APPENDIX A. STATE, FEDERAL, AND INTERSTATE AUTHORITIES AFFECTING COASTAL FISH HABITAT IN NORTH CAROLINA

Public Trust Doctrine - Implemented as part of North Carolina's constitution; applied in management of North Carolina's coastal lands, surface waters, and the resources in those waters. The doctrine states that "public trust lands, waters, and living resources in a State are held by the State in trust for the benefit of all the people, and establishes the right of the public to fully enjoy public trust lands, waters, and living resources for a wide variety of recognized public uses. The doctrine also sets limitations on the States, the public, and private owners, as well as establishing the responsibilities of the States when managing these public trust assets" (Coastal States Organization 1997).

North Carolina General Assembly - Enacts statutes affecting all of North Carolina. State laws and rules implementing those laws cannot overrule federal laws. However, state actions can be more restrictive than federal rules for environmental protection.

North Carolina Fisheries Reform Act of 1997 (FRA) - Includes a provision [G.S. 143B-279.8] for preparation of Coastal Habitat Protection Plans (CHPPs) by the N.C. Department of Environment and Natural Resources (DENR), with adoption and implementation by three regulatory commissions and their administrative agencies.

Magnuson-Stevens Fisheries Conservation and Management Act of 1976 - The basic law giving the federal government fisheries management authority in the ocean. The reauthorization law (in 1996) is known as the Sustainable Fisheries Act (SFA), which established the basis for federal designation of Essential Fish Habitat (EFH).

National Marine Fisheries Service (NMFS) - The agency in the National Oceanic and Atmospheric Administration (NOAA) charged with principal responsibilities for management of the Nation's fisheries and fish habitat in the oceans beyond individual states' jurisdictions. Federal fishery management plans must include provisions for the protection of Essential Fish Habitat (EFH) from negative impacts from federally funded activities.

Coastal Resources Commission (CRC) - One of three North Carolina regulatory commissions that must adopt CHPPs and implement their recommendations. The CRC enacts rules to manage development and land disturbing activities along estuarine and ocean shorelines, shoreline stabilization, alteration of submerged bottoms and coastal wetlands, and marina construction. The Division of Coastal Management (DCM), an agency of the N.C. Department of Environment and Natural Resources, implements CRC rules.

Environmental Management Commission (EMC) - One of North Carolina regulatory commissions that must adopt CHPPs and implement their recommendations. The EMC has wide-ranging authority over activities affecting water quality statewide. Rules adopted by the EMC govern point and nonpoint discharges, wastewater management, alteration of non-coastal wetlands, and stormwater management. Several different DENR agencies implement EMC rules, including the divisions of Water Quality (DWQ), Air Quality (DAQ), Water Resources (DWR), and Land Resources (DLR) of the N.C. Department of Environment and Natural Resources.

Marine Fisheries Commission (MFC) - One of three North Carolina regulatory commissions that must adopt CHPPs and implement their recommendations. The MFC manages commercial and recreational fishing practices in coastal waters through rules implemented by the Division of Marine Fisheries (DMF), an agency of the N.C. Department of Environment and Natural Resources.

Intercommission Review Committee (IRC) - A committee of two members from each of the three regulatory commissions (EMC, CRC, MFC), who reviewed the CHPP and developed the management recommendations.

Division of Marine Fisheries (DMF) - DENR agency that implements MFC rules affecting commercial and recreational fishing practices in coastal waters, including rules governing effects of fishing practices on fish habitats. The DMF also conducts extensive monitoring and research programs concerning fish stocks, landings statistics, licensing, and enforcement, and prepares and implements state fishery management plans.

Division of Water Quality (DWQ) - One of the DENR agencies that implements rules of the Environmental Management Commission to govern point and nonpoint discharges into surface waters, wastewater management, alteration of non-coastal wetlands, and stormwater management. The DWQ conducts an extensive statewide water quality monitoring program, manages permit programs for wetlands impacts and wastewater discharges, and prepares and implements basinwide management plans.

Division of Air Quality (DAQ) - One of the DENR agencies that implements rules of the Environmental Management Commission to govern discharges of particulates and gases into the atmosphere. The DAQ operates a statewide network to monitor air quality.

Division of Water Resources (DWR) - One of the DENR agencies that implements rules of Environmental Management Commission pertaining to use of water resources and water supply. The DWR manages state grant programs for water resource development projects, such as navigation and ocean beach nourishment.

Division of Land Resources (DLR) - The DLR administers rules adopted by Sedimentation Control Commission to control sediment transport from land development, as well as rules of the N.C. Mining Commission. The DLR administers the State's dam safety program, and also includes the N.C. Geological Survey and the N.C. Geodetic Survey.

Division of Coastal Management (DCM) - DENR agency that implements rules adopted by the CRC to manage development and land disturbing activities along estuarine and ocean shorelines, shoreline stabilization, alteration of submerged bottoms and coastal wetlands, and marina construction through permit programs. The DCM also sponsors and conducts research and analysis concerning coastal erosion and wetlands mapping.

Wildlife Resources Commission (WRC) - The state agency charged with management of inland fisheries, hunting, and management of wildlife, including birds and protected species. The WRC has authority over most anadromous fish spawning areas in coastal rivers and creeks. The WRC conducts fisheries research on a statewide basis.

APPENDIX B. CHPP STEERING COMMITTEE AND PLAN DEVELOPMENT TEAM (2005-2010)

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APPENDIX C. PART 1 (ACRONYMS)

Acronym	Meaning
A	One of the three primary surface water classifications established by the EMC
AAAS	American Association for the Advancement of Science
ADCP	Acoustic Doppler Current Profiling
AEC	Area of Environmental Concern
AFS	American Fisheries Society
AIWW	Atlantic Intracoastal Waterway (see "ICW" below)
APES	Albemarle-Pamlico Estuarine Study
APNEP	Albemarle-Pamlico National Estuary Program
ASMFC	Atlantic States Marine Fisheries Commission
B	One of the three primary surface water classifications established by the EMC
BACIPS	Before-After-Control-Impact Paired Series
BEACH	Beaches Environmental Assessment and Coastal Health Act of 2000
BMPs	Best Management Practices
BOD	Biological Oxygen Demand
BRACO	Blue Ribbon Advisory Council on Oysters
C	One of the three primary surface water classifications established by the EMC
CAAE	Center for Applied Aquatic Ecology at North Carolina State University
CAMA	Coastal Area Management Act
CBF	Chesapeake Bay Foundation
CCA	Copper, chromium, and arsenic
C-CAP	Coastal Change Analysis Program
CCPCA	Central Coastal Plain Capacity Use Area
cfs	Cubic feet per second
CFZ	Coastal frontal zone
CGIA	Center for Geographic Information and Analysis
CHAs	Critical Habitat Areas
CHPP	Coastal Habitat Protection Plan
CHS	Commission for Health Services
C-MAN	Coastal-Marine Automated Network
CMSR	Center for Marine Science Research at the University of North Carolina - Wilmington
COBRA	Coastal Barrier Resources Act
COMP	Coastal Ocean Monitoring Program
CORMP	Coastal Ocean Research and Monitoring Program
CPH	Commission for Public Health (formerly Commission for Health Services)
CPUE	Catch per unit effort
CRAC	Coastal Resources Advisory Council
CRC	Coastal Resources Commission
CREP	Conservation Reserve Enhancement Program
CREWS	Coastal Region Evaluation of Wetland Significance
CWMTF	Clean Water Management Trust Fund
DAQ	Division of Air Quality
DCM	Division of Coastal Management
DDD	1,1-dichloro-2,2-bis(p-chlorophenyl)ethane
DDE	1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene

Acronym	Meaning
DDT	Dichlorodiphenyltrichloroethane
DEH	Division of Environmental Health
DEH - SS	Division of Environmental Health - Shellfish Sanitation
DEHNR	Department of Environment, Health and Natural Resources
DEM	Division of Environmental Management
DENR	Department of Environment and Natural Resources
Dermo	*Perkinus marinus*
DFR	Division of Forest Resources
DLR	Division of Land Resources
DMF	Division of Marine Fisheries
DNA	Deoxyribonucleic acid
DO	Dissolved oxygen
DOT	Department of Transportation
DSWC	Division of Soil and Water Conservation
DWQ	Division of Water Quality
EA	Environmental Assessment
ECU	East Carolina University
EEP	Ecosystem Enhancement Program
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EMAP	Environmental Monitoring and Assessment Program
EMC	Environmental Management Commission
EO	Executive Order
EPA	United States Environmental Protection Agency (see "USEPA" below)
FC	Fecal coliform bacteria
FLDEP	Florida Department of Environmental Protection
FMP	Fishery Management Plan
FONSI	Findings of No Significant Impact
FPGs	Forestry Practice Guidelines
FRA	Fisheries Reform Act
FWS	United States Fish & Wildlife Service (see “USFWS” below)
FWS	Future Water Supply
FY	Fiscal year
GIS	Geographic Information System
GS	General Statute
HAPC	Habitat Area(s) of Particular Concern
HB	House Bill
HQW	High Quality Waters (EMC supplemental water quality classification)
HU	Hydrologic unit
ICW	Atlantic Intracoastal Waterway (see "AIWW" above)
IRC	Intercommission Review Committee
JAI	Juvenile abundance index
LC50	Lethal concentration 50%
MAFMC	Mid-Atlantic Fishery Management Council
MARMAP	Marine Resources Monitoring, Assessment, and Prediction Program
MFC	Marine Fisheries Commission

Acronym	Meaning
mgd	Million gallons per day
MHW	Mean high water
MLW	Mean low water
MMS	Minerals Management Service
MODMON	Neuse River Estuary Modeling and Monitoring project
MPA	Marine Protected Area
MS4s	Municipal separate storm sewer systems
Acronym	Meaning
MSC	Moratorium Steering Committee
MSX	*Haplosporidium nelsoni*
MU	Management Unit
NAWQA	National Water Quality Assessment
NCAC	North Carolina Administrative Code
NCDEHNR	North Carolina Department of Environment, Health and Natural Resources
NCDOT	North Carolina Department of Transportation
NCGS	North Carolina General Statute
NCSU	North Carolina State University
NCWRP	North Carolina Wetlands Restoration Program
NHP	Natural Heritage Program
NM	Nautical mile
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NPDES	National Pollution Discharge Elimination System
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NRI	National Resource Inventory
NSW	Nutrient Sensitive Waters (EMC supplemental water quality classification)
NTA	No Trawl Areas
NTU	Nephelometric turbidity unit
NWI	National Wetland Inventory
NWR	National Wildlife Refuge
OECA	Office of Enforcement and Compliance Assurance
ODMDS	Ocean Dredge Material Disposal Site
ORM	Organic rich mud
ORW	Outstanding Resource Waters (EMC supplemental water quality classification)
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PNA	Primary Nursery Area
ppm	Parts per million
ppt	Parts per thousand
PWS	Public Water Supply
Acronym	Meaning
RCGL	Recreational Commercial Gear License
RO	Reverse osmosis
SA	One of the three primary surface water classifications for coastal waters established by the EMC

Acronym	Meaning
SAB	South Atlantic Bight
SABRE	South Atlantic Bight Recruitment Experiment
SAFMC	South Atlantic Fishery Management Council
SAV	Submerged aquatic vegetation
SB	One of the three primary surface water classifications for coastal waters established by the EMC
SB	Senate Bill
SBFMP	Striped Bass Fishery Management Plan
SC	One of the three primary surface water classifications for coastal waters established by the EMC
SCC	Sedimentation Control Commission
SCGL	Standard Commercial Gear License
SCDHEC	South Carolina Department of Health and Environmental Control
SCMRD	South Carolina Marine Resources Division
SEAMAP	Southeast Area Monitoring and Assessment Program
SEAMAP-SA	Southeast Area Monitoring and Assessment Program - South Atlantic
SECC	Sedimentation and Erosion Control Commission
SEPA	State Environmental Policy Act
SFA	Sustainable Fisheries Act
SHA	Strategic Habitat Area
SL	Session Law
SMZ	Federal Artificial Reef Special Management Zone
SMZ	Streamside Management Zone
SNA	Secondary Nursery Area
SNHA	Significant Natural Heritage Area
SOC	Schedule of Compliance
SOD	Sediment Oxygen Demand
SSMAs	Shellfish/Seed Management Areas
SSR	Stock Status Report
STORET	Storage and Retrieval System
SW	Swamp waters (EMC supplemental water quality classification)
TBT	Tributyltin
TL	Total length
Acronym	Meaning
TMDL	Total Maximum Daily Load
TR	Trout waters (EMC supplemental water quality classification)
TRC	Total residual chlorine
TSS	Total suspended solids
UM	Ulcerative mycosis
UNC	University of North Carolina
UNC-IMS	University of North Carolina - Institute of Marine Science
UNC-W	University of North Carolina - Wilmington
USACE	United States Army Corps of Engineers (see "ACOE" and "COE" above)
USC	United States Code
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency (see "EPA" above)

Acronym	Meaning
USFWS	United States Fish & Wildlife Service
USGS	United States Geological Survey
UV	Ultraviolet light
VIMS	Virginia Institute of Marine Science
WRC	Wildlife Resources Commission
WRP	Wetland Restoration Program
WS	Water Supply (EMC supplemental water quality classification)

APPENDIX C. PART 2 (DEFINITIONS)

Term	Description
Accretion/ accrete	Natural process by which marshes build in elevation with rising water level.
Adsorption	Chemical attachment to a particle.
Aerenchyma	Specialized thin-walled cells with large air spaces between them to provide buoyancy and support in an aquatic environment.
Anadromous	Fish species that migrate from the ocean to fresh water streams, lakes, and wetlands to spawn.
Anaerobic/ reducing	Condition of the water column without oxygen.
Anoxia	Absence of oxygen.
Anthropogenic	Human-like or caused by humans.
Baseflow	Sustained low flow of a stream which is often due to groundwater inflow to the stream channel.
Benthic	Associated with the bottom under a water body.
Benthic-pelagic coupling	The influence of the benthic community and sediments on the water column, and, in turn, the influence of the water column on the benthic community and sediments, through integrated events and processes such as resuspension, nutrient cycling, settlement, and absorption .
Biomass	Weight of living material, usually expressed as a dry weight, in all or part of an organism, population, or community. Commonly presented as weight per unit area, a biomass density.
Biotic interactions	The physical interactions among organisms (i.e., predation, spawning, competition).
Buffer	A vegetated transitional zone between upland areas and aquatic habitats, which functions as a filter of surface water runoff.
Catadromous	Fish species that migrate from fresh waters through to spawning areas in the ocean.
Catch per unit effort	Amount of fish (numbers or weight) caught by a standard amount of fishing, such as pounds per trip.
Compensatory mitigation	The restoration, creation, enhancement, or, in exceptional cases, preservation of wetlands and/or other aquatic resources for the purpose of compensating for unavoidable impacts from human activities.
Demersal	Fish species that live primarily on or near the bottom.
Denitrification	Biochemical reduction, primarily by microorganisms, of nitrogen from nitrate (NO_3^-) eventually to molecular nitrogen (N_2).
Desiccation	Removal of water from organic material.
Detritivores	An organism that feeds on freshly dead or partially decomposed organic matter.
Detritus	Fragments of plant material occurring in the water during the process of

Term	Description
	decomposition by bacteria and fungi.
Drowned river system	An estuary that originated as a river basin flooded by rising sea level.
Embayment	A bay or bay-like water body.
Emergent vegetation	Non-woody wetland vegetation rooted in shallow water having leaves protruding above the water.
Energy regimes	Refers to the timing and magnitude of wave impact on and near a shoreline.
Epibenthic	Living on the surface of the bottom.
Epibiota	Organisms living on a relatively stationary surface.
Estuarine and ocean waters	All the waters of the Atlantic Ocean within the seaward boundary of North Carolina and all the bays, sounds, rivers, and tributaries thereto seaward of the dividing line between coastal fishing waters and inland fishing waters.
Estuary	A dynamic coastal water body in which fresh water from rivers and creeks mixes with ocean waters.
Euphotic zone	Portion of the water column in which light penetrates sufficiently to allow photosynthesis.
Eutrophication	Process of enrichment of a water body with excessive nutrients to the extent that abnormal algae blooms occur and community structure changes.
Evapo-transpiration	The combination of water transpired from vegetation and evaporated from the soil and plant surfaces.
Extirpation	To destroy totally; extermination.
Functional equivalence	Refers to different characteristics that provide the same function in a system.
Hard bottom habitat	Exposed areas of rock or consolidated sediments, distinguished from surrounding unconsolidated sediments, which may or may not be characterized by a thin veneer of live or dead biota, generally located in the ocean rather than in the estuarine system.
Herbivory	Consuming living plants or their parts.
Heterogeneity	The variety of qualities found in an environment (habitat patches) or a population (genotypic variation).
Hydric soils	A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part.
Hydrodynamic conditions	How the water is moving or circulating through a body of water.
Hydrogeomorphology	The characteristics of aquifers transmitting groundwater.
Hypoxia	Condition in which the level of dissolved oxygen in the water column is below that necessary to fully support normal biological functions, resulting in stress for the natural community.
Ichthyoplankton	Fish eggs and larvae that drift with the currents near the water's surface.
Impoundment	Water body created or modified by a barrier or dam which purposefully or unintentionally obstructs the outflow of water. This could include man-made dams and beaver dams.
Interbasin transfers	Artificial movement of water from one river basin to another, generally through pipelines or canals.
Inundation	Covering with water.
Isobath	Lines on a map or graph connecting points with the same water depth.
Light attenuation	The reduction of radiant energy (light) with depth, by both scattering and absorption

Term	Description
	mechanisms.
Light availability	The amount of light present at a given depth.
Macroalgae	Large algae visible to the naked eye, such as sea lettuce and kelp.
Term	Description
Macrofauna	The larger animals such as adult crabs and fish.
Macrophyte	Plant large enough to be visible to the naked eye.
Marine systems	Open ocean waters overlying the continental shelf and its associated high-energy coastline where salinities exceed 30 ppt.
Meiofauna	Microscopic animals that live in the upper layers of sediment.
Meroplankton	Organisms that spend only part of their life cycle in the plankton.
Mesohaline	Moderate salinity waters (5-18 ppt).
Nekton	Free-swimming organisms that live in the water column.
Oligohaline	Low salinity waters (0.5-5 ppt).
Peat blocks	Old marsh beds on which the vegetation has died, leaving a mass of decomposed roots. Along eroding shorelines, they are created when the banks cave in.
Pelagic	Fish species that live primarily up in the water column.
Phytobenthic	Refers to microscopic plants that live on the bottom.
Phytoplankton	Microscopic plants that float in the water column.
Plankton	Small organisms that live in the water column, generally near the surface, including eggs, larvae, and adults; they may float with the currents, or have some control over their movements.
Polyhaline	High salinity waters (18-30 ppt).
Porewater	Water found among the air spaces in soil.
Primary production	The accumulation of energy and nutrients by green plants and other life forms that do not consume other life forms to survive (autotrophs).
Propagules	A plant seed or spore.
Public trust waters	All navigable waters within state jurisdiction and the lands thereunder, below the mean high water line or mean water level.
Recruitment	Number of fish hatched or born in any year that survive to reproductive size; also, the number of individuals that reach a harvestable size, a particular size or age, or a size captured by a particular fishing gear.
Rhizomes	Underground plant stem that can give rise to a new plant above the surface.
Riparian wetlands	Wetlands that are connected to coastal water bodies by surface water of sufficient depth to allow fish utilization.
Sciaenids	Family of fishes that includes the drums and croakers
Secondary production	The accumulation of energy and nutrients by organisms consuming green plants or other autotrophs.
Sedimentation	Soil that is washed into coastal waters by runoff waters. The source of sedimentation could be land-disturbing human activities or natural events.
Sessile	Stationary or non-moving.
Siltation	Process of filling a water body with sediments.
Silviculture	The branch of forestry dealing with the development and care of forests.
Sinks	Habitats where certain organisms have a higher mortality rates and production rate (i.e., areas that are heavily fished or otherwise dangerous).
Term	Description
Slough	A stagnant, backwater area associated a swamp.
Strategic Habitat Areas (SHAs)	Specific locations of individual fish habitats or systems of fish habitats that have been identified to provide exceptional habitat functions or that are particularly at risk

Term	Description
	due to imminent threats, vulnerability, or rarity.
Submersion regime	The frequency and depth of flooding over a given bottom area.
Subsidence	Natural degradation of marsh wetlands to open waters.
Substrate	A submerged surface, usually associated with the bottom.
Surface incident light	The amount of light hitting a surface.
Temporal abundance	The variation in abundance of a given organism through time.
Tidal amplitude	Vertical distance between the high and low points of lunar tides.
Total suspended solids	A measure of suspended particles (i.e., sediment, phytoplankton) in the water column.
Trophic position	An organism's position on the food chain (top predator vs. plant eater).
Trunk estuaries	Coast-perpendicular, drowned river estuaries.
Turbidity	Reduced water clarity caused by sediment or other particulates suspended in the water column.
Unconsolidated substrate	Substrate with at least 25% cover of particles smaller than stones, and vegetative cover less than 30% (Cowardin et al. 1979).
Vegetated swales	Very wide ditches with sloping banks constructed to gradually convey storm water to surface waters.
Water clarity	A measure of the depth to which light penetrates the water column.
Wetlands	Areas that are inundated or saturated by an accumulation of surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.
Wind fetch	Distance over which the wind has blown uninterrupted by land, over water.
Zoogeographical	Related to the geographic distribution of animals.

APPENDIX D. COMMON AND SCIENTIFIC NAMES OF SELECTED FISH AND INVERTEBRATES CITED IN THIS DOCUMENT

Common name	***Scientific name***	**Common name**	***Scientific name***
Alewife	*Alosa pseudoharengus*	Greater amberjack	*Seriola dumerili*
American eel	*Anguilla rostrata*	Gulf flounder	*Paralichthys albigutta*
American shad	*Alosa sapidissima*	Hard clam	*Mercenaria* spp.
Atlantic croaker	*Micropogonias undulatus*	Hermit crab	*Pagurus bernhardus*
Atlantic menhaden	*Brevoortia tyrannus*	Hickory shad	*Alosa mediocris*
Atlantic spadefish	*Chaetodipterus faber*	Horseshoe crab	*Limulus polyphemus*
Atlantic stingray	*Dasyatis sabina*	Inland silverside	*Menidia beryllina*
Atlantic sturgeon	*Acipenser oxyrhynchus*	Inshore lizardfish	*Synodus foetens*
Banded killifish	*Fundulus diaphanus*	King mackerel	*Scomberomorus cavalla*
Bay anchovy	*Anchoa mitchilli*	Kingfish	*Menticirrhus* spp.
Bay scallop	*Argopecten irradians*	Mantis shrimp	*Squilla empusa*
Bay whiff	*Citharichthys spilopterus*	Moon snail	*Polinices duplicatus*
Black drum	*Pogonias cromis*	Mummichog	*Fundulus heteroclitus*
Black sea bass	*Centropristis striata*	Naked goby	*Gobiosoma bosc*
Blackcheek tonguefish	*Symphurus plagiusa*	Oyster	*Crassostrea virginica*
Blue crab	*Callinectes sapidus*	Oyster toadfish	*Opsanus tau*
Blueback herring	*Alosa aestivalis*	Pinfish	*Lagodon rhomboides*
Bluefish	*Pomatomus saltatrix*	Pink shrimp	*Penaeus duorarum*
Brown shrimp	*Penaeus aztecus*	Planehead filefish	*Stephanolepis hispidus*
Cobia	*Rachycentron canadum*	Red drum	*Sciaenops ocellatus*
Cownose ray	*Rhinoptera bonasus*	Rough silverside	*Membras martinica*
Florida pompano	*Trachinotus carolinus*	Round scad	*Decapterus macarellus*
Gag	*Mycteroperca microlepis*	Scup	*Stenotomus chrysops*
Grass shrimp	*Palaemonetes* spp.	Sheepshead	*Archosargus probatocephalus*
Sheepshead minnow	*Cyprinodon variegatus*	Stone crab	*Menippe mercenaria*
Shortnose sturgeon	*Acipenser brevirostrum*	Striped anchovy	*Anchoa hepsetus*
Silver perch	*Bairdiella chrysoura*	Striped bass	*Morone saxatilis*
Skilletfish	*Gobiesox strumosus*	Striped mullet	*Mugil cephalus*
Smooth dogfish	*Mustelus canis*	Summer flounder	*Paralichthys dentatus*
Southern flounder	*Paralichthys lethostigma*	Tautog	*Tautoga onitis*
Southern kingfish	*Menticirrhus americanus*	Tomtate	*Haemulon aurolineatum*
Spanish mackerel	*Scomberomorus maculatus*	Weakfish	*Cynoscion regalis*
Spiny dogfish	*Squalus acanthias*	Whelks	*Busycon* spp.
Spot	*Leiostomus xanthurus*	White grunt	*Haemulon plumieri*
Spottail pinfish	*Diplodus holbrooki*	White shrimp	*Penaeus setiferus*
Spotted seatrout	*Cynoscion nebulosus*	Whitebone porgy	*Calamus leucosteus*

APPENDIX E. EXISTING STATE AND FEDERAL AGENCY PROGRAMS THAT MAY AFFECT WATER QUALITY (SOURCE: ESTUARINE SHORELINE PROTECTION STAKEHOLDERS REPORT 1999)

Program type	Organization	Program/Policy/Act	Affected impact[1]	Authority[2]	Geographic jurisdiction[3]	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year
Federal government	Council on Environmental Quality	National Environmental Policy Act	F,N,S,T	S	N	X			X	X				1972
	Environmental Protection Agency	Clean Air Act	T,N	S	N	X	X	X	X	X	X	X	X	1970
		Clean Water Act	F,S,N,T	S	N	X	X	X	X	X	X	X	X	1977
		Insect, Fungi, & Rodenticide Act	T	S	N	X	X			X	X	X	X	1972
		Office of Wetlands, Oceans&Watersheds	F,S,N,T	S,R	N	X	X	X	X	X	X	X	X	1977
		Oil Pollution Act	T	S	N	X	X		X	X	X	X	X	1990
		Pollution Prevention Act	T	S	N			X	X	X	X		X	1990
		Safe Drinking Water Act	F,S,N,T	S	N	X	X			X	X	?	X	1974

[1] F = Fecal coliforms, S = Sediment, N = Nutrients, T = Toxics, Q = Water quality/flow
[2] S = Statutory, R = rules, C = Conservation, E = Research, V = Voluntary, * = Federally mandated state program
[3] C = 20 coastal counties, S = Statewide, N = National

Program type	Organization	Program/Policy/Act	Affected impact[1]	Authority[2]	Geographic jurisdiction[3]	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year
	Nat. Oceanic & Atmospheric Adm.	Coastal Non-point Source Prog.	F,N,S,T	S	N				X	X	X			1990
		National Marine Fisheries Service	F,N,S,T	S,E	N			X		X	X	X		
Federal government	US Army Corps of Engineers	N/A	F,N,S,T	S	N	X	X	X						1899
	US Coast Guard	N/A	F,N,S,T	S	N		X							
	US Dept. of Agriculture	Conservation Reserve Enhance. P.	N,F,S,T	V,C	C				X	X				1999
		Conservation Reserve Program	N,F,S,T	V,C	S				X	X				
		Environ. Quality Incentives P.	N,F,S,T	V,C	S				X	X				1996
		Farmland Protection Program	N,F,S,T	V,C	S				X	X				
		Flood Risk Reduction Program	N,F,S,T	V,C	S				X	X				
		Wetlands Reserve Program	N,F,S,T	V,C	S				X	X				
		Wildlife Habitat Incentives P.	N,F,S,T	V,C	S				X	X				
	US Fish & Wildlife Service	Endangered Species Act	S,N,T	S	N	X	X	X	X	X	X	X	X	1973

