SAFMC Fishery Ecosystem Plan II Implementation Plan Draft October 2017

Table of Contents: Approved Policy Statements and Plan Structure

Introduction

The South Atlantic Fishery Management Council developed Fishery Ecosystem Plan (FEP) II as a mechanism, in cooperation with NOAA Fisheries, to incorporate ecosystem principles, goals, and policies into the fishery management process. A core part of the FEP II development process involved engaging the Council's Habitat Protection and Ecosystem Based Management Advisory Panel and regional experts in developing new Sections and ecosystem specific policy statements to address South Atlantic food webs and connectivity and South Atlantic climate variability and fisheries. In addition, the Council also updated standing essential fish habitat policy statements and developed a new artificial reef habitat policy statement. In combination, these statements advance habitat conservation and the move to ecosystem based fishery management (EBFM) in the region and provided a foundation to develop the FEP II Implementation Plan. Council policies developed through the process support data collection, model and supporting tool development, and implementation of Fishery Ecosystem Plan II. The FEP II and the FEP II Implementation Plan, also provide a metric for determining the incorporation of ecosystem considerations into the management process. The Implementation Plan is not intended to direct or instruct any external program, organization, or entity to undertake a specific action or to reprioritize their work or programs.

Background

Habitat Conservation and the Fishery Ecosystem Plan

The Council, viewing habitat conservation as the foundation in the move to ecosystem based fishery management in the region, facilitated the evolution of the Habitat Plan into the first FEP (2009). This approach required a greater understanding of the South Atlantic ecosystem and the complex relationships among humans, marine life, and the environment including essential fish habitat. To support this move, the Council adopted broad goals for ecosystem based fishery management including: maintaining or improving ecosystem structure and function; maintaining or improving economic, social, and cultural benefits from resources; and maintaining or improving biological, economic, and cultural diversity. The original FEP served as a source document describing the South Atlantic ecosystem and the impact of fisheries on the environment.

The Council developed Fishery Ecosystem Plan II as a mechanism to incorporate the evaluation and consideration of ecosystem principles, goals, and policies into fishery management in the region. Fishery Ecosystem Plan I which has evolved to the living FEP II Dashboard and associated online tools provides a clear description and understanding of the fundamental physical, biological, and human and institutional context of South Atlantic ecosystems within which fisheries are managed. In addition, FEP II builds on existing and advances new policies that guide future evaluation and implementation and advancement of habitat conservation and ecosystem-based fishery management in the region.

Ecosystem-Based Fishery Management Policy and Road Map

Managing fisheries over the long-term means taking into account habitat conservation and managing more than just one species at a time. Advancing this more holistic, science-based approach which looks at the entire ecosystem is known as Ecosystem-Based Fisheries Management (EBFM).

To support this move, NOAA Fisheries developed an agency-wide EBFM Policy and Road Map, outlining a set of principles to guide actions and decisions over the long-term to: Implement ecosystem-level planning; Advance our understanding of ecosystem processes; Prioritize vulnerabilities and risks of ecosystems and their components; Explore and address trade-offs within an ecosystem; Incorporate ecosystem considerations into management advice; and Maintain resilient ecosystems.

FEP II new Sections were developed employing writing and review teams established from the Council's Habitat Protection and Ecosystem Based Management Advisory Panel, and experts from state, Federal, NGOs, academia and other regional organizations and associations. FEP II, unlike the original FEP, is a living continually developing online information system presenting core Sections and Sections with links to documents or other online systems presenting detailed updated information on species, habitat, fisheries and research. FEP II for example, provides both concise summaries of Council managed species and a link to detailed species information available through the Ecospecies, developed jointly with FWRI. The online information system provides access to detailed information on habitat, life history, the fishery and management.

This more concise and focused FEP II also addresses key new issue areas including highlighting our understanding of the complexity and connectivity of South Atlantic food webs, as well as, the implications of climate variability on fisheries. This information can be used as the basis for the following:

- Further policy development
- Consideration in habitat and fish stock assessment
- Future management of fisheries and habitat
- Support for a more comprehensive view of conservation and management in the South Atlantic
- Identification of long-term information needs

In summary, the FEP II advances the move to EBFM in the region through enhancing the capabilities of available models and tools used to manage habitat and fisheries. A key tenet of EBFM is the consideration of potential indirect effects of fisheries on food web linkages when developing harvest strategies and management plans.

Goals of EBFM in the South Atlantic Region

The FEP II and the implementation plan support the Council's broad goals for ecosystem based fishery management

GOAL 1: Maintaining or improving ecosystem structure and function.

GOAL 2: Maintaining or improving economic, social, and cultural benefits.

GOAL 3: Maintaining or improving biological, economic, and cultural diversity.

FEP II Implementation Plan Structure and Framework

The Implementation Plan is structured to translate approved policy statements of the SAFMC into actionable items. The plan therefore encompasses chapters beginning with an introduction to the policy statement, a link to the complete policy statement, and a table which translates policies and policy components into potential action items. The actions within the Plan are recommendations for activities that could support the Council's FEP II policies and recommendations.

Each chapter table includes the same columns. The first three columns list the general policies specified and policy components which were interpreted from policy discussions or identified priority research or information derived from each Policy Statement. The next column presents specific, potentially actionable items that support policies or policy components with the following column identifying priorities for each action (Low, Medium, or High). There is a column that identifies the Council or suggested partners or organization(s) that may be able to accomplish each action. And finally these two columns presenting recommended start and completion dates indicating how soon the work can begin and its expected duration. The Implementation Plan is not intended to direct or instruct any external program, organization, or entity to undertake a specific action or to reprioritize their work or programs. The entities listed in the "Program, Organization, Agency" column are suggested partners for the actions. The Habitat Protection and Ecosystem Based Management Advisory Panel, during their spring meeting, will discuss actions addressed in the previous year as summarized by Council staff.

The following chart visually represents the translation of SAFMC policies presented in policy statements and FEP II sections where appropriate, into actionable items that support the implementation plan for FEP II.

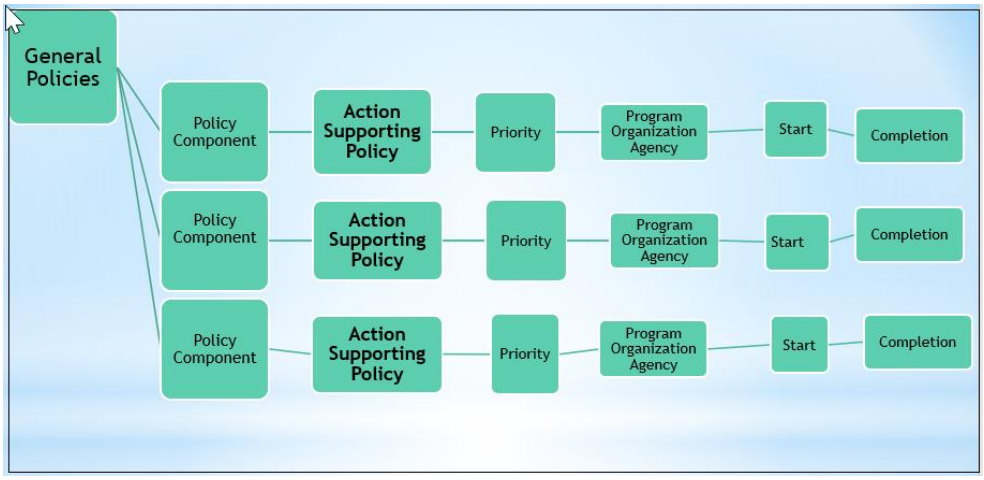

Figure 1. Visual representation of SAFMC policies into action items supporting the

Chapter 1. South Atlantic Food Webs and Connectivity

POLICY CONSIDERATIONS FOR SOUTH ATLANTIC FOOD WEBS AND CONNECTIVITY AND ESSENTIAL FISH HABITATS (Adopted December 2016)

Introduction to Policy Statement

This policy provides guidance from the South Atlantic Fishery Management Council (SAFMC) regarding South Atlantic Food Webs and Connectivity and the protection of Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (EFH-HAPCs) supporting the Council move to Ecosystem Based Fishery Management. The guidance is consistent with the overall habitat protection policies of the SAFMC as formulated and adopted in the Habitat Plan, the Comprehensive EFH Amendment, the Fishery Ecosystem Plan of the South Atlantic Region, Comprehensive Ecosystem-Based Amendment 1, Comprehensive Ecosystem-Based Amendment 2, and the various Fishery Management Plans (FMPs) of the Council. For the purposes of policy, the findings assess potential threats and impacts to managed species EFH and EFH-HAPCs and the South Atlantic ecosystem associated with changes in food webs and connectivity and processes that could improve those resources or place them at risk. The policies and recommendations established in this document are designed to address such impacts in accordance with the habitat policies of the SAFMC as mandated by law.

