
3.4.5	Update maps of shoreline structures in the CAMA counties.	**DCM**	L, M
3.4.6	Promote the appropriate use of oyster shells to facilitate habitat enhancement in living shoreline structures.	**DCM**	L, O
Recommendation 3.8. Develop coordinated policies including management adaptations and guidelines to increase resiliency of fish habitat to ecosystem changes.			
3.8.1	Direct outreach to local governments on sea level rise to allow coastal communities to assess needs and implement strategies to minimize hazard risk and increase environmental resiliency.	**DCM**	L
Recommendation 4.4. Enhance coordination with, and provide financial/technical support for, local government/private actions to effectively manage stormwater, stormwater runoff, and wastewater.			
4.4.1	Pursue funding for the Community Conservation Assistance Program with emphasis on CHPP stormwater priorities in coastal counties	**DSWC, DEQ**	S, L

ACTIONS TO DEVELOP METRICS ON HABITAT TRENDS AND MANAGEMENT EFFECTIVENESS

Action #	Implementation Action	Agency	Issue
Recommendation 1.2b. Coordinate and enhance assessment and monitoring of effectiveness of rules established to protect coastal habitats.			
1.2b.1	Investigate development of performance criteria for measuring success of management actions (eg. stormwater rules, BMPs).	**DEMLR, DWR, DCM**, DMF, APNEP	M

OTHER ACTIONS

Action #	Implementation Action	Agency
GOAL 1. IMPROVE EFFECTIVE OF EXISTING RULES AND PROGRAMS PROTECTING COASTAL FISH HABITAT		
1.1.1	Cross train Marine Patrol officers to take note of and report violations of EMC rules and permits in Coastal Waters to appropriate agencies.	**DCM**, DMF
1.3.2	Promote habitat conservation by incorporating habitat information into division outreach efforts, including, 1) creating interactive materials for events highlighting life history, habitat use, and threats of species; 2) setting up fish habitat aquarium displays for longer events; 3) seeking funding for additional displays	**DMF**, DCM, Sea Grant
1.4.1	The Department will hold quarterly meetings on proposed projects and enforcement cases that are or may be subject to the permitting or enforcement jurisdiction of the programs of more than one division and invite other state and federal agencies to participate as appropriate.	**DCM**, DEQ
GOAL 3. ENHANCE AND PROTECT HABITATS FROM ADVERSE PHYSICAL IMPACTS		
3.2.1	Implement the beach and inlet management plan, and continue to require minimum criteria for monitoring beach nourishment projects to evaluate ecological effects.	**DCM**
3.4.7	Work with NOAA's Technical Advisory Committee members in their sponsored research program "Ecological Effects of Sea Level Rise" to develop information/tools to better forecast and manage landscape res ponses of critical natural resources relative to sea level rise.	**DCM**
GOAL 4. ENHANCE AND PROTECT WATER QUALITY		
4.7.2	Improve wastewater/stormwater management at coastal marinas.	**DWR**, DCM

DIVISION OF WATER RESOURCES/ ENERGY, MINERALS, AND LAND RESOURCES

ACTIONS TO REDUCE SEDIMENTATION IMPACTS IN ESTUARINE CREEKS

Action #	Implementation Action	Agency	Issue
Recommendation 1.3. Enhance and expand outreach on the fish habitat value, threats from land use and other activities, and explanations of management measures and challenges.			
1.3.4	Educate traditional economic interests (eg. developers) on the impact of stormwater and new options included in the stormwater design manual; implement workshops for engineers and consultants on stormwater management, buffers, and 401 Certifications.	**DWR**, DEMLR, WRRI	S
Recommendation 4.3c. Prevent additional shellfish closures and swimming advisories by continuing to phase-out existing outfalls by implementing alternative stormwater management strategies.			
4.3c.1	Implement new stormwater BMPs and Low Impact Development (LID) program to reduce runoff.	**DEMLR**	S
4.3c.2	Partner with NCDOT to retrofit road ditches that discharge to shellfish waters.	**DEMLR** DWR, DMF	S
Recommendation 4.4. Enhance coordination with, and provide financial/technical support for, local government/private actions to effectively manage stormwater, stormwater runoff, and wastewater.			
4.4.2	Encourage development of effective local erosion control programs to maintain compliance and reduce sediment from reaching surface waters.	**DEMLR**	S
4.4.3	Provide education and financial/technical support (funding, training, equipment) for local and state programs to better manage sediment control measures from all land disturbing activities and enhance monitoring capabilities (ie purchase turbidity meters).	**DEMLR**, DWR	S
4.4.4	Continue to educate the public, developers, contractors, and farmers on the need for sediment erosion control measures and techniques for effective sediment control.	**DEMLR**, DWR	S
Recommendation 4.5a. Continue to improve strategies throughout the river basins to reduce nonpoint pollution and minimize cumulative losses of fish habitat through voluntary actions, assistance, and incentives, including improved methods to reduce pollution from construction sites, agriculture, and forestry.			
4.5a.1	Provide outreach to the public and government agencies on stormwater BMP techniques by holding workshops that include visiting project demonstration sites.	**DEMLR,** DCM	S
Recommendation 4.6. Maintain effective regulatory strategies throughout the river basins to reduce nonpoint pollution and minimize cumulative losses of fish habitat, including use of vegetated buffers and established stormwater controls.			
4.6.1	Assess if coastal stormwater rules are effectively reducing runoff.	**DEMLR,** DWR	S, M
Recommendation 4.7. Maintain adequate water quality conducive to the support of present and future mariculture in public trust waters.			
4.7.1	Investigate management needed to maintain open shellfish waters; encourage aquaculture that will enhance or minimize impacts to water quality that affect public trust uses.	**DMF**, **DWR**, DEMLR, DCM	S