Program type	Organization	Program/Policy/Act	Affected impact[1]	Authority[2]	Geographic jurisdiction[3]	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year
Federal government	U.S. Fish & Wildlife Service	Fish & Wildlife Coordination Act	F,S,N,T	S	N			X	X					1934
		Magnuson-Stevens Cons./Mgmt.	F,S,N,T	S	N	X	X	X	X	X	X	X	X	1996
	US Forest Service	American Heritage Rivers Initiative	S	V,C	N				X	X				1997
		Technical Develop. & Planning P.	S	V,C	N				X	X		X	X	
Private organization	Conservation Trust for NC	N/A	F,N,S,T	C	S				X					
	The Nature Conservancy	N/A	F,N,S,T	C	N				X	X	X	X	X	
State government	NC Clean Water Management Trust Fund	Clean Water Mgmt Trust Fund	N,T,S,F	S,C	S					X			X	1996
	NC Dept. of Administration	SEPA Program	N,T,S,F	S*	S			X	X					1971
	NC Dept. of Agriculture	Aquaculture and Natural Res. Div.	F,N,S,T	S	S			X	X	X			X	1975
State government	NC Dept. of Agriculture, Agronomic Division	N/A	F,N,S,T	S	S					X	X	X	X	1938
	NC Dept. of Commerce	Business & Industry Dev. P., etc.		S	S				X	X				1971

Program type	Organization	Program/Policy/Act	Affected impact[1]	Authority[2]	Geographic jurisdiction[3]	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year
	NC Dept. of Commerce, Div. Of Community Assistance	N/A		S	S				X	X				1971
	NC Dept. of Transportation	Statewide Planning Branch	S,T,N	S	S				X	X				
	NC Div. Of Highways	Soil and Water Engineering Prog.	S,N,T	S,R	S				X	X				
		Wetland Restoration Program	S,N,T	S	S				X		X			
	NC Division of Air Quality	Air Emissions Permitting Program	N,T,S	S,R*	S	X	X	X	X	X	X			1971
		Ambient Air Quality Monitoring P.	N,T,S	S	S					X	X		X	1971
		Compliance Program	N,T,S	S,R*	S		X			X	X			1971
State government	NC Division of Air Quality	Odor Control/Animal Operations P.	N	S,R	S	X		X	X	X	X			1971
		Planning Section	N,T,S	S,R*	S	X		X	X	X			X	1971
		Public Outreach Program	N,T,S	S,C	S					X	X		X	1990
	NC Division of Coastal Management	Coastal Reserves Program	F,S,N,T	S,C	C				X		X	X	X	1989

Program type	Organization	Program/Policy/Act	Affected impact[1]	Authority[2]	Geographic jurisdiction[3]	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year
		Development Permitting (AEC) P.	F,S,N,T	R	C	X	X	X		X				1974
		Dredge & Fill Permitting Program	S,N,T	R	S	X	X	X		X				1970
		Federal Consistency Program	F,S,N,T	R	C		X		X	X				1974
		Land-use Planning Program	F,S,N,T	S	C			X	X	X				1974
		Marine Sewage Pumpout Program	F,T,N	S	C					X		X	X	1994
		Ocean Res. Mgmt./OCS Program	F,S,N,T	S*	C			X	X	X				1993
		Wetland Mapping Program		S,C	C				X	X				1992
State government	NC Division of Environmental Health	On-site Wastewater Program	F,N	S,R	S	X		X		X			X	1977
	NC Division of Environmental Health	Public Health Pest Mgmt. Program	S	R	S	X	X	X		X	X		X	1957
		Public Water Supply Program	Q	R	S	X	X	X	X	X	X		X	
		Shellfish Sanitation Program	F	S,R	C	X		X	X	X	X	X	X	1930s
	NC Division of Forestry Resources	Forest Practices Guidelines	S,N	R	S				X	X			X	1990
		Forestry BMPs	S,N	V	S				X	X			X	

Program type	Organization	Program/Policy/Act	Affected impact[1]	Authority[2]	Geographic jurisdiction[3]	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year
		Forest Stewardship Program	S,N	V	S				X	X			X	1990
		Forest Land Enhancement Program	S,N	V	S				X	X			X	
		Forest Development Program	S,N	V	S					X				?
	NC Division of Land Resources	Dam Safety Permits Program	S	S/R	S	X	X	X						1967
		Mining Permits Program	S	S/R	S	X	X	X						1973
		Sedimentation/ Erosion Control P.	S	S/R	S	X	X	X	X	X				1974
	NC Division of Marine Fisheries	Coastal Habitat Protection Program	F,N,S,T	S	S				X					1999
State government	NC Division of Marine Fisheries	Fisheries Management Section	F,N,S,T	S,R	C			X	X	X	X	X		1822
		Permit Review Program	F,N,S,T	S	S			X						1984
	NC Division of Parks and Recreation	Natural Heritage Program	N	S,E,C	S				X	X	X		X	1979
	NC Division of Soil and Water Conservation	319 Coordinating Program	N,T,S,F	V,C	S					X				1997
		Agriculture Cost-share Program	N,T,S,F	V,C	S					X			X	1980s?
		Neuse R. Rules Coordinating P.	N,T,S,F	V,C	C				X	X			X	1996
		Operational Reviews Program	N,T,S,F	R	S			X	X	X	X		X	

Program type	Organization	Program/Policy/Act	Affected impact[1]	Authority[2]	Geographic jurisdiction[3]	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year
		Pamlico R. Rules Coordinating P.	N,T,S,F	V,C	C				X	X			X	1996
		Soil survey Program	S	S	S				X	X	X		X	1938
	NC Division of Waste Management	Hazardous Waste Program	T	SF/R	S	X	X			X				1980
		Solid Waste Management Program	T	S/R	S	X	X			X	X			1989
		Superfund Program	T	SF	S			X		X				1980
State government	NC Division of Waste Management	Underground Storage Tank Prog.	T	S/R	S	X	X			X				1983
	NC Division of Water Quality	303(d) TMDL Program	F,N,S,T	R*	S	X			X	X	X			1997
		404/401 Wetlands Program	F,N,S,T	R*	S	X	X	X		X				1973
		Albemarle-Pamlico Program	F,N,S,T	S,R*	C				X	X				1987
		Basinwide Mgmt. Plans Program	F,N,S,T	S*	S				X	X			X	1993
		Construction Grants & Loan P.	F,N	S*	S				X	X				
		NC 319 Program	F,N,S,T	S*	S				X	X				1990
		Neuse R. Rapid Response Prog.	F,N,S,T	S,E	C						X		X	?
		Non-discharge Program - Sewage	F,N	R	S	X	X	X	X	X				rev. 1997

Program type	Organization	Program/Policy/Act	Affected impact[1]	Authority[2]	Geographic jurisdiction[3]	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year
		NPDES Program – Stormwater	F,N,S,T	S,R*	S	X	X	X	X	X			X	?
		NPDES Program – Wastewater	F,N	S,R*	S	X	X	X	X	X			X	1973
State government	NC Division of Water Quality	Nutrient Sensitive Waters Program	F,N	S,R	C	X			X		X			1979
		Pamlico R. Rapid Response Prog.	F,N,S,T	S,E	C						X		X	1996
		State Stormwater Mgmt. Program	F,N,S,T	R	S	X	X	X	X	X			X	rev. 1997
		Unified Watershed Asses. Program	F,N,S,T	R*	S	X			X	X	X			1998
		Use Restoration Waters Program	F,N,S,T	S*	S	X			X	X				1998
		Water Quality Monitoring Program	F,N,S,T	S	S					X	X			1973
		Wetlands Restoration Program	F,N,S,T	S	S				X	X	X		X	1996
		WQ Std. / Classification Program	F,N,S,T	R*	S	X			X		X			1976
	NC Division of Water Resources	Aquatic Weed Control Program	T	S	S					X				1982
		Interbasin transfer certificate	Q	R	S	X		X		X				1993
		NC Rivers Assessment	F,N,S,T	S	S				X		X		X	1997

Program type	Organization	Program/Policy/Act	Affected impact[1]	Authority[2]	Geographic jurisdiction[3]	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year
State government	NC Division of Water Resources	Project Stream Watch	F,N,S,T	S	S						X		X	1978
		Project WET	F,N,S,T	S	S								X	1993
		Streamflow modification notification	Q	S	S	X		X		X				1977
		Water Res. Dev. Grant Program	S,T	S	S					X				1979
		Water Supply Planning Program	Q	S	S				X	X	X		X	1992
		Water Use Permit	Q	R	S	X								1967
		Water withdrawal / transfer	Q	R	S	X		X		X				1991
	NC Wildlife Resources Commission	Habitat Conservation Program	N,T,S,F	S*	S			X	X	X			X	1989

APPENDIX F. EFFECTS OF ENVIRONMENTAL POLLUTANTS ON FISH EARLY LIFE STAGES

[modified from Weis and Weis (1989), Key et al. (2000); "exp" = "exposure"]

Chemicals	Effect on fish			Water quality standards (ug/l) for aquatic life	
	Test organism	Test	Results	Salt-water	Fresh-water
Benzo[a] Pyrene (B[a]P)					
Methylmercury	Mummichog	unspecified exp.	Abnormal cell division of embryos		
Chlorine					
Chlorine, total residual	Striped bass	0.07 mg/l exp.	3.5% of embryos hatched and malformation of surviving hatchlings	na	17 (AL)
		0.01 mg/l exp.	23% of embryos hatched		
		0.15 mg/l exp.	Embryo mortality noted in combination with temperature change of 2°C.		
	Spotted seatrout	unspecified exp.	Greater resistance of embryos than larvae		
	Striped bass, white perch, blueback herring, silversides	0.3 mg/l exp.	Lethal to embryos		
Herbicides					
Atrazine	Channel catfish	0.4 mg/l exp.	Embryo deformities		na
Diquat	Mummichog	0.01-10mg/l exp.	Fry neurologically impaired after embryo exposed		
Trifluraline	Sheepshead minnow	unspecified exp.	Embryo deformities		
PCBs					
Aroclor 1016	Sheepshead minnow	>32 ug/l exp.	Total mortality of embryos and fry		
Aroclor 1242	Fathead minnow	<5.4 ug/l exp.	No effect on embryos		
Aroclor 1254	Sheepshead minnow	10 ug/l exp.	Reduced survival rate of embryos		
Aroclor 1254	Sheepshead minnow	>0.1 ug/l exp.	Reduced fry survival		

Chemicals	Effect on fish			Water quality standards (ug/l) for aquatic life	
	Test organism	Test	Results	Salt-water	Fresh-water
		0.14 ug/l exp.	Adult exposure and reduced survival of embryos and fry		
Pesticides					
Aldicarb (Temik)	Fathead minnow	<320 ug/l exp.	No effect		
	Fathead minnow	156 ug/l exp.	100% larvae mortality in 30-day test		
Carbaryl (Sevin)	Silversides	10 ug/l exp.	Embryo malformations		
	Killifish	10 ug/l exp.	Arrested embryo development, embryos transferred to clear water after continuous exp. had abnormalities		
DDT	Killifish	1mg/l exp.	Hatchlings with tail deformities	0.001	0.001
		0.1 ug/l exp.	Slowed development of embryos		
	Silversides	25 ug/l exp.	Embryo malformations		
	Yellow perch	unspecified exp.	No fin ray asymmetry		
Dieldrin	Winter flounder	>1.74 ng/g eggs	Eggs not fertilized	0.0002	0.002
		39 ug/l exp.	50% mortality		
Endrin	Sheepshead minnow	0.31 ug/l	Embryo stunting, some mortality, and lower fertility of adults	0.002	0.002
Fenoprop (Kuron)	Bluegill	>10 ug/l exp.	100% mortality of hatchlings		
Fenvalerate	Sheepshead minnow	3.9 ug/l exp.	Reduced hatchling survival		
	Fathead minnow	0.43 ug/l exp.	Unspecified negative effect on larvae		
Fonofos	Fathead minnow	<80 ug/l exp.	No effect		
		33 ug/l exp.	100% larvae mortality in 30-day test		
Kelthane (Dicophol)	Fathead minnow	125 ug/l exp.	Delayed and reduced hatching, survivors deformed and died		
		39 ug/l exp.	50% mortality		
Kepone	Sheepshead minnow	1.9 ug/l exp.	16% arrested development of embryos		

Chemicals	Effect on fish			Water quality standards (ug/l) for aquatic life	
	Test organism	Test	Results	Salt-water	Fresh-water
	Fathead minnow	0.31ug/l exp.	Reducing hatching success		
Lindane	Caranx	unspecified exp.	Premature hatching and fry deformities	0.004	0.01
Malathion	Silversides	10 ug/l exp.	Embryo malformations		
Methoxychlor	Winter flounder	>1.74 ng/g eggs	Eggs not fertilized	0.03	0.03
		39 ug/l exp.	50% mortality		
Mirex	Fathead minnow	2,3,7 ug/l exp.	Increased viability of hatchlings	0.001	0.001
		13,34 ug/l exp.	No effect		
Parathion	Mummichog	10 ug/l exp.	Arrested embryonic development, 50% of embryos exposed for 3 days and returned to clean water had malformations	0.178	0.013
Permethrin	Sheepshead minnow	22 ug/l exp.	Reduced hatchling survival		
		2.2 ug/l exp.	Reduced hatchling size		
Permethrin biomist	Gambusia	25,114 mg/l	48 h LC_{50}		
Permethrin-Permanone	Gambusia	0.0027 mg/l	48 h LC_{50}		
Pyrethroids	Sheepshead minnow	0.06 ug/l exp.	Reduced fish weight		
Temephos	Gambusia	0.014-0.039 mg/l	48 h LC_{50}		
Petroleum hydrocarbon					
Toluene	Fathead minnow	30-45 mg/l exp.	Embryonic malformations	na	11
Water soluable fraction of No. 2 fuel oil	Mummichog	unspecified exp.	Malformation of larvae and decreased time to hatching of embryos, increased toxicity noted at suboptimal water conditions		
Water soluable fraction of No. 2 fuel oil	Mummichogs, sheepshead minnow	12 ppm	100% mortality of hatchlings		
		6 ppm	50% mortality of hatchlings		
		1,4 ppm	Stimulated hatching		
Wood preservative					

Chemicals	Effect on fish			Water quality standards (ug/l) for aquatic life	
	Test organism	Test	Results	Salt-water	Fresh-water
Pentachlorophenol	Fathead minnow	128 ug/l exp.	Reduced larval survival		
		>73 ug/l exp.	Reduced growth of larvae		

APPENDIX G. POLICY STATEMENT FOR PROTECTION OF SAV HABITAT

North Carolina Marine Fisheries Commission
(Adopted May 12, 2004)

Submerged aquatic vegetation (SAV) serves as the basis for premium habitat for many coastal fish and invertebrates. The SAV habitat is so important that special efforts are required to protect and enhance water quality and physical conditions for its propagation and distribution.

The purpose of this statement is to provide guidance for management needs to protect SAV habitat in the development of fisheries management plans and habitat protection plans. The following is a summary of the special quality of SAV as habitat and the attendant water quality/physical conditions necessary for its maintenance. Details and additional information can be found in the SAV chapter in the Coastal Habitat Protection Plan (CHPP) and background scientific references.

The role of SAV as habitat

- Submerged aquatic vegetation, which consists of plants having growing roots (rhizomes) in the sediment, serves as physical hiding places for important fish and shellfish species, as well as a food base for essential food chains. Aquatic productivity in waters with SAV beds is significantly higher than in coastal waters without SAV.
- SAV supports a vast array of epiphytes and attached invertebrates that serve as a source of food for many important fish and shellfish.
- The major criterion limiting distribution and propagation of SAV is the amount of light reaching the bottom. Suspended solids and proliferation of algae in the water column are significant causes of reduced light penetration in coastal waters. Water-column clarity, therefore, should be a significant water-quality criterion. SAV, in turn, can also improve water quality through its baffling effects on currents and through its filtering of water by attached epiphytes and invertebrates.
- SAV serves as important habitat for species such as scallops, shrimp, blue crabs and some species of fish.

Management guidelines

- In order to delineate and assess the distribution and health of SAV habitat, SAV beds need to be mapped and monitored. The saltwater end of coastal waters supports eelgrass, widgeongrass, and shoalgrass, and the freshwater end supports several species of freshwater SAV.
- Minimize nutrient and sediment loading to coastal waters that support existing SAV to protect adequate water quality as defined by water-column clarity in standard measurement units.
- All SAV needs to be protected from all bottom-disturbing fishing and recreational gear. Sufficient buffer zones surrounding SAV beds should also be protected from disturbance to prevent impacts of sediments on growing SAV.
- Provide adequate safeguards to prevent direct (or indirect) impacts from development projects adjacent to or connected to SAV.
- Assess cumulative impacts of land use and development changes in the watershed affecting SAV to identify the potential impact. Require identification of cumulative impacts as a condition of development of permit applications.
- Require compensatory mitigation where impacts are unavoidable. Initiate restoration programs to recoup and/or enhance lost SAV habitat.

- Educate landowners adjacent to SAV, boaters, and other potential interested parties about the value of SAV as a habitat for many coastal fishes and invertebrates.

APPENDIX H. POLICIES FOR THE PROTECTION AND RESTORATION OF MARINE AND ESTUATINE RESOURCES AND ENVIRONMENTAL PERMIT REVIEW AND COMMENTING

North Carolina Marine Fisheries Commission
(Adopted September 24, 2009)

Issue

This document establishes the policies of the NC Marine Fisheries Commission (Commission) regarding overall protection and restoration of the state's marine and estuarine resources, and for environmental permit review for proposed projects with the potential to adversely impact those resources.

Background

The "marine and estuarine resources" of North Carolina are defined broadly as "[a]11 fish, except inland game fish, found in the Atlantic Ocean and in coastal fishing waters; all fisheries based upon such fish; all uncultivated or undomesticated plant and animal life, other than wildlife resources, inhabiting or dependent upon coastal fishing waters; and the entire ecology supporting such fish, fisheries, and plant and animal life." N.C.G.S. 113-129(11). The Commission is charged with the duty to "(m)anage, restore, develop, cultivate, conserve, protect, and regulate the marine and estuarine resources within its jurisdiction." N.C.G.S. 143B-289.51(b)(1).

Two powers of the Commission constitute its primary authorities to effectuate that charge, and thereby to protect and restore North Carolina marine and estuarine resources. First, the Commission is specifically empowered "[t]o comment on and otherwise participate in the determination of permit applications received by state agencies that may have an effect on the marine and estuarine resources of the state." N.C.G.S. 143b-289.52(2)(9). Second, the Commission has to power and duty to participate in the development, approval, and implementation of Coastal Habitat Protection Plans (CHPPs) for all "critical fisheries habitats." N.C.G.S. 143B-279.8; 143B-289.52(a)(11). The goal of such CHPPs is "the net long-term enhancement of coastal fisheries associated with each coastal habitat identified." N.C.G.S. 142B-279.8. The Commission by unanimous vote has delegated its permit commenting authority to its Habitat and Water Quality Standing Advisory Committee (Committee) for the sake of efficiency and effectiveness. Likewise, the Commission has designated the Committee as its participating body in the development of CHPPs, which will then be approved and implemented by the full Commission. However, since the formal preparation of will not begin until at least 1 July 1999, it will be some time before final CHPPs can be developed and implemented in order to help protect against the impacts of coastal development and other human activities that adversely affect North Carolina's marine and estuarine resources. Consequently, the Commission's environmental permit review authority currently constitutes the primary vehicle by which the Commission can effectuate its duty to protect and enhance the state's marine and estuarine resources.

Discussion

There are two equally serious challenges to the Commission's successfully maintaining and enhancing North Carolina's marine and estuarine resources: (1) the lack of necessary information on the current nature and status of many of those resources; and (2) the lack of obvious mechanisms to account for and ameliorate the ever accumulating changes that impair the functioning of critical fisheries habitats and otherwise adversely affect fisheries stocks. The Commission cannot hope to comply with its statutory duties to protect and enhance marine and estuarine resources without the abilities to identify and monitor

changes in those resources, to compensate for losses to critical fisheries habitats, and to enhance the overall functioning of the altered coastal ecosystem.

Cumulative adverse resource impacts from both large and small scale human activities constitute the principal impediment to the Commission's ability to achieve its statutory mandate of conserving, protecting, and restoring North Carolina's marine and estuarine resources. Many of the activities that contribute to coastal resource destruction or impairment require no environmental permits. As a consequence, their impacts are not accounted for, to the long-term detriment of marine and estuarine resources. Even for permitted activities, the adverse impacts on marine and estuarine resources may be individually minor, causing them to fall below the thresholds that require compensatory mitigation under existing state policy.

However, where specific projects requiring environmental permits pose a threat to resources under the Commission's jurisdiction, it is reasonable to expect the permittee to contribute to resolving both the informational and resource protection dilemmas faced by the Commission to ensure that unacceptable impacts to marine and estuarine resources do not occur. A direct precedent to such action by a state agency is found in the N.C. Division of Water Quality's current requirement that NPDES permittees conduct upstream and downstream monitoring as a condition of their permits, to ensure that state water quality standards are not violated. In addition, that agency has worked with dischargers in certain river basins to establish industry - funded, integrated monitoring networks to track water quality trends in those waters.

Specific action by the Commission is required if it is to meet its charge of protecting and restoring the state's marine and estuarine resources. To the greatest extent possible, activities that potentially threaten those resources must be prevented from contributing to overall resource degradation. Instead, adequate measures must be implemented to ensure a long-term, net improvement in the quantity and quality of fisheries stocks and critical fisheries habitats under the Commission's jurisdiction. To achieve that end, two goals must be attained:

- adequate compensatory and resource enhancement measures must be incorporated into existing environmental permitting processes
- resource restoration and enhancement programs must be developed to offset losses from activities not requiring permits

No net loss policies for permitted activities, while having many benefits, have at times limited the ability of state agencies to implement compensatory mitigation in a manner that effectively offsets losses to the impacted watershed. By requiring in-kind mitigation, primarily for wetland impacts, mitigation, in some instances, targets wetlands in a different landscape position or watershed, which serves different ecological functions, and consequently does not replace the ecological services lost by the permitted activity in the affected watershed. In addition, mitigation is not required for permitted aquatic resource impacts associated with private water dependent activities, such as loss of submerged aquatic vegetation habitat from channel dredging or degradation of a primary nursery area from shoreline hardening.

The Marine Fisheries Commission authorized DMF staff to begin to incorporate mitigation policy into bylaws at their Business Meeting in Atlantic Beach, NC, on December 2-3, 2004. MFC endorsed the concept of holding workshops to address technical and policy issues related compensatory mitigation. These workshops have now been completed, and provided guidance for a study conducted by East Carolina University, Environmental Defense Fund, and NC Ecosystem Enhancement Program. From this work utilizing two expert panels – one on wetland science and the other on wetland policy, two documents have been completed to provide guidance on alternatives to traditional mitigation. The first report, A Science-based Framework for Compensatory Mitigation of Coastal Habitat in North Carolina (ECU 2006) presented a scientific framework for an alternative approach to compensatory mitigation to

better assure functional replacement. The framework involves evaluating watershed condition, encouraging the use of varied complementary techniques for functional recovery, and designing restoration projects in response to system-wide watershed scale challenges. The goal was to integrate compensatory mitigation requirements into watershed protection strategies that are consistent with the goals and objectives of the CHPP. In the second phase of the project, in a report entitled, An Approach to Coordinate Compensatory Mitigation Requirements to Meet Goals of the Coastal Habitat Protection Plan (ECU and Environmental Defense, 2006), the group developed an alternative assessment procedure for North Carolina's watersheds. The results of the study were presented during a day-long meeting (October 15, 2008) to a group represented by state and federal regulatory agencies and academic researchers, most of who were involved in the original workshops. The next phase of the project involves demonstrating application of the approach in two subwatersheds of the White Oak River basin.

A summary of the first two phases of this project were presented to the MFC on November 6, 2008. The MFC endorsed developing a compensatory mitigation process as part of the policy statement. On January 16, 2009 the Habitat and Water Quality Committee unanimously voted to recommend the following policy for consideration by the MFC. This compensatory mitigation policy would be implemented as a final component of the existing Resource Protection and Environmental Permit Review and Commenting Policies.

The first two policies below were established in 1999 primarily to achieve the first goal of incorporating adequate compensatory and resource enhancement measures into existing environmental permitting processes. The third policy was established in 2009 to provide more direction in how to accomplish that, given our evolving understanding of ecosystem functions, threats, and techniques for successful mitigation and restoration. Progress on the second goal (developing restoration/enhancement programs to offset losses not directly associated with permitted activities) has primarily occurred in North Carolina through enhancement of DMF's oyster sanctuary program, Clean Water Management Trust Fund projects, and numerous wetland and oyster restoration projects conducted by non-profit environmental organizations.

Proposed Resource Protection and Environmental Permit Review and Commenting Policies

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. 143B-289.52(a)(9), the Habitat and Water Quality Standing Advisory Committee shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats);and

2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems; and

3) incorporate the following array of options when planning compensatory mitigation to allow focus on

restoration of equivalent ecosystem functions within a watershed, based on our evolving understanding of the needs of compensatory mitigation to protect and enhance coastal water quality and watersheds:

i. Establish goals for coastal watersheds by the MFC based on desired outcomes - protection/restoration of shellfishing waters, PNAs, SAV beds, etc.;
ii. Identify watersheds/areas where these goals can be realistically achieved. The Strategic Habitat Areas approach that emerged from CHPP can be used to identify locations where protection/restoration is most likely to be successful;
iii. Utilize the Rapid Watershed Assessment Procedure (or other assessment methods) to assess watershed condition and identify problems/solutions;
iv. Evaluate and authorize compensatory mitigation projects based on their ability to contribute to goals established for coastal watersheds. Projects that provide functional replacement, e.g., increased water retention/storage through the use of BMPs, may be approved if documentation is provided that the projects are the most effective mechanism to achieve the goals established for a watershed;
v. Implement monitoring to support data acquisition necessary to support the SHA process and the effectiveness of projects that have been implemented;
vi. Solicit funding from all available sources (compensatory mitigation, CWMTF, 319, etc.) to fully implement protection/restoration strategies in coastal watersheds.

APPENDIX I: MFC BEACH NOURISHMENT POLICY

North Carolina Marine Fisheries Commission
(Adopted November 16, 2000)

Policy Context

This document establishes the policies of the North Carolina Marine Fisheries Commission (Commission) regarding protection and restoration of the state's marine and estuarine resources associated with beach dredge and fill activities, and related large-scale coastal engineering projects. The policies are designed to be consistent with the overall habitat protection policies of the Commission, adopted April 13, 1999, as amended February 17-18, 2000, as follows:

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. §143B-289.52(a)(9), the Chairs of the Habitat and Water Quality Standing Advisory Committee, in consultation with the Commission Chair, shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

(1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats); and

(2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems.

The findings presented below assess the marine and estuarine resources of North Carolina which are potentially threatened by activities related to the large-scale movement of sand in the coastal ocean and adjacent habitats, and the processes whereby those resources are placed at risk. The policies established in this document are designed to avoid, minimize, and offset damage caused by these activities, in accordance with the laws of the state and the general habitat policies of this Commission.

Marine and Estuarine Resources at Risk from Beach Dredge and Fill Activities

The Commission finds:

1. In general, the array of large-scale and long-term beach alteration projects currently being considered for North Carolina together constitute a real and significant threat to the marine and estuarine resources of the United States and North Carolina.

2. The cumulative effects of these projects have not been adequately assessed, including impacts on public trust marine and estuarine resources, use of public trust beaches, public access, state and federally protected species, state critical habitats, and federal essential fish habitats.

3. Individual beach dredge-and-fill projects and related large-scale coastal engineering activities rarely provide adequate assessment or consideration of potential damage to fishery resources under state and federal management. Historically, emphasis has been placed on the logistics of sand procurement and movement, and economics, with environmental considerations dominated by compliance with limitations imparted by the Endangered Species Act for sea turtles, piping plovers and other listed organisms.

4. Opportunities to avoid and minimize impacts of beach dredge-and-fill activities on fishery resources, and offsets for unavoidable impacts have rarely been proposed or implemented.

5. Large-scale beach dredge and fill activities have the potential to cause impacts in four types of habitats:

    a. waters and benthic habitats near the dredging sites;
    b. waters between dredging and filling sites;
    c. waters and benthic habitats near the fill sites; and
    d. waters and benthic habitats potentially affected as sediments move subsequent to deposition in fill areas.

6. Certain nearshore habitats are particularly important to the long-term viability of North Carolina's commercial and recreational fisheries and potentially threatened by large-scale, long-term or frequent disturbance of sediments:

    a. inlets;
    b. the swash and surf zones and beach-associated bars; and
    c. underwater soft-sediment topographic features, both onshore and offshore
    d. underwater hard-substrate topographic features.