Policy Considerations

EBFM addresses unintended consequences of fishing including the over exploitation of predators, an increase in abundance of their prey, and a decline of organisms two trophic levels below them, a phenomenon known as a trophic cascade. Alternatively, fishing on lower trophic level species, planktivorous “forage” fishes for example, may ultimately lead to predator population declines due to food limitation. Food web linkages connect different components of the larger ecosystem, such as pelagic forage fishes and their piscivorous predators or demersal carnivores. This connectivity between food webs over space, time, and depth creates multiple energy pathways that enhance ecosystem stability and resilience. Food web models are increasingly being utilized by fisheries managers as ecological prediction tools because they provide the capability to simulate the entire ecosystem from primary producers to top predators to fisheries. Food web models can serve to inform single species assessment and management and are capable of generating reference points and ecosystem-level indicators.

Link to Complete Policy Statement:
http://safmc.net/download/SAFMC_HabitatPolicy_FoodWebConnectivity_Final_Dec2016.pdf

Note: The following are initial color coding incorporated in some tables

Preliminary Priority Actions to be initiated/accomplished in the next two years

Actions Underway

Actions which could be moved to a long-term research Appendix

Table 1. FEP II Policy to Action Excel spreadsheet: Food Web and Connectivity Sheet presenting General Policy, Policy Components and Action Items (recommendations on how to best implement the policy statement).

Food Webs & Connectivity	**Policy Component**	**Action Items Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
I. Forage Fisheries – Consider forage fish stock abundances and dynamics, and their impacts on predator productivity, when setting catch limits to promote ecosystem sustainability.	1. Refine list of forage fish species presented in Appendix A of the Policy Statement. (Quantify managed species diet compositions to identify predator dependency of forage species both spatially and temporally in the South Atlantic	A. Identify species for which diet data are lacking, and prioritize future research accordingly.	High	SAFMC, state agencies, NOAA	2018	2018
		B. Define and prioritize major forage groups in managed species diet composition: Atlantic menhaden, halfbeaks, anchovies, sardines, Atlantic silverside, scads, shad, Atlantic thread herring, mullets, and other pelagic oceanic planktivores such as flying fish, Squid, and shrimp	High	Review Existing SERFS and State Fishery Independent Surveys	2018	2019
	Include forage fish information (species occurrence and distribution of biomass with variable environmental conditions) in other fishery management tools and processes in order to support the development of sustainable harvest strategies that incorporate ecosystem considerations and trade-offs.	A. Define environmental relationships for forage fish (temperature, salinity, chlorophyll-a)	High	SERFS and State Fishery Independent Surveys, SECOORA Partners, SAFMC/SALCC Ecosystem Modeling	2019	2022 Ongoing
		B. Document distribution of major prey and forage groups with variable environmental conditions: Atlantic menhaden, halfbeaks, anchovies, sardines, Atlantic silverside, scads, shad, Atlantic thread herring, mullets, and other pelagic oceanic planktivores such as flying fish, Squid, and shrimp	High	NOAA, state agencies, SAFMC	2018	2020

Food Webs & Connectivity	**Policy Component**	**Action Items Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	2. Collect more science and monitoring information to improve our understanding of the role of forage fish in the ecosystem. (Forage species life history, ecological roles, and migration patterns)	A. Characterize life history of primary prey (including forage species) for Council managed species, including snapper grouper, king and Spanish mackerel, cobia, dolphin and wahoo	High	SERFS and State Fishery Independent Surveys and academic partners	2018	2020 Ongoing
		B. Calculate parameters for forage species describing growth, mortality, maturity, reproduction, etc. that can be used in models	Medium	SERFS, NOAA, state agencies	2020	2022
		C. Define environmental relationships (temperature, salinity, chlorophyll-a)	Medium	SERFS, NOAA, state agencies	2020	2022
		D. Facilitate development of intra-state innovative public/private research partnerships that focus on addressing Council forage fish science priorities including predator dependencies. (e.g. Florida Forage Fish Research Program)	High	State Fishery Agencies and University Marine/Fishery Graduate Programs	2018	ongoing
	3. Include forage fish information in stock assessments that incorporate ecosystem considerations and trade-offs. (Forage species distribution and production)	A. Develop annual and seasonal distribution maps for major prey and forage groups (https://www.roffs.com/) : Atlantic menhaden, halfbeaks, anchovies, sardines, Atlantic silverside, scads, shad, Atlantic thread herring, mullets, and other pelagic oceanic planktivores such as flying fish, Squid, and shrimp, This should also be linked to the climate-based distribution maps instead of being done in a vacuum.	Medium	SERFS and State Fishery Independent Surveys, Roffs	2018	2020

Food Webs & Connectivity	**Policy Component**	**Action Items Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		B. Develop original models of intermediate complexity that include a few species, forage fish being one of them.	Medium	Academia	2022	2025
		C. Explore developing an Electronic Reporting and Monitoring Program for forage species to help identify temporal forage distributions, characterize bait, predator diets and catches etc.	Medium	SAFMC (possibly as part of a pilot project through Citizen Science)	2019	2021
	4. Include forage fish information in ecosystem models that incorporate ecosystem considerations and trade-offs. (Forage species use of habitat and occurrence with managed species)	A. Identify and map benthic and pelagic habitat associated with major prey and forage groups: Atlantic menhaden, halfbeaks, anchovies, sardines, Atlantic silverside, scads, shad, Atlantic thread herring, mullets, and other pelagic oceanic planktivores such as flying fish, Squid, and shrimp	Medium	NOAA, SERFS, and State Fishery Independent Surveys	2019	2021
		B. Identify specific management objectives and desired outputs from ecosystem models related to forage fish management.	High	SAFMC	2019	2019
		C. Develop new ecosystem models or adapt existing models to address specific management objectives related to forage fish.	Medium	SAFMC, NOAA, State agencies, Academic partners	2022	2025

Food Webs & Connectivity	**Policy Component**	**Action Items Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
II. Food Web Models – Food web models can provide useful information to inform stock assessments, screen policy options for unintended consequences, examine ecological and economic trade-offs, and evaluate performance of management actions under alternative ecosystem states.	1. Information to inform stock assessments (SAB ecosystem model improvement and SEDAR type review of ecosystem models)	A. Request a SEFSC Integrated Ecosystem Assessment program for the South Atlantic that would identify priority modeling activities and evaluate model performance for examining tradeoffs and management actions.	Medium	NOAA	2018	Ongoing
		B. Use ecosystem models to generate time- and age-specific estimates of natural mortality for use in stock assessments	Medium	NOAA, Academia	2022	2025
		C. Use ecosystem models to explore stock recruit relationships and causes for recruitment deviations	Medium	NOAA, Academia	2022	2025
		D. Operationalize ecosystem models so they can provide routine and timely assessments of forage fish biomass and occurrence as it relates to current environmental conditions	Medium	NOAA, Academia	2022	2025
	2. Screen policy options for unintended consequences (Account for Invasive Species impacts on SA Food Webs – lionfish are known competitors of reef fish for shelter and those effects should be accounted for in management actions)	A. Quantify impacts of SA artificial reef programs on increasing lionfish recruitment & abundance	Medium	Academic/NOAA	2019	2020

Food Webs & Connectivity	**Policy Component**	**Action Items Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		B. Request research and management monitoring lionfish recruitment and predation on artificial reefs throughout the South Atlantic	Medium	NOAA/ State Agencies	2019	Ongoing
	3. Examine ecological and economic trade-offs (Account for Invasive Species impacts on South Atlantic Food Webs and economically important reef fish species in stock assessments and management actions)	A. Incorporate lionfish predation impacts on South Atlantic reef fish into South Atlantic ecosystem model(s)	Medium	SAFMC, NOAA, State agencies, Academic partners	2019	2019
		B. Determine optimal configuration of fishing effort across fleets that balances conservation vs socio-economic objectives.	Medium	NOAA, SAFMC	2022	2024
	4. Evaluate performance of management actions under alternative ecosystem states	A. Evaluate, at the SSC level, projection scenarios with both the stock assessment and ecosystem models to determine performance of policy options under alternative environmental conditions and to estimate impacts of policy options on other species and fisheries	Medium	SSC, NOAA	2023	2023