ACTIONS TO DEVELOP METRICS ON HABITAT TRENDS AND MANAGEMENT EFFECTIVENESS

Action #	Implementation Action	Agency	Issue
Recommendation 1.2b. Coordinate and enhance assessment and monitoring of effectiveness of rules established to protect coastal habitats.			
1.2b.1	Investigate development of performance criteria for measuring success of management actions (eg. stormwater rules, BMPs).	**DEMLR, DWR, DCM**, DMF, APNEP	M
Recommendation 1.6. Enhance management of invasive species with existing programs. Monitor and track status in affected waterbodies.			
1.6.1**	Assess invasive SAV in the APNEP region annually and continue to coordinate invasive SAV treatment with DMF and APNEP.	**DWR**, APNEP, DMF	M
Recommendation 2.1b. Support assessments to classify habitat value and condition by selectively monitoring the condition and status of those habitats.			
2.1b.3	Develop indicator metrics for the six fish habitats; data to be used to establish habitat thresholds and conduct habitat assessments.	**DMF, APNEP,** DWR, DCM	M
2.1b.4	Develop a coastwide sampling protocol to collect metric data and seek funding to accomplish it.	**DMF, APNEP**, DWR, DCM	M
2.1b.5	Implement data collection of habitat metrics.	**DMF, APNEP,** DWR, DCM	M

ACTIONS TO ENCOURAGE USE OF LIVING SHORELINES

Action #	Implementation Action	Agency	Issue
Recommendation 3.1b. Expand habitat restoration in accordance with restoration plan goals, including re-establishing of riparian wetlands and stream hydrology.			
3.1b.2	Work with the Corps of Engineers and the Department of Transportation on innovative mitigation projects and an appropriate crediting system for them under the DMS. Such projects may include the protection and restoration of SAV and oyster beds, and the removal of certain dams and other aquatic organism barriers, and enhancing wetlands through construction of living shorelines.	**DMS,** DEQ, DMF, DCM, DWR	O, L
Recommendation 3.4. Improve management of estuarine and public trust shorelines and shallow water habitats by revising shoreline stabilization rules to include consideration of site specific conditions and advocate for alternatives to vertical shoreline stabilization structures.			
3.4.1	Encourage waterfront property owners to utilize the shoreline stabilization technique recommended for their shoreline type.	**DCM,** DWR	L
3.4.2	Encourage alternatives to vertical shoreline stabilization methods through permit requirements, fees, and process simplification, including but not limited to refining rule 15A NCAC 07H .2700 GP for Marsh Sills and coordinating permit process changes with the Corps of Engineers (USACOE).	**DCM**, DWR	L
3.4.4	Promote research and monitoring of living shorelines to 1) examine effectiveness of natural and other materials of erosion control and ecosystem enhancement; 2) examine long-term stability of living shorelines and vertical structures, particularly after storm events; 3) map areas where living shorelines would be suitable for erosion control; and 4) investigate use of living shorelines as a BMP or mitigation option.	**DCM,** DWR, DMF	L