7. Large sections of North Carolina waters potentially affected by these projects, both individually and collectively, have been identified as Essential Fish Habitats (EFH) by the South Atlantic Fishery Management Council (SAFMC) and the Mid-Atlantic Fishery Management Council (MAFMC). Affected species under federal management include:

    a. summer flounder (various nearshore waters, including the surf zone and inlets; certain offshore waters);
    b. bluefish (various nearshore waters, including the surf zone and inlets);
    c. red drum (ocean high-salinity surf zones and unconsolidated bottoms to a depth of 50 meters);
    d. several snapper and grouper species (live hard bottom from shore to 600 feet, and – for estuarine-dependent species [e.g., gag grouper and gray snapper] – unconsolidated bottoms and live hard bottoms to the 100 foot contour);
    e. spiny dogfish (various coastal waters from the surf zone to 200 miles);
    f. black sea bass (various nearshore waters, including unconsolidated bottom and live hard bottom to 100 feet, and hard bottoms to 600 feet);
    g. penaeid shrimps (offshore habitats used for spawning and growth to maturity, and waters connecting to inshore nursery areas, including the surf zone and inlets);
    h. coastal migratory pelagics (sandy shoals of capes and bars, barrier island and ocean-side waters from the surf zone to the shelf break inshore of the Gulf Stream; all coastal inlets);
    i. corals of various types (hard substrates and muddy, silty bottoms from the subtidal to the shelf break);

j. calico scallops (unconsolidated bottoms northeast and southwest of Cape Lookout in 62-102 feet);
k. sargassum (wherever it occurs out to 200 miles);
l. many large and small coastal sharks, managed by the Secretary of the Department of Commerce (inlets and nearshore waters, including pupping and nursery grounds).

8. Beach dredge and fill projects also potentially threaten important fish habitats for anadromous species under federal, interstate and state management (in particular, inlets and offshore overwintering grounds), as well as essential overwintering grounds and other critical habitats for weakfish and other species managed by the Atlantic States Marine Fisheries Commission and the State of North Carolina. The SAFMC identified for anadromous and catadromous species those habitats that have been EFH if there had been a council plan (inlets and nearshore waters).

9. Many of the habitats potentially affected by these projects have been identified as Habitat Areas of Particular Concern by the SAFMC. The specific fishery management plan is provided in parentheses:

    a. all nearshore hard bottom areas (SAFMC, snapper-grouper);
    b. all coastal inlets (SAFMC, penaeid shrimps, red drum, and snapper-grouper);
    c. near-shore spawning sites (SAFMC, penaeid shrimps, and red drum)
    d. well-known seafloor features, including the Point, Ten Fathom Ledge and Big Rock (SAFMC, snapper-grouper, coastal migratory pelagics, and corals);
    e. pelagic and benthic sargassum (SAFMC, snapper-grouper);
    f. sandy shoals of Cape Lookout, Cape Fear, and Cape Hatteras (SAFMC, coastal migratory pelagics) and;
    g. Bogue Sound and New River Estuary (SAFMC, coastal migratory pelagics).

10. Habitats likely to be affected by beach dredge and fill projects include many being recognized in North Carolina Fishery Management Plans as important for state-managed species. Many of these habitats are in the process of being recognized as Critical Habitat Areas by the Commission, in either FMPs or in Coastal Habitat Protection Plans. Examples include:

    a. inlets (Blue Crab FMP, Red Drum FMP, River Herring FMP);
    b. oceanic nearshore waters (Blue Crab FMP, Red Drum FMP); and
    c. many others as FMPs and CHPPs are adopted over the coming years.

11. Recent work by scientists in east Florida has documented exceptionally important habitat values for nearshore, hard-bottom habitats often buried by beach dredging projects, including use by over 500 species of fishes and invertebrates, and juveniles of many reef fishes. Equivalent scientific work is just beginning off North Carolina, but life histories suggest that similar habitat use patterns will be found.

Threats to Marine and Estuarine Resources from Beach Dredge and Fill Activities

The Commission finds that beach dredge-and-fill activities and related large-scale coastal engineering projects (including inlet alteration projects) threaten the marine and estuarine resources of North Carolina through the following mechanisms:

1. Direct mortality and displacement of organisms at and near sediment dredging sites;
2. Alteration of seafloor topography and associated current and waves patterns and magnitudes at dredging areas;

3. Alteration of seafloor sediment size-frequency distributions at dredging sites, with secondary effects on benthos at those sites;
4. Elevated turbidity and deposition of fine sediments down-current from dredging sites;
5. Direct mortality and displacement of organisms at initial sediment fill sites;
6. Elevated turbidity in and near initial fill sites, especially in the surf zone, and deposition of fine sediment down-current from initial fill sites;
7. Alteration of near-shore topography and current and waves patterns and magnitudes associated with fill;
8. Movement of deposited sediment away from initial fill sites, especially onto hard bottoms;
9. Alteration of large-scale sediment budgets, sediment movement patterns and feeding and other ecological relationships, including the potential for cascading disturbance effects;
10. Alteration of large-scale movement patterns of water, with secondary effects on water quality and biota;
11. Alteration of movement patterns and successful inlet passage for larvae, post-larvae, juveniles and adults of marine and estuarine organisms;
12. Alteration of long-term shoreline migration patterns (inducing further ecological cascades with consequences that are difficult to predict); and
13. Exacerbation of transport and/or biological uptake of toxicants and other pollutants released at either dredge or fill sites.

Commission Policies for Beach Dredge and Fill Projects and Related Large Coastal Engineering Projects

The Commission establishes the following general policies related to large-scale beach dredge-and-fill and related projects, to clarify and augment the general policies already adopted on April 13, 1999:

1. Projects should fulfill the Commission's general habitat policy by avoiding, minimizing and offsetting damage to the marine and estuarine resources of North Carolina;

2. Projects should provide detailed analyses of possible impacts to each type of Essential Fish Habitat (EFH), with careful and detailed analyses of possible impacts to Habitat Areas of Particular Concern (HAPC) and Critical Habitat Areas (CHA), including short and long term, and population and ecosystem scale effects;

3. Projects should provide a full range of alternatives, along with assessments of the relative impacts of each on each type of EFH, HAPC and CHA;

4. Projects should avoid impacts on EFH, HAPCs and CHAs that are shown to be avoidable through the alternatives analysis, and minimize impacts that are not;

5. Projects should include assessments of potential unavoidable damage to marine resources, using conservative assumptions;

6. Projects should be conditioned on the avoidance of avoidable impacts, and should include compensatory mitigation for all reasonably predictable impacts to the marine and estuarine resources of North Carolina, taking into account uncertainty about these effects. Mitigation should be local, up-front and in-kind wherever possible;

7. Projects should include baseline and project-related monitoring adequate to document pre-project conditions and impacts of the projects on the marine and estuarine resources of North Carolina;

8. All assessments should be based upon the best available science, and be appropriately conservative so as to be prudent and precautionary; and

9. All assessments should take into account the cumulative impacts associated with other beach dredge-and-fill projects in North Carolina and adjacent states, and other large-scale coastal engineering projects that are ecologically related.

APPENDIX J: CHPP IMPLEMENTATION PLAN (2009-2011)

The listing below was drawn from the CHPP 2008-2009 Annual Report approved by the Joint Legislative Commission on Seafood and Aquaculture in September 2009. The full implementation plans can be queried from a database housed on the Division of Marine Fisheries, Habitat Protection server. Implementation Plans also contain specific actions from previous plans that are "carried forward" due to a partially complete or incomplete status. These actions may also be considered "on-going" until the CHPP Steering Committee decides to discontinue them.

September 2009 – August 2010 Planned Action and Needs

- Delineate SHAs in Region 3 (Approximately White Oak River Basin). (DMF/MFC, WRC, EEP/DENR).
- Conduct SHA evaluation and designation process for Region 2 (Pamlico Sound and tributaries).(DMF, WRC)
- Continue to review "Inner Banks" development issues and address environmental issues.(CRC/DCM, DWQ/EMC)
- Begin to address the challenges associated with Sea Level Rise and climate change more broadly in a context consistent with the reports of the Legislative Committee on Climate Change to NC.(DENR)
- Continue to increase public awareness on the value of and threats to coastal fish habitats and the role of the CHPP process to protect and enhance these resources.(DMF, DCM, EEP/DENR)
- Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.(DMF/DCM, EEP/DWR/DENR, WRC)
- Examine the feasibility and preferred siting of wind turbines in North Carolina without significantly impacting fish habitat.(DENR)
- Pursue funding for the Community Conservation Assistance Program (CCAP) in the Division of Soil and Water Conservation.(DSWC/DENR)
- Seek dedicated funding to staff DCM's Clean Marina Program and effectively implement Best Management Practices as a non-regulatory way to improve water quality in and around marinas and docks.(DCM, DENR)
- Continue development and refinement of shoreline stabilization rules that preserve ecosystem function and consider rising sea levels and a changing land/water interface.(DCM/CRC, EEP/DENR)
- Take steps to encourage more restoration of degraded waters and work towards removal from the Federal 303-d listing.(APNEP, DWQ)
- Continue to identify problems regarding infrastructure for Waste Water Treatment Plants and system maintenance. Work with the local governments to develop and implement plans to correct deficiencies.(DWQ)
- Continue to develop a non-traditional mitigation strategy with the White Oak basin as a pilot project. The consultants developing the Local Watershed Plan (East Carolina University and Environmental Defense Fund) are working through EEP's Non-Traditional Mitigation Steering Committee and two ad hoc advisory committees to seek consensus goals and a viable mitigation strategy.(EEP/DENR)
- Work with the Division of Water Resources to minimize conflicts between Aquatic Weed Control practices and protection of SAV habitat.(DMF/MFC, WRC)
- Consider development of a conservation lease for the purpose of oyster and other habitat restoration.(DMF/MFC)
- Seek funding to initiate research on impacts of endocrine-disrupting chemicals to blue crabs and oysters.(DENR)

- Work with the Department of Agriculture and Consumer Services to develop and implement a drug disposal program for pharmaceuticals.(DMF/MFC)
- Complete photo-interpretation of SAV imagery of coast.(DMF, APNEP)
- Continue to study the feasibility and benefits of developing an SAV Restoration Program.(DMF, APNEP, EEP/DENR)
- Seek dedicated funding for the state SAV mapping program.(DMF, APNEP)
- Complete river herring spawning surveys in Albemarle system and prioritize obstruction removals.(DMF)
- Continue expanding the oyster sanctuary program, seeding sanctuaries with live oysters, and construct a shellfish hatchery.(DMF)
- Continue to work toward more funding for the Community Conservation Assistance Program. (DSWC)
- Workshops currently planned for next year include topics such as water reuse (i.e. rain water harvesting, gray water use), stormwater workshops for realtors, an invasive red fox symposium, a microbial pollution workshop, and a grant writing workshop depending upon budget constraints.(DCM/NERR)
- In the coming year, APNEP will work with the NC Division of Water Quality to implement several projects: 1) to host Coastal Stormwater and Riparian Buffer Rules Workshop for Development Professionals. 2) Develop information for display and distribution about Riparian Buffers and 401 Water Quality Certifications. Information will focus on the riparian buffer rules in the Neuse and Tar-Pamlico River Basins and the 401 Water Quality Certification Program, which is in effect throughout the entire state. 3) A project will provide information to focus on students in K-12 understanding the biodiversity the lakes, streams and estuaries.(APNEP, DWQ)
- APNEP will continue to build upon the data inventory survey conducted in 2006 in partnership with the Virginia Institute for Marine Sciences. Data referenced in the survey for the Virginia portion of the Pasquotank and Chowan Rivers. Data will include monitoring data on water quality and living resources as well as land use, population trends and other potential ecosystem stressors. Analyses will be conducted for indications of change over the period of record. The goal is to develop a preliminary State of the River Basin report for the Pasquotank and Chowan Rivers. The approach will be holistic in that changes in monitored variables will be tracked throughout river basins and river systems. These stations are monitored by the Virginia Department of Environmental Quality. These data can be further analyzed to look for trends in seasons as well as trends in other monitored parameters. An attempt will be made to trace changes in water quality and living resources back to changes in the basin.(APNEP)
- DEH – SS will continue meeting with the Shoreline Survey Task Force finalizing proposed inspection program and put the plan in the form of a report for presentation to CHPP Steering Committee.(DEH-SS/DENR)

APPENDIX G. POLICY STATEMENT FOR PROTECTION OF SAV HABITAT

North Carolina Marine Fisheries Commission
(Adopted May 12, 2004)

Submerged aquatic vegetation (SAV) serves as the basis for premium habitat for many coastal fish and invertebrates. The SAV habitat is so important that special efforts are required to protect and enhance water quality and physical conditions for its propagation and distribution.

The purpose of this statement is to provide guidance for management needs to protect SAV habitat in the development of fisheries management plans and habitat protection plans. The following is a summary of the special quality of SAV as habitat and the attendant water quality/physical conditions necessary for its maintenance. Details and additional information can be found in the SAV chapter in the Coastal Habitat Protection Plan (CHPP) and background scientific references.

The role of SAV as habitat

- Submerged aquatic vegetation, which consists of plants having growing roots (rhizomes) in the sediment, serves as physical hiding places for important fish and shellfish species, as well as a food base for essential food chains. Aquatic productivity in waters with SAV beds is significantly higher than in coastal waters without SAV.
- SAV supports a vast array of epiphytes and attached invertebrates that serve as a source of food for many important fish and shellfish.
- The major criterion limiting distribution and propagation of SAV is the amount of light reaching the bottom. Suspended solids and proliferation of algae in the water column are significant causes of reduced light penetration in coastal waters. Water-column clarity, therefore, should be a significant water-quality criterion. SAV, in turn, can also improve water quality through its baffling effects on currents and through its filtering of water by attached epiphytes and invertebrates.
- SAV serves as important habitat for species such as scallops, shrimp, blue crabs and some species of fish.

Management guidelines

- In order to delineate and assess the distribution and health of SAV habitat, SAV beds need to be mapped and monitored. The saltwater end of coastal waters supports eelgrass, widgeongrass, and shoalgrass, and the freshwater end supports several species of freshwater SAV.
- Minimize nutrient and sediment loading to coastal waters that support existing SAV to protect adequate water quality as defined by water-column clarity in standard measurement units.
- All SAV needs to be protected from all bottom-disturbing fishing and recreational gear. Sufficient buffer zones surrounding SAV beds should also be protected from disturbance to prevent impacts of sediments on growing SAV.
- Provide adequate safeguards to prevent direct (or indirect) impacts from development projects adjacent to or connected to SAV.
- Assess cumulative impacts of land use and development changes in the watershed affecting SAV to identify the potential impact. Require identification of cumulative impacts as a condition of development of permit applications.
- Require compensatory mitigation where impacts are unavoidable. Initiate restoration programs to recoup and/or enhance lost SAV habitat.

- Educate landowners adjacent to SAV, boaters, and other potential interested parties about the value of SAV as a habitat for many coastal fishes and invertebrates.

APPENDIX H. POLICIES FOR THE PROTECTION AND RESTORATION OF MARINE AND ESTUATINE RESOURCES AND ENVIRONMENTAL PERMIT REVIEW AND COMMENTING

North Carolina Marine Fisheries Commission
(Adopted September 24, 2009)

Issue

This document establishes the policies of the NC Marine Fisheries Commission (Commission) regarding overall protection and restoration of the state's marine and estuarine resources, and for environmental permit review for proposed projects with the potential to adversely impact those resources.

Background

The "marine and estuarine resources" of North Carolina are defined broadly as "[a]11 fish, except inland game fish, found in the Atlantic Ocean and in coastal fishing waters; all fisheries based upon such fish; all uncultivated or undomesticated plant and animal life, other than wildlife resources, inhabiting or dependent upon coastal fishing waters; and the entire ecology supporting such fish, fisheries, and plant and animal life." N.C.G.S. 113-129(11). The Commission is charged with the duty to "(m)anage, restore, develop, cultivate, conserve, protect, and regulate the marine and estuarine resources within its jurisdiction." N.C.G.S. 143B-289.51(b)(1).

Two powers of the Commission constitute its primary authorities to effectuate that charge, and thereby to protect and restore North Carolina marine and estuarine resources. First, the Commission is specifically empowered "[t]o comment on and otherwise participate in the determination of permit applications received by state agencies that may have an effect on the marine and estuarine resources of the state." N.C.G.S. 143b-289.52(2)(9). Second, the Commission has to power and duty to participate in the development, approval, and implementation of Coastal Habitat Protection Plans (CHPPs) for all "critical fisheries habitats." N.C.G.S. 143B-279.8; 143B-289.52(a)(11). The goal of such CHPPs is "the net long-term enhancement of coastal fisheries associated with each coastal habitat identified." N.C.G.S. 142B-279.8. The Commission by unanimous vote has delegated its permit commenting authority to its Habitat and Water Quality Standing Advisory Committee (Committee) for the sake of efficiency and effectiveness. Likewise, the Commission has designated the Committee as its participating body in the development of CHPPs, which will then be approved and implemented by the full Commission. However, since the formal preparation of will not begin until at least 1 July 1999, it will be some time before final CHPPs can be developed and implemented in order to help protect against the impacts of coastal development and other human activities that adversely affect North Carolina's marine and estuarine resources. Consequently, the Commission's environmental permit review authority currently constitutes the primary vehicle by which the Commission can effectuate its duty to protect and enhance the state's marine and estuarine resources.

Discussion

There are two equally serious challenges to the Commission's successfully maintaining and enhancing North Carolina's marine and estuarine resources: (1) the lack of necessary information on the current nature and status of many of those resources; and (2) the lack of obvious mechanisms to account for and ameliorate the ever accumulating changes that impair the functioning of critical fisheries habitats and otherwise adversely affect fisheries stocks. The Commission cannot hope to comply with its statutory duties to protect and enhance marine and estuarine resources without the abilities to identify and monitor

changes in those resources, to compensate for losses to critical fisheries habitats, and to enhance the overall functioning of the altered coastal ecosystem.

Cumulative adverse resource impacts from both large and small scale human activities constitute the principal impediment to the Commission's ability to achieve its statutory mandate of conserving, protecting, and restoring North Carolina's marine and estuarine resources. Many of the activities that contribute to coastal resource destruction or impairment require no environmental permits. As a consequence, their impacts are not accounted for, to the long-term detriment of marine and estuarine resources. Even for permitted activities, the adverse impacts on marine and estuarine resources may be individually minor, causing them to fall below the thresholds that require compensatory mitigation under existing state policy.

However, where specific projects requiring environmental permits pose a threat to resources under the Commission's jurisdiction, it is reasonable to expect the permittee to contribute to resolving both the informational and resource protection dilemmas faced by the Commission to ensure that unacceptable impacts to marine and estuarine resources do not occur. A direct precedent to such action by a state agency is found in the N.C. Division of Water Quality's current requirement that NPDES permittees conduct upstream and downstream monitoring as a condition of their permits, to ensure that state water quality standards are not violated. In addition, that agency has worked with dischargers in certain river basins to establish industry - funded, integrated monitoring networks to track water quality trends in those waters.

Specific action by the Commission is required if it is to meet its charge of protecting and restoring the state's marine and estuarine resources. To the greatest extent possible, activities that potentially threaten those resources must be prevented from contributing to overall resource degradation. Instead, adequate measures must be implemented to ensure a long-term, net improvement in the quantity and quality of fisheries stocks and critical fisheries habitats under the Commission's jurisdiction. To achieve that end, two goals must be attained:

- adequate compensatory and resource enhancement measures must be incorporated into existing environmental permitting processes
- resource restoration and enhancement programs must be developed to offset losses from activities not requiring permits

No net loss policies for permitted activities, while having many benefits, have at times limited the ability of state agencies to implement compensatory mitigation in a manner that effectively offsets losses to the impacted watershed. By requiring in-kind mitigation, primarily for wetland impacts, mitigation, in some instances, targets wetlands in a different landscape position or watershed, which serves different ecological functions, and consequently does not replace the ecological services lost by the permitted activity in the affected watershed. In addition, mitigation is not required for permitted aquatic resource impacts associated with private water dependent activities, such as loss of submerged aquatic vegetation habitat from channel dredging or degradation of a primary nursery area from shoreline hardening.

The Marine Fisheries Commission authorized DMF staff to begin to incorporate mitigation policy into bylaws at their Business Meeting in Atlantic Beach, NC, on December 2-3, 2004. MFC endorsed the concept of holding workshops to address technical and policy issues related compensatory mitigation. These workshops have now been completed, and provided guidance for a study conducted by East Carolina University, Environmental Defense Fund, and NC Ecosystem Enhancement Program. From this work utilizing two expert panels – one on wetland science and the other on wetland policy, two documents have been completed to provide guidance on alternatives to traditional mitigation. The first report, A Science-based Framework for Compensatory Mitigation of Coastal Habitat in North Carolina (ECU 2006) presented a scientific framework for an alternative approach to compensatory mitigation to

better assure functional replacement. The framework involves evaluating watershed condition, encouraging the use of varied complementary techniques for functional recovery, and designing restoration projects in response to system-wide watershed scale challenges. The goal was to integrate compensatory mitigation requirements into watershed protection strategies that are consistent with the goals and objectives of the CHPP. In the second phase of the project, in a report entitled, An Approach to Coordinate Compensatory Mitigation Requirements to Meet Goals of the Coastal Habitat Protection Plan (ECU and Environmental Defense, 2006), the group developed an alternative assessment procedure for North Carolina's watersheds. The results of the study were presented during a day-long meeting (October 15, 2008) to a group represented by state and federal regulatory agencies and academic researchers, most of who were involved in the original workshops. The next phase of the project involves demonstrating application of the approach in two subwatersheds of the White Oak River basin.

A summary of the first two phases of this project were presented to the MFC on November 6, 2008. The MFC endorsed developing a compensatory mitigation process as part of the policy statement. On January 16, 2009 the Habitat and Water Quality Committee unanimously voted to recommend the following policy for consideration by the MFC. This compensatory mitigation policy would be implemented as a final component of the existing Resource Protection and Environmental Permit Review and Commenting Policies.

The first two policies below were established in 1999 primarily to achieve the first goal of incorporating adequate compensatory and resource enhancement measures into existing environmental permitting processes. The third policy was established in 2009 to provide more direction in how to accomplish that, given our evolving understanding of ecosystem functions, threats, and techniques for successful mitigation and restoration. Progress on the second goal (developing restoration/enhancement programs to offset losses not directly associated with permitted activities) has primarily occurred in North Carolina through enhancement of DMF's oyster sanctuary program, Clean Water Management Trust Fund projects, and numerous wetland and oyster restoration projects conducted by non-profit environmental organizations.

Proposed Resource Protection and Environmental Permit Review and Commenting Policies

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. 143B-289.52(a)(9), the Habitat and Water Quality Standing Advisory Committee shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats);and

2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems; and

3) incorporate the following array of options when planning compensatory mitigation to allow focus on

restoration of equivalent ecosystem functions within a watershed, based on our evolving understanding of the needs of compensatory mitigation to protect and enhance coastal water quality and watersheds:

i. Establish goals for coastal watersheds by the MFC based on desired outcomes - protection/restoration of shellfishing waters, PNAs, SAV beds, etc.;
ii. Identify watersheds/areas where these goals can be realistically achieved. The Strategic Habitat Areas approach that emerged from CHPP can be used to identify locations where protection/restoration is most likely to be successful;
iii. Utilize the Rapid Watershed Assessment Procedure (or other assessment methods) to assess watershed condition and identify problems/solutions;
iv. Evaluate and authorize compensatory mitigation projects based on their ability to contribute to goals established for coastal watersheds. Projects that provide functional replacement, e.g., increased water retention/storage through the use of BMPs, may be approved if documentation is provided that the projects are the most effective mechanism to achieve the goals established for a watershed;
v. Implement monitoring to support data acquisition necessary to support the SHA process and the effectiveness of projects that have been implemented;
vi. Solicit funding from all available sources (compensatory mitigation, CWMTF, 319, etc.) to fully implement protection/restoration strategies in coastal watersheds.

APPENDIX I: MFC BEACH NOURISHMENT POLICY

North Carolina Marine Fisheries Commission
(Adopted November 16, 2000)

Policy Context

This document establishes the policies of the North Carolina Marine Fisheries Commission (Commission) regarding protection and restoration of the state's marine and estuarine resources associated with beach dredge and fill activities, and related large-scale coastal engineering projects. The policies are designed to be consistent with the overall habitat protection policies of the Commission, adopted April 13, 1999, as amended February 17-18, 2000, as follows:

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. §143B-289.52(a)(9), the Chairs of the Habitat and Water Quality Standing Advisory Committee, in consultation with the Commission Chair, shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

(1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats); and

(2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems.

The findings presented below assess the marine and estuarine resources of North Carolina which are potentially threatened by activities related to the large-scale movement of sand in the coastal ocean and adjacent habitats, and the processes whereby those resources are placed at risk. The policies established in this document are designed to avoid, minimize, and offset damage caused by these activities, in accordance with the laws of the state and the general habitat policies of this Commission.

Marine and Estuarine Resources at Risk from Beach Dredge and Fill Activities

The Commission finds:

1. In general, the array of large-scale and long-term beach alteration projects currently being considered for North Carolina together constitute a real and significant threat to the marine and estuarine resources of the United States and North Carolina.

2. The cumulative effects of these projects have not been adequately assessed, including impacts on public trust marine and estuarine resources, use of public trust beaches, public access, state and federally protected species, state critical habitats, and federal essential fish habitats.

3. Individual beach dredge-and-fill projects and related large-scale coastal engineering activities rarely provide adequate assessment or consideration of potential damage to fishery resources under state and federal management. Historically, emphasis has been placed on the logistics of sand procurement and movement, and economics, with environmental considerations dominated by compliance with limitations imparted by the Endangered Species Act for sea turtles, piping plovers and other listed organisms.

4. Opportunities to avoid and minimize impacts of beach dredge-and-fill activities on fishery resources, and offsets for unavoidable impacts have rarely been proposed or implemented.

5. Large-scale beach dredge and fill activities have the potential to cause impacts in four types of habitats:

    a. waters and benthic habitats near the dredging sites;
    b. waters between dredging and filling sites;
    c. waters and benthic habitats near the fill sites; and
    d. waters and benthic habitats potentially affected as sediments move subsequent to deposition in fill areas.

6. Certain nearshore habitats are particularly important to the long-term viability of North Carolina's commercial and recreational fisheries and potentially threatened by large-scale, long-term or frequent disturbance of sediments:

    a. inlets;
    b. the swash and surf zones and beach-associated bars; and
    c. underwater soft-sediment topographic features, both onshore and offshore
    d. underwater hard-substrate topographic features.

7. Large sections of North Carolina waters potentially affected by these projects, both individually and collectively, have been identified as Essential Fish Habitats (EFH) by the South Atlantic Fishery Management Council (SAFMC) and the Mid-Atlantic Fishery Management Council (MAFMC). Affected species under federal management include:

    a. summer flounder (various nearshore waters, including the surf zone and inlets; certain offshore waters);
    b. bluefish (various nearshore waters, including the surf zone and inlets);
    c. red drum (ocean high-salinity surf zones and unconsolidated bottoms to a depth of 50 meters);
    d. several snapper and grouper species (live hard bottom from shore to 600 feet, and – for estuarine-dependent species [e.g., gag grouper and gray snapper] – unconsolidated bottoms and live hard bottoms to the 100 foot contour);
    e. spiny dogfish (various coastal waters from the surf zone to 200 miles);
    f. black sea bass (various nearshore waters, including unconsolidated bottom and live hard bottom to 100 feet, and hard bottoms to 600 feet);
    g. penaeid shrimps (offshore habitats used for spawning and growth to maturity, and waters connecting to inshore nursery areas, including the surf zone and inlets);
    h. coastal migratory pelagics (sandy shoals of capes and bars, barrier island and ocean-side waters from the surf zone to the shelf break inshore of the Gulf Stream; all coastal inlets);
    i. corals of various types (hard substrates and muddy, silty bottoms from the subtidal to the shelf break);

j. calico scallops (unconsolidated bottoms northeast and southwest of Cape Lookout in 62-102 feet);
k. sargassum (wherever it occurs out to 200 miles);
l. many large and small coastal sharks, managed by the Secretary of the Department of Commerce (inlets and nearshore waters, including pupping and nursery grounds).

8. Beach dredge and fill projects also potentially threaten important fish habitats for anadromous species under federal, interstate and state management (in particular, inlets and offshore overwintering grounds), as well as essential overwintering grounds and other critical habitats for weakfish and other species managed by the Atlantic States Marine Fisheries Commission and the State of North Carolina. The SAFMC identified for anadromous and catadromous species those habitats that have been EFH if there had been a council plan (inlets and nearshore waters).