Food Webs & Connectivity	**Policy Component**	**Action Items Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
III. Develop Food Web Indicators	1. To summarize the state of knowledge of the South Atlantic Food Web/Ecosystem. (Serve as ecological benchmarks to inform future actions)	A. Develop ecosystem indicators. These could be included in a South Atlantic Ecosystem Status Report that documents and characterizes-key managed and prey species, environmental drivers of those species, and mechanisms to monitor those drivers / species, etc.	High	NOAA Fisheries, Academia	2018	2020
		B. Develop ecological reference points	High	NOAA, Academia	2022	2025
		C. Conduct ecological network analysis on food web data to understand energy flows and cycles and to calculate ecosystem-level metrics such as ascendancy, overhead, and capacity.	Medium	Academia	2023	2025
IV. Food Web Connectivity – Separate food webs exist in the South Atlantic: inshore-offshore, north-south, and benthic-pelagic, connected by species that migrate between them such that loss of connectivity could have impacts on other components of the ecosystem that would otherwise appear unrelated	1. Refine understanding of inshore to offshore connections (Link estuarine models with habitat and oceanographic models)	A. Compile existing and create new inshore/offshore estuarine models for all major South Atlantic Estuaries that include (*inter alia*) energy transfer of forage species (e.g. mullet, menhaden).	Medium	Existing SERFS and State Fishery Independent Surveys, NCSU, HBOI/FAU, SECOORA, SAFMC/SALCC Ecosystem Modeling SALCC, academia	2020	2022

Food Webs & Connectivity	**Policy Component**	**Action Items Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
and must be accounted for.						
		B. Compile existing and create new estuarine models for all major South Atlantic Estuaries.	Medium	SALCC, academia	2018	2025
		C. Conduct isotopic analysis to define connectivity patterns	Low	Academia	2023	2025
	2. Refine understanding of north-south connections (Species use of habitat by season)	A. Characterize seasonal patterns for managed species exhibiting seasonal north-south movement: major snapper grouper species including gag, jacks, cobia, dolphin, mackerels etc. done in conjunction with the climate team	High	Existing SERFS and State Fishery Independent Surveys	2018	2020 - Ongoing
		B. Conduct tagging studies to track seasonal movements of fish	Medium	SERFS, state agencies, academia, NOAA	2019	2024
		C. Use ecosystem models and spatial distribution models to test hypothesis about what drives migration patterns	Medium	SERFS, state agencies, academia, NOAA	2020	2022
	3. Refine understanding of connectivity between all systems, including benthic-pelagic systems (Link oceanographic models with habitat and species distribution)	A. Link existing physical oceanographic models with Council managed species, prey and habitat distribution to gain a better understanding of how physical conditions influence distribution.	Medium	SERFS and State Fishery Independent Surveys NCSU, HBOI/FAU, SECOORA, SAFMC/SALCC Ecosystem Modeling	2018	2025

Food Webs & Connectivity	**Policy Component**	**Action Items Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		B. Compile information from tagging, isotopic work, and ecosystem modeling to describe the broad connectivity patterns	Low	Academia	2023	2025
	4. Refine understanding of benthic-pelagic connections (Link oceanographic models with species and prey distribution)	A. Conduct isotopic analysis to determine whether species are feeding on the benthic or pelagic food web, or both.	Low	Academia	2020	2025
		B. Conduct behavioral studies to determine vertical movement patterns	Medium	Academia	2020	2025
		C. Use output from oceanographic models as input into spatially explicit ecosystem models.	High	Academia, SALCC, NOAA Fisheries	2018	2022
V. Trophic Pathways – Managers should aim to understand how fisheries production is driven either by bottom-up or top-down forcing and attempt to maintain diverse energy pathways to promote overall food web stability.	1. Understand bottom-up forcing in South Atlantic fisheries production	A. Compile time series and/or spatial maps of temperature, chlorophyll -a, freshwater flow, salinity, etc.	High	Academia	2022	2023
		B. Use ecosystem models to test hypothesis about which species are more or less influence by top-down versus bottom-up processes.	Medium	Academia	2022	2023
		C. Use ecosystem models to test hypothesis about which environmental drivers are most influential on which species.	Medium	Academia	2022	2023

Food Webs & Connectivity	**Policy Component**	**Action Items Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	2. Understand top-down forcing in South Atlantic fisheries production	A. Use ecosystem models to test hypothesis about which species are more or less influence by top-down versus bottom-up processes.	Medium	Academia	2023	2023
		B. Use ecosystem models to determine which species are exerting top-down control on the ecosystem.	Medium	Academia		
	3. Characterize diverse energy pathways in South Atlantic ecosystem	A. Conduct ecological network analysis on food web data to understand energy flows and cycles.	Low	Academia	2023	2025
	4. Characterize food web stability in South Atlantic ecosystem	A. Calculate ecosystem-level metrics such as ascendancy, overhead, and capacity using ecological network analysis and ecosystem models B. Use ecosystem models to simulate strong disturbances (fishing or environmental) under different food web configurations	Low	Academia	2023	2025

Chapter 2. South Atlantic Climate Variability and Fisheries

POLICY CONSIDERATIONS FOR SOUTH ATLANTIC CLIMATE VARIABILITY AND FISHERIES AND ESSENTIAL FISH HABITATS (Adopted December 2016)

Introduction to Policy Statement

This policy provides guidance for the SAFMC supporting the Council's move to ecosystem based fishery management, in particular South Atlantic climate variability and fisheries and the protection of Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (EFH-HAPCs). The guidance is consistent with the overall habitat protection policies of the SAFMC as formulated and adopted in the Habitat Plan, the Comprehensive EFH Amendment, the Fishery Ecosystem Plan of the South Atlantic Region, Comprehensive Ecosystem-Based Amendment 1, Comprehensive Ecosystem-Based Amendment 2, and the various Fishery Management Plans (FMPs) of the Council. The policy assesses potential threats and impacts to managed species EFH and EFH-HAPCs and the South Atlantic ecosystem associated with climate variability or change and processes that could improve those resources or place them at risk.

Policy Considerations

The marine environment is constantly in flux and today, many parts of the ocean are changing quickly due to such factors as varying temperatures and salinities, fluctuating productivity, rising sea levels, ocean acidification and growing coastal populations. While the extent and types of changes occurring vary from region to region, these changes are a major driver of ecosystem dynamics and the impacts are already being observed by scientists, managers, and fishermen in the South Atlantic. Fish populations can react to changing ocean conditions. For example, as the ocean warms, many fish species are expanding their range or shifting their distributions toward the poles or into deep areas to find cooler waters.

Link to Complete Policy Statement:
http://safmc.net/download/SAFMC_HabitatPolicy_ClimateVariabilityFisheries_Final_Dec2016.pdf

Table 2. FEP II Policy to Action Excel spreadsheet: South Atlantic Climate Variability and Fisheries presenting General Policy, Policy Components and Action Items (recommendations on how to best implement the policy statement).

Climate Variability:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
I. As species expand/shift their distributions due to changing ocean conditions and/or market demands, the SAFMC will proactively work to manage species that span multiple jurisdictions.	1. Coordination with State Agencies (Document Species Distribution. Characterize annual and seasonal South Atlantic Ocean conditions.	A. Council form a small working group with members from each organization to develop and track a list of species that have or are likely to expand or shift their ranges. Results should be presented to the Council every 2-3 years. (Note: this could be combined with the Food Webs action to develop distribution maps for important forage species)	High	SAFMC, State Agencies, ASMFC, MAFMC, GMFMC, CFMC, NOAA Fisheries, SERFS	2018	Ongoing
		B. Council develop and engage in a Memorandum of Understanding with the MAFMC, ASMFC, GMFMC, and/or CFMC to explore ways to adaptively manage species that are or are expecting to shift/expand their ranges.	High	SAFMC, ASMFC, MAFMC, GMFMC, CFMC MOU under development	2018	2018
		C. Council collaborate with regional partners to develop baseline information of regional marine environmental conditions, as well as their future projections.	High	SAFMC, SALCC, SECOORA, NOAA RISAs, USGS CSC, Academia	2018	ongoing
		D. Council request Advisory Panels document observed changes in fisheries or oceanic conditions for use in the Stock Assessment and Fishery Evaluation (SAFE)	High	SAFMC Advisory Panels	2018	ongoing