OTHER ACTIONS

Action #	Implementation Action	Agency
GOAL 1. IMPROVE EFFECTIVE OF EXISTING RULES AND PROGRAMS PROTECTING COASTAL FISH HABITAT		
1.3.1	Conduct outreach to educate citizens about DWR's Neuse and Tar-Pamlico riparian buffer rules and 401 Water Quality Certification program.	**DWR**, APNEP
1.3.5	Provide information to focus students in K-12 understanding the biodiversity of lakes, streams, and estuaries.	**DWR**, DPR, APNEP, DSWC
GOAL 3. ENHANCE AND PROTECT HABITATS FROM ADVERSE PHYSICAL IMPACTS		
3.1c.1	Work with researchers to establish methods to restore SAV.	**DMF, APNEP**, DMS, DWR
3.5a.1	Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.	**DMF, WRC,** DWR, DMS
3.5b.3	The Department, through the DWR and the DMS will pursue dam removal projects where appropriate.	**DWR, DMS**
GOAL 4. ENHANCE AND PROTECT WATER QUALITY		
4.7.2	Improve wastewater/stormwater management at coastal marinas.	**DWR**, DCM

Divisions of Water Resources / Energy, Minerals, and Land Resources

4.8a.1	Implement environmentally superior alternatives to animal waste lagoon and spray field systems.	**DEQ**, DWR

PARTNER AGENCIES

ACTIONS TO ENCOURAGE USE OF LIVING SHORELINES

Action #	Implementation Action	Agency	Issue
Recommendation 3.1b. Expand habitat restoration in accordance with restoration plan goals, including re-establishing of riparian wetlands and stream hydrology.			
3.1b.2	Work with the Corps of Engineers and the Department of Transportation on innovative mitigation projects and an appropriate crediting system for them under the DMS. Such projects may include the protection and restoration of SAV and oyster beds, and the removal of certain dams and other aquatic organism barriers, and enhancing wetlands through construction of living shorelines.	**DMS**, DEQ, DMF, DCM, DWR	O, L

ACTIONS TO REDUCE SEDIMENTATION IMPACTS IN ESTUARINE CREEKS

Action #	Implementation Action	Agency	Issue
Recommendation 1.3. Enhance and expand educational outreach on the value of fish habitat, threats from land use and other activities, and explanations of management measures and challenges.			
1.3.4	Educate traditional economic interests (eg. developers) on the impact of stormwater and new options included in the stormwater design manual; implement workshops for engineers and consultants on stormwater management, buffers, and 401 Water Quality Certifications.	**DWR**, DEMLR, WRRI	S
Recommendation 3.1b. Expand habitat restoration in accordance with restoration plan goals, including re-establishing of riparian wetlands and stream hydrology.			
3.1b.1	Encourage local SWCDs to include strategic coastal habitat areas and other CHPP priorities in local priority ranking system for the Agriculture Cost Share Program, Community Conservation Assistance Program and Conservation Reserve Enhancement Program (CREP).	**DMF, DSWC**	S
Recommendation 4.3c. Prevent additional shellfish closures and swimming advisories by continuing to phase-out existing outfalls by implementing alternative stormwater management strategies.			
4.3c.2	Partner with NCDOT to retrofit road ditches that discharge to shellfish waters.	**DEMLR**, DWR, DMF, DOT	S
Recommendation 4.4. Enhance coordination with, and provide financial/technical support for, local government/private actions to effectively manage stormwater, stormwater runoff, and wastewater.			
4.4.1	Pursue funding for the Community Conservation Assistance Program with emphasis on CHPP stormwater priorities in coastal counties	**DSWC, DEQ**	S, L

Partner Agencies

ACTIONS TO DEVELOP METRICS ON HABITAT TRENDS AND MANAGEMENT EFFECTIVENESS

Action #	Implementation Action	Agency	Issue
Recommendation 1.2a. Coordinate and enhance monitoring of water quality, habitat, and fisheries resources (including data management) from headwaters to the nearshore ocean.			
1.2a.2	The Department, through the APNEP, will develop a comprehensive monitoring plan for the estuarine system within the APNEP region.	**APNEP**, DMF	M
Recommendation 1.2b. Coordinate and enhance assessment and monitoring of effectiveness of rules established to protect coastal habitats.			
1.2b.1	Investigate development of performance criteria for measuring success of management actions (eg. stormwater rules, BMPs).	**DEMLR, DWR, DCM**, DMF, APNEP	M
Recommendation 1.6. Enhance management of invasive species with existing programs. Monitor and track status in affected waterbodies.			
1.6.1**	Assess invasive SAV in the APNEP region annually and continue to coordinate invasive SAV treatment with DMF and APNEP.	**DWR**, APNEP, DMF	M
Recommendation 2.1a. Support assessments to classify habitat value and condition by coordinating, completing, and maintaining baseline habitat mapping			
2.1a.1	Map SAV on five year cycles.	**APNEP**, **DMF**	M
2.1a.2	Establish sentinel sites in the five SAV regions and monitor annually.	**APNEP**, **DMF**	M
2.1a.3	Seek dedicated funding for the state SAV mapping program.	**DEQ,** DMF, APNEP	M
Recommendation 2.1b. Support assessments to classify habitat value and condition by selectively monitoring the condition and status of those habitats.			
2.1b.3	Develop indicator metrics for the six fish habitats; data to be used to establish habitat thresholds and conduct habitat assessments.	**DMF, APNEP,** DWR, DCM	M
2.1b.4	Develop a coastwide sampling protocol to collect metric data and seek funding to accomplish it.	**DMF, APNEP**, DWR, DCM	M
2.1b.5	Implement data collection of habitat metrics.	**DMF, APNEP,** DWR, DCM	M
Recommendation 3.5b. Protect and restore habitat for migratory fishes by restoring fish passage through elimination or modification of stream obstructions, such as dams and culverts.			
3.5b.2	Survey previously identified Albemarle Sound river herring spawning areas to estimate current condition and spawning function, identify stream obstructions on river herring spawning streams, and prioritize obstructions for herring-friendly replacement.	**DMF**, WRC	M