9. Many of the habitats potentially affected by these projects have been identified as Habitat Areas of Particular Concern by the SAFMC. The specific fishery management plan is provided in parentheses:

    a. all nearshore hard bottom areas (SAFMC, snapper-grouper);
    b. all coastal inlets (SAFMC, penaeid shrimps, red drum, and snapper-grouper);
    c. near-shore spawning sites (SAFMC, penaeid shrimps, and red drum)
    d. well-known seafloor features, including the Point, Ten Fathom Ledge and Big Rock (SAFMC, snapper-grouper, coastal migratory pelagics, and corals);
    e. pelagic and benthic sargassum (SAFMC, snapper-grouper);
    f. sandy shoals of Cape Lookout, Cape Fear, and Cape Hatteras (SAFMC, coastal migratory pelagics) and;
    g. Bogue Sound and New River Estuary (SAFMC, coastal migratory pelagics).

10. Habitats likely to be affected by beach dredge and fill projects include many being recognized in North Carolina Fishery Management Plans as important for state-managed species. Many of these habitats are in the process of being recognized as Critical Habitat Areas by the Commission, in either FMPs or in Coastal Habitat Protection Plans. Examples include:

    a. inlets (Blue Crab FMP, Red Drum FMP, River Herring FMP);
    b. oceanic nearshore waters (Blue Crab FMP, Red Drum FMP); and
    c. many others as FMPs and CHPPs are adopted over the coming years.

11. Recent work by scientists in east Florida has documented exceptionally important habitat values for nearshore, hard-bottom habitats often buried by beach dredging projects, including use by over 500 species of fishes and invertebrates, and juveniles of many reef fishes. Equivalent scientific work is just beginning off North Carolina, but life histories suggest that similar habitat use patterns will be found.

Threats to Marine and Estuarine Resources from Beach Dredge and Fill Activities

The Commission finds that beach dredge-and-fill activities and related large-scale coastal engineering projects (including inlet alteration projects) threaten the marine and estuarine resources of North Carolina through the following mechanisms:

1. Direct mortality and displacement of organisms at and near sediment dredging sites;
2. Alteration of seafloor topography and associated current and waves patterns and magnitudes at dredging areas;

3. Alteration of seafloor sediment size-frequency distributions at dredging sites, with secondary effects on benthos at those sites;
4. Elevated turbidity and deposition of fine sediments down-current from dredging sites;
5. Direct mortality and displacement of organisms at initial sediment fill sites;
6. Elevated turbidity in and near initial fill sites, especially in the surf zone, and deposition of fine sediment down-current from initial fill sites;
7. Alteration of near-shore topography and current and waves patterns and magnitudes associated with fill;
8. Movement of deposited sediment away from initial fill sites, especially onto hard bottoms;
9. Alteration of large-scale sediment budgets, sediment movement patterns and feeding and other ecological relationships, including the potential for cascading disturbance effects;
10. Alteration of large-scale movement patterns of water, with secondary effects on water quality and biota;
11. Alteration of movement patterns and successful inlet passage for larvae, post-larvae, juveniles and adults of marine and estuarine organisms;
12. Alteration of long-term shoreline migration patterns (inducing further ecological cascades with consequences that are difficult to predict); and
13. Exacerbation of transport and/or biological uptake of toxicants and other pollutants released at either dredge or fill sites.

Commission Policies for Beach Dredge and Fill Projects and Related Large Coastal Engineering Projects

The Commission establishes the following general policies related to large-scale beach dredge-and-fill and related projects, to clarify and augment the general policies already adopted on April 13, 1999:

1. Projects should fulfill the Commission's general habitat policy by avoiding, minimizing and offsetting damage to the marine and estuarine resources of North Carolina;

2. Projects should provide detailed analyses of possible impacts to each type of Essential Fish Habitat (EFH), with careful and detailed analyses of possible impacts to Habitat Areas of Particular Concern (HAPC) and Critical Habitat Areas (CHA), including short and long term, and population and ecosystem scale effects;

3. Projects should provide a full range of alternatives, along with assessments of the relative impacts of each on each type of EFH, HAPC and CHA;

4. Projects should avoid impacts on EFH, HAPCs and CHAs that are shown to be avoidable through the alternatives analysis, and minimize impacts that are not;

5. Projects should include assessments of potential unavoidable damage to marine resources, using conservative assumptions;

6. Projects should be conditioned on the avoidance of avoidable impacts, and should include compensatory mitigation for all reasonably predictable impacts to the marine and estuarine resources of North Carolina, taking into account uncertainty about these effects. Mitigation should be local, up-front and in-kind wherever possible;

7. Projects should include baseline and project-related monitoring adequate to document pre-project conditions and impacts of the projects on the marine and estuarine resources of North Carolina;

8. All assessments should be based upon the best available science, and be appropriately conservative so as to be prudent and precautionary; and

9. All assessments should take into account the cumulative impacts associated with other beach dredge-and-fill projects in North Carolina and adjacent states, and other large-scale coastal engineering projects that are ecologically related.

APPENDIX J: CHPP IMPLEMENTATION PLAN (2009-2011)

The listing below was drawn from the CHPP 2008-2009 Annual Report approved by the Joint Legislative Commission on Seafood and Aquaculture in September 2009. The full implementation plans can be queried from a database housed on the Division of Marine Fisheries, Habitat Protection server. Implementation Plans also contain specific actions from previous plans that are "carried forward" due to a partially complete or incomplete status. These actions may also be considered "on-going" until the CHPP Steering Committee decides to discontinue them.

September 2009 – August 2010 Planned Action and Needs

- Delineate SHAs in Region 3 (Approximately White Oak River Basin). (DMF/MFC, WRC, EEP/DENR).
- Conduct SHA evaluation and designation process for Region 2 (Pamlico Sound and tributaries).(DMF, WRC)
- Continue to review "Inner Banks" development issues and address environmental issues.(CRC/DCM, DWQ/EMC)
- Begin to address the challenges associated with Sea Level Rise and climate change more broadly in a context consistent with the reports of the Legislative Committee on Climate Change to NC.(DENR)
- Continue to increase public awareness on the value of and threats to coastal fish habitats and the role of the CHPP process to protect and enhance these resources.(DMF, DCM, EEP/DENR)
- Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.(DMF/DCM, EEP/DWR/DENR, WRC)
- Examine the feasibility and preferred siting of wind turbines in North Carolina without significantly impacting fish habitat.(DENR)
- Pursue funding for the Community Conservation Assistance Program (CCAP) in the Division of Soil and Water Conservation.(DSWC/DENR)
- Seek dedicated funding to staff DCM's Clean Marina Program and effectively implement Best Management Practices as a non-regulatory way to improve water quality in and around marinas and docks.(DCM, DENR)
- Continue development and refinement of shoreline stabilization rules that preserve ecosystem function and consider rising sea levels and a changing land/water interface.(DCM/CRC, EEP/DENR)
- Take steps to encourage more restoration of degraded waters and work towards removal from the Federal 303-d listing.(APNEP, DWQ)
- Continue to identify problems regarding infrastructure for Waste Water Treatment Plants and system maintenance. Work with the local governments to develop and implement plans to correct deficiencies.(DWQ)
- Continue to develop a non-traditional mitigation strategy with the White Oak basin as a pilot project. The consultants developing the Local Watershed Plan (East Carolina University and Environmental Defense Fund) are working through EEP's Non-Traditional Mitigation Steering Committee and two ad hoc advisory committees to seek consensus goals and a viable mitigation strategy.(EEP/DENR)
- Work with the Division of Water Resources to minimize conflicts between Aquatic Weed Control practices and protection of SAV habitat.(DMF/MFC, WRC)
- Consider development of a conservation lease for the purpose of oyster and other habitat restoration.(DMF/MFC)
- Seek funding to initiate research on impacts of endocrine-disrupting chemicals to blue crabs and oysters.(DENR)

- Work with the Department of Agriculture and Consumer Services to develop and implement a drug disposal program for pharmaceuticals.(DMF/MFC)
- Complete photo-interpretation of SAV imagery of coast.(DMF, APNEP)
- Continue to study the feasibility and benefits of developing an SAV Restoration Program.(DMF, APNEP, EEP/DENR)
- Seek dedicated funding for the state SAV mapping program.(DMF, APNEP)
- Complete river herring spawning surveys in Albemarle system and prioritize obstruction removals.(DMF)
- Continue expanding the oyster sanctuary program, seeding sanctuaries with live oysters, and construct a shellfish hatchery.(DMF)
- Continue to work toward more funding for the Community Conservation Assistance Program. (DSWC)
- Workshops currently planned for next year include topics such as water reuse (i.e. rain water harvesting, gray water use), stormwater workshops for realtors, an invasive red fox symposium, a microbial pollution workshop, and a grant writing workshop depending upon budget constraints.(DCM/NERR)
- In the coming year, APNEP will work with the NC Division of Water Quality to implement several projects: 1) to host Coastal Stormwater and Riparian Buffer Rules Workshop for Development Professionals. 2) Develop information for display and distribution about Riparian Buffers and 401 Water Quality Certifications. Information will focus on the riparian buffer rules in the Neuse and Tar-Pamlico River Basins and the 401 Water Quality Certification Program, which is in effect throughout the entire state. 3) A project will provide information to focus on students in K-12 understanding the biodiversity the lakes, streams and estuaries.(APNEP, DWQ)
- APNEP will continue to build upon the data inventory survey conducted in 2006 in partnership with the Virginia Institute for Marine Sciences. Data referenced in the survey for the Virginia portion of the Pasquotank and Chowan Rivers. Data will include monitoring data on water quality and living resources as well as land use, population trends and other potential ecosystem stressors. Analyses will be conducted for indications of change over the period of record. The goal is to develop a preliminary State of the River Basin report for the Pasquotank and Chowan Rivers. The approach will be holistic in that changes in monitored variables will be tracked throughout river basins and river systems. These stations are monitored by the Virginia Department of Environmental Quality. These data can be further analyzed to look for trends in seasons as well as trends in other monitored parameters. An attempt will be made to trace changes in water quality and living resources back to changes in the basin.(APNEP)
- DEH – SS will continue meeting with the Shoreline Survey Task Force finalizing proposed inspection program and put the plan in the form of a report for presentation to CHPP Steering Committee.(DEH-SS/DENR)

APPENDIX G. POLICY STATEMENT FOR PROTECTION OF SAV HABITAT

North Carolina Marine Fisheries Commission
(Adopted May 12, 2004)

Submerged aquatic vegetation (SAV) serves as the basis for premium habitat for many coastal fish and invertebrates. The SAV habitat is so important that special efforts are required to protect and enhance water quality and physical conditions for its propagation and distribution.

The purpose of this statement is to provide guidance for management needs to protect SAV habitat in the development of fisheries management plans and habitat protection plans. The following is a summary of the special quality of SAV as habitat and the attendant water quality/physical conditions necessary for its maintenance. Details and additional information can be found in the SAV chapter in the Coastal Habitat Protection Plan (CHPP) and background scientific references.

The role of SAV as habitat

- Submerged aquatic vegetation, which consists of plants having growing roots (rhizomes) in the sediment, serves as physical hiding places for important fish and shellfish species, as well as a food base for essential food chains. Aquatic productivity in waters with SAV beds is significantly higher than in coastal waters without SAV.
- SAV supports a vast array of epiphytes and attached invertebrates that serve as a source of food for many important fish and shellfish.
- The major criterion limiting distribution and propagation of SAV is the amount of light reaching the bottom. Suspended solids and proliferation of algae in the water column are significant causes of reduced light penetration in coastal waters. Water-column clarity, therefore, should be a significant water-quality criterion. SAV, in turn, can also improve water quality through its baffling effects on currents and through its filtering of water by attached epiphytes and invertebrates.
- SAV serves as important habitat for species such as scallops, shrimp, blue crabs and some species of fish.

Management guidelines

- In order to delineate and assess the distribution and health of SAV habitat, SAV beds need to be mapped and monitored. The saltwater end of coastal waters supports eelgrass, widgeongrass, and shoalgrass, and the freshwater end supports several species of freshwater SAV.
- Minimize nutrient and sediment loading to coastal waters that support existing SAV to protect adequate water quality as defined by water-column clarity in standard measurement units.
- All SAV needs to be protected from all bottom-disturbing fishing and recreational gear. Sufficient buffer zones surrounding SAV beds should also be protected from disturbance to prevent impacts of sediments on growing SAV.
- Provide adequate safeguards to prevent direct (or indirect) impacts from development projects adjacent to or connected to SAV.
- Assess cumulative impacts of land use and development changes in the watershed affecting SAV to identify the potential impact. Require identification of cumulative impacts as a condition of development of permit applications.
- Require compensatory mitigation where impacts are unavoidable. Initiate restoration programs to recoup and/or enhance lost SAV habitat.

- Educate landowners adjacent to SAV, boaters, and other potential interested parties about the value of SAV as a habitat for many coastal fishes and invertebrates.

APPENDIX H. POLICIES FOR THE PROTECTION AND RESTORATION OF MARINE AND ESTUATINE RESOURCES AND ENVIRONMENTAL PERMIT REVIEW AND COMMENTING

North Carolina Marine Fisheries Commission
(Adopted September 24, 2009)

Issue

This document establishes the policies of the NC Marine Fisheries Commission (Commission) regarding overall protection and restoration of the state's marine and estuarine resources, and for environmental permit review for proposed projects with the potential to adversely impact those resources.

Background

The "marine and estuarine resources" of North Carolina are defined broadly as "[a]11 fish, except inland game fish, found in the Atlantic Ocean and in coastal fishing waters; all fisheries based upon such fish; all uncultivated or undomesticated plant and animal life, other than wildlife resources, inhabiting or dependent upon coastal fishing waters; and the entire ecology supporting such fish, fisheries, and plant and animal life." N.C.G.S. 113-129(11). The Commission is charged with the duty to "(m)anage, restore, develop, cultivate, conserve, protect, and regulate the marine and estuarine resources within its jurisdiction." N.C.G.S. 143B-289.51(b)(1).

Two powers of the Commission constitute its primary authorities to effectuate that charge, and thereby to protect and restore North Carolina marine and estuarine resources. First, the Commission is specifically empowered "[t]o comment on and otherwise participate in the determination of permit applications received by state agencies that may have an effect on the marine and estuarine resources of the state." N.C.G.S. 143b-289.52(2)(9). Second, the Commission has to power and duty to participate in the development, approval, and implementation of Coastal Habitat Protection Plans (CHPPs) for all "critical fisheries habitats." N.C.G.S. 143B-279.8; 143B-289.52(a)(11). The goal of such CHPPs is "the net long-term enhancement of coastal fisheries associated with each coastal habitat identified." N.C.G.S. 142B-279.8. The Commission by unanimous vote has delegated its permit commenting authority to its Habitat and Water Quality Standing Advisory Committee (Committee) for the sake of efficiency and effectiveness. Likewise, the Commission has designated the Committee as its participating body in the development of CHPPs, which will then be approved and implemented by the full Commission. However, since the formal preparation of will not begin until at least 1 July 1999, it will be some time before final CHPPs can be developed and implemented in order to help protect against the impacts of coastal development and other human activities that adversely affect North Carolina's marine and estuarine resources. Consequently, the Commission's environmental permit review authority currently constitutes the primary vehicle by which the Commission can effectuate its duty to protect and enhance the state's marine and estuarine resources.

Discussion

There are two equally serious challenges to the Commission's successfully maintaining and enhancing North Carolina's marine and estuarine resources: (1) the lack of necessary information on the current nature and status of many of those resources; and (2) the lack of obvious mechanisms to account for and ameliorate the ever accumulating changes that impair the functioning of critical fisheries habitats and otherwise adversely affect fisheries stocks. The Commission cannot hope to comply with its statutory duties to protect and enhance marine and estuarine resources without the abilities to identify and monitor

changes in those resources, to compensate for losses to critical fisheries habitats, and to enhance the overall functioning of the altered coastal ecosystem.

Cumulative adverse resource impacts from both large and small scale human activities constitute the principal impediment to the Commission's ability to achieve its statutory mandate of conserving, protecting, and restoring North Carolina's marine and estuarine resources. Many of the activities that contribute to coastal resource destruction or impairment require no environmental permits. As a consequence, their impacts are not accounted for, to the long-term detriment of marine and estuarine resources. Even for permitted activities, the adverse impacts on marine and estuarine resources may be individually minor, causing them to fall below the thresholds that require compensatory mitigation under existing state policy.

However, where specific projects requiring environmental permits pose a threat to resources under the Commission's jurisdiction, it is reasonable to expect the permittee to contribute to resolving both the informational and resource protection dilemmas faced by the Commission to ensure that unacceptable impacts to marine and estuarine resources do not occur. A direct precedent to such action by a state agency is found in the N.C. Division of Water Quality's current requirement that NPDES permittees conduct upstream and downstream monitoring as a condition of their permits, to ensure that state water quality standards are not violated. In addition, that agency has worked with dischargers in certain river basins to establish industry - funded, integrated monitoring networks to track water quality trends in those waters.

Specific action by the Commission is required if it is to meet its charge of protecting and restoring the state's marine and estuarine resources. To the greatest extent possible, activities that potentially threaten those resources must be prevented from contributing to overall resource degradation. Instead, adequate measures must be implemented to ensure a long-term, net improvement in the quantity and quality of fisheries stocks and critical fisheries habitats under the Commission's jurisdiction. To achieve that end, two goals must be attained:

- adequate compensatory and resource enhancement measures must be incorporated into existing environmental permitting processes
- resource restoration and enhancement programs must be developed to offset losses from activities not requiring permits

No net loss policies for permitted activities, while having many benefits, have at times limited the ability of state agencies to implement compensatory mitigation in a manner that effectively offsets losses to the impacted watershed. By requiring in-kind mitigation, primarily for wetland impacts, mitigation, in some instances, targets wetlands in a different landscape position or watershed, which serves different ecological functions, and consequently does not replace the ecological services lost by the permitted activity in the affected watershed. In addition, mitigation is not required for permitted aquatic resource impacts associated with private water dependent activities, such as loss of submerged aquatic vegetation habitat from channel dredging or degradation of a primary nursery area from shoreline hardening.

The Marine Fisheries Commission authorized DMF staff to begin to incorporate mitigation policy into bylaws at their Business Meeting in Atlantic Beach, NC, on December 2-3, 2004. MFC endorsed the concept of holding workshops to address technical and policy issues related compensatory mitigation. These workshops have now been completed, and provided guidance for a study conducted by East Carolina University, Environmental Defense Fund, and NC Ecosystem Enhancement Program. From this work utilizing two expert panels – one on wetland science and the other on wetland policy, two documents have been completed to provide guidance on alternatives to traditional mitigation. The first report, A Science-based Framework for Compensatory Mitigation of Coastal Habitat in North Carolina (ECU 2006) presented a scientific framework for an alternative approach to compensatory mitigation to

better assure functional replacement. The framework involves evaluating watershed condition, encouraging the use of varied complementary techniques for functional recovery, and designing restoration projects in response to system-wide watershed scale challenges. The goal was to integrate compensatory mitigation requirements into watershed protection strategies that are consistent with the goals and objectives of the CHPP. In the second phase of the project, in a report entitled, An Approach to Coordinate Compensatory Mitigation Requirements to Meet Goals of the Coastal Habitat Protection Plan (ECU and Environmental Defense, 2006), the group developed an alternative assessment procedure for North Carolina's watersheds. The results of the study were presented during a day-long meeting (October 15, 2008) to a group represented by state and federal regulatory agencies and academic researchers, most of who were involved in the original workshops. The next phase of the project involves demonstrating application of the approach in two subwatersheds of the White Oak River basin.

A summary of the first two phases of this project were presented to the MFC on November 6, 2008. The MFC endorsed developing a compensatory mitigation process as part of the policy statement. On January 16, 2009 the Habitat and Water Quality Committee unanimously voted to recommend the following policy for consideration by the MFC. This compensatory mitigation policy would be implemented as a final component of the existing Resource Protection and Environmental Permit Review and Commenting Policies.

The first two policies below were established in 1999 primarily to achieve the first goal of incorporating adequate compensatory and resource enhancement measures into existing environmental permitting processes. The third policy was established in 2009 to provide more direction in how to accomplish that, given our evolving understanding of ecosystem functions, threats, and techniques for successful mitigation and restoration. Progress on the second goal (developing restoration/enhancement programs to offset losses not directly associated with permitted activities) has primarily occurred in North Carolina through enhancement of DMF's oyster sanctuary program, Clean Water Management Trust Fund projects, and numerous wetland and oyster restoration projects conducted by non-profit environmental organizations.

Proposed Resource Protection and Environmental Permit Review and Commenting Policies

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. 143B-289.52(a)(9), the Habitat and Water Quality Standing Advisory Committee shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats);and

2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems; and

3) incorporate the following array of options when planning compensatory mitigation to allow focus on

restoration of equivalent ecosystem functions within a watershed, based on our evolving understanding of the needs of compensatory mitigation to protect and enhance coastal water quality and watersheds:

i. Establish goals for coastal watersheds by the MFC based on desired outcomes - protection/restoration of shellfishing waters, PNAs, SAV beds, etc.;
ii. Identify watersheds/areas where these goals can be realistically achieved. The Strategic Habitat Areas approach that emerged from CHPP can be used to identify locations where protection/restoration is most likely to be successful;
iii. Utilize the Rapid Watershed Assessment Procedure (or other assessment methods) to assess watershed condition and identify problems/solutions;
iv. Evaluate and authorize compensatory mitigation projects based on their ability to contribute to goals established for coastal watersheds. Projects that provide functional replacement, e.g., increased water retention/storage through the use of BMPs, may be approved if documentation is provided that the projects are the most effective mechanism to achieve the goals established for a watershed;
v. Implement monitoring to support data acquisition necessary to support the SHA process and the effectiveness of projects that have been implemented;
vi. Solicit funding from all available sources (compensatory mitigation, CWMTF, 319, etc.) to fully implement protection/restoration strategies in coastal watersheds.

APPENDIX I: MFC BEACH NOURISHMENT POLICY

North Carolina Marine Fisheries Commission
(Adopted November 16, 2000)

Policy Context

This document establishes the policies of the North Carolina Marine Fisheries Commission (Commission) regarding protection and restoration of the state's marine and estuarine resources associated with beach dredge and fill activities, and related large-scale coastal engineering projects. The policies are designed to be consistent with the overall habitat protection policies of the Commission, adopted April 13, 1999, as amended February 17-18, 2000, as follows:

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. §143B-289.52(a)(9), the Chairs of the Habitat and Water Quality Standing Advisory Committee, in consultation with the Commission Chair, shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

(1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats); and

(2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems.

The findings presented below assess the marine and estuarine resources of North Carolina which are potentially threatened by activities related to the large-scale movement of sand in the coastal ocean and adjacent habitats, and the processes whereby those resources are placed at risk. The policies established in this document are designed to avoid, minimize, and offset damage caused by these activities, in accordance with the laws of the state and the general habitat policies of this Commission.

Marine and Estuarine Resources at Risk from Beach Dredge and Fill Activities

The Commission finds:

1. In general, the array of large-scale and long-term beach alteration projects currently being considered for North Carolina together constitute a real and significant threat to the marine and estuarine resources of the United States and North Carolina.

2. The cumulative effects of these projects have not been adequately assessed, including impacts on public trust marine and estuarine resources, use of public trust beaches, public access, state and federally protected species, state critical habitats, and federal essential fish habitats.

3. Individual beach dredge-and-fill projects and related large-scale coastal engineering activities rarely provide adequate assessment or consideration of potential damage to fishery resources under state and federal management. Historically, emphasis has been placed on the logistics of sand procurement and movement, and economics, with environmental considerations dominated by compliance with limitations imparted by the Endangered Species Act for sea turtles, piping plovers and other listed organisms.

4. Opportunities to avoid and minimize impacts of beach dredge-and-fill activities on fishery resources, and offsets for unavoidable impacts have rarely been proposed or implemented.

5. Large-scale beach dredge and fill activities have the potential to cause impacts in four types of habitats:

    a. waters and benthic habitats near the dredging sites;
    b. waters between dredging and filling sites;
    c. waters and benthic habitats near the fill sites; and
    d. waters and benthic habitats potentially affected as sediments move subsequent to deposition in fill areas.

6. Certain nearshore habitats are particularly important to the long-term viability of North Carolina's commercial and recreational fisheries and potentially threatened by large-scale, long-term or frequent disturbance of sediments:

    a. inlets;
    b. the swash and surf zones and beach-associated bars; and
    c. underwater soft-sediment topographic features, both onshore and offshore
    d. underwater hard-substrate topographic features.

7. Large sections of North Carolina waters potentially affected by these projects, both individually and collectively, have been identified as Essential Fish Habitats (EFH) by the South Atlantic Fishery Management Council (SAFMC) and the Mid-Atlantic Fishery Management Council (MAFMC). Affected species under federal management include:

    a. summer flounder (various nearshore waters, including the surf zone and inlets; certain offshore waters);
    b. bluefish (various nearshore waters, including the surf zone and inlets);
    c. red drum (ocean high-salinity surf zones and unconsolidated bottoms to a depth of 50 meters);
    d. several snapper and grouper species (live hard bottom from shore to 600 feet, and – for estuarine-dependent species [e.g., gag grouper and gray snapper] – unconsolidated bottoms and live hard bottoms to the 100 foot contour);
    e. spiny dogfish (various coastal waters from the surf zone to 200 miles);
    f. black sea bass (various nearshore waters, including unconsolidated bottom and live hard bottom to 100 feet, and hard bottoms to 600 feet);
    g. penaeid shrimps (offshore habitats used for spawning and growth to maturity, and waters connecting to inshore nursery areas, including the surf zone and inlets);
    h. coastal migratory pelagics (sandy shoals of capes and bars, barrier island and ocean-side waters from the surf zone to the shelf break inshore of the Gulf Stream; all coastal inlets);
    i. corals of various types (hard substrates and muddy, silty bottoms from the subtidal to the shelf break);

j. calico scallops (unconsolidated bottoms northeast and southwest of Cape Lookout in 62-102 feet);
k. sargassum (wherever it occurs out to 200 miles);
l. many large and small coastal sharks, managed by the Secretary of the Department of Commerce (inlets and nearshore waters, including pupping and nursery grounds).

8. Beach dredge and fill projects also potentially threaten important fish habitats for anadromous species under federal, interstate and state management (in particular, inlets and offshore overwintering grounds), as well as essential overwintering grounds and other critical habitats for weakfish and other species managed by the Atlantic States Marine Fisheries Commission and the State of North Carolina. The SAFMC identified for anadromous and catadromous species those habitats that have been EFH if there had been a council plan (inlets and nearshore waters).

9. Many of the habitats potentially affected by these projects have been identified as Habitat Areas of Particular Concern by the SAFMC. The specific fishery management plan is provided in parentheses:

    a. all nearshore hard bottom areas (SAFMC, snapper-grouper);
    b. all coastal inlets (SAFMC, penaeid shrimps, red drum, and snapper-grouper);
    c. near-shore spawning sites (SAFMC, penaeid shrimps, and red drum)
    d. well-known seafloor features, including the Point, Ten Fathom Ledge and Big Rock (SAFMC, snapper-grouper, coastal migratory pelagics, and corals);
    e. pelagic and benthic sargassum (SAFMC, snapper-grouper);
    f. sandy shoals of Cape Lookout, Cape Fear, and Cape Hatteras (SAFMC, coastal migratory pelagics) and;
    g. Bogue Sound and New River Estuary (SAFMC, coastal migratory pelagics).

10. Habitats likely to be affected by beach dredge and fill projects include many being recognized in North Carolina Fishery Management Plans as important for state-managed species. Many of these habitats are in the process of being recognized as Critical Habitat Areas by the Commission, in either FMPs or in Coastal Habitat Protection Plans. Examples include:

    a. inlets (Blue Crab FMP, Red Drum FMP, River Herring FMP);
    b. oceanic nearshore waters (Blue Crab FMP, Red Drum FMP); and
    c. many others as FMPs and CHPPs are adopted over the coming years.

11. Recent work by scientists in east Florida has documented exceptionally important habitat values for nearshore, hard-bottom habitats often buried by beach dredging projects, including use by over 500 species of fishes and invertebrates, and juveniles of many reef fishes. Equivalent scientific work is just beginning off North Carolina, but life histories suggest that similar habitat use patterns will be found.