Climate Variability:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		reports				
II. NOAA or regional partners develop a priority list of climate indicators that likely track ecological, social, and economic trends and status and annual summaries documenting species likely to be influenced, and fisheries trends that appear to be due to changing ocean environmental conditions in the South Atlantic ecosystem.	1. Ecological indicators, Social Indicators, and Indicators of Economic Status and Trends	A. Develop or select previously developed climate indicators and define triggers for when management action is needed.	High	NOAA	2018	2018
		B. Provide the Council with an annual summary of these indicators, species likely to be influenced, and fisheries trends that appear to be due to changing ocean environmental conditions in the South Atlantic ecosystem.	High	NOAA	2018	ongoing
		C. NOAA provides annual Ecosystem Status Reports. Indicators mentioned above should be included in this report.	High	NOAA Fisheries, NOS	2018	Ongoing

Climate Variability:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	2. Scientific research and collection of data to further understand the impacts of climate variability on the South Atlantic ecosystem and fish productivity must be prioritized. This includes research on species vulnerabilities in terms of distribution, habitat, reproduction, recruitment, growth, survival, and predator-prey interactions.	A. Incorporate these climate research areas, including a Climate Vulnerability Assessment, into the next version of the South Atlantic Research and Monitoring Prioritization Plan and consider if/how the SAFMC Citizen Science Program or other collaborative science initiatives may be able to address some of these questions.	Medium	SAFMC NOAA Fisheries	2018	Ongoing
	3. Characterize offshore ocean habitats used by estuarine dependent species for possible use in developing ecosystem models.	A. Incorporate this into the next version of the South Atlantic Research and Monitoring Prioritization Plan	High	SAFMC	2021	2021
III. Climate change requires the consideration of tradeoffs. Changing ocean conditions necessitate responses ranging from increasing buffers due to a higher level of uncertainty to adjusting quotas upward or downward to account for predicted and realized increases or decreases in productivity.	1.	A. SSC discusses and considers action to include climate impacts in the ABC Control Rule and in stock assessments where appropriate	High	SAFMC, SSC	2019	2019

Climate Variability:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	2. As appropriate, climate data and the effects of climate variability should be integrated into stock assessments. Climate impacts could also be a focus of the new proposed stock assessment research cycle.	A. Request the SSC provide recommendations on how to best integrate the effects of climate variability into stock assessments. This should include a best practices workshop including lessons from other regional or national climate experts.	Medium	SAFMC and SSC, regional and national experts	2018	2018
	3. Develop Management Strategy Evaluations to allow the analysis of potential regional climate scenarios and determine whether current harvest strategies are robust to future changes.	A. Incorporate these Management Strategy Evaluations into the next version of the South Atlantic Research and Monitoring Prioritization Plan	Medium	SAFMC	2021	2021
	4. Greater understanding of the socio-economic impacts and fisheries responses to climate variability is needed.	A. Incorporate this into the next version of the South Atlantic Research and Monitoring Prioritization Plan	Low	SAFMC	2021	2021

Climate Variability:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
IV. Given the uncertainty of climate impacts, the precautionary principle should be invoked as possible for future management decisions on issues that can be influenced by climate change.		A. Consider the uncertainty of climate impacts on fish and fisheries when establishing ACLs, especially for those species that are identified as most vulnerable to change in a NOAA Climate Vulnerability Assessment	Low	SAFMC, NOAA	2019	ongoing
V. Careful scientific and management evaluation should be undertaken as new fisheries develop, including consideration of how to avoid harmful impacts on essential fish habitat.		A. Define the "rules of the road" for developing new fisheries and specify the scientific and management evaluation that is needed as these fisheries develop	Medium	SAFMC	2018	2018
	3. Expand collection of three dimensional ocean observations of ocean conditions to characterize the coastal- estuarine – ocean habitats.	A. Incorporate this into the next version of the South Atlantic Research and Monitoring Prioritization Plan	Medium	SAFMC SECOORA SEAMAP/MARMAP/SEFIS	2019	2021

Chapter 3. Marine Aquaculture

POLICY CONSIDERATIONS FOR THE INTERACTIONS BETWEEN ESSENTIAL FISH HABITATS AND MARINE AQUACULTURE (Adopted June 2014)

Introduction to Policy Statement

This policy provides the SAFMC guidance regarding interactions of marine aquaculture with Essential Fish Habitat (EFH) and Essential Fish Habitat - Habitat Areas of Particular Concern (EFH-HAPCs). This guidance is consistent with the overall habitat protection policies of the SAFMC as formulated in the Habitat Plan and adopted in the Comprehensive EFH Amendment, Fishery Ecosystem Plan for the South Atlantic Region, Comprehensive Ecosystem-Based Management Amendment 1, Comprehensive Ecosystem-Based Amendment 2 and the various Fishery Management Plans (FMPs) of the Council.

Policy Considerations

This policy addresses concerns related to the production of seafood and other non-seafood related products (*e.g.*, biofuels, ornamentals, bait, pharmaceuticals, and gemstones) by aquaculture, but does not specifically address issues related to stock enhancement. The policy assesses potential impacts, negative and positive, to EFH and EFH- HAPCs posed by activities related to marine aquaculture in offshore and coastal waters, riverine systems and adjacent wetland habitats, and the processes that could improve or place those resources at risk.

The recommendations presented apply to aquaculture activities that may impact EFH and EFH-HAPCs. Aquaculture activities have the potential to interact both positively and negatively with EFH and EFH-HAPCs when conducted in onshore, nearshore, and offshore environments.

Link to Complete Policy Statement:

http://cdn1.safmc.net/wp-content/uploads/2016/11/28102847/SAFMCAquaPolicyFinalJune14.pdf

Table 3. FEP II Policy to Action Excel spreadsheet: Marine Aquaculture Sheet presenting General Policy, Policy Components and Action Items (recommendations on how to best implement the policy statement).

Marine Aquaculture: Policy Component	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
1. Marine aquaculture activities in federal waters of the South Atlantic require thorough public review and effective regulation under MSA and other applicable federal statutes.	A. Council develop an Aquaculture FMP like other regional FMCs have done or are doing to regulate these activities and dictate requirements for them.	High	SAFMC, NOAA, NMFS, EPA, state fisheries agencies responsible for marine aquaculture	2018/ 2019	2020/ 2021
	B. Council comment on all regional FMC Aquaculture FMP processes and any Aquaculture congressional legislation.	High	SAFMC, NOAA	2018	Ongoing
2. Aquaculture permits should be for at least a 10-year duration (or the maximum allowed if the applicable law or regulation sets a maximum less than 10 years) with annual reporting requirements (activity reports). Permits of 10 years or more should undergo a 5-year comprehensive operational review with the option for revocation at any time in the event there is no prolonged activity or there are documented adverse impacts that pose a substantial threat to marine resources.	A. Council develop an Aquaculture FMP like other regional FMCs have done or are doing that is consistent with the requirements included in the SAFMC policy.	High	SAFMC, NOAA, NMFS, EPA, state fisheries agencies responsible for marine aquaculture	2018/ 2019	2020/ 2021
	B. Comment on all regional FMC Aquaculture FMP processes and any Aquaculture congressional legislation to try and get this accomplished.	High	SAFMC, NOAA	2018	Ongoing

<u>Marine Aquaculture:</u> Policy Component	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
3. Only drugs, biologics, and other chemicals approved for aquaculture by the FDA, EPA, or USDA should be used, in compliance with applicable laws and regulations (see Appendix for current list of approvals).	A. Develop an Aquaculture FMP like other regional FMCs have done or are doing that is consistent with the requirements included in the SAFMC policy.	High	SAFMC, NOAA, NMFS, EPA, state fisheries agencies responsible for marine aquaculture	2018/ 2019	2020/2021
	B. Comment on all regional FMC Aquaculture FMP processes and any Aquaculture congressional legislation to try and get this accomplished.	High	SAFMC, NOAA	2018	Ongoing
4. Only native (populations) species should be used for aquaculture in federal waters of the South Atlantic.	A. Develop an Aquaculture FMP like other regional FMCs have done or are doing that is consistent with the requirements included in the SAFMC policy.	High	SAFMC, NOAA, NMFS, EPA, state fisheries agencies responsible for marine aquaculture	2018/ 2019	2020/ 2021
	B. Comment on all regional FMC Aquaculture FMP processes and any Aquaculture congressional legislation to try and get this accomplished.	High	SAFMC, NOAA	2018	Ongoing
5. Genetically modified organisms should only be used for aquaculture in federal waters of the South Atlantic, pending FDA and/or other Federal approval, following a rigorous and documented biological assessment which concludes there is no reasonable possibility for genetic exchange with natural organisms or other irreversible form of ecological impact. Further, aquaculture of genetically modified organisms should be prohibited in federal waters of the South Atlantic when there exists a reasonable opportunity for escapement and dispersal into waters of any state in which their culture and/or commerce	A. Develop an Aquaculture FMP like other regional FMCs have done or are doing that is consistent with the requirements included in the SAFMC policy.	High	SAFMC, NOAA, NMFS, EPA, state fisheries agencies responsible for marine aquaculture	2018/ 2019	2020/ 2021

