



ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

BRAXTON C. DAVIS
Director

CRC-17-29

October 20, 2017

MEMORANDUM

TO: Coastal Resources Commission
FROM: Mike Lopazanski
SUBJECT: Approval Coastal Habitat Protection Plan Implementation Plans

The NC Fisheries Reform Act (GS.143B-279.8) requires three of the state's regulatory commissions - the Marine Fisheries, Environmental Management, and Coastal Resources Commissions - to adopt a plan to protect and restore resources critical to North Carolina's fisheries. The Department of Environmental Quality (DEQ) developed a Coastal Habitat Protection Plan (CHPP) through a cooperative, multiagency effort. The CHPP was written by DEQ staff, adopted by the three commissions in 2004, and updated in 2010. The 2015 update of the Coastal Habitat Protection Plan (CHPP) was approved by the CRC at the February 2016 meeting. The areas of focus in the 2015 update include oyster restoration and living shorelines. The goals and revisions are designed to achieve the CHPP's goal of "long-term enhancement of coastal fisheries associated with each coastal habitat."

Each division involved in the CHPP is charged with developing implementation actions that address the goals and recommendations of the CHPP. Development of the CHPP and the implementation plans is overseen by the CHPP Steering Committee comprised of two members of each commission (Larry Baldwin currently represents the CRC).

The 2018-2020 implementation plan (attached) contains some ongoing or modified actions from previous plans as well as new actions. In addition to working on broader department-wide efforts, DCM/CRC actions for the two-year period include coastal habitat educational and outreach efforts; enhancing living shoreline outreach, research and marsh sill permit streamlining efforts; updating the estuarine shoreline structures map; working with local governments to address sea level rise through hazard assessments and environmental resiliency strategies; improving wastewater/stormwater management at marinas; and continuing interagency coordination efforts.

Jimmy Johnson, the Department's CHPP Coordinator, will present the implementation plans at the upcoming meeting in Atlantic Beach for CRC approval. Implementation plans will also be presented to the Environmental Management and Marine Fisheries Commissions for their approval.

Staff recommends approval of the 2018-2020 CHPP Implementation Plan.

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

DIVISION OF MARINE FISHERIES

ACTIONS TO RESTORE OYSTER REEF HABITAT

Action #	Implementation Action	Agency	Issue
<i>Recommendation 2.1. Support assessments to classify habitat value, condition, and status through mapping and monitoring.</i>			
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
<i>Recommendation 3.1a. Expand habitat restoration including increasing subtidal and intertidal oyster habitat through restoration.</i>			
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
<i>Recommendation 3.3. Protect habitat from adverse fishing gear effects through improved compliance.</i>			
3.3.1	Evaluate through the FMP process the need for further restrictions of bottom-disturbing gear.	DMF	O

Division of Marine Fisheries

ACTIONS TO DEVELOP METRICS ON HABITAT TRENDS AND MANAGEMENT EFFECTIVENESS

Action #	Implementation Action	Agency	Issue
<i>Recommendation 1.2a. Coordinate and enhance monitoring of water quality, habitats, and fisheries</i>			
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
<i>Recommendation 1.2b. Coordinate and enhance assessment and monitoring of effectiveness of rules established to protect coastal habitats.</i>			
1.2b.1	Investigate development of performance criteria for measuring success of management actions (eg. stormwater rules, BMPs).	DEMLR, DWR, DCM, DMF, APNEP	M
<i>Recommendation 1.6. Enhance management of invasive species with existing programs. Monitor and track status in affected waterbodies.</i>			
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
<i>Recommendation 2.1a. Support assessments to classify habitat value and condition by coordinating, completing, and maintaining baseline habitat mapping (seagrass, shell bottom, shoreline)</i>			
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
<i>Recommendation 2.1b. Support assessments to classify habitat value and condition by selectively monitoring the condition and status of those habitats.</i>			
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
<i>Recommendation 2.2. Continue to identify and field groundtruth strategic coastal habitats.</i>			
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

Division of Marine Fisheries

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
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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