Threats to Marine and Estuarine Resources from Beach Dredge and Fill Activities

The Commission finds that beach dredge-and-fill activities and related large-scale coastal engineering projects (including inlet alteration projects) threaten the marine and estuarine resources of North Carolina through the following mechanisms:

1. Direct mortality and displacement of organisms at and near sediment dredging sites;
2. Alteration of seafloor topography and associated current and waves patterns and magnitudes at dredging areas;

3. Alteration of seafloor sediment size-frequency distributions at dredging sites, with secondary effects on benthos at those sites;
4. Elevated turbidity and deposition of fine sediments down-current from dredging sites;
5. Direct mortality and displacement of organisms at initial sediment fill sites;
6. Elevated turbidity in and near initial fill sites, especially in the surf zone, and deposition of fine sediment down-current from initial fill sites;
7. Alteration of near-shore topography and current and waves patterns and magnitudes associated with fill;
8. Movement of deposited sediment away from initial fill sites, especially onto hard bottoms;
9. Alteration of large-scale sediment budgets, sediment movement patterns and feeding and other ecological relationships, including the potential for cascading disturbance effects;
10. Alteration of large-scale movement patterns of water, with secondary effects on water quality and biota;
11. Alteration of movement patterns and successful inlet passage for larvae, post-larvae, juveniles and adults of marine and estuarine organisms;
12. Alteration of long-term shoreline migration patterns (inducing further ecological cascades with consequences that are difficult to predict); and
13. Exacerbation of transport and/or biological uptake of toxicants and other pollutants released at either dredge or fill sites.

Commission Policies for Beach Dredge and Fill Projects and Related Large Coastal Engineering Projects

The Commission establishes the following general policies related to large-scale beach dredge-and-fill and related projects, to clarify and augment the general policies already adopted on April 13, 1999:

1. Projects should fulfill the Commission's general habitat policy by avoiding, minimizing and offsetting damage to the marine and estuarine resources of North Carolina;

2. Projects should provide detailed analyses of possible impacts to each type of Essential Fish Habitat (EFH), with careful and detailed analyses of possible impacts to Habitat Areas of Particular Concern (HAPC) and Critical Habitat Areas (CHA), including short and long term, and population and ecosystem scale effects;

3. Projects should provide a full range of alternatives, along with assessments of the relative impacts of each on each type of EFH, HAPC and CHA;

4. Projects should avoid impacts on EFH, HAPCs and CHAs that are shown to be avoidable through the alternatives analysis, and minimize impacts that are not;

5. Projects should include assessments of potential unavoidable damage to marine resources, using conservative assumptions;

6. Projects should be conditioned on the avoidance of avoidable impacts, and should include compensatory mitigation for all reasonably predictable impacts to the marine and estuarine resources of North Carolina, taking into account uncertainty about these effects. Mitigation should be local, up-front and in-kind wherever possible;

7. Projects should include baseline and project-related monitoring adequate to document pre-project conditions and impacts of the projects on the marine and estuarine resources of North Carolina;

8. All assessments should be based upon the best available science, and be appropriately conservative so as to be prudent and precautionary; and

9. All assessments should take into account the cumulative impacts associated with other beach dredge-and-fill projects in North Carolina and adjacent states, and other large-scale coastal engineering projects that are ecologically related.

APPENDIX J: CHPP IMPLEMENTATION PLAN (2009-2011)

The listing below was drawn from the CHPP 2008-2009 Annual Report approved by the Joint Legislative Commission on Seafood and Aquaculture in September 2009. The full implementation plans can be queried from a database housed on the Division of Marine Fisheries, Habitat Protection server. Implementation Plans also contain specific actions from previous plans that are "carried forward" due to a partially complete or incomplete status. These actions may also be considered "on-going" until the CHPP Steering Committee decides to discontinue them.

September 2009 – August 2010 Planned Action and Needs

- Delineate SHAs in Region 3 (Approximately White Oak River Basin). (DMF/MFC, WRC, EEP/DENR).
- Conduct SHA evaluation and designation process for Region 2 (Pamlico Sound and tributaries).(DMF, WRC)
- Continue to review "Inner Banks" development issues and address environmental issues.(CRC/DCM, DWQ/EMC)
- Begin to address the challenges associated with Sea Level Rise and climate change more broadly in a context consistent with the reports of the Legislative Committee on Climate Change to NC.(DENR)
- Continue to increase public awareness on the value of and threats to coastal fish habitats and the role of the CHPP process to protect and enhance these resources.(DMF, DCM, EEP/DENR)
- Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.(DMF/DCM, EEP/DWR/DENR, WRC)
- Examine the feasibility and preferred siting of wind turbines in North Carolina without significantly impacting fish habitat.(DENR)
- Pursue funding for the Community Conservation Assistance Program (CCAP) in the Division of Soil and Water Conservation.(DSWC/DENR)
- Seek dedicated funding to staff DCM's Clean Marina Program and effectively implement Best Management Practices as a non-regulatory way to improve water quality in and around marinas and docks.(DCM, DENR)
- Continue development and refinement of shoreline stabilization rules that preserve ecosystem function and consider rising sea levels and a changing land/water interface.(DCM/CRC, EEP/DENR)
- Take steps to encourage more restoration of degraded waters and work towards removal from the Federal 303-d listing.(APNEP, DWQ)
- Continue to identify problems regarding infrastructure for Waste Water Treatment Plants and system maintenance. Work with the local governments to develop and implement plans to correct deficiencies.(DWQ)
- Continue to develop a non-traditional mitigation strategy with the White Oak basin as a pilot project. The consultants developing the Local Watershed Plan (East Carolina University and Environmental Defense Fund) are working through EEP's Non-Traditional Mitigation Steering Committee and two ad hoc advisory committees to seek consensus goals and a viable mitigation strategy.(EEP/DENR)
- Work with the Division of Water Resources to minimize conflicts between Aquatic Weed Control practices and protection of SAV habitat.(DMF/MFC, WRC)
- Consider development of a conservation lease for the purpose of oyster and other habitat restoration.(DMF/MFC)
- Seek funding to initiate research on impacts of endocrine-disrupting chemicals to blue crabs and oysters.(DENR)

- Work with the Department of Agriculture and Consumer Services to develop and implement a drug disposal program for pharmaceuticals.(DMF/MFC)
- Complete photo-interpretation of SAV imagery of coast.(DMF, APNEP)
- Continue to study the feasibility and benefits of developing an SAV Restoration Program.(DMF, APNEP, EEP/DENR)
- Seek dedicated funding for the state SAV mapping program.(DMF, APNEP)
- Complete river herring spawning surveys in Albemarle system and prioritize obstruction removals.(DMF)
- Continue expanding the oyster sanctuary program, seeding sanctuaries with live oysters, and construct a shellfish hatchery.(DMF)
- Continue to work toward more funding for the Community Conservation Assistance Program. (DSWC)
- Workshops currently planned for next year include topics such as water reuse (i.e. rain water harvesting, gray water use), stormwater workshops for realtors, an invasive red fox symposium, a microbial pollution workshop, and a grant writing workshop depending upon budget constraints.(DCM/NERR)
- In the coming year, APNEP will work with the NC Division of Water Quality to implement several projects: 1) to host Coastal Stormwater and Riparian Buffer Rules Workshop for Development Professionals. 2) Develop information for display and distribution about Riparian Buffers and 401 Water Quality Certifications. Information will focus on the riparian buffer rules in the Neuse and Tar-Pamlico River Basins and the 401 Water Quality Certification Program, which is in effect throughout the entire state. 3) A project will provide information to focus on students in K-12 understanding the biodiversity the lakes, streams and estuaries.(APNEP, DWQ)
- APNEP will continue to build upon the data inventory survey conducted in 2006 in partnership with the Virginia Institute for Marine Sciences. Data referenced in the survey for the Virginia portion of the Pasquotank and Chowan Rivers. Data will include monitoring data on water quality and living resources as well as land use, population trends and other potential ecosystem stressors. Analyses will be conducted for indications of change over the period of record. The goal is to develop a preliminary State of the River Basin report for the Pasquotank and Chowan Rivers. The approach will be holistic in that changes in monitored variables will be tracked throughout river basins and river systems. These stations are monitored by the Virginia Department of Environmental Quality. These data can be further analyzed to look for trends in seasons as well as trends in other monitored parameters. An attempt will be made to trace changes in water quality and living resources back to changes in the basin.(APNEP)
- DEH – SS will continue meeting with the Shoreline Survey Task Force finalizing proposed inspection program and put the plan in the form of a report for presentation to CHPP Steering Committee.(DEH-SS/DENR)

APPENDIX G. POLICY STATEMENT FOR PROTECTION OF SAV HABITAT

North Carolina Marine Fisheries Commission
(Adopted May 12, 2004)

Submerged aquatic vegetation (SAV) serves as the basis for premium habitat for many coastal fish and invertebrates. The SAV habitat is so important that special efforts are required to protect and enhance water quality and physical conditions for its propagation and distribution.

The purpose of this statement is to provide guidance for management needs to protect SAV habitat in the development of fisheries management plans and habitat protection plans. The following is a summary of the special quality of SAV as habitat and the attendant water quality/physical conditions necessary for its maintenance. Details and additional information can be found in the SAV chapter in the Coastal Habitat Protection Plan (CHPP) and background scientific references.

The role of SAV as habitat

- Submerged aquatic vegetation, which consists of plants having growing roots (rhizomes) in the sediment, serves as physical hiding places for important fish and shellfish species, as well as a food base for essential food chains. Aquatic productivity in waters with SAV beds is significantly higher than in coastal waters without SAV.
- SAV supports a vast array of epiphytes and attached invertebrates that serve as a source of food for many important fish and shellfish.
- The major criterion limiting distribution and propagation of SAV is the amount of light reaching the bottom. Suspended solids and proliferation of algae in the water column are significant causes of reduced light penetration in coastal waters. Water-column clarity, therefore, should be a significant water-quality criterion. SAV, in turn, can also improve water quality through its baffling effects on currents and through its filtering of water by attached epiphytes and invertebrates.
- SAV serves as important habitat for species such as scallops, shrimp, blue crabs and some species of fish.

Management guidelines

- In order to delineate and assess the distribution and health of SAV habitat, SAV beds need to be mapped and monitored. The saltwater end of coastal waters supports eelgrass, widgeongrass, and shoalgrass, and the freshwater end supports several species of freshwater SAV.
- Minimize nutrient and sediment loading to coastal waters that support existing SAV to protect adequate water quality as defined by water-column clarity in standard measurement units.
- All SAV needs to be protected from all bottom-disturbing fishing and recreational gear. Sufficient buffer zones surrounding SAV beds should also be protected from disturbance to prevent impacts of sediments on growing SAV.
- Provide adequate safeguards to prevent direct (or indirect) impacts from development projects adjacent to or connected to SAV.
- Assess cumulative impacts of land use and development changes in the watershed affecting SAV to identify the potential impact. Require identification of cumulative impacts as a condition of development of permit applications.
- Require compensatory mitigation where impacts are unavoidable. Initiate restoration programs to recoup and/or enhance lost SAV habitat.

- Educate landowners adjacent to SAV, boaters, and other potential interested parties about the value of SAV as a habitat for many coastal fishes and invertebrates.

APPENDIX H. POLICIES FOR THE PROTECTION AND RESTORATION OF MARINE AND ESTUATINE RESOURCES AND ENVIRONMENTAL PERMIT REVIEW AND COMMENTING

North Carolina Marine Fisheries Commission
(Adopted September 24, 2009)

Issue

This document establishes the policies of the NC Marine Fisheries Commission (Commission) regarding overall protection and restoration of the state's marine and estuarine resources, and for environmental permit review for proposed projects with the potential to adversely impact those resources.

Background

The "marine and estuarine resources" of North Carolina are defined broadly as "[a]11 fish, except inland game fish, found in the Atlantic Ocean and in coastal fishing waters; all fisheries based upon such fish; all uncultivated or undomesticated plant and animal life, other than wildlife resources, inhabiting or dependent upon coastal fishing waters; and the entire ecology supporting such fish, fisheries, and plant and animal life." N.C.G.S. 113-129(11). The Commission is charged with the duty to "(m)anage, restore, develop, cultivate, conserve, protect, and regulate the marine and estuarine resources within its jurisdiction." N.C.G.S. 143B-289.51(b)(1).

Two powers of the Commission constitute its primary authorities to effectuate that charge, and thereby to protect and restore North Carolina marine and estuarine resources. First, the Commission is specifically empowered "[t]o comment on and otherwise participate in the determination of permit applications received by state agencies that may have an effect on the marine and estuarine resources of the state." N.C.G.S. 143b-289.52(2)(9). Second, the Commission has to power and duty to participate in the development, approval, and implementation of Coastal Habitat Protection Plans (CHPPs) for all "critical fisheries habitats." N.C.G.S. 143B-279.8; 143B-289.52(a)(11). The goal of such CHPPs is "the net long-term enhancement of coastal fisheries associated with each coastal habitat identified." N.C.G.S. 142B-279.8. The Commission by unanimous vote has delegated its permit commenting authority to its Habitat and Water Quality Standing Advisory Committee (Committee) for the sake of efficiency and effectiveness. Likewise, the Commission has designated the Committee as its participating body in the development of CHPPs, which will then be approved and implemented by the full Commission. However, since the formal preparation of will not begin until at least 1 July 1999, it will be some time before final CHPPs can be developed and implemented in order to help protect against the impacts of coastal development and other human activities that adversely affect North Carolina's marine and estuarine resources. Consequently, the Commission's environmental permit review authority currently constitutes the primary vehicle by which the Commission can effectuate its duty to protect and enhance the state's marine and estuarine resources.

Discussion

There are two equally serious challenges to the Commission's successfully maintaining and enhancing North Carolina's marine and estuarine resources: (1) the lack of necessary information on the current nature and status of many of those resources; and (2) the lack of obvious mechanisms to account for and ameliorate the ever accumulating changes that impair the functioning of critical fisheries habitats and otherwise adversely affect fisheries stocks. The Commission cannot hope to comply with its statutory duties to protect and enhance marine and estuarine resources without the abilities to identify and monitor

changes in those resources, to compensate for losses to critical fisheries habitats, and to enhance the overall functioning of the altered coastal ecosystem.

Cumulative adverse resource impacts from both large and small scale human activities constitute the principal impediment to the Commission's ability to achieve its statutory mandate of conserving, protecting, and restoring North Carolina's marine and estuarine resources. Many of the activities that contribute to coastal resource destruction or impairment require no environmental permits. As a consequence, their impacts are not accounted for, to the long-term detriment of marine and estuarine resources. Even for permitted activities, the adverse impacts on marine and estuarine resources may be individually minor, causing them to fall below the thresholds that require compensatory mitigation under existing state policy.

However, where specific projects requiring environmental permits pose a threat to resources under the Commission's jurisdiction, it is reasonable to expect the permittee to contribute to resolving both the informational and resource protection dilemmas faced by the Commission to ensure that unacceptable impacts to marine and estuarine resources do not occur. A direct precedent to such action by a state agency is found in the N.C. Division of Water Quality's current requirement that NPDES permittees conduct upstream and downstream monitoring as a condition of their permits, to ensure that state water quality standards are not violated. In addition, that agency has worked with dischargers in certain river basins to establish industry - funded, integrated monitoring networks to track water quality trends in those waters.

Specific action by the Commission is required if it is to meet its charge of protecting and restoring the state's marine and estuarine resources. To the greatest extent possible, activities that potentially threaten those resources must be prevented from contributing to overall resource degradation. Instead, adequate measures must be implemented to ensure a long-term, net improvement in the quantity and quality of fisheries stocks and critical fisheries habitats under the Commission's jurisdiction. To achieve that end, two goals must be attained:

- adequate compensatory and resource enhancement measures must be incorporated into existing environmental permitting processes
- resource restoration and enhancement programs must be developed to offset losses from activities not requiring permits

No net loss policies for permitted activities, while having many benefits, have at times limited the ability of state agencies to implement compensatory mitigation in a manner that effectively offsets losses to the impacted watershed. By requiring in-kind mitigation, primarily for wetland impacts, mitigation, in some instances, targets wetlands in a different landscape position or watershed, which serves different ecological functions, and consequently does not replace the ecological services lost by the permitted activity in the affected watershed. In addition, mitigation is not required for permitted aquatic resource impacts associated with private water dependent activities, such as loss of submerged aquatic vegetation habitat from channel dredging or degradation of a primary nursery area from shoreline hardening.

The Marine Fisheries Commission authorized DMF staff to begin to incorporate mitigation policy into bylaws at their Business Meeting in Atlantic Beach, NC, on December 2-3, 2004. MFC endorsed the concept of holding workshops to address technical and policy issues related compensatory mitigation. These workshops have now been completed, and provided guidance for a study conducted by East Carolina University, Environmental Defense Fund, and NC Ecosystem Enhancement Program. From this work utilizing two expert panels – one on wetland science and the other on wetland policy, two documents have been completed to provide guidance on alternatives to traditional mitigation. The first report, A Science-based Framework for Compensatory Mitigation of Coastal Habitat in North Carolina (ECU 2006) presented a scientific framework for an alternative approach to compensatory mitigation to

better assure functional replacement. The framework involves evaluating watershed condition, encouraging the use of varied complementary techniques for functional recovery, and designing restoration projects in response to system-wide watershed scale challenges. The goal was to integrate compensatory mitigation requirements into watershed protection strategies that are consistent with the goals and objectives of the CHPP. In the second phase of the project, in a report entitled, An Approach to Coordinate Compensatory Mitigation Requirements to Meet Goals of the Coastal Habitat Protection Plan (ECU and Environmental Defense, 2006), the group developed an alternative assessment procedure for North Carolina's watersheds. The results of the study were presented during a day-long meeting (October 15, 2008) to a group represented by state and federal regulatory agencies and academic researchers, most of who were involved in the original workshops. The next phase of the project involves demonstrating application of the approach in two subwatersheds of the White Oak River basin.

A summary of the first two phases of this project were presented to the MFC on November 6, 2008. The MFC endorsed developing a compensatory mitigation process as part of the policy statement. On January 16, 2009 the Habitat and Water Quality Committee unanimously voted to recommend the following policy for consideration by the MFC. This compensatory mitigation policy would be implemented as a final component of the existing Resource Protection and Environmental Permit Review and Commenting Policies.

The first two policies below were established in 1999 primarily to achieve the first goal of incorporating adequate compensatory and resource enhancement measures into existing environmental permitting processes. The third policy was established in 2009 to provide more direction in how to accomplish that, given our evolving understanding of ecosystem functions, threats, and techniques for successful mitigation and restoration. Progress on the second goal (developing restoration/enhancement programs to offset losses not directly associated with permitted activities) has primarily occurred in North Carolina through enhancement of DMF's oyster sanctuary program, Clean Water Management Trust Fund projects, and numerous wetland and oyster restoration projects conducted by non-profit environmental organizations.

Proposed Resource Protection and Environmental Permit Review and Commenting Policies

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. 143B-289.52(a)(9), the Habitat and Water Quality Standing Advisory Committee shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

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i. Establish goals for coastal watersheds by the MFC based on desired outcomes - protection/restoration of shellfishing waters, PNAs, SAV beds, etc.;
ii. Identify watersheds/areas where these goals can be realistically achieved. The Strategic Habitat Areas approach that emerged from CHPP can be used to identify locations where protection/restoration is most likely to be successful;
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APPENDIX I: MFC BEACH NOURISHMENT POLICY

North Carolina Marine Fisheries Commission
(Adopted November 16, 2000)

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Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. §143B-289.52(a)(9), the Chairs of the Habitat and Water Quality Standing Advisory Committee, in consultation with the Commission Chair, shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

(1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats); and

(2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems.

The findings presented below assess the marine and estuarine resources of North Carolina which are potentially threatened by activities related to the large-scale movement of sand in the coastal ocean and adjacent habitats, and the processes whereby those resources are placed at risk. The policies established in this document are designed to avoid, minimize, and offset damage caused by these activities, in accordance with the laws of the state and the general habitat policies of this Commission.

Marine and Estuarine Resources at Risk from Beach Dredge and Fill Activities

The Commission finds:

1. In general, the array of large-scale and long-term beach alteration projects currently being considered for North Carolina together constitute a real and significant threat to the marine and estuarine resources of the United States and North Carolina.

2. The cumulative effects of these projects have not been adequately assessed, including impacts on public trust marine and estuarine resources, use of public trust beaches, public access, state and federally protected species, state critical habitats, and federal essential fish habitats.

3. Individual beach dredge-and-fill projects and related large-scale coastal engineering activities rarely provide adequate assessment or consideration of potential damage to fishery resources under state and federal management. Historically, emphasis has been placed on the logistics of sand procurement and movement, and economics, with environmental considerations dominated by compliance with limitations imparted by the Endangered Species Act for sea turtles, piping plovers and other listed organisms.

4. Opportunities to avoid and minimize impacts of beach dredge-and-fill activities on fishery resources, and offsets for unavoidable impacts have rarely been proposed or implemented.

5. Large-scale beach dredge and fill activities have the potential to cause impacts in four types of habitats:

    a. waters and benthic habitats near the dredging sites;
    b. waters between dredging and filling sites;
    c. waters and benthic habitats near the fill sites; and
    d. waters and benthic habitats potentially affected as sediments move subsequent to deposition in fill areas.

6. Certain nearshore habitats are particularly important to the long-term viability of North Carolina's commercial and recreational fisheries and potentially threatened by large-scale, long-term or frequent disturbance of sediments:

    a. inlets;
    b. the swash and surf zones and beach-associated bars; and
    c. underwater soft-sediment topographic features, both onshore and offshore
    d. underwater hard-substrate topographic features.

7. Large sections of North Carolina waters potentially affected by these projects, both individually and collectively, have been identified as Essential Fish Habitats (EFH) by the South Atlantic Fishery Management Council (SAFMC) and the Mid-Atlantic Fishery Management Council (MAFMC). Affected species under federal management include:

    a. summer flounder (various nearshore waters, including the surf zone and inlets; certain offshore waters);
    b. bluefish (various nearshore waters, including the surf zone and inlets);
    c. red drum (ocean high-salinity surf zones and unconsolidated bottoms to a depth of 50 meters);
    d. several snapper and grouper species (live hard bottom from shore to 600 feet, and – for estuarine-dependent species [e.g., gag grouper and gray snapper] – unconsolidated bottoms and live hard bottoms to the 100 foot contour);
    e. spiny dogfish (various coastal waters from the surf zone to 200 miles);
    f. black sea bass (various nearshore waters, including unconsolidated bottom and live hard bottom to 100 feet, and hard bottoms to 600 feet);
    g. penaeid shrimps (offshore habitats used for spawning and growth to maturity, and waters connecting to inshore nursery areas, including the surf zone and inlets);
    h. coastal migratory pelagics (sandy shoals of capes and bars, barrier island and ocean-side waters from the surf zone to the shelf break inshore of the Gulf Stream; all coastal inlets);
    i. corals of various types (hard substrates and muddy, silty bottoms from the subtidal to the shelf break);

j. calico scallops (unconsolidated bottoms northeast and southwest of Cape Lookout in 62-102 feet);
k. sargassum (wherever it occurs out to 200 miles);
l. many large and small coastal sharks, managed by the Secretary of the Department of Commerce (inlets and nearshore waters, including pupping and nursery grounds).

8. Beach dredge and fill projects also potentially threaten important fish habitats for anadromous species under federal, interstate and state management (in particular, inlets and offshore overwintering grounds), as well as essential overwintering grounds and other critical habitats for weakfish and other species managed by the Atlantic States Marine Fisheries Commission and the State of North Carolina. The SAFMC identified for anadromous and catadromous species those habitats that have been EFH if there had been a council plan (inlets and nearshore waters).

9. Many of the habitats potentially affected by these projects have been identified as Habitat Areas of Particular Concern by the SAFMC. The specific fishery management plan is provided in parentheses:

    a. all nearshore hard bottom areas (SAFMC, snapper-grouper);
    b. all coastal inlets (SAFMC, penaeid shrimps, red drum, and snapper-grouper);
    c. near-shore spawning sites (SAFMC, penaeid shrimps, and red drum)
    d. well-known seafloor features, including the Point, Ten Fathom Ledge and Big Rock (SAFMC, snapper-grouper, coastal migratory pelagics, and corals);
    e. pelagic and benthic sargassum (SAFMC, snapper-grouper);
    f. sandy shoals of Cape Lookout, Cape Fear, and Cape Hatteras (SAFMC, coastal migratory pelagics) and;
    g. Bogue Sound and New River Estuary (SAFMC, coastal migratory pelagics).

10. Habitats likely to be affected by beach dredge and fill projects include many being recognized in North Carolina Fishery Management Plans as important for state-managed species. Many of these habitats are in the process of being recognized as Critical Habitat Areas by the Commission, in either FMPs or in Coastal Habitat Protection Plans. Examples include:

    a. inlets (Blue Crab FMP, Red Drum FMP, River Herring FMP);
    b. oceanic nearshore waters (Blue Crab FMP, Red Drum FMP); and
    c. many others as FMPs and CHPPs are adopted over the coming years.

11. Recent work by scientists in east Florida has documented exceptionally important habitat values for nearshore, hard-bottom habitats often buried by beach dredging projects, including use by over 500 species of fishes and invertebrates, and juveniles of many reef fishes. Equivalent scientific work is just beginning off North Carolina, but life histories suggest that similar habitat use patterns will be found.

Threats to Marine and Estuarine Resources from Beach Dredge and Fill Activities

The Commission finds that beach dredge-and-fill activities and related large-scale coastal engineering projects (including inlet alteration projects) threaten the marine and estuarine resources of North Carolina through the following mechanisms:

1. Direct mortality and displacement of organisms at and near sediment dredging sites;
2. Alteration of seafloor topography and associated current and waves patterns and magnitudes at dredging areas;

3. Alteration of seafloor sediment size-frequency distributions at dredging sites, with secondary effects on benthos at those sites;
4. Elevated turbidity and deposition of fine sediments down-current from dredging sites;
5. Direct mortality and displacement of organisms at initial sediment fill sites;
6. Elevated turbidity in and near initial fill sites, especially in the surf zone, and deposition of fine sediment down-current from initial fill sites;
7. Alteration of near-shore topography and current and waves patterns and magnitudes associated with fill;
8. Movement of deposited sediment away from initial fill sites, especially onto hard bottoms;
9. Alteration of large-scale sediment budgets, sediment movement patterns and feeding and other ecological relationships, including the potential for cascading disturbance effects;
10. Alteration of large-scale movement patterns of water, with secondary effects on water quality and biota;
11. Alteration of movement patterns and successful inlet passage for larvae, post-larvae, juveniles and adults of marine and estuarine organisms;
12. Alteration of long-term shoreline migration patterns (inducing further ecological cascades with consequences that are difficult to predict); and
13. Exacerbation of transport and/or biological uptake of toxicants and other pollutants released at either dredge or fill sites.

Commission Policies for Beach Dredge and Fill Projects and Related Large Coastal Engineering Projects

The Commission establishes the following general policies related to large-scale beach dredge-and-fill and related projects, to clarify and augment the general policies already adopted on April 13, 1999:

1. Projects should fulfill the Commission's general habitat policy by avoiding, minimizing and offsetting damage to the marine and estuarine resources of North Carolina;

2. Projects should provide detailed analyses of possible impacts to each type of Essential Fish Habitat (EFH), with careful and detailed analyses of possible impacts to Habitat Areas of Particular Concern (HAPC) and Critical Habitat Areas (CHA), including short and long term, and population and ecosystem scale effects;

3. Projects should provide a full range of alternatives, along with assessments of the relative impacts of each on each type of EFH, HAPC and CHA;

4. Projects should avoid impacts on EFH, HAPCs and CHAs that are shown to be avoidable through the alternatives analysis, and minimize impacts that are not;

5. Projects should include assessments of potential unavoidable damage to marine resources, using conservative assumptions;

6. Projects should be conditioned on the avoidance of avoidable impacts, and should include compensatory mitigation for all reasonably predictable impacts to the marine and estuarine resources of North Carolina, taking into account uncertainty about these effects. Mitigation should be local, up-front and in-kind wherever possible;

7. Projects should include baseline and project-related monitoring adequate to document pre-project conditions and impacts of the projects on the marine and estuarine resources of North Carolina;

8. All assessments should be based upon the best available science, and be appropriately conservative so as to be prudent and precautionary; and

9. All assessments should take into account the cumulative impacts associated with other beach dredge-and-fill projects in North Carolina and adjacent states, and other large-scale coastal engineering projects that are ecologically related.