<u>Marine Aquaculture:</u> Policy Component	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
are prohibited by state rule or policy.					
	B. Comment on all regional FMC Aquaculture FMP processes and any Aquaculture congressional legislation to try and get this accomplished.	High	SAFMC, NOAA	2018	Ongoing
6. Given the critical nature of proper siting, the permitting agency should require the applicant to provide all information necessary to thoroughly evaluate the suitability of potential aquaculture sites. If sufficient information is not provided in the time allotted by existing application review processes, the permitting agency should either deny the permit or hold the permit in abeyance until the required information is available.	A. Develop an Aquaculture FMP like other FMCs or states (in state waters) have done or are doing that requires adequate site suitability information is included to ensure siting minimizes habitat impacts.	High	SAFMC, NOAA, NMFS, EPA, state fisheries agencies responsible for marine aquaculture	2018/ 2019	2020/ 2021
	B. Work with grant funding agencies to prioritize projects to develop site-selection tools for for applicants. (e.g., 2017 SK grant proposal: "Next generation spatial planning for offshore aquaculture in the Gulf of Mexico")	High	SAFMC, NOAA	2017/ 2018	2018

<u>Marine Aquaculture:</u> Policy Component	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	C. Develop an Aquaculture FMP like other regional FMCs have done or are doing that includes establishment of Aquaculture Enterprise Areas as a tool for siting aquaculture operations in environmentally suitable areas. .	High	State fisheries agencies responsible for marine aquaculture	2018/ 2019	2019/ 2021
7. Environmental monitoring plans for projects authorized under MSA should be developed by the applicant/permit holder and approved by NOAA Fisheries with input from the Council.	A. Develop an Aquaculture FMP like other regional FMCs have done or are doing that is consistent with the requirements included in the SAFMC policy.	High	SAFMC, NOAA, NMFS, EPA, state fisheries agencies responsible for marine aquaculture	2018/ 2019	2020/ 2021
	B. Comment on all regional FMC Aquaculture FMP processes and any Aquaculture congressional legislation to try and get this accomplished.	High	SAFMC, NOAA	2018	Ongoing
8. Fishery management plans for aquaculture should require permittees to have adequate funds (e.g., assurance bond) committed to ensure removal of organisms and decommissioning of facilities that are abandoned, obsolete, or storm-damaged or have had their permit revoked. The plans should also require that the amount of these funds be determined by NOAA Fisheries with input from the Council and that the funds be held in trust.	A. Develop an Aquaculture FMP like other regional FMCs have done or are doing that is consistent with the requirements included in the SAFMC policy.	High	SAFMC, NOAA, NMFS, EPA, state fisheries agencies responsible for marine aquaculture	2018/ 2019	2020/ 2021
	B. Relay the Policy and these concepts to all of the other regional FMCs so they take them into consideration during Aquaculture FMP development for their regions.	Medium	SAFMC	2017/ 2018	2017/ 2018

Marine Aquaculture: Policy Component	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
9. When issuing permits for aquaculture in federal waters, NOAA Fisheries should specify conditions of use and outline the process to repeal permits in order to prevent negative impacts to EFH. NOAA should take the appropriate steps to modify or revoke permits using its authority if permit conditions are not being met.	A. Develop an Aquaculture FMP like other regional FMCs have done or are doing that is consistent with the requirements included in the SAFMC policy.	High	SAFMC, NOAA, NMFS, EPA, state fisheries agencies responsible for marine aquaculture	2018/ 2019	2020/ 2021
	B. Comment on all FMC Aquaculture FMP processes and any Aquaculture congressional legislation to try and get this accomplished.	High	SAFMC, NOAA	2018	Ongoing

Chapter 4. Submerged Aquatic Vegetation (SAV)

SAFMC Policy for Protection and Enhancement of Estuarine and Marine Submerged Aquatic Vegetation (SAV) Habitat (Adopted June 2014)

Introduction to Policy Statement

The SAFMC and the Habitat Advisory Panel considered the issue of the decline of Estuarine and Marine Submerged Aquatic Vegetation (SAV) or seagrass habitat in Florida and North Carolina as it relates to Council habitat policy. Subsequently, the Council's Habitat Committee requested that the Habitat Advisory Panel develop the following policy statement to support Council efforts to protect and enhance habitat for managed species.

Policy Considerations

In the South Atlantic region, SAV is found primarily in the states of Florida and North Carolina where environmental conditions are more favorable than in South Carolina and Georgia. The distribution of SAV habitat is indicative of its importance to economically important fisheries: in North Carolina, total coverage is estimated to be 130,000 acres; in Florida, the nearshore seagrass coverage is estimated to be 2.2 million acres with an additional 2-3 million acres offshore in the Gulf of Mexico.

SAV is designated through Fishery Management Plans as Essential Fish Habitat for several federally managed species, including Penaeid shrimp, spiny lobster, snapper-grouper species, and cobia. It is also designated as Habitat Area of Particular Concern for snapper-grouper species and juvenile summer flounder. SAV is critically important to numerous state managed species, and a diverse assemblage of fauna that are prey to federally managed species; SAV provides valuable ecological and economic functions. Food and shelter afforded by SAV result in a complex and dynamic system that provides a primary nursery habitat for various organisms important both to the overall system ecology, to commercial and recreational fisheries, and to non-harvested fish, shellfish, manatees, and sea turtles. Using ecological services valuations, Florida seagrass ecosystems alone provide services worth more than $20 billion a year.

Link to Complete Policy Statement:

http://cdn1.safmc.net/wp-content/uploads/2016/11/28102847/SAFMCSAVPolFinalJune14.pdf

Table 4. FEP II Policy to Action Excel spreadsheet: Submerged Aquatic Vegetation Sheet presenting General Policy, Policy Components and Action Items (recommendations on how to best implement the policy statement).

Submerged Aquatic Vegetation:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
I. Monitoring and Research: Periodic mapping and monitoring of SAV in the region are required to determine how distribution has changed spatially over time, the progress toward the goal of a net resource gain, and what management actions are needed to reach established goals.	1. Develop and standardize imagery acquisition and resource mapping protocols, with regional modification as necessary to achieve effective results.	A. Council work with regional partners to identify and review existing SAV mapping programs.	High	FWC, NCDMF, NOAA/NCCOS/ CCFHR, SAFMC	2018	2018
		B. Council work with regional partners to determine the geographic extent of existing mapping efforts; identify data gaps.	High	FWC, NCDMF, NOAA/NCCOS/ CCFHR, SAFMC	2018	2018 / Ongoing
		C. Council work with regional partners to review and summarize mapping protocols employed by various SAV monitoring programs; Develop standard protocols.	High	FWC, NCDMF, NOAA/NCCOS/ CCFHR, SAFMC	2018	2018 / Ongoing
		D. Council host a workshop to discuss standard protocols developed in Action C above; Revise and distribute recommended protocols.	High	SAFMC	2018/ 2019	2018/ 2019
		E. Repeatedly map SAV over time to assess change; will require seeking funding.	High	FWC, NCDMF, NOAA, APNEP	2018	Ongoing