DIVISION OF COASTAL MANAGEMENT ACTIONS TO ENCOURAGE USE OF LIVING SHORELINES

Action #	Implementation Action	Agency	Issue
<i>Recommendation 3.1b. Expand habitat restoration, including re-establishing of riparian wetlands and stream hydrology.</i>			
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
<i>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.</i>			
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
<i>Recommendation 3.8. Develop coordinated policies including management adaptations and guidelines to increase resiliency of fish habitat to ecosystem changes.</i>			
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

Division of Coastal Management

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
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Division of Coastal Management

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 responses 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

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

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

ACTIONS TO REDUCE SEDIMENTATION IMPACTS IN ESTUARINE CREEKS

Action #	Implementation Action	Agency	Issue
<i>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.</i>			
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, WRRRI	S
<i>Recommendation 4.3c. Prevent additional shellfish closures and swimming advisories by continuing to phase-out existing outfalls by implementing alternative stormwater management strategies.</i>			
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
<i>Recommendation 4.4. Enhance coordination with, and provide financial/technical support for, local government/private actions to effectively manage stormwater, stormwater runoff, and wastewater.</i>			
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
<i>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.</i>			
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
<i>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.</i>			
4.6.1	Assess if coastal stormwater rules are effectively reducing runoff.	DEMLR, DWR	S, M
<i>Recommendation 4.7. Maintain adequate water quality conducive to the support of present and future mariculture in public trust waters.</i>			

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

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
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ACTIONS TO DEVELOP METRICS ON HABITAT TRENDS AND MANAGEMENT EFFECTIVENESS

Action #	Implementation Action	Agency	Issue
<i>Recommendation 1.2b. Coordinate and enhance assessment and monitoring of effectiveness of rules established to protect coastal habitats.</i>			
1.2b.1	Investigate development of performance criteria for measuring success of management actions (eg. stormwater rules, BMPs).	DEMLR, DWR, DCM, DMF, APNEP	M
<i>Recommendation 1.6. Enhance management of invasive species with existing programs. Monitor and track status in affected waterbodies.</i>			
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
<i>Recommendation 2.1b. Support assessments to classify habitat value and condition by selectively monitoring the condition and status of those habitats.</i>			
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

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

ACTIONS TO ENCOURAGE USE OF LIVING SHORELINES

Action #	Implementation Action	Agency	Issue
<i>Recommendation 3.1b. Expand habitat restoration in accordance with restoration plan goals, including re-establishing of riparian wetlands and stream hydrology.</i>			
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
<i>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.</i>			
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

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

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
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
<i>Recommendation 3.1b. Expand habitat restoration in accordance with restoration plan goals, including re-establishing of riparian wetlands and stream hydrology.</i>			
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
<i>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.</i>			
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
<i>Recommendation 3.1b. Expand habitat restoration in accordance with restoration plan goals, including re-establishing of riparian wetlands and stream hydrology.</i>			
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
<i>Recommendation 4.3c. Prevent additional shellfish closures and swimming advisories by continuing to phase-out existing outfalls by implementing alternative stormwater management strategies.</i>			
4.3c.2	Partner with NCDOT to retrofit road ditches that discharge to shellfish waters.	DEMLR, DWR, DMF, DOT	S
<i>Recommendation 4.4. Enhance coordination with, and provide financial/technical support for, local government/private actions to effectively manage stormwater, stormwater runoff, and wastewater.</i>			
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
<i>Recommendation 1.2a. Coordinate and enhance monitoring of water quality, habitat, and fisheries resources (including data management) from headwaters to the nearshore ocean.</i>			
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
<i>Recommendation 1.2b. Coordinate and enhance assessment and monitoring of effectiveness of rules established to protect coastal habitats.</i>			
1.2b.1	Investigate development of performance criteria for measuring success of management actions (eg. stormwater rules, BMPs).	DEMLR, DWR, DCM, DMF, APNEP	M
<i>Recommendation 1.6. Enhance management of invasive species with existing programs. Monitor and track status in affected waterbodies.</i>			
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
<i>Recommendation 2.1a. Support assessments to classify habitat value and condition by coordinating, completing, and maintaining baseline habitat mapping</i>			
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
<i>Recommendation 2.1b. Support assessments to classify habitat value and condition by selectively monitoring the condition and status of those habitats.</i>			
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
<i>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.</i>			
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

Partner Agencies

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