APPENDIX J: CHPP IMPLEMENTATION PLAN (2009-2011)

The listing below was drawn from the CHPP 2008-2009 Annual Report approved by the Joint Legislative Commission on Seafood and Aquaculture in September 2009. The full implementation plans can be queried from a database housed on the Division of Marine Fisheries, Habitat Protection server. Implementation Plans also contain specific actions from previous plans that are "carried forward" due to a partially complete or incomplete status. These actions may also be considered "on-going" until the CHPP Steering Committee decides to discontinue them.

September 2009 – August 2010 Planned Action and Needs

- Delineate SHAs in Region 3 (Approximately White Oak River Basin). (DMF/MFC, WRC, EEP/DENR).
- Conduct SHA evaluation and designation process for Region 2 (Pamlico Sound and tributaries).(DMF, WRC)
- Continue to review "Inner Banks" development issues and address environmental issues.(CRC/DCM, DWQ/EMC)
- Begin to address the challenges associated with Sea Level Rise and climate change more broadly in a context consistent with the reports of the Legislative Committee on Climate Change to NC.(DENR)
- Continue to increase public awareness on the value of and threats to coastal fish habitats and the role of the CHPP process to protect and enhance these resources.(DMF, DCM, EEP/DENR)
- Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.(DMF/DCM, EEP/DWR/DENR, WRC)
- Examine the feasibility and preferred siting of wind turbines in North Carolina without significantly impacting fish habitat.(DENR)
- Pursue funding for the Community Conservation Assistance Program (CCAP) in the Division of Soil and Water Conservation.(DSWC/DENR)
- Seek dedicated funding to staff DCM's Clean Marina Program and effectively implement Best Management Practices as a non-regulatory way to improve water quality in and around marinas and docks.(DCM, DENR)
- Continue development and refinement of shoreline stabilization rules that preserve ecosystem function and consider rising sea levels and a changing land/water interface.(DCM/CRC, EEP/DENR)
- Take steps to encourage more restoration of degraded waters and work towards removal from the Federal 303-d listing.(APNEP, DWQ)
- Continue to identify problems regarding infrastructure for Waste Water Treatment Plants and system maintenance. Work with the local governments to develop and implement plans to correct deficiencies.(DWQ)
- Continue to develop a non-traditional mitigation strategy with the White Oak basin as a pilot project. The consultants developing the Local Watershed Plan (East Carolina University and Environmental Defense Fund) are working through EEP's Non-Traditional Mitigation Steering Committee and two ad hoc advisory committees to seek consensus goals and a viable mitigation strategy.(EEP/DENR)
- Work with the Division of Water Resources to minimize conflicts between Aquatic Weed Control practices and protection of SAV habitat.(DMF/MFC, WRC)
- Consider development of a conservation lease for the purpose of oyster and other habitat restoration.(DMF/MFC)
- Seek funding to initiate research on impacts of endocrine-disrupting chemicals to blue crabs and oysters.(DENR)

- Work with the Department of Agriculture and Consumer Services to develop and implement a drug disposal program for pharmaceuticals.(DMF/MFC)
- Complete photo-interpretation of SAV imagery of coast.(DMF, APNEP)
- Continue to study the feasibility and benefits of developing an SAV Restoration Program.(DMF, APNEP, EEP/DENR)
- Seek dedicated funding for the state SAV mapping program.(DMF, APNEP)
- Complete river herring spawning surveys in Albemarle system and prioritize obstruction removals.(DMF)
- Continue expanding the oyster sanctuary program, seeding sanctuaries with live oysters, and construct a shellfish hatchery.(DMF)
- Continue to work toward more funding for the Community Conservation Assistance Program. (DSWC)
- Workshops currently planned for next year include topics such as water reuse (i.e. rain water harvesting, gray water use), stormwater workshops for realtors, an invasive red fox symposium, a microbial pollution workshop, and a grant writing workshop depending upon budget constraints.(DCM/NERR)
- In the coming year, APNEP will work with the NC Division of Water Quality to implement several projects: 1) to host Coastal Stormwater and Riparian Buffer Rules Workshop for Development Professionals. 2) Develop information for display and distribution about Riparian Buffers and 401 Water Quality Certifications. Information will focus on the riparian buffer rules in the Neuse and Tar-Pamlico River Basins and the 401 Water Quality Certification Program, which is in effect throughout the entire state. 3) A project will provide information to focus on students in K-12 understanding the biodiversity the lakes, streams and estuaries.(APNEP, DWQ)
- APNEP will continue to build upon the data inventory survey conducted in 2006 in partnership with the Virginia Institute for Marine Sciences. Data referenced in the survey for the Virginia portion of the Pasquotank and Chowan Rivers. Data will include monitoring data on water quality and living resources as well as land use, population trends and other potential ecosystem stressors. Analyses will be conducted for indications of change over the period of record. The goal is to develop a preliminary State of the River Basin report for the Pasquotank and Chowan Rivers. The approach will be holistic in that changes in monitored variables will be tracked throughout river basins and river systems. These stations are monitored by the Virginia Department of Environmental Quality. These data can be further analyzed to look for trends in seasons as well as trends in other monitored parameters. An attempt will be made to trace changes in water quality and living resources back to changes in the basin.(APNEP)
- DEH – SS will continue meeting with the Shoreline Survey Task Force finalizing proposed inspection program and put the plan in the form of a report for presentation to CHPP Steering Committee.(DEH-SS/DENR)

APPENDIX G. POLICY STATEMENT FOR PROTECTION OF SAV HABITAT

North Carolina Marine Fisheries Commission
(Adopted May 12, 2004)

Submerged aquatic vegetation (SAV) serves as the basis for premium habitat for many coastal fish and invertebrates. The SAV habitat is so important that special efforts are required to protect and enhance water quality and physical conditions for its propagation and distribution.

The purpose of this statement is to provide guidance for management needs to protect SAV habitat in the development of fisheries management plans and habitat protection plans. The following is a summary of the special quality of SAV as habitat and the attendant water quality/physical conditions necessary for its maintenance. Details and additional information can be found in the SAV chapter in the Coastal Habitat Protection Plan (CHPP) and background scientific references.

The role of SAV as habitat

- Submerged aquatic vegetation, which consists of plants having growing roots (rhizomes) in the sediment, serves as physical hiding places for important fish and shellfish species, as well as a food base for essential food chains. Aquatic productivity in waters with SAV beds is significantly higher than in coastal waters without SAV.
- SAV supports a vast array of epiphytes and attached invertebrates that serve as a source of food for many important fish and shellfish.
- The major criterion limiting distribution and propagation of SAV is the amount of light reaching the bottom. Suspended solids and proliferation of algae in the water column are significant causes of reduced light penetration in coastal waters. Water-column clarity, therefore, should be a significant water-quality criterion. SAV, in turn, can also improve water quality through its baffling effects on currents and through its filtering of water by attached epiphytes and invertebrates.
- SAV serves as important habitat for species such as scallops, shrimp, blue crabs and some species of fish.

Management guidelines

- In order to delineate and assess the distribution and health of SAV habitat, SAV beds need to be mapped and monitored. The saltwater end of coastal waters supports eelgrass, widgeongrass, and shoalgrass, and the freshwater end supports several species of freshwater SAV.
- Minimize nutrient and sediment loading to coastal waters that support existing SAV to protect adequate water quality as defined by water-column clarity in standard measurement units.
- All SAV needs to be protected from all bottom-disturbing fishing and recreational gear. Sufficient buffer zones surrounding SAV beds should also be protected from disturbance to prevent impacts of sediments on growing SAV.
- Provide adequate safeguards to prevent direct (or indirect) impacts from development projects adjacent to or connected to SAV.
- Assess cumulative impacts of land use and development changes in the watershed affecting SAV to identify the potential impact. Require identification of cumulative impacts as a condition of development of permit applications.
- Require compensatory mitigation where impacts are unavoidable. Initiate restoration programs to recoup and/or enhance lost SAV habitat.

- Educate landowners adjacent to SAV, boaters, and other potential interested parties about the value of SAV as a habitat for many coastal fishes and invertebrates.

APPENDIX H. POLICIES FOR THE PROTECTION AND RESTORATION OF MARINE AND ESTUATINE RESOURCES AND ENVIRONMENTAL PERMIT REVIEW AND COMMENTING

North Carolina Marine Fisheries Commission
(Adopted September 24, 2009)

Issue

This document establishes the policies of the NC Marine Fisheries Commission (Commission) regarding overall protection and restoration of the state's marine and estuarine resources, and for environmental permit review for proposed projects with the potential to adversely impact those resources.

Background

The "marine and estuarine resources" of North Carolina are defined broadly as "[a]11 fish, except inland game fish, found in the Atlantic Ocean and in coastal fishing waters; all fisheries based upon such fish; all uncultivated or undomesticated plant and animal life, other than wildlife resources, inhabiting or dependent upon coastal fishing waters; and the entire ecology supporting such fish, fisheries, and plant and animal life." N.C.G.S. 113-129(11). The Commission is charged with the duty to "(m)anage, restore, develop, cultivate, conserve, protect, and regulate the marine and estuarine resources within its jurisdiction." N.C.G.S. 143B-289.51(b)(1).

Two powers of the Commission constitute its primary authorities to effectuate that charge, and thereby to protect and restore North Carolina marine and estuarine resources. First, the Commission is specifically empowered "[t]o comment on and otherwise participate in the determination of permit applications received by state agencies that may have an effect on the marine and estuarine resources of the state." N.C.G.S. 143b-289.52(2)(9). Second, the Commission has to power and duty to participate in the development, approval, and implementation of Coastal Habitat Protection Plans (CHPPs) for all "critical fisheries habitats." N.C.G.S. 143B-279.8; 143B-289.52(a)(11). The goal of such CHPPs is "the net long-term enhancement of coastal fisheries associated with each coastal habitat identified." N.C.G.S. 142B-279.8. The Commission by unanimous vote has delegated its permit commenting authority to its Habitat and Water Quality Standing Advisory Committee (Committee) for the sake of efficiency and effectiveness. Likewise, the Commission has designated the Committee as its participating body in the development of CHPPs, which will then be approved and implemented by the full Commission. However, since the formal preparation of will not begin until at least 1 July 1999, it will be some time before final CHPPs can be developed and implemented in order to help protect against the impacts of coastal development and other human activities that adversely affect North Carolina's marine and estuarine resources. Consequently, the Commission's environmental permit review authority currently constitutes the primary vehicle by which the Commission can effectuate its duty to protect and enhance the state's marine and estuarine resources.

Discussion

There are two equally serious challenges to the Commission's successfully maintaining and enhancing North Carolina's marine and estuarine resources: (1) the lack of necessary information on the current nature and status of many of those resources; and (2) the lack of obvious mechanisms to account for and ameliorate the ever accumulating changes that impair the functioning of critical fisheries habitats and otherwise adversely affect fisheries stocks. The Commission cannot hope to comply with its statutory duties to protect and enhance marine and estuarine resources without the abilities to identify and monitor

changes in those resources, to compensate for losses to critical fisheries habitats, and to enhance the overall functioning of the altered coastal ecosystem.

Cumulative adverse resource impacts from both large and small scale human activities constitute the principal impediment to the Commission's ability to achieve its statutory mandate of conserving, protecting, and restoring North Carolina's marine and estuarine resources. Many of the activities that contribute to coastal resource destruction or impairment require no environmental permits. As a consequence, their impacts are not accounted for, to the long-term detriment of marine and estuarine resources. Even for permitted activities, the adverse impacts on marine and estuarine resources may be individually minor, causing them to fall below the thresholds that require compensatory mitigation under existing state policy.

However, where specific projects requiring environmental permits pose a threat to resources under the Commission's jurisdiction, it is reasonable to expect the permittee to contribute to resolving both the informational and resource protection dilemmas faced by the Commission to ensure that unacceptable impacts to marine and estuarine resources do not occur. A direct precedent to such action by a state agency is found in the N.C. Division of Water Quality's current requirement that NPDES permittees conduct upstream and downstream monitoring as a condition of their permits, to ensure that state water quality standards are not violated. In addition, that agency has worked with dischargers in certain river basins to establish industry - funded, integrated monitoring networks to track water quality trends in those waters.

Specific action by the Commission is required if it is to meet its charge of protecting and restoring the state's marine and estuarine resources. To the greatest extent possible, activities that potentially threaten those resources must be prevented from contributing to overall resource degradation. Instead, adequate measures must be implemented to ensure a long-term, net improvement in the quantity and quality of fisheries stocks and critical fisheries habitats under the Commission's jurisdiction. To achieve that end, two goals must be attained:

- adequate compensatory and resource enhancement measures must be incorporated into existing environmental permitting processes
- resource restoration and enhancement programs must be developed to offset losses from activities not requiring permits

No net loss policies for permitted activities, while having many benefits, have at times limited the ability of state agencies to implement compensatory mitigation in a manner that effectively offsets losses to the impacted watershed. By requiring in-kind mitigation, primarily for wetland impacts, mitigation, in some instances, targets wetlands in a different landscape position or watershed, which serves different ecological functions, and consequently does not replace the ecological services lost by the permitted activity in the affected watershed. In addition, mitigation is not required for permitted aquatic resource impacts associated with private water dependent activities, such as loss of submerged aquatic vegetation habitat from channel dredging or degradation of a primary nursery area from shoreline hardening.

The Marine Fisheries Commission authorized DMF staff to begin to incorporate mitigation policy into bylaws at their Business Meeting in Atlantic Beach, NC, on December 2-3, 2004. MFC endorsed the concept of holding workshops to address technical and policy issues related compensatory mitigation. These workshops have now been completed, and provided guidance for a study conducted by East Carolina University, Environmental Defense Fund, and NC Ecosystem Enhancement Program. From this work utilizing two expert panels – one on wetland science and the other on wetland policy, two documents have been completed to provide guidance on alternatives to traditional mitigation. The first report, A Science-based Framework for Compensatory Mitigation of Coastal Habitat in North Carolina (ECU 2006) presented a scientific framework for an alternative approach to compensatory mitigation to

better assure functional replacement. The framework involves evaluating watershed condition, encouraging the use of varied complementary techniques for functional recovery, and designing restoration projects in response to system-wide watershed scale challenges. The goal was to integrate compensatory mitigation requirements into watershed protection strategies that are consistent with the goals and objectives of the CHPP. In the second phase of the project, in a report entitled, An Approach to Coordinate Compensatory Mitigation Requirements to Meet Goals of the Coastal Habitat Protection Plan (ECU and Environmental Defense, 2006), the group developed an alternative assessment procedure for North Carolina's watersheds. The results of the study were presented during a day-long meeting (October 15, 2008) to a group represented by state and federal regulatory agencies and academic researchers, most of who were involved in the original workshops. The next phase of the project involves demonstrating application of the approach in two subwatersheds of the White Oak River basin.

A summary of the first two phases of this project were presented to the MFC on November 6, 2008. The MFC endorsed developing a compensatory mitigation process as part of the policy statement. On January 16, 2009 the Habitat and Water Quality Committee unanimously voted to recommend the following policy for consideration by the MFC. This compensatory mitigation policy would be implemented as a final component of the existing Resource Protection and Environmental Permit Review and Commenting Policies.

The first two policies below were established in 1999 primarily to achieve the first goal of incorporating adequate compensatory and resource enhancement measures into existing environmental permitting processes. The third policy was established in 2009 to provide more direction in how to accomplish that, given our evolving understanding of ecosystem functions, threats, and techniques for successful mitigation and restoration. Progress on the second goal (developing restoration/enhancement programs to offset losses not directly associated with permitted activities) has primarily occurred in North Carolina through enhancement of DMF's oyster sanctuary program, Clean Water Management Trust Fund projects, and numerous wetland and oyster restoration projects conducted by non-profit environmental organizations.

Proposed Resource Protection and Environmental Permit Review and Commenting Policies

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. 143B-289.52(a)(9), the Habitat and Water Quality Standing Advisory Committee shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats);and

2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems; and

3) incorporate the following array of options when planning compensatory mitigation to allow focus on

restoration of equivalent ecosystem functions within a watershed, based on our evolving understanding of the needs of compensatory mitigation to protect and enhance coastal water quality and watersheds:

i. Establish goals for coastal watersheds by the MFC based on desired outcomes - protection/restoration of shellfishing waters, PNAs, SAV beds, etc.;
ii. Identify watersheds/areas where these goals can be realistically achieved. The Strategic Habitat Areas approach that emerged from CHPP can be used to identify locations where protection/restoration is most likely to be successful;
iii. Utilize the Rapid Watershed Assessment Procedure (or other assessment methods) to assess watershed condition and identify problems/solutions;
iv. Evaluate and authorize compensatory mitigation projects based on their ability to contribute to goals established for coastal watersheds. Projects that provide functional replacement, e.g., increased water retention/storage through the use of BMPs, may be approved if documentation is provided that the projects are the most effective mechanism to achieve the goals established for a watershed;
v. Implement monitoring to support data acquisition necessary to support the SHA process and the effectiveness of projects that have been implemented;
vi. Solicit funding from all available sources (compensatory mitigation, CWMTF, 319, etc.) to fully implement protection/restoration strategies in coastal watersheds.

APPENDIX I: MFC BEACH NOURISHMENT POLICY

North Carolina Marine Fisheries Commission
(Adopted November 16, 2000)

Policy Context

This document establishes the policies of the North Carolina Marine Fisheries Commission (Commission) regarding protection and restoration of the state's marine and estuarine resources associated with beach dredge and fill activities, and related large-scale coastal engineering projects. The policies are designed to be consistent with the overall habitat protection policies of the Commission, adopted April 13, 1999, as amended February 17-18, 2000, as follows:

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. §143B-289.52(a)(9), the Chairs of the Habitat and Water Quality Standing Advisory Committee, in consultation with the Commission Chair, shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

(1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats); and

(2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems.

The findings presented below assess the marine and estuarine resources of North Carolina which are potentially threatened by activities related to the large-scale movement of sand in the coastal ocean and adjacent habitats, and the processes whereby those resources are placed at risk. The policies established in this document are designed to avoid, minimize, and offset damage caused by these activities, in accordance with the laws of the state and the general habitat policies of this Commission.

Marine and Estuarine Resources at Risk from Beach Dredge and Fill Activities

The Commission finds:

1. In general, the array of large-scale and long-term beach alteration projects currently being considered for North Carolina together constitute a real and significant threat to the marine and estuarine resources of the United States and North Carolina.

2. The cumulative effects of these projects have not been adequately assessed, including impacts on public trust marine and estuarine resources, use of public trust beaches, public access, state and federally protected species, state critical habitats, and federal essential fish habitats.

3. Individual beach dredge-and-fill projects and related large-scale coastal engineering activities rarely provide adequate assessment or consideration of potential damage to fishery resources under state and federal management. Historically, emphasis has been placed on the logistics of sand procurement and movement, and economics, with environmental considerations dominated by compliance with limitations imparted by the Endangered Species Act for sea turtles, piping plovers and other listed organisms.

4. Opportunities to avoid and minimize impacts of beach dredge-and-fill activities on fishery resources, and offsets for unavoidable impacts have rarely been proposed or implemented.

5. Large-scale beach dredge and fill activities have the potential to cause impacts in four types of habitats:

    a. waters and benthic habitats near the dredging sites;
    b. waters between dredging and filling sites;
    c. waters and benthic habitats near the fill sites; and
    d. waters and benthic habitats potentially affected as sediments move subsequent to deposition in fill areas.

6. Certain nearshore habitats are particularly important to the long-term viability of North Carolina's commercial and recreational fisheries and potentially threatened by large-scale, long-term or frequent disturbance of sediments:

    a. inlets;
    b. the swash and surf zones and beach-associated bars; and
    c. underwater soft-sediment topographic features, both onshore and offshore
    d. underwater hard-substrate topographic features.

7. Large sections of North Carolina waters potentially affected by these projects, both individually and collectively, have been identified as Essential Fish Habitats (EFH) by the South Atlantic Fishery Management Council (SAFMC) and the Mid-Atlantic Fishery Management Council (MAFMC). Affected species under federal management include:

    a. summer flounder (various nearshore waters, including the surf zone and inlets; certain offshore waters);
    b. bluefish (various nearshore waters, including the surf zone and inlets);
    c. red drum (ocean high-salinity surf zones and unconsolidated bottoms to a depth of 50 meters);
    d. several snapper and grouper species (live hard bottom from shore to 600 feet, and – for estuarine-dependent species [e.g., gag grouper and gray snapper] – unconsolidated bottoms and live hard bottoms to the 100 foot contour);
    e. spiny dogfish (various coastal waters from the surf zone to 200 miles);
    f. black sea bass (various nearshore waters, including unconsolidated bottom and live hard bottom to 100 feet, and hard bottoms to 600 feet);
    g. penaeid shrimps (offshore habitats used for spawning and growth to maturity, and waters connecting to inshore nursery areas, including the surf zone and inlets);
    h. coastal migratory pelagics (sandy shoals of capes and bars, barrier island and ocean-side waters from the surf zone to the shelf break inshore of the Gulf Stream; all coastal inlets);
    i. corals of various types (hard substrates and muddy, silty bottoms from the subtidal to the shelf break);

j. calico scallops (unconsolidated bottoms northeast and southwest of Cape Lookout in 62-102 feet);
k. sargassum (wherever it occurs out to 200 miles);
l. many large and small coastal sharks, managed by the Secretary of the Department of Commerce (inlets and nearshore waters, including pupping and nursery grounds).

8. Beach dredge and fill projects also potentially threaten important fish habitats for anadromous species under federal, interstate and state management (in particular, inlets and offshore overwintering grounds), as well as essential overwintering grounds and other critical habitats for weakfish and other species managed by the Atlantic States Marine Fisheries Commission and the State of North Carolina. The SAFMC identified for anadromous and catadromous species those habitats that have been EFH if there had been a council plan (inlets and nearshore waters).

9. Many of the habitats potentially affected by these projects have been identified as Habitat Areas of Particular Concern by the SAFMC. The specific fishery management plan is provided in parentheses:

    a. all nearshore hard bottom areas (SAFMC, snapper-grouper);
    b. all coastal inlets (SAFMC, penaeid shrimps, red drum, and snapper-grouper);
    c. near-shore spawning sites (SAFMC, penaeid shrimps, and red drum)
    d. well-known seafloor features, including the Point, Ten Fathom Ledge and Big Rock (SAFMC, snapper-grouper, coastal migratory pelagics, and corals);
    e. pelagic and benthic sargassum (SAFMC, snapper-grouper);
    f. sandy shoals of Cape Lookout, Cape Fear, and Cape Hatteras (SAFMC, coastal migratory pelagics) and;
    g. Bogue Sound and New River Estuary (SAFMC, coastal migratory pelagics).

10. Habitats likely to be affected by beach dredge and fill projects include many being recognized in North Carolina Fishery Management Plans as important for state-managed species. Many of these habitats are in the process of being recognized as Critical Habitat Areas by the Commission, in either FMPs or in Coastal Habitat Protection Plans. Examples include:

    a. inlets (Blue Crab FMP, Red Drum FMP, River Herring FMP);
    b. oceanic nearshore waters (Blue Crab FMP, Red Drum FMP); and
    c. many others as FMPs and CHPPs are adopted over the coming years.

11. Recent work by scientists in east Florida has documented exceptionally important habitat values for nearshore, hard-bottom habitats often buried by beach dredging projects, including use by over 500 species of fishes and invertebrates, and juveniles of many reef fishes. Equivalent scientific work is just beginning off North Carolina, but life histories suggest that similar habitat use patterns will be found.

Threats to Marine and Estuarine Resources from Beach Dredge and Fill Activities

The Commission finds that beach dredge-and-fill activities and related large-scale coastal engineering projects (including inlet alteration projects) threaten the marine and estuarine resources of North Carolina through the following mechanisms:

1. Direct mortality and displacement of organisms at and near sediment dredging sites;
2. Alteration of seafloor topography and associated current and waves patterns and magnitudes at dredging areas;

3. Alteration of seafloor sediment size-frequency distributions at dredging sites, with secondary effects on benthos at those sites;
4. Elevated turbidity and deposition of fine sediments down-current from dredging sites;
5. Direct mortality and displacement of organisms at initial sediment fill sites;
6. Elevated turbidity in and near initial fill sites, especially in the surf zone, and deposition of fine sediment down-current from initial fill sites;
7. Alteration of near-shore topography and current and waves patterns and magnitudes associated with fill;
8. Movement of deposited sediment away from initial fill sites, especially onto hard bottoms;
9. Alteration of large-scale sediment budgets, sediment movement patterns and feeding and other ecological relationships, including the potential for cascading disturbance effects;
10. Alteration of large-scale movement patterns of water, with secondary effects on water quality and biota;
11. Alteration of movement patterns and successful inlet passage for larvae, post-larvae, juveniles and adults of marine and estuarine organisms;
12. Alteration of long-term shoreline migration patterns (inducing further ecological cascades with consequences that are difficult to predict); and
13. Exacerbation of transport and/or biological uptake of toxicants and other pollutants released at either dredge or fill sites.

Commission Policies for Beach Dredge and Fill Projects and Related Large Coastal Engineering Projects

The Commission establishes the following general policies related to large-scale beach dredge-and-fill and related projects, to clarify and augment the general policies already adopted on April 13, 1999:

1. Projects should fulfill the Commission's general habitat policy by avoiding, minimizing and offsetting damage to the marine and estuarine resources of North Carolina;

2. Projects should provide detailed analyses of possible impacts to each type of Essential Fish Habitat (EFH), with careful and detailed analyses of possible impacts to Habitat Areas of Particular Concern (HAPC) and Critical Habitat Areas (CHA), including short and long term, and population and ecosystem scale effects;

3. Projects should provide a full range of alternatives, along with assessments of the relative impacts of each on each type of EFH, HAPC and CHA;

4. Projects should avoid impacts on EFH, HAPCs and CHAs that are shown to be avoidable through the alternatives analysis, and minimize impacts that are not;

5. Projects should include assessments of potential unavoidable damage to marine resources, using conservative assumptions;

6. Projects should be conditioned on the avoidance of avoidable impacts, and should include compensatory mitigation for all reasonably predictable impacts to the marine and estuarine resources of North Carolina, taking into account uncertainty about these effects. Mitigation should be local, up-front and in-kind wherever possible;

7. Projects should include baseline and project-related monitoring adequate to document pre-project conditions and impacts of the projects on the marine and estuarine resources of North Carolina;

8. All assessments should be based upon the best available science, and be appropriately conservative so as to be prudent and precautionary; and

9. All assessments should take into account the cumulative impacts associated with other beach dredge-and-fill projects in North Carolina and adjacent states, and other large-scale coastal engineering projects that are ecologically related.

APPENDIX J: CHPP IMPLEMENTATION PLAN (2009-2011)

The listing below was drawn from the CHPP 2008-2009 Annual Report approved by the Joint Legislative Commission on Seafood and Aquaculture in September 2009. The full implementation plans can be queried from a database housed on the Division of Marine Fisheries, Habitat Protection server. Implementation Plans also contain specific actions from previous plans that are "carried forward" due to a partially complete or incomplete status. These actions may also be considered "on-going" until the CHPP Steering Committee decides to discontinue them.