Submerged Aquatic Vegetation:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		F. Establish standardized indicators to assess SAV condition; monitor SAV indicator parameters on a regular basis.	High	FWC, NCDMF, NOAA, APNEP SALCC	2018	Ongoing
	2. Develop and maintain a Geographic Information System database for essential habitat including SAV and use that information for assessment of trends in SAV extent.	A. Council work with regional partners to compile GIS data from SAV mapping programs within the South Atlantic region and update as new data becomes available (identified through actions supporting Policy Component 1).	High	FWC, NCDMF, NOAA/NCCOS/ CCFHR SAFMC	2018	Ongoing
		B. Use data collected during Action 1 above to assess SAV status and trends.	High	FWC, NCDMF, NOAA/NCCOS/ CCFHR	2018	Ongoing
	3. Evaluate water quality criteria needed to support SAV survival and growth and support policy making to manage quality and quantity of surface runoff.	A. Compile existing information on water quality requirements for SAV within specific water bodies (e.g. IRL, Pamlico Sound); Identify data gaps.	High	FWC, NCDMF, NOAA/NCCOS/ CCFHR, SJRWMD, SFWMD, FIU, BNP, NOAA/SEFSC	2018	2018/ 2019

Submerged Aquatic Vegetation:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		B. Conduct research to determine water quality requirements for SAV in locations where data are limited or currently not available.	High	FWC, NCDMF, NOAA/NCCOS/ CCFHR, SJRWMD, SFWMD, FIU, BNP, NOAA/SEFSC	2018 /2019	Ongoing
	4. Research and document causes and effects of SAV losses, including cumulative impacts, watershed runoff, shoreline development, shading associated with pier and dock, development, invasive species, and extreme weather conditions (drought, tropical storms, algal blooms, etc).	A. Compile and summarize existing information regarding causes of SAV loss within specific water bodies in the south Atlantic coastal area.	Medium	FWC, FDEP, NCDMF, NOAA/NCCOS/ CCFHR, SJRWMD, SFWMD, FIU, BNP, NOAA/SEFSC	2018	2018
		B. Determine cumulative impact of shading associated with pier and dock development on SAV communities within specific water bodies in the south Atlantic coastal region.	Medium	FWC, FDEP, NCDEQ, NC and FL universities	**2019**	**2021**

Submerged Aquatic Vegetation:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	5. Encourage states to minimize impacts to SAV by developing design criteria for docks and piers which establish minimum height, maximum width and materials.	A. Compile and review information on existing dock criteria for NC and FL.		NOAA/NMFS, FWC, FDEP, NCDEQ	2018	2018
		B. Encourage state agencies to adopt or promote dock siting rules that promote enhancement and conservation of SAV.	Medium	FDEP, NCDCM	2020	2021
	6. Investigate effective restoration techniques, including ecological function and cost/benefit.	A. Identify and summarize mitigation and restoration projects completed since at least 2005 that were deemed successful by permitting agencies. Conduct research to determine ecological function (e.g. faunal utilization, sediment carbon accumulation) of restored or created SAV communities to identify most successful and cost effective techniques based on functional attributes.	Medium	FWC, FDEP, NCDEQ, SARP, SALCC, CCFHR, NOAA/SEFSC, NC and FL universities	2018	2019
		B. Determine water quality criteria needed to establish and sustain viable SAV beds.	Medium	FWC, FDEP, NCDEQ, NOAA	2019	2019
		C. Develop prioritized research questions needed to further advance SAV restoration.	Medium	FWC, FDEP, NCDEQ, NOAA,	2018	Ongoing

Submerged Aquatic Vegetation:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
				universities		
	7. Research potential effect of climate change on SAV habitat.	A. Investigate potential effects of climate change and sea level rise on SAV communities within the south Atlantic coastal region.	High	USGS, SECAS, SALCC, SAFMC, NOAA	2018	2020
II. Planning: Establishing goals, objectives, and measures of success is essential to evaluate progress and to provide a framework to direct future actions.						
	1. Watershed planning which incorporates SAV as an integral part of a healthy ecological system and utilizes change in SAV distribution as an indicator of system health.	A. Incorporate changes in SAV distribution as a watershed planning indicator of water quality health.	Medium	FWC, FDEP, NCDEQ, NCDMF, SARP, SECAS	2018/ 2019	Ongoing
	2. The regulatory definition of SAV habitat as: shallow water habitat with appropriate sediment, depth, light penetration and wave energy, including areas without existing SAV.	A. SAFMC should work with state agencies to utilize the definition of SAV habitat based on suitability rather than presence/absence.	High	FWC, FDEP, NCDEQ, NCDMF	2018	2019

Submerged Aquatic Vegetation:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	3. Comprehensive planning initiatives as well as interagency coordination, partnerships, and planning to protect SAV habitat and increase awareness.	A. SAFMC should facilitate planning efforts to prioritize SAV areas for protection and restoration.	High	FWC, FDEP, NCDEQ, NCDMF	2018	Ongoing
	4. The establishment of standardized SAV survey protocols for reviewing coastal development permit applications. This action includes survey windows, survey methods, and in-water work windows.	A. Review permits issued since at least 2005 and summarize approved SAV survey techniques. Based on review of past permits that had potential for SAV impacts, develop standard SAV survey protocols that also allow for regional flexibility due to differences in growth seasons and environmental conditions.	High	FWC, FDEP, NCDEQ	2018	2019
		B. Use data compiled in Action A above to develop standard SAV survey protocols.	High	FWC, FDEP, NCDEQ	2020	2021
	5. The Habitat Advisory Panel members in actively seeking to involve the SAFMC in the review of projects which will impact, directly or indirectly, SAV habitat resources.	A. Coordinate with state permit review agencies to encourage permit actions that avoid or minimize impacts to SAV, consistent with the SAV policy	Medium	SAFMC Habitat and Ecosystem Advisory Panel	2018	Ongoing
	6. Development of SAV restoration guidelines for both high and low	A. Identify and summarize mitigation and restoration projects completed since at least 2005 deemed successful	High	FWC, FDEP, NCDEQ	2018	2019

Submerged Aquatic Vegetation:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	salinity SAV to accelerate successful, cost-effective SAV restoration.	by permitting agencies.				
III. Management: Based on assessment of monitoring data, research results and planning, management actions should be developed or modified as necessary to address primary issues affecting SAV habitat. Conservation and expansion of SAV habitat are critical to the maintenance of the living resources that depend on these systems.						
	1. Review and modification of state and federal rules to ensure protection of SAV from impacts such as dredging, propeller scarring, marina and pier construction, and bottom-disturbing fishing activity.	A. Council coordinate with fishery agencies to promote restricting bottom disturbing activities (for fishing or navigation) in documented SAV habitat which serves as EFH-HAPC for managed species.	Medium	SAFMC, FWC, FDEP, NCDEQ, NCDMF, ASMFC	2019	Ongoing
	2. Review of state water quality standards and rules to determine if changes are needed to protect and enhance	A. Using information from actions under Monitoring and Research, modify water quality standards as needed.	Medium	FWC, FDEP, NCDEQ, ASMFC	2019	2021

Submerged Aquatic Vegetation:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	SAV.					
IV. Education and Enforcement: Educating and engaging the public on the value of SAV habitat will aid in the protection of existing SAV habitat and garnish support for additional management measures that may be needed. Enforcing existing regulations to sustain SAV health minimizes the need for additional regulatory actions.	1. Design of education programs to heighten the public's awareness of the importance of SAV. An informed public will provide a firm foundation of support for protection and restoration efforts.	A. Develop geographically specific educational products to promote the importance of SAV, and highlight potential SAV threats including disturbance and water quality. These products must be targeted for particular age groups (e.g. see Seagrass-Watch). Develop products highlighting the role SAV plays in estuarine dependent species and their prey as part of the larger food web.	High	FWC, FDEP, NCDEQ, NCDMF, NOAA	2018/ 2019	2018/ 2019
		B. Provide information to legislators and other policy-makers on the value and need to support SAV conservation.	High	FWC, FDEP, NCDEQ, NCDMF, NOAA	2018/ 2019	Ongoing
	2. Review of existing regulations and enforcement to determine their effectiveness.	A. Review of existing regulations and enforcement to determine their effectiveness.	Medium	FWC, FDEP, NCDEQ, NCDMF, NOAA	2018/ 2019	Ongoing
	3. Coordination with state resource and regulatory agencies to ensure that existing regulations are being enforced.	A. Council provide the SAFMC policy to federal and state resource and regulatory agencies to ensure that existing regulations are being enforced.	Medium	FWC, FDEP, NCDEQ, NCDMF, NOAA	2019	Ongoing

Submerged Aquatic Vegetation:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	4. Development of economic analyses on the economic benefits of protecting and enhancing SAV habitat.	A. Identify complete Ecosystem Services provided by SAV and compile values of species, fisheries and non-consumptive use values dependent on SAV	Medium	FWC, FDEP, NCDEQ, NCDMF, NOAA, SARP, SALCC	2019	Ongoing

Chapter 5. Beach Dredging/Re-nourishment and Large Scale Coastal Engineering

POLICIES FOR THE PROTECTION AND RESTORATION OF ESSENTIAL FISH HABITATS FROM BEACH DREDGING AND FILLING, BEACH RENOURISHMENT AND LARGE-SCALE COASTAL ENGINEERING (Adopted March 2015)

Introduction to Policy Statement

This policy of the SAFMC establishes protection for essential fish habitats (EFH) and habitat areas of particular concern (EFH-HAPCs) impacted by beach dredge-and-fill activities, and related large-scale coastal engineering projects (e.g., beach scraping). The policy is designed to be consistent with the overall habitat protection policies of the SAFMC as formulated and adopted in the Habitat Plan (SAFMC, 1998a), the Comprehensive EFH Amendment (SAFMC, 1998b) and Fishery Ecosystem Plan (SAFMC, 2009). This policy does not supersede any other applicable state or federal policy or regulation pertaining to beach dredge-and-fill projects, but intended to complement existing policies or regulations for the benefit of protecting essential fish habitat managed by the SAFMC.