OTHER ACTIONS

Action #	Implementation Action	Agency
GOAL 1. IMPROVE EFFECTIVE OF EXISTING RULES AND PROGRAMS PROTECTING COASTAL FISH HABITAT		
1.1.2	The Department will seek funding for additional compliance positions in appropriate programs and regulatory divisions will continue to educate the public on rules and the ecological importance and need for compliance.	**DEQ**
1.2a.1	Enhance dependable water quality monitoring by investing in Neuse Estuary MODMON and FerryMon.	**DEQ**
1.3.1	Conduct outreach to educate citizens about DWR's Neuse and Tar-Pamlico riparian buffer rules and 401 Water Quality Certification program.	**DWR**, APNEP
1.3.2	Promote habitat conservation by incorporating habitat information into division outreach efforts, including, 1) creating interactive materials for events highlighting life history, habitat use, and threats of species; 2) setting up fish habitat aquarium displays for longer events; 3) seeking funding for additional displays	**DMF**, DCM, Sea Grant
1.4.1	The Department will hold quarterly meetings on proposed projects and enforcement cases that are or may be subject to the permitting or enforcement jurisdiction of the programs of more than one division and invite other state and federal agencies to participate as appropriate.	**DCM**, DEQ
GOAL 2. IDENTIFY AND DELINEATE STRATEGIC COASTAL HABITATS		
2.2.1	Work with agencies to include strategic coastal habitat (SHA) priorities within DMS local watershed plans, and other restoration programs.	**DMF**, DMS, DEQ
GOAL 3. ENHANCE AND PROTECT HABITATS FROM ADVERSE PHYSICAL IMPACTS		
3.1b.3	Obtain funding to restore streams and associated wetlands designated as anadromous fish spawning areas in the Albemarle Sound area as implementation steps for the River Herring Fishery Management Plan.	**DMF, APNEP, DMS, WRC**
3.1c.1	Work with researchers to establish methods to restore SAV.	**DMF, APNEP**, DMS, DWR
3.5a.1	Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.	**DMF, WRC,** DWR, DMS
3.5b.1	Encourage research to determine the minimum acceptable culvert dimensions and characteristics that will allow passage of river herring and whether there are other causes inhibiting river herring from migrating upstream past culverts.	**DMF, APNEP,** DOT, WRC
3.5b.3	The Department, through the DWR and the DMS will pursue dam removal projects where appropriate.	**DWR, DMS**
GOAL 4. ENHANCE AND PROTECT WATER QUALITY		
4.8a.1	Implement environmentally superior alternatives to animal waste lagoon and spray field systems.	**DEQ**, DWR

LIST OF ACRONYMS

Acronym	Name
APNEP	Albemarle-Pamlico National Estuary Partnership
BMP	Best Management Practices
CAMA	Coastal Area Management Act
CHPP	Coastal Habitat Protection Plan
CRC	Coastal Resource Commission
DACS	Department of Agriculture and Consumer Services
DCM	Division of Coastal Management
DEMLR	Division of Energy, Mineral, and Land Resources
DEQ	Department of Environmental Quality
DMF	Division of Marine Fisheries
DMS	Division of Mitigation Services
DSWC	Division of Soil and Water Conservation
DWR	Division of Water Resources
EMC	Environmental Management Commission
HQW	High Quality Waters
MFC	Marine Fisheries Commission
NCFS	NC Forest Service
PNA	Primary Nursery Area
SAV	submerged aquatic vegetation
SCC	Sedimentation Control Commission
SHA	strategic coastal habitats
SWCC	Soil and Water Conservation Commission
WRC	Wildlife Resources Commission
USACOE	US Army Corps of Engineers