September 2009 – August 2010 Planned Action and Needs

- Delineate SHAs in Region 3 (Approximately White Oak River Basin). (DMF/MFC, WRC, EEP/DENR).
- Conduct SHA evaluation and designation process for Region 2 (Pamlico Sound and tributaries).(DMF, WRC)
- Continue to review "Inner Banks" development issues and address environmental issues.(CRC/DCM, DWQ/EMC)
- Begin to address the challenges associated with Sea Level Rise and climate change more broadly in a context consistent with the reports of the Legislative Committee on Climate Change to NC.(DENR)
- Continue to increase public awareness on the value of and threats to coastal fish habitats and the role of the CHPP process to protect and enhance these resources.(DMF, DCM, EEP/DENR)
- Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.(DMF/DCM, EEP/DWR/DENR, WRC)
- Examine the feasibility and preferred siting of wind turbines in North Carolina without significantly impacting fish habitat.(DENR)
- Pursue funding for the Community Conservation Assistance Program (CCAP) in the Division of Soil and Water Conservation.(DSWC/DENR)
- Seek dedicated funding to staff DCM's Clean Marina Program and effectively implement Best Management Practices as a non-regulatory way to improve water quality in and around marinas and docks.(DCM, DENR)
- Continue development and refinement of shoreline stabilization rules that preserve ecosystem function and consider rising sea levels and a changing land/water interface.(DCM/CRC, EEP/DENR)
- Take steps to encourage more restoration of degraded waters and work towards removal from the Federal 303-d listing.(APNEP, DWQ)
- Continue to identify problems regarding infrastructure for Waste Water Treatment Plants and system maintenance. Work with the local governments to develop and implement plans to correct deficiencies.(DWQ)
- Continue to develop a non-traditional mitigation strategy with the White Oak basin as a pilot project. The consultants developing the Local Watershed Plan (East Carolina University and Environmental Defense Fund) are working through EEP's Non-Traditional Mitigation Steering Committee and two ad hoc advisory committees to seek consensus goals and a viable mitigation strategy.(EEP/DENR)
- Work with the Division of Water Resources to minimize conflicts between Aquatic Weed Control practices and protection of SAV habitat.(DMF/MFC, WRC)
- Consider development of a conservation lease for the purpose of oyster and other habitat restoration.(DMF/MFC)
- Seek funding to initiate research on impacts of endocrine-disrupting chemicals to blue crabs and oysters.(DENR)

- Work with the Department of Agriculture and Consumer Services to develop and implement a drug disposal program for pharmaceuticals.(DMF/MFC)
- Complete photo-interpretation of SAV imagery of coast.(DMF, APNEP)
- Continue to study the feasibility and benefits of developing an SAV Restoration Program.(DMF, APNEP, EEP/DENR)
- Seek dedicated funding for the state SAV mapping program.(DMF, APNEP)
- Complete river herring spawning surveys in Albemarle system and prioritize obstruction removals.(DMF)
- Continue expanding the oyster sanctuary program, seeding sanctuaries with live oysters, and construct a shellfish hatchery.(DMF)
- Continue to work toward more funding for the Community Conservation Assistance Program. (DSWC)
- Workshops currently planned for next year include topics such as water reuse (i.e. rain water harvesting, gray water use), stormwater workshops for realtors, an invasive red fox symposium, a microbial pollution workshop, and a grant writing workshop depending upon budget constraints.(DCM/NERR)
- In the coming year, APNEP will work with the NC Division of Water Quality to implement several projects: 1) to host Coastal Stormwater and Riparian Buffer Rules Workshop for Development Professionals. 2) Develop information for display and distribution about Riparian Buffers and 401 Water Quality Certifications. Information will focus on the riparian buffer rules in the Neuse and Tar-Pamlico River Basins and the 401 Water Quality Certification Program, which is in effect throughout the entire state. 3) A project will provide information to focus on students in K-12 understanding the biodiversity the lakes, streams and estuaries.(APNEP, DWQ)
- APNEP will continue to build upon the data inventory survey conducted in 2006 in partnership with the Virginia Institute for Marine Sciences. Data referenced in the survey for the Virginia portion of the Pasquotank and Chowan Rivers. Data will include monitoring data on water quality and living resources as well as land use, population trends and other potential ecosystem stressors. Analyses will be conducted for indications of change over the period of record. The goal is to develop a preliminary State of the River Basin report for the Pasquotank and Chowan Rivers. The approach will be holistic in that changes in monitored variables will be tracked throughout river basins and river systems. These stations are monitored by the Virginia Department of Environmental Quality. These data can be further analyzed to look for trends in seasons as well as trends in other monitored parameters. An attempt will be made to trace changes in water quality and living resources back to changes in the basin.(APNEP)
- DEH – SS will continue meeting with the Shoreline Survey Task Force finalizing proposed inspection program and put the plan in the form of a report for presentation to CHPP Steering Committee.(DEH-SS/DENR)

APPENDIX G. POLICY STATEMENT FOR PROTECTION OF SAV HABITAT

North Carolina Marine Fisheries Commission
(Adopted May 12, 2004)

Submerged aquatic vegetation (SAV) serves as the basis for premium habitat for many coastal fish and invertebrates. The SAV habitat is so important that special efforts are required to protect and enhance water quality and physical conditions for its propagation and distribution.

The purpose of this statement is to provide guidance for management needs to protect SAV habitat in the development of fisheries management plans and habitat protection plans. The following is a summary of the special quality of SAV as habitat and the attendant water quality/physical conditions necessary for its maintenance. Details and additional information can be found in the SAV chapter in the Coastal Habitat Protection Plan (CHPP) and background scientific references.

The role of SAV as habitat

- Submerged aquatic vegetation, which consists of plants having growing roots (rhizomes) in the sediment, serves as physical hiding places for important fish and shellfish species, as well as a food base for essential food chains. Aquatic productivity in waters with SAV beds is significantly higher than in coastal waters without SAV.
- SAV supports a vast array of epiphytes and attached invertebrates that serve as a source of food for many important fish and shellfish.
- The major criterion limiting distribution and propagation of SAV is the amount of light reaching the bottom. Suspended solids and proliferation of algae in the water column are significant causes of reduced light penetration in coastal waters. Water-column clarity, therefore, should be a significant water-quality criterion. SAV, in turn, can also improve water quality through its baffling effects on currents and through its filtering of water by attached epiphytes and invertebrates.
- SAV serves as important habitat for species such as scallops, shrimp, blue crabs and some species of fish.

Management guidelines

- In order to delineate and assess the distribution and health of SAV habitat, SAV beds need to be mapped and monitored. The saltwater end of coastal waters supports eelgrass, widgeongrass, and shoalgrass, and the freshwater end supports several species of freshwater SAV.
- Minimize nutrient and sediment loading to coastal waters that support existing SAV to protect adequate water quality as defined by water-column clarity in standard measurement units.
- All SAV needs to be protected from all bottom-disturbing fishing and recreational gear. Sufficient buffer zones surrounding SAV beds should also be protected from disturbance to prevent impacts of sediments on growing SAV.
- Provide adequate safeguards to prevent direct (or indirect) impacts from development projects adjacent to or connected to SAV.
- Assess cumulative impacts of land use and development changes in the watershed affecting SAV to identify the potential impact. Require identification of cumulative impacts as a condition of development of permit applications.
- Require compensatory mitigation where impacts are unavoidable. Initiate restoration programs to recoup and/or enhance lost SAV habitat.

- Educate landowners adjacent to SAV, boaters, and other potential interested parties about the value of SAV as a habitat for many coastal fishes and invertebrates.

APPENDIX H. POLICIES FOR THE PROTECTION AND RESTORATION OF MARINE AND ESTUATINE RESOURCES AND ENVIRONMENTAL PERMIT REVIEW AND COMMENTING

North Carolina Marine Fisheries Commission
(Adopted September 24, 2009)

Issue

This document establishes the policies of the NC Marine Fisheries Commission (Commission) regarding overall protection and restoration of the state's marine and estuarine resources, and for environmental permit review for proposed projects with the potential to adversely impact those resources.

Background

The "marine and estuarine resources" of North Carolina are defined broadly as "[a]11 fish, except inland game fish, found in the Atlantic Ocean and in coastal fishing waters; all fisheries based upon such fish; all uncultivated or undomesticated plant and animal life, other than wildlife resources, inhabiting or dependent upon coastal fishing waters; and the entire ecology supporting such fish, fisheries, and plant and animal life." N.C.G.S. 113-129(11). The Commission is charged with the duty to "(m)anage, restore, develop, cultivate, conserve, protect, and regulate the marine and estuarine resources within its jurisdiction." N.C.G.S. 143B-289.51(b)(1).

Two powers of the Commission constitute its primary authorities to effectuate that charge, and thereby to protect and restore North Carolina marine and estuarine resources. First, the Commission is specifically empowered "[t]o comment on and otherwise participate in the determination of permit applications received by state agencies that may have an effect on the marine and estuarine resources of the state." N.C.G.S. 143b-289.52(2)(9). Second, the Commission has to power and duty to participate in the development, approval, and implementation of Coastal Habitat Protection Plans (CHPPs) for all "critical fisheries habitats." N.C.G.S. 143B-279.8; 143B-289.52(a)(11). The goal of such CHPPs is "the net long-term enhancement of coastal fisheries associated with each coastal habitat identified." N.C.G.S. 142B-279.8. The Commission by unanimous vote has delegated its permit commenting authority to its Habitat and Water Quality Standing Advisory Committee (Committee) for the sake of efficiency and effectiveness. Likewise, the Commission has designated the Committee as its participating body in the development of CHPPs, which will then be approved and implemented by the full Commission. However, since the formal preparation of will not begin until at least 1 July 1999, it will be some time before final CHPPs can be developed and implemented in order to help protect against the impacts of coastal development and other human activities that adversely affect North Carolina's marine and estuarine resources. Consequently, the Commission's environmental permit review authority currently constitutes the primary vehicle by which the Commission can effectuate its duty to protect and enhance the state's marine and estuarine resources.

Discussion

There are two equally serious challenges to the Commission's successfully maintaining and enhancing North Carolina's marine and estuarine resources: (1) the lack of necessary information on the current nature and status of many of those resources; and (2) the lack of obvious mechanisms to account for and ameliorate the ever accumulating changes that impair the functioning of critical fisheries habitats and otherwise adversely affect fisheries stocks. The Commission cannot hope to comply with its statutory duties to protect and enhance marine and estuarine resources without the abilities to identify and monitor

changes in those resources, to compensate for losses to critical fisheries habitats, and to enhance the overall functioning of the altered coastal ecosystem.

Cumulative adverse resource impacts from both large and small scale human activities constitute the principal impediment to the Commission's ability to achieve its statutory mandate of conserving, protecting, and restoring North Carolina's marine and estuarine resources. Many of the activities that contribute to coastal resource destruction or impairment require no environmental permits. As a consequence, their impacts are not accounted for, to the long-term detriment of marine and estuarine resources. Even for permitted activities, the adverse impacts on marine and estuarine resources may be individually minor, causing them to fall below the thresholds that require compensatory mitigation under existing state policy.

However, where specific projects requiring environmental permits pose a threat to resources under the Commission's jurisdiction, it is reasonable to expect the permittee to contribute to resolving both the informational and resource protection dilemmas faced by the Commission to ensure that unacceptable impacts to marine and estuarine resources do not occur. A direct precedent to such action by a state agency is found in the N.C. Division of Water Quality's current requirement that NPDES permittees conduct upstream and downstream monitoring as a condition of their permits, to ensure that state water quality standards are not violated. In addition, that agency has worked with dischargers in certain river basins to establish industry - funded, integrated monitoring networks to track water quality trends in those waters.

Specific action by the Commission is required if it is to meet its charge of protecting and restoring the state's marine and estuarine resources. To the greatest extent possible, activities that potentially threaten those resources must be prevented from contributing to overall resource degradation. Instead, adequate measures must be implemented to ensure a long-term, net improvement in the quantity and quality of fisheries stocks and critical fisheries habitats under the Commission's jurisdiction. To achieve that end, two goals must be attained:

- adequate compensatory and resource enhancement measures must be incorporated into existing environmental permitting processes
- resource restoration and enhancement programs must be developed to offset losses from activities not requiring permits

No net loss policies for permitted activities, while having many benefits, have at times limited the ability of state agencies to implement compensatory mitigation in a manner that effectively offsets losses to the impacted watershed. By requiring in-kind mitigation, primarily for wetland impacts, mitigation, in some instances, targets wetlands in a different landscape position or watershed, which serves different ecological functions, and consequently does not replace the ecological services lost by the permitted activity in the affected watershed. In addition, mitigation is not required for permitted aquatic resource impacts associated with private water dependent activities, such as loss of submerged aquatic vegetation habitat from channel dredging or degradation of a primary nursery area from shoreline hardening.

The Marine Fisheries Commission authorized DMF staff to begin to incorporate mitigation policy into bylaws at their Business Meeting in Atlantic Beach, NC, on December 2-3, 2004. MFC endorsed the concept of holding workshops to address technical and policy issues related compensatory mitigation. These workshops have now been completed, and provided guidance for a study conducted by East Carolina University, Environmental Defense Fund, and NC Ecosystem Enhancement Program. From this work utilizing two expert panels – one on wetland science and the other on wetland policy, two documents have been completed to provide guidance on alternatives to traditional mitigation. The first report, A Science-based Framework for Compensatory Mitigation of Coastal Habitat in North Carolina (ECU 2006) presented a scientific framework for an alternative approach to compensatory mitigation to

better assure functional replacement. The framework involves evaluating watershed condition, encouraging the use of varied complementary techniques for functional recovery, and designing restoration projects in response to system-wide watershed scale challenges. The goal was to integrate compensatory mitigation requirements into watershed protection strategies that are consistent with the goals and objectives of the CHPP. In the second phase of the project, in a report entitled, An Approach to Coordinate Compensatory Mitigation Requirements to Meet Goals of the Coastal Habitat Protection Plan (ECU and Environmental Defense, 2006), the group developed an alternative assessment procedure for North Carolina's watersheds. The results of the study were presented during a day-long meeting (October 15, 2008) to a group represented by state and federal regulatory agencies and academic researchers, most of who were involved in the original workshops. The next phase of the project involves demonstrating application of the approach in two subwatersheds of the White Oak River basin.

A summary of the first two phases of this project were presented to the MFC on November 6, 2008. The MFC endorsed developing a compensatory mitigation process as part of the policy statement. On January 16, 2009 the Habitat and Water Quality Committee unanimously voted to recommend the following policy for consideration by the MFC. This compensatory mitigation policy would be implemented as a final component of the existing Resource Protection and Environmental Permit Review and Commenting Policies.

The first two policies below were established in 1999 primarily to achieve the first goal of incorporating adequate compensatory and resource enhancement measures into existing environmental permitting processes. The third policy was established in 2009 to provide more direction in how to accomplish that, given our evolving understanding of ecosystem functions, threats, and techniques for successful mitigation and restoration. Progress on the second goal (developing restoration/enhancement programs to offset losses not directly associated with permitted activities) has primarily occurred in North Carolina through enhancement of DMF's oyster sanctuary program, Clean Water Management Trust Fund projects, and numerous wetland and oyster restoration projects conducted by non-profit environmental organizations.

Proposed Resource Protection and Environmental Permit Review and Commenting Policies

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. 143B-289.52(a)(9), the Habitat and Water Quality Standing Advisory Committee shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats);and

2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems; and

3) incorporate the following array of options when planning compensatory mitigation to allow focus on

restoration of equivalent ecosystem functions within a watershed, based on our evolving understanding of the needs of compensatory mitigation to protect and enhance coastal water quality and watersheds:

i. Establish goals for coastal watersheds by the MFC based on desired outcomes - protection/restoration of shellfishing waters, PNAs, SAV beds, etc.;
ii. Identify watersheds/areas where these goals can be realistically achieved. The Strategic Habitat Areas approach that emerged from CHPP can be used to identify locations where protection/restoration is most likely to be successful;
iii. Utilize the Rapid Watershed Assessment Procedure (or other assessment methods) to assess watershed condition and identify problems/solutions;
iv. Evaluate and authorize compensatory mitigation projects based on their ability to contribute to goals established for coastal watersheds. Projects that provide functional replacement, e.g., increased water retention/storage through the use of BMPs, may be approved if documentation is provided that the projects are the most effective mechanism to achieve the goals established for a watershed;
v. Implement monitoring to support data acquisition necessary to support the SHA process and the effectiveness of projects that have been implemented;
vi. Solicit funding from all available sources (compensatory mitigation, CWMTF, 319, etc.) to fully implement protection/restoration strategies in coastal watersheds.

APPENDIX I: MFC BEACH NOURISHMENT POLICY

North Carolina Marine Fisheries Commission
(Adopted November 16, 2000)

Policy Context

This document establishes the policies of the North Carolina Marine Fisheries Commission (Commission) regarding protection and restoration of the state's marine and estuarine resources associated with beach dredge and fill activities, and related large-scale coastal engineering projects. The policies are designed to be consistent with the overall habitat protection policies of the Commission, adopted April 13, 1999, as amended February 17-18, 2000, as follows:

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. §143B-289.52(a)(9), the Chairs of the Habitat and Water Quality Standing Advisory Committee, in consultation with the Commission Chair, shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

(1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats); and

(2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems.

The findings presented below assess the marine and estuarine resources of North Carolina which are potentially threatened by activities related to the large-scale movement of sand in the coastal ocean and adjacent habitats, and the processes whereby those resources are placed at risk. The policies established in this document are designed to avoid, minimize, and offset damage caused by these activities, in accordance with the laws of the state and the general habitat policies of this Commission.

Marine and Estuarine Resources at Risk from Beach Dredge and Fill Activities

The Commission finds:

1. In general, the array of large-scale and long-term beach alteration projects currently being considered for North Carolina together constitute a real and significant threat to the marine and estuarine resources of the United States and North Carolina.

2. The cumulative effects of these projects have not been adequately assessed, including impacts on public trust marine and estuarine resources, use of public trust beaches, public access, state and federally protected species, state critical habitats, and federal essential fish habitats.

3. Individual beach dredge-and-fill projects and related large-scale coastal engineering activities rarely provide adequate assessment or consideration of potential damage to fishery resources under state and federal management. Historically, emphasis has been placed on the logistics of sand procurement and movement, and economics, with environmental considerations dominated by compliance with limitations imparted by the Endangered Species Act for sea turtles, piping plovers and other listed organisms.

4. Opportunities to avoid and minimize impacts of beach dredge-and-fill activities on fishery resources, and offsets for unavoidable impacts have rarely been proposed or implemented.

5. Large-scale beach dredge and fill activities have the potential to cause impacts in four types of habitats:

    a. waters and benthic habitats near the dredging sites;
    b. waters between dredging and filling sites;
    c. waters and benthic habitats near the fill sites; and
    d. waters and benthic habitats potentially affected as sediments move subsequent to deposition in fill areas.

6. Certain nearshore habitats are particularly important to the long-term viability of North Carolina's commercial and recreational fisheries and potentially threatened by large-scale, long-term or frequent disturbance of sediments:

    a. inlets;
    b. the swash and surf zones and beach-associated bars; and
    c. underwater soft-sediment topographic features, both onshore and offshore
    d. underwater hard-substrate topographic features.

7. Large sections of North Carolina waters potentially affected by these projects, both individually and collectively, have been identified as Essential Fish Habitats (EFH) by the South Atlantic Fishery Management Council (SAFMC) and the Mid-Atlantic Fishery Management Council (MAFMC). Affected species under federal management include:

    a. summer flounder (various nearshore waters, including the surf zone and inlets; certain offshore waters);
    b. bluefish (various nearshore waters, including the surf zone and inlets);
    c. red drum (ocean high-salinity surf zones and unconsolidated bottoms to a depth of 50 meters);
    d. several snapper and grouper species (live hard bottom from shore to 600 feet, and – for estuarine-dependent species [e.g., gag grouper and gray snapper] – unconsolidated bottoms and live hard bottoms to the 100 foot contour);
    e. spiny dogfish (various coastal waters from the surf zone to 200 miles);
    f. black sea bass (various nearshore waters, including unconsolidated bottom and live hard bottom to 100 feet, and hard bottoms to 600 feet);
    g. penaeid shrimps (offshore habitats used for spawning and growth to maturity, and waters connecting to inshore nursery areas, including the surf zone and inlets);
    h. coastal migratory pelagics (sandy shoals of capes and bars, barrier island and ocean-side waters from the surf zone to the shelf break inshore of the Gulf Stream; all coastal inlets);
    i. corals of various types (hard substrates and muddy, silty bottoms from the subtidal to the shelf break);

j. calico scallops (unconsolidated bottoms northeast and southwest of Cape Lookout in 62-102 feet);
k. sargassum (wherever it occurs out to 200 miles);
l. many large and small coastal sharks, managed by the Secretary of the Department of Commerce (inlets and nearshore waters, including pupping and nursery grounds).

8. Beach dredge and fill projects also potentially threaten important fish habitats for anadromous species under federal, interstate and state management (in particular, inlets and offshore overwintering grounds), as well as essential overwintering grounds and other critical habitats for weakfish and other species managed by the Atlantic States Marine Fisheries Commission and the State of North Carolina. The SAFMC identified for anadromous and catadromous species those habitats that have been EFH if there had been a council plan (inlets and nearshore waters).

9. Many of the habitats potentially affected by these projects have been identified as Habitat Areas of Particular Concern by the SAFMC. The specific fishery management plan is provided in parentheses:

    a. all nearshore hard bottom areas (SAFMC, snapper-grouper);
    b. all coastal inlets (SAFMC, penaeid shrimps, red drum, and snapper-grouper);
    c. near-shore spawning sites (SAFMC, penaeid shrimps, and red drum)
    d. well-known seafloor features, including the Point, Ten Fathom Ledge and Big Rock (SAFMC, snapper-grouper, coastal migratory pelagics, and corals);
    e. pelagic and benthic sargassum (SAFMC, snapper-grouper);
    f. sandy shoals of Cape Lookout, Cape Fear, and Cape Hatteras (SAFMC, coastal migratory pelagics) and;
    g. Bogue Sound and New River Estuary (SAFMC, coastal migratory pelagics).

10. Habitats likely to be affected by beach dredge and fill projects include many being recognized in North Carolina Fishery Management Plans as important for state-managed species. Many of these habitats are in the process of being recognized as Critical Habitat Areas by the Commission, in either FMPs or in Coastal Habitat Protection Plans. Examples include:

    a. inlets (Blue Crab FMP, Red Drum FMP, River Herring FMP);
    b. oceanic nearshore waters (Blue Crab FMP, Red Drum FMP); and
    c. many others as FMPs and CHPPs are adopted over the coming years.

11. Recent work by scientists in east Florida has documented exceptionally important habitat values for nearshore, hard-bottom habitats often buried by beach dredging projects, including use by over 500 species of fishes and invertebrates, and juveniles of many reef fishes. Equivalent scientific work is just beginning off North Carolina, but life histories suggest that similar habitat use patterns will be found.

Threats to Marine and Estuarine Resources from Beach Dredge and Fill Activities

The Commission finds that beach dredge-and-fill activities and related large-scale coastal engineering projects (including inlet alteration projects) threaten the marine and estuarine resources of North Carolina through the following mechanisms:

1. Direct mortality and displacement of organisms at and near sediment dredging sites;
2. Alteration of seafloor topography and associated current and waves patterns and magnitudes at dredging areas;

3. Alteration of seafloor sediment size-frequency distributions at dredging sites, with secondary effects on benthos at those sites;
4. Elevated turbidity and deposition of fine sediments down-current from dredging sites;
5. Direct mortality and displacement of organisms at initial sediment fill sites;
6. Elevated turbidity in and near initial fill sites, especially in the surf zone, and deposition of fine sediment down-current from initial fill sites;
7. Alteration of near-shore topography and current and waves patterns and magnitudes associated with fill;
8. Movement of deposited sediment away from initial fill sites, especially onto hard bottoms;
9. Alteration of large-scale sediment budgets, sediment movement patterns and feeding and other ecological relationships, including the potential for cascading disturbance effects;
10. Alteration of large-scale movement patterns of water, with secondary effects on water quality and biota;
11. Alteration of movement patterns and successful inlet passage for larvae, post-larvae, juveniles and adults of marine and estuarine organisms;
12. Alteration of long-term shoreline migration patterns (inducing further ecological cascades with consequences that are difficult to predict); and
13. Exacerbation of transport and/or biological uptake of toxicants and other pollutants released at either dredge or fill sites.

Commission Policies for Beach Dredge and Fill Projects and Related Large Coastal Engineering Projects

The Commission establishes the following general policies related to large-scale beach dredge-and-fill and related projects, to clarify and augment the general policies already adopted on April 13, 1999:

1. Projects should fulfill the Commission's general habitat policy by avoiding, minimizing and offsetting damage to the marine and estuarine resources of North Carolina;

2. Projects should provide detailed analyses of possible impacts to each type of Essential Fish Habitat (EFH), with careful and detailed analyses of possible impacts to Habitat Areas of Particular Concern (HAPC) and Critical Habitat Areas (CHA), including short and long term, and population and ecosystem scale effects;

3. Projects should provide a full range of alternatives, along with assessments of the relative impacts of each on each type of EFH, HAPC and CHA;

4. Projects should avoid impacts on EFH, HAPCs and CHAs that are shown to be avoidable through the alternatives analysis, and minimize impacts that are not;

5. Projects should include assessments of potential unavoidable damage to marine resources, using conservative assumptions;

6. Projects should be conditioned on the avoidance of avoidable impacts, and should include compensatory mitigation for all reasonably predictable impacts to the marine and estuarine resources of North Carolina, taking into account uncertainty about these effects. Mitigation should be local, up-front and in-kind wherever possible;

7. Projects should include baseline and project-related monitoring adequate to document pre-project conditions and impacts of the projects on the marine and estuarine resources of North Carolina;

8. All assessments should be based upon the best available science, and be appropriately conservative so as to be prudent and precautionary; and

9. All assessments should take into account the cumulative impacts associated with other beach dredge-and-fill projects in North Carolina and adjacent states, and other large-scale coastal engineering projects that are ecologically related.

APPENDIX J: CHPP IMPLEMENTATION PLAN (2009-2011)

The listing below was drawn from the CHPP 2008-2009 Annual Report approved by the Joint Legislative Commission on Seafood and Aquaculture in September 2009. The full implementation plans can be queried from a database housed on the Division of Marine Fisheries, Habitat Protection server. Implementation Plans also contain specific actions from previous plans that are "carried forward" due to a partially complete or incomplete status. These actions may also be considered "on-going" until the CHPP Steering Committee decides to discontinue them.

September 2009 – August 2010 Planned Action and Needs

- Delineate SHAs in Region 3 (Approximately White Oak River Basin). (DMF/MFC, WRC, EEP/DENR).
- Conduct SHA evaluation and designation process for Region 2 (Pamlico Sound and tributaries).(DMF, WRC)
- Continue to review "Inner Banks" development issues and address environmental issues.(CRC/DCM, DWQ/EMC)
- Begin to address the challenges associated with Sea Level Rise and climate change more broadly in a context consistent with the reports of the Legislative Committee on Climate Change to NC.(DENR)
- Continue to increase public awareness on the value of and threats to coastal fish habitats and the role of the CHPP process to protect and enhance these resources.(DMF, DCM, EEP/DENR)
- Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.(DMF/DCM, EEP/DWR/DENR, WRC)
- Examine the feasibility and preferred siting of wind turbines in North Carolina without significantly impacting fish habitat.(DENR)
- Pursue funding for the Community Conservation Assistance Program (CCAP) in the Division of Soil and Water Conservation.(DSWC/DENR)
- Seek dedicated funding to staff DCM's Clean Marina Program and effectively implement Best Management Practices as a non-regulatory way to improve water quality in and around marinas and docks.(DCM, DENR)
- Continue development and refinement of shoreline stabilization rules that preserve ecosystem function and consider rising sea levels and a changing land/water interface.(DCM/CRC, EEP/DENR)
- Take steps to encourage more restoration of degraded waters and work towards removal from the Federal 303-d listing.(APNEP, DWQ)
- Continue to identify problems regarding infrastructure for Waste Water Treatment Plants and system maintenance. Work with the local governments to develop and implement plans to correct deficiencies.(DWQ)
- Continue to develop a non-traditional mitigation strategy with the White Oak basin as a pilot project. The consultants developing the Local Watershed Plan (East Carolina University and Environmental Defense Fund) are working through EEP's Non-Traditional Mitigation Steering Committee and two ad hoc advisory committees to seek consensus goals and a viable mitigation strategy.(EEP/DENR)
- Work with the Division of Water Resources to minimize conflicts between Aquatic Weed Control practices and protection of SAV habitat.(DMF/MFC, WRC)
- Consider development of a conservation lease for the purpose of oyster and other habitat restoration.(DMF/MFC)
- Seek funding to initiate research on impacts of endocrine-disrupting chemicals to blue crabs and oysters.(DENR)

- Work with the Department of Agriculture and Consumer Services to develop and implement a drug disposal program for pharmaceuticals.(DMF/MFC)
- Complete photo-interpretation of SAV imagery of coast.(DMF, APNEP)
- Continue to study the feasibility and benefits of developing an SAV Restoration Program.(DMF, APNEP, EEP/DENR)
- Seek dedicated funding for the state SAV mapping program.(DMF, APNEP)
- Complete river herring spawning surveys in Albemarle system and prioritize obstruction removals.(DMF)
- Continue expanding the oyster sanctuary program, seeding sanctuaries with live oysters, and construct a shellfish hatchery.(DMF)
- Continue to work toward more funding for the Community Conservation Assistance Program. (DSWC)
- Workshops currently planned for next year include topics such as water reuse (i.e. rain water harvesting, gray water use), stormwater workshops for realtors, an invasive red fox symposium, a microbial pollution workshop, and a grant writing workshop depending upon budget constraints.(DCM/NERR)
- In the coming year, APNEP will work with the NC Division of Water Quality to implement several projects: 1) to host Coastal Stormwater and Riparian Buffer Rules Workshop for Development Professionals. 2) Develop information for display and distribution about Riparian Buffers and 401 Water Quality Certifications. Information will focus on the riparian buffer rules in the Neuse and Tar-Pamlico River Basins and the 401 Water Quality Certification Program, which is in effect throughout the entire state. 3) A project will provide information to focus on students in K-12 understanding the biodiversity the lakes, streams and estuaries.(APNEP, DWQ)
- APNEP will continue to build upon the data inventory survey conducted in 2006 in partnership with the Virginia Institute for Marine Sciences. Data referenced in the survey for the Virginia portion of the Pasquotank and Chowan Rivers. Data will include monitoring data on water quality and living resources as well as land use, population trends and other potential ecosystem stressors. Analyses will be conducted for indications of change over the period of record. The goal is to develop a preliminary State of the River Basin report for the Pasquotank and Chowan Rivers. The approach will be holistic in that changes in monitored variables will be tracked throughout river basins and river systems. These stations are monitored by the Virginia Department of Environmental Quality. These data can be further analyzed to look for trends in seasons as well as trends in other monitored parameters. An attempt will be made to trace changes in water quality and living resources back to changes in the basin.(APNEP)
- DEH – SS will continue meeting with the Shoreline Survey Task Force finalizing proposed inspection program and put the plan in the form of a report for presentation to CHPP Steering Committee.(DEH-SS/DENR)

APPENDIX G. POLICY STATEMENT FOR PROTECTION OF SAV HABITAT

North Carolina Marine Fisheries Commission
(Adopted May 12, 2004)

Submerged aquatic vegetation (SAV) serves as the basis for premium habitat for many coastal fish and invertebrates. The SAV habitat is so important that special efforts are required to protect and enhance water quality and physical conditions for its propagation and distribution.