Policy Considerations

The policy assesses the threats to EFH potentially posed by activities related to the large-scale dredging and disposal of sediments in the coastal ocean and adjacent habitats, and the processes whereby those resources are placed at risk. The policy is designed to avoid, minimize and offset damage caused by these activities, in accordance with the general habitat policies of the SAFMC as mandated by law.

Link to Complete Policy Statement:

http://cdn1.safmc.net/wp-content/uploads/2016/11/28102847/SAFMCFinalEFHBeachPolicyMarch15.pdf

Table 5. FEP II Policy to Action Excel spreadsheet: Beach Dredging /Re-nourishment and Large Scale Coastal Engineering Sheet presenting General Policy, Policy Components and Action Items (recommendations on how to best implement the policy statement).

Beach Dredging/ Re-nourishment and Large Scale Coastal Engineering:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
I. For each project, a comprehensive environmental document should be prepared based on the best available information, and address detailed components specified in the Council Policy Statement.	1. Defined areas of direct and indirect impact, using guidance provided in 40 CFR Section 1508.8 Effects. Baseline surveys designed with appropriate methodology to adequately document pre-project conditions for biological, physical and water resources in both direct and indirect impact areas Baseline surveys should follow the BACI (Before-After, Control-Impact) sampling framework (Stewart-Oaten 1986). A full range of alternatives, including alternatives that may minimize future need for additional nourishment activities (e.g., sand bypass). Impact assessment for each alternative using ecologically conservative assumptions and worst case scenarios A compensatory mitigation plan be developed A during-construction monitoring plan as deemed necessary for a specific project A post-construction monitoring plan for biological, physical and	A. The Council provide policy statement with all the required components to regulatory agencies and request that it be provided to applicants. To provide guidance on: • Which types of direct and indirect impacts should be addressed in the EA/EIS. • Required monitoring criteria • Scope and range of alternatives that should be considered in the EA/EIS. • That direct and indirect impacts of all alternatives (including the "no-action" alternative) be discussed. • The development of a "during construction" monitoring plan, if deemed necessary. • Method (or SOP) for developing a compensatory mitigation plan. • The development of a "post-construction" monitoring plan	Medium	NOAA Fisheries, SAFMC, State CZM Agencies, USACOE, USFWS, State DNRs/ Fish & Wildlife Agencies	2018	Ongoing

Beach Dredging/ Re-nourishment and Large Scale Coastal Engineering:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	water resources designed with appropriate methodology to adequately detect and document both direct and indirect project impacts.					
		B. Council provide policy with all the required components to regulatory agencies and request that it be provided to permit applicants regarding which areas of direct and indirect impact should be included in the EA/EIS, with particular emphasis on any coral reefs, hard bottom areas, SAVs, or HAPCs within or near the areas of impact.	Medium	State CZM Agencies, USACOE, NMFS, USFWS, State DNRs/ Fish & Wildlife Agencies	2018	Ongoing
		C. Depending on the size of the proposed project, request permitting agencies require permit applicants to prepare an EA or EIS addressing each of the issues below.	High	NOAA Fisheries, State CZM Agencies, USACOE	2018	Ongoing
II. Fill material should match the sediment characteristics of the recipient beach as closely as possible.		A. Provide supporting information on grain size compatibility and ecological and economic benefits of using compatible sand to the USACOE and CZM agencies. Request permitting agencies require permit applicants to perform sediment analyses that include grain size,	Medium	NOAA Fisheries, State CZM Agencies, USACOE	2018	Ongoing

Beach Dredging/ Re-nourishment and Large Scale Coastal Engineering:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		sorting, and mineralogy to determine compatibility of dredged sediments with recipient beach sediments.				
III. Dredging should be limited to bathymetric peaks (rather than depressions or level sea bottom) in areas characterized by strong currents and sand movement, in order to increase sediment infilling rates and decrease the duration of impacts to benthic habitats.		A. Compile existing bathymetric and hydrologic information to develop bathymetric maps of ocean soft bottom habitat and identify gaps. Provide resulting maps to the regulatory agencies to aid in minimizing long term habitat impacts from dredging. Work with SEAMAP-SA to prioritize topographic mapping of ocean soft bottom, where information gaps exist. Require permit applicants to perform bathymetric and hydrologic surveys of potential dredge sites to identify bathymetric peaks, preferably in high energy environments.	Medium	NOAA Fisheries, SAFMC, State CZM Agencies, USACOE, SEAMAP-SA	2018	Ongoing

Beach Dredging/ Re-nourishment and Large Scale Coastal Engineering:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
IV. Dredging should be limited to the shallowest depths possible to minimize changes in wave energy and currents, thus reducing the likelihood of infilling with fine-grained sediments.		A. Compile existing bathymetric and hydrologic information to develop bathymetric maps of ocean soft bottom habitat and identify gaps. Provide resulting maps to the regulatory agencies to aid in minimizing long term habitat impacts from dredging. Work with SEAMAP-SA to prioritize topographic mapping of ocean soft bottom, where information gaps existRequire permit applicants to minimize the depth of dredging to reduce the likelihood of infilling with fine-grained sediments.	Medium	State CZM Agencies USACOE, SEAMAP-SA	2018	Ongoing

Chapter 6. Energy Exploration and Development

POLICY FOR THE PROTECTION AND RESTORATION OF ESSENTIAL FISH HABITATS FROM ENERGY EXPLORATION AND DEVELOPMENT ACTIVITIES (Adopted December 2015)

Introduction to Policy Statement

This policy provides the SAFMC guidance regarding the protection of Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (EFH-HAPCs) from impacts associated with energy exploration and development activities. This policy also provides guidance regarding mitigation of those impacts, including avoidance, minimization and compensatory mitigation. The guidance is consistent with the overall habitat protection policies of the SAFMC as formulated and adopted in the Habitat Plan, the Comprehensive EFH Amendment, the Fishery Ecosystem Plan of the South Atlantic Region, Comprehensive Ecosystem-Based Amendment 1, Comprehensive Ecosystem-Based Amendment 2, and the various Fishery Management Plans (FMPs) of the Council.

Policy Considerations

The types of activities within the scope of this policy include wind; oil and gas; methane hydrate mining; estuarine and marine hydrokinetic; liquefied natural gas (LNG) regasification, pipelines, and offshore and on-shore facilities; and onshore power plants. The findings assess potential impacts to EFH and EFH-HAPCs posed by activities related to energy exploration and development in offshore and coastal waters, riverine systems and adjacent wetland habitats, and the processes that could improve those resources or place them at risk. The policies and recommendations are designed to avoid and minimize impacts and optimize benefits from these activities.

Link to Complete Policy Statement:

http://cdn1.safmc.net/wp-content/uploads/2016/11/28102846/SAFMCEnergyPolicyDec1415.pdf

Table 6. FEP II Policy to Action Excel spreadsheet: Energy Exploration and Development Sheet presenting General Policy, Policy Components and Action Items (recommendations on how to best implement the policy statement).