The purpose of this statement is to provide guidance for management needs to protect SAV habitat in the development of fisheries management plans and habitat protection plans. The following is a summary of the special quality of SAV as habitat and the attendant water quality/physical conditions necessary for its maintenance. Details and additional information can be found in the SAV chapter in the Coastal Habitat Protection Plan (CHPP) and background scientific references.

The role of SAV as habitat

- Submerged aquatic vegetation, which consists of plants having growing roots (rhizomes) in the sediment, serves as physical hiding places for important fish and shellfish species, as well as a food base for essential food chains. Aquatic productivity in waters with SAV beds is significantly higher than in coastal waters without SAV.
- SAV supports a vast array of epiphytes and attached invertebrates that serve as a source of food for many important fish and shellfish.
- The major criterion limiting distribution and propagation of SAV is the amount of light reaching the bottom. Suspended solids and proliferation of algae in the water column are significant causes of reduced light penetration in coastal waters. Water-column clarity, therefore, should be a significant water-quality criterion. SAV, in turn, can also improve water quality through its baffling effects on currents and through its filtering of water by attached epiphytes and invertebrates.
- SAV serves as important habitat for species such as scallops, shrimp, blue crabs and some species of fish.

Management guidelines

- In order to delineate and assess the distribution and health of SAV habitat, SAV beds need to be mapped and monitored. The saltwater end of coastal waters supports eelgrass, widgeongrass, and shoalgrass, and the freshwater end supports several species of freshwater SAV.
- Minimize nutrient and sediment loading to coastal waters that support existing SAV to protect adequate water quality as defined by water-column clarity in standard measurement units.
- All SAV needs to be protected from all bottom-disturbing fishing and recreational gear. Sufficient buffer zones surrounding SAV beds should also be protected from disturbance to prevent impacts of sediments on growing SAV.
- Provide adequate safeguards to prevent direct (or indirect) impacts from development projects adjacent to or connected to SAV.
- Assess cumulative impacts of land use and development changes in the watershed affecting SAV to identify the potential impact. Require identification of cumulative impacts as a condition of development of permit applications.
- Require compensatory mitigation where impacts are unavoidable. Initiate restoration programs to recoup and/or enhance lost SAV habitat.

- Educate landowners adjacent to SAV, boaters, and other potential interested parties about the value of SAV as a habitat for many coastal fishes and invertebrates.

APPENDIX H. POLICIES FOR THE PROTECTION AND RESTORATION OF MARINE AND ESTUATINE RESOURCES AND ENVIRONMENTAL PERMIT REVIEW AND COMMENTING

North Carolina Marine Fisheries Commission
(Adopted September 24, 2009)

Issue

This document establishes the policies of the NC Marine Fisheries Commission (Commission) regarding overall protection and restoration of the state's marine and estuarine resources, and for environmental permit review for proposed projects with the potential to adversely impact those resources.

Background

The "marine and estuarine resources" of North Carolina are defined broadly as "[a]11 fish, except inland game fish, found in the Atlantic Ocean and in coastal fishing waters; all fisheries based upon such fish; all uncultivated or undomesticated plant and animal life, other than wildlife resources, inhabiting or dependent upon coastal fishing waters; and the entire ecology supporting such fish, fisheries, and plant and animal life." N.C.G.S. 113-129(11). The Commission is charged with the duty to "(m)anage, restore, develop, cultivate, conserve, protect, and regulate the marine and estuarine resources within its jurisdiction." N.C.G.S. 143B-289.51(b)(1).

Two powers of the Commission constitute its primary authorities to effectuate that charge, and thereby to protect and restore North Carolina marine and estuarine resources. First, the Commission is specifically empowered "[t]o comment on and otherwise participate in the determination of permit applications received by state agencies that may have an effect on the marine and estuarine resources of the state." N.C.G.S. 143b-289.52(2)(9). Second, the Commission has to power and duty to participate in the development, approval, and implementation of Coastal Habitat Protection Plans (CHPPs) for all "critical fisheries habitats." N.C.G.S. 143B-279.8; 143B-289.52(a)(11). The goal of such CHPPs is "the net long-term enhancement of coastal fisheries associated with each coastal habitat identified." N.C.G.S. 142B-279.8. The Commission by unanimous vote has delegated its permit commenting authority to its Habitat and Water Quality Standing Advisory Committee (Committee) for the sake of efficiency and effectiveness. Likewise, the Commission has designated the Committee as its participating body in the development of CHPPs, which will then be approved and implemented by the full Commission. However, since the formal preparation of will not begin until at least 1 July 1999, it will be some time before final CHPPs can be developed and implemented in order to help protect against the impacts of coastal development and other human activities that adversely affect North Carolina's marine and estuarine resources. Consequently, the Commission's environmental permit review authority currently constitutes the primary vehicle by which the Commission can effectuate its duty to protect and enhance the state's marine and estuarine resources.

Discussion

There are two equally serious challenges to the Commission's successfully maintaining and enhancing North Carolina's marine and estuarine resources: (1) the lack of necessary information on the current nature and status of many of those resources; and (2) the lack of obvious mechanisms to account for and ameliorate the ever accumulating changes that impair the functioning of critical fisheries habitats and otherwise adversely affect fisheries stocks. The Commission cannot hope to comply with its statutory duties to protect and enhance marine and estuarine resources without the abilities to identify and monitor

changes in those resources, to compensate for losses to critical fisheries habitats, and to enhance the overall functioning of the altered coastal ecosystem.

Cumulative adverse resource impacts from both large and small scale human activities constitute the principal impediment to the Commission's ability to achieve its statutory mandate of conserving, protecting, and restoring North Carolina's marine and estuarine resources. Many of the activities that contribute to coastal resource destruction or impairment require no environmental permits. As a consequence, their impacts are not accounted for, to the long-term detriment of marine and estuarine resources. Even for permitted activities, the adverse impacts on marine and estuarine resources may be individually minor, causing them to fall below the thresholds that require compensatory mitigation under existing state policy.

However, where specific projects requiring environmental permits pose a threat to resources under the Commission's jurisdiction, it is reasonable to expect the permittee to contribute to resolving both the informational and resource protection dilemmas faced by the Commission to ensure that unacceptable impacts to marine and estuarine resources do not occur. A direct precedent to such action by a state agency is found in the N.C. Division of Water Quality's current requirement that NPDES permittees conduct upstream and downstream monitoring as a condition of their permits, to ensure that state water quality standards are not violated. In addition, that agency has worked with dischargers in certain river basins to establish industry - funded, integrated monitoring networks to track water quality trends in those waters.

Specific action by the Commission is required if it is to meet its charge of protecting and restoring the state's marine and estuarine resources. To the greatest extent possible, activities that potentially threaten those resources must be prevented from contributing to overall resource degradation. Instead, adequate measures must be implemented to ensure a long-term, net improvement in the quantity and quality of fisheries stocks and critical fisheries habitats under the Commission's jurisdiction. To achieve that end, two goals must be attained:

- adequate compensatory and resource enhancement measures must be incorporated into existing environmental permitting processes
- resource restoration and enhancement programs must be developed to offset losses from activities not requiring permits

No net loss policies for permitted activities, while having many benefits, have at times limited the ability of state agencies to implement compensatory mitigation in a manner that effectively offsets losses to the impacted watershed. By requiring in-kind mitigation, primarily for wetland impacts, mitigation, in some instances, targets wetlands in a different landscape position or watershed, which serves different ecological functions, and consequently does not replace the ecological services lost by the permitted activity in the affected watershed. In addition, mitigation is not required for permitted aquatic resource impacts associated with private water dependent activities, such as loss of submerged aquatic vegetation habitat from channel dredging or degradation of a primary nursery area from shoreline hardening.

The Marine Fisheries Commission authorized DMF staff to begin to incorporate mitigation policy into bylaws at their Business Meeting in Atlantic Beach, NC, on December 2-3, 2004. MFC endorsed the concept of holding workshops to address technical and policy issues related compensatory mitigation. These workshops have now been completed, and provided guidance for a study conducted by East Carolina University, Environmental Defense Fund, and NC Ecosystem Enhancement Program. From this work utilizing two expert panels – one on wetland science and the other on wetland policy, two documents have been completed to provide guidance on alternatives to traditional mitigation. The first report, A Science-based Framework for Compensatory Mitigation of Coastal Habitat in North Carolina (ECU 2006) presented a scientific framework for an alternative approach to compensatory mitigation to

better assure functional replacement. The framework involves evaluating watershed condition, encouraging the use of varied complementary techniques for functional recovery, and designing restoration projects in response to system-wide watershed scale challenges. The goal was to integrate compensatory mitigation requirements into watershed protection strategies that are consistent with the goals and objectives of the CHPP. In the second phase of the project, in a report entitled, An Approach to Coordinate Compensatory Mitigation Requirements to Meet Goals of the Coastal Habitat Protection Plan (ECU and Environmental Defense, 2006), the group developed an alternative assessment procedure for North Carolina's watersheds. The results of the study were presented during a day-long meeting (October 15, 2008) to a group represented by state and federal regulatory agencies and academic researchers, most of who were involved in the original workshops. The next phase of the project involves demonstrating application of the approach in two subwatersheds of the White Oak River basin.

A summary of the first two phases of this project were presented to the MFC on November 6, 2008. The MFC endorsed developing a compensatory mitigation process as part of the policy statement. On January 16, 2009 the Habitat and Water Quality Committee unanimously voted to recommend the following policy for consideration by the MFC. This compensatory mitigation policy would be implemented as a final component of the existing Resource Protection and Environmental Permit Review and Commenting Policies.

The first two policies below were established in 1999 primarily to achieve the first goal of incorporating adequate compensatory and resource enhancement measures into existing environmental permitting processes. The third policy was established in 2009 to provide more direction in how to accomplish that, given our evolving understanding of ecosystem functions, threats, and techniques for successful mitigation and restoration. Progress on the second goal (developing restoration/enhancement programs to offset losses not directly associated with permitted activities) has primarily occurred in North Carolina through enhancement of DMF's oyster sanctuary program, Clean Water Management Trust Fund projects, and numerous wetland and oyster restoration projects conducted by non-profit environmental organizations.

Proposed Resource Protection and Environmental Permit Review and Commenting Policies

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. 143B-289.52(a)(9), the Habitat and Water Quality Standing Advisory Committee shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats);and

2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems; and

3) incorporate the following array of options when planning compensatory mitigation to allow focus on

restoration of equivalent ecosystem functions within a watershed, based on our evolving understanding of the needs of compensatory mitigation to protect and enhance coastal water quality and watersheds:

i. Establish goals for coastal watersheds by the MFC based on desired outcomes - protection/restoration of shellfishing waters, PNAs, SAV beds, etc.;
ii. Identify watersheds/areas where these goals can be realistically achieved. The Strategic Habitat Areas approach that emerged from CHPP can be used to identify locations where protection/restoration is most likely to be successful;
iii. Utilize the Rapid Watershed Assessment Procedure (or other assessment methods) to assess watershed condition and identify problems/solutions;
iv. Evaluate and authorize compensatory mitigation projects based on their ability to contribute to goals established for coastal watersheds. Projects that provide functional replacement, e.g., increased water retention/storage through the use of BMPs, may be approved if documentation is provided that the projects are the most effective mechanism to achieve the goals established for a watershed;
v. Implement monitoring to support data acquisition necessary to support the SHA process and the effectiveness of projects that have been implemented;
vi. Solicit funding from all available sources (compensatory mitigation, CWMTF, 319, etc.) to fully implement protection/restoration strategies in coastal watersheds.

APPENDIX I: MFC BEACH NOURISHMENT POLICY

North Carolina Marine Fisheries Commission
(Adopted November 16, 2000)

Policy Context

This document establishes the policies of the North Carolina Marine Fisheries Commission (Commission) regarding protection and restoration of the state's marine and estuarine resources associated with beach dredge and fill activities, and related large-scale coastal engineering projects. The policies are designed to be consistent with the overall habitat protection policies of the Commission, adopted April 13, 1999, as amended February 17-18, 2000, as follows:

It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.

Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. §143B-289.52(a)(9), the Chairs of the Habitat and Water Quality Standing Advisory Committee, in consultation with the Commission Chair, shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:

(1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats); and

(2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems.

The findings presented below assess the marine and estuarine resources of North Carolina which are potentially threatened by activities related to the large-scale movement of sand in the coastal ocean and adjacent habitats, and the processes whereby those resources are placed at risk. The policies established in this document are designed to avoid, minimize, and offset damage caused by these activities, in accordance with the laws of the state and the general habitat policies of this Commission.

Marine and Estuarine Resources at Risk from Beach Dredge and Fill Activities

The Commission finds:

1. In general, the array of large-scale and long-term beach alteration projects currently being considered for North Carolina together constitute a real and significant threat to the marine and estuarine resources of the United States and North Carolina.

2. The cumulative effects of these projects have not been adequately assessed, including impacts on public trust marine and estuarine resources, use of public trust beaches, public access, state and federally protected species, state critical habitats, and federal essential fish habitats.

3. Individual beach dredge-and-fill projects and related large-scale coastal engineering activities rarely provide adequate assessment or consideration of potential damage to fishery resources under state and federal management. Historically, emphasis has been placed on the logistics of sand procurement and movement, and economics, with environmental considerations dominated by compliance with limitations imparted by the Endangered Species Act for sea turtles, piping plovers and other listed organisms.

4. Opportunities to avoid and minimize impacts of beach dredge-and-fill activities on fishery resources, and offsets for unavoidable impacts have rarely been proposed or implemented.

5. Large-scale beach dredge and fill activities have the potential to cause impacts in four types of habitats:

    a. waters and benthic habitats near the dredging sites;
    b. waters between dredging and filling sites;
    c. waters and benthic habitats near the fill sites; and
    d. waters and benthic habitats potentially affected as sediments move subsequent to deposition in fill areas.

6. Certain nearshore habitats are particularly important to the long-term viability of North Carolina's commercial and recreational fisheries and potentially threatened by large-scale, long-term or frequent disturbance of sediments:

    a. inlets;
    b. the swash and surf zones and beach-associated bars; and
    c. underwater soft-sediment topographic features, both onshore and offshore
    d. underwater hard-substrate topographic features.

7. Large sections of North Carolina waters potentially affected by these projects, both individually and collectively, have been identified as Essential Fish Habitats (EFH) by the South Atlantic Fishery Management Council (SAFMC) and the Mid-Atlantic Fishery Management Council (MAFMC). Affected species under federal management include:

    a. summer flounder (various nearshore waters, including the surf zone and inlets; certain offshore waters);
    b. bluefish (various nearshore waters, including the surf zone and inlets);
    c. red drum (ocean high-salinity surf zones and unconsolidated bottoms to a depth of 50 meters);
    d. several snapper and grouper species (live hard bottom from shore to 600 feet, and – for estuarine-dependent species [e.g., gag grouper and gray snapper] – unconsolidated bottoms and live hard bottoms to the 100 foot contour);
    e. spiny dogfish (various coastal waters from the surf zone to 200 miles);
    f. black sea bass (various nearshore waters, including unconsolidated bottom and live hard bottom to 100 feet, and hard bottoms to 600 feet);
    g. penaeid shrimps (offshore habitats used for spawning and growth to maturity, and waters connecting to inshore nursery areas, including the surf zone and inlets);
    h. coastal migratory pelagics (sandy shoals of capes and bars, barrier island and ocean-side waters from the surf zone to the shelf break inshore of the Gulf Stream; all coastal inlets);
    i. corals of various types (hard substrates and muddy, silty bottoms from the subtidal to the shelf break);

j. calico scallops (unconsolidated bottoms northeast and southwest of Cape Lookout in 62-102 feet);
k. sargassum (wherever it occurs out to 200 miles);
l. many large and small coastal sharks, managed by the Secretary of the Department of Commerce (inlets and nearshore waters, including pupping and nursery grounds).

8. Beach dredge and fill projects also potentially threaten important fish habitats for anadromous species under federal, interstate and state management (in particular, inlets and offshore overwintering grounds), as well as essential overwintering grounds and other critical habitats for weakfish and other species managed by the Atlantic States Marine Fisheries Commission and the State of North Carolina. The SAFMC identified for anadromous and catadromous species those habitats that have been EFH if there had been a council plan (inlets and nearshore waters).

9. Many of the habitats potentially affected by these projects have been identified as Habitat Areas of Particular Concern by the SAFMC. The specific fishery management plan is provided in parentheses:

    a. all nearshore hard bottom areas (SAFMC, snapper-grouper);
    b. all coastal inlets (SAFMC, penaeid shrimps, red drum, and snapper-grouper);
    c. near-shore spawning sites (SAFMC, penaeid shrimps, and red drum)
    d. well-known seafloor features, including the Point, Ten Fathom Ledge and Big Rock (SAFMC, snapper-grouper, coastal migratory pelagics, and corals);
    e. pelagic and benthic sargassum (SAFMC, snapper-grouper);
    f. sandy shoals of Cape Lookout, Cape Fear, and Cape Hatteras (SAFMC, coastal migratory pelagics) and;
    g. Bogue Sound and New River Estuary (SAFMC, coastal migratory pelagics).

10. Habitats likely to be affected by beach dredge and fill projects include many being recognized in North Carolina Fishery Management Plans as important for state-managed species. Many of these habitats are in the process of being recognized as Critical Habitat Areas by the Commission, in either FMPs or in Coastal Habitat Protection Plans. Examples include:

    a. inlets (Blue Crab FMP, Red Drum FMP, River Herring FMP);
    b. oceanic nearshore waters (Blue Crab FMP, Red Drum FMP); and
    c. many others as FMPs and CHPPs are adopted over the coming years.

11. Recent work by scientists in east Florida has documented exceptionally important habitat values for nearshore, hard-bottom habitats often buried by beach dredging projects, including use by over 500 species of fishes and invertebrates, and juveniles of many reef fishes. Equivalent scientific work is just beginning off North Carolina, but life histories suggest that similar habitat use patterns will be found.

Threats to Marine and Estuarine Resources from Beach Dredge and Fill Activities

The Commission finds that beach dredge-and-fill activities and related large-scale coastal engineering projects (including inlet alteration projects) threaten the marine and estuarine resources of North Carolina through the following mechanisms:

1. Direct mortality and displacement of organisms at and near sediment dredging sites;
2. Alteration of seafloor topography and associated current and waves patterns and magnitudes at dredging areas;

3. Alteration of seafloor sediment size-frequency distributions at dredging sites, with secondary effects on benthos at those sites;
4. Elevated turbidity and deposition of fine sediments down-current from dredging sites;
5. Direct mortality and displacement of organisms at initial sediment fill sites;
6. Elevated turbidity in and near initial fill sites, especially in the surf zone, and deposition of fine sediment down-current from initial fill sites;
7. Alteration of near-shore topography and current and waves patterns and magnitudes associated with fill;
8. Movement of deposited sediment away from initial fill sites, especially onto hard bottoms;
9. Alteration of large-scale sediment budgets, sediment movement patterns and feeding and other ecological relationships, including the potential for cascading disturbance effects;
10. Alteration of large-scale movement patterns of water, with secondary effects on water quality and biota;
11. Alteration of movement patterns and successful inlet passage for larvae, post-larvae, juveniles and adults of marine and estuarine organisms;
12. Alteration of long-term shoreline migration patterns (inducing further ecological cascades with consequences that are difficult to predict); and
13. Exacerbation of transport and/or biological uptake of toxicants and other pollutants released at either dredge or fill sites.

Commission Policies for Beach Dredge and Fill Projects and Related Large Coastal Engineering Projects

The Commission establishes the following general policies related to large-scale beach dredge-and-fill and related projects, to clarify and augment the general policies already adopted on April 13, 1999:

1. Projects should fulfill the Commission's general habitat policy by avoiding, minimizing and offsetting damage to the marine and estuarine resources of North Carolina;

2. Projects should provide detailed analyses of possible impacts to each type of Essential Fish Habitat (EFH), with careful and detailed analyses of possible impacts to Habitat Areas of Particular Concern (HAPC) and Critical Habitat Areas (CHA), including short and long term, and population and ecosystem scale effects;

3. Projects should provide a full range of alternatives, along with assessments of the relative impacts of each on each type of EFH, HAPC and CHA;

4. Projects should avoid impacts on EFH, HAPCs and CHAs that are shown to be avoidable through the alternatives analysis, and minimize impacts that are not;

5. Projects should include assessments of potential unavoidable damage to marine resources, using conservative assumptions;

6. Projects should be conditioned on the avoidance of avoidable impacts, and should include compensatory mitigation for all reasonably predictable impacts to the marine and estuarine resources of North Carolina, taking into account uncertainty about these effects. Mitigation should be local, up-front and in-kind wherever possible;

7. Projects should include baseline and project-related monitoring adequate to document pre-project conditions and impacts of the projects on the marine and estuarine resources of North Carolina;

8. All assessments should be based upon the best available science, and be appropriately conservative so as to be prudent and precautionary; and

9. All assessments should take into account the cumulative impacts associated with other beach dredge-and-fill projects in North Carolina and adjacent states, and other large-scale coastal engineering projects that are ecologically related.

APPENDIX J: CHPP IMPLEMENTATION PLAN (2009-2011)

The listing below was drawn from the CHPP 2008-2009 Annual Report approved by the Joint Legislative Commission on Seafood and Aquaculture in September 2009. The full implementation plans can be queried from a database housed on the Division of Marine Fisheries, Habitat Protection server. Implementation Plans also contain specific actions from previous plans that are "carried forward" due to a partially complete or incomplete status. These actions may also be considered "on-going" until the CHPP Steering Committee decides to discontinue them.

September 2009 – August 2010 Planned Action and Needs

- Delineate SHAs in Region 3 (Approximately White Oak River Basin). (DMF/MFC, WRC, EEP/DENR).
- Conduct SHA evaluation and designation process for Region 2 (Pamlico Sound and tributaries).(DMF, WRC)
- Continue to review "Inner Banks" development issues and address environmental issues.(CRC/DCM, DWQ/EMC)
- Begin to address the challenges associated with Sea Level Rise and climate change more broadly in a context consistent with the reports of the Legislative Committee on Climate Change to NC.(DENR)
- Continue to increase public awareness on the value of and threats to coastal fish habitats and the role of the CHPP process to protect and enhance these resources.(DMF, DCM, EEP/DENR)
- Continue to study the feasibility and benefits of dam and barrier removal in general and for mitigation.(DMF/DCM, EEP/DWR/DENR, WRC)
- Examine the feasibility and preferred siting of wind turbines in North Carolina without significantly impacting fish habitat.(DENR)
- Pursue funding for the Community Conservation Assistance Program (CCAP) in the Division of Soil and Water Conservation.(DSWC/DENR)
- Seek dedicated funding to staff DCM's Clean Marina Program and effectively implement Best Management Practices as a non-regulatory way to improve water quality in and around marinas and docks.(DCM, DENR)
- Continue development and refinement of shoreline stabilization rules that preserve ecosystem function and consider rising sea levels and a changing land/water interface.(DCM/CRC, EEP/DENR)
- Take steps to encourage more restoration of degraded waters and work towards removal from the Federal 303-d listing.(APNEP, DWQ)
- Continue to identify problems regarding infrastructure for Waste Water Treatment Plants and system maintenance. Work with the local governments to develop and implement plans to correct deficiencies.(DWQ)
- Continue to develop a non-traditional mitigation strategy with the White Oak basin as a pilot project. The consultants developing the Local Watershed Plan (East Carolina University and Environmental Defense Fund) are working through EEP's Non-Traditional Mitigation Steering Committee and two ad hoc advisory committees to seek consensus goals and a viable mitigation strategy.(EEP/DENR)
- Work with the Division of Water Resources to minimize conflicts between Aquatic Weed Control practices and protection of SAV habitat.(DMF/MFC, WRC)
- Consider development of a conservation lease for the purpose of oyster and other habitat restoration.(DMF/MFC)
- Seek funding to initiate research on impacts of endocrine-disrupting chemicals to blue crabs and oysters.(DENR)

- Work with the Department of Agriculture and Consumer Services to develop and implement a drug disposal program for pharmaceuticals.(DMF/MFC)
- Complete photo-interpretation of SAV imagery of coast.(DMF, APNEP)
- Continue to study the feasibility and benefits of developing an SAV Restoration Program.(DMF, APNEP, EEP/DENR)
- Seek dedicated funding for the state SAV mapping program.(DMF, APNEP)
- Complete river herring spawning surveys in Albemarle system and prioritize obstruction removals.(DMF)
- Continue expanding the oyster sanctuary program, seeding sanctuaries with live oysters, and construct a shellfish hatchery.(DMF)
- Continue to work toward more funding for the Community Conservation Assistance Program. (DSWC)
- Workshops currently planned for next year include topics such as water reuse (i.e. rain water harvesting, gray water use), stormwater workshops for realtors, an invasive red fox symposium, a microbial pollution workshop, and a grant writing workshop depending upon budget constraints.(DCM/NERR)
- In the coming year, APNEP will work with the NC Division of Water Quality to implement several projects: 1) to host Coastal Stormwater and Riparian Buffer Rules Workshop for Development Professionals. 2) Develop information for display and distribution about Riparian Buffers and 401 Water Quality Certifications. Information will focus on the riparian buffer rules in the Neuse and Tar-Pamlico River Basins and the 401 Water Quality Certification Program, which is in effect throughout the entire state. 3) A project will provide information to focus on students in K-12 understanding the biodiversity the lakes, streams and estuaries.(APNEP, DWQ)
- APNEP will continue to build upon the data inventory survey conducted in 2006 in partnership with the Virginia Institute for Marine Sciences. Data referenced in the survey for the Virginia portion of the Pasquotank and Chowan Rivers. Data will include monitoring data on water quality and living resources as well as land use, population trends and other potential ecosystem stressors. Analyses will be conducted for indications of change over the period of record. The goal is to develop a preliminary State of the River Basin report for the Pasquotank and Chowan Rivers. The approach will be holistic in that changes in monitored variables will be tracked throughout river basins and river systems. These stations are monitored by the Virginia Department of Environmental Quality. These data can be further analyzed to look for trends in seasons as well as trends in other monitored parameters. An attempt will be made to trace changes in water quality and living resources back to changes in the basin.(APNEP)
- DEH – SS will continue meeting with the Shoreline Survey Task Force finalizing proposed inspection program and put the plan in the form of a report for presentation to CHPP Steering Committee.(DEH-SS/DENR)