Energy Exploration and Development (EED):	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
I. Projects should avoid, minimize, and – where possible – offset damage to EFH, EFH-HAPCs, and SHAs. This should be accomplished, in part, by integrating the best available and least damaging technologies into the project design.		A. The Council provides EED policy with all required components to the regulatory agencies to ensure compliance with the SAFMC policy.	High	SAFMC, NOAA Fisheries, BOEM, USACOE, NOAA Fisheries, State agencies	2018	Ongoing
II. Projects should avoid intersection or overlap with Allowable Fishing Areas within the Deepwater Coral HAPCs.		A. The Council provide maps of priority fishing areas, MPAs, and EFH-HAPC to be avoided in federal and state waters for energy exploration and development activities.	High	SAFMC, NOAA Fisheries	2018	Ongoing
III. All facilities associated with energy exploration and development should be designed to avoid or minimize to the maximum extent practicable impacts on coastal ecosystems and sand sharing systems.		A. The Council provides EED policy with all required components to the regulatory agencies to ensure compliance with the SAFMC policy. NOAA Fisheries in cooperation with SAFMC should review and comment on all EED projects to ensure compliance with the SAFMC policy.	High	SAFMC, NOAA Fisheries, BOEM, USACOE, State CZM Programs, USGS, applicants	2018	ongoing

Energy Exploration and Development (EED):	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
IV. Projects should comply with existing standards and requirements regulating domestic and international transportation of energy products including regulated waste disposal and emissions which are intended to minimize negative impacts on and preserve the quality of the marine environment.		A. Require companies associated with energy development to fund compliance monitoring positions that will inspect and assess if requirements are being adhered to.	High	SAFMC, NOAA Fisheries	2018	Ongoing
V. Open-loop LNG processing facilities should be avoided in favor of closed-loop systems. Water intake associated with closed-loop should be minimized and the effects to fishery resources should be determined through baseline studies and project monitoring.		A. Avoid open-loop LNG processing facilities in favor of closed-loop systems. Water intake associated with closed-loop should be minimized and the effects to fishery resources should be determined through baseline studies and project monitoring.	High	BOEM, USACOE, State CZM Programs, USGS, applicants	2018	Ongoing
VI. Pilot scale projects should not occur in areas where full-scale efforts are predicted to be environmentally unacceptable (e.g., MPAs, CHAPCs, and		A. Provide maps of priority fishing areas, MPAs, and EFH-HAPC to be avoided in federal and state waters for energy exploration and development activities.	High	SAFMC, NOAA NMFS	2018	Ongoing

Energy Exploration and Development (EED):	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
Spawning SMZs).						
VII. EFH Review, Administrative Policies, Licensing Policies and Best Management Practices:						
	1. EFH Assessments prepared for energy-related projects include the mandatory components set forth in 50 CFR Part 600, Subpart K: i A description of the proposed action; · An analysis of the effects, including cumulative effects, of the action on EFH, the managed species, and associated species by life history stage; ii The Federal agency's views regarding the effects of the action on EFH; and iii Proposed mitigation	A. Provide EED policy with all required components to the regulatory agencies to ensure compliance with the SAFMC policy. Request that the policy be provided to applicants.	High	BOEM, NOAA NMFS, USACOE	2018	Ongoing
	2. Projects requiring expanded EFH consultation should provide a full range of alternatives, along with assessments of the relative impacts of each on each type of EFH, EFH-HAPC, and SHAs. Expanded EFH consultations allow NMFS and a Federal action agency the maximum opportunity to work together in the review	A. Provide information to federal agencies on fish, habitat, and fisheries data available on the SAFMC GIS portal that can be used in the EFH consultation process as a tool for evaluating alternatives.	High	BOEM, NOAA NMFS, USACOE	2018	Ongoing

Energy Exploration and Development (EED):	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	of an activity's impact on EFH and the development of EFH conservation recommendations. Expanded consultation procedures must be used for Federal actions that would result in substantial adverse effects to EFH. Federal action agencies are encouraged to contact NMFS at the earliest opportunity to discuss whether the adverse effect of a proposed action makes expanded consultation appropriate.					
	3. Impact evaluations should include quantitative assessments for each habitat based on recent scientific studies, habitat characterizations, and the best available information. All EFH assessments should be based upon the best available science, be conservative, and follow precautionary principles as developed for various Federal and State policies. EFH Assessments are produced with information gathered from the best available technologies to map and	A. Work with federal agencies to identify information gaps and prioritize research needs.	High	BOEM, NOAA NMFS, USACOE	2018	Ongoing

Energy Exploration and Development (EED):	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	characterize project sites. The methods used for habitat mapping and characterization work should reflect input from resource trustees and be performed with experienced personnel.					
	4. Existing transportation infrastructure (e.g., existing cables or pipelines) should be utilized wherever practicable in order to avoid or minimize environmental impacts.	A. Provide the EED policy with all the required components to regulatory agencies to ensure compliance with the SAFMC policy.	High	Applicants or BOEM?	2018	Ongoing
	5. The effects of sound from proposed projects on fish behavior and health should be considered in EFH Assessments.	A. Provide maps of priority fishing areas, MPAs, and EFH-HAPC to be avoided in federal and state waters for energy exploration and development activities.	High	SAFMC, NOAA NMFS	2018	Ongoing
	6. Compensatory mitigation should not be considered until avoidance and minimization measures have been duly demonstrated. Compensatory mitigation should be required to offset losses to EFH, including losses associated with temporary impacts, and should take into account uncertainty and the risk of the chosen mitigation measures inadequately offsetting the	A. Provide the EED policy with all the required components to regulatory agencies to ensure compliance with the SAFMC policy.	High	Applicants or BOEM?	2018	Ongoing

Energy Exploration and Development (EED):	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	impacts. Mitigation should be local, "up-front," and "in-kind," and include long-term monitoring to assess and ensure the efficacy of the mitigation program selected.					
	7. Modelling efforts should fully characterize assumptions applied and disclose any potential biases that may affect results	A. Provide the EED policy with all the required components to regulatory agencies to ensure compliance with the SAFMC policy.	High	Applicants or BOEM?	2018	Ongoing
	8. Determination of the physical and chemical oceanographic and meteorological characteristics of the area should be done through field studies by lead action agencies, cooperating agencies, academics, or the applicant. These characteristics include but are not limited to, on-site direction and velocity of currents and tides, sea states, temperature, salinity, water quality, wind storms frequencies, and intensities and icing conditions. Studies should also include a detailed characterization of seasonal surface currents and likely spill trajectories. Such studies must be conducted prior to approval of any Exploration	A. Provide the EED policy with all the required components to regulatory agencies to ensure compliance with the SAFMC policy.	High	Applicants or BOEM?	2018	Ongoing

Energy Exploration and Development (EED):	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	Plan or Development and Production Plan in order to have adequate information upon which to base decisions related to site-specific proposed activities.					
		A. Seek funding for needed research (based on 8 A above) required to characterize potential oil and gas development sites.	Medium	Applicants or BOEM?	2018	Ongoing
	9. The Environmental Impact Statement (EIS), Environmental Assessment (EA) or EFH Assessment for any outer continental shelf oil and gas lease sale should address impacts, if any, from activities specifically related to natural gas production, safety precautions required in the event of the discovery of "sour gas" or hydrogen sulfide reserves and the potential for cross-shelf transport of hydrocarbons to nearshore and inshore estuarine habitats by Gulf Stream spin-off eddies. The EIS, EA, or EFH Assessment should also address the development of contingency plans to be implemented if problems arise due to	A. Provide the EED policy with all the required components to regulatory agencies to ensure compliance with the SAFMC policy.	High	FWC, GDNR, SCDNR, NCDEQ, SAFMC, NOAA NMFS	2018	Ongoing

Energy Exploration and Development (EED):	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	oceanographic conditions or bottom topography, the need for and availability of onshore support facilities in coastal areas, and an analysis of existing facilities and community services in light of existing major coastal developments.					
	10. License or permit decisions for construction projects that penetrate or attach to the seabed should be based on geotechnical studies completed to ensure that the geology of the area is appropriate for the construction method and that geological risks are appropriately mitigated.	A. Provide the EED policy with all the required components to regulatory agencies to ensure compliance with the SAFMC policy.	High	BOEM, NOAA NMFS, USACOE, EPA, State Agencies	2018	Ongoing
	11. Adequate spill containment and clean-up equipment should be maintained for all development facilities, and, the equipment shall be available on-site or located so as to be on-site within the landing time trajectory.	A. Provide a list of appropriate containment and cleanup equipment to regulatory agencies. Work with regulatory agencies to confirm the needed equipment is on site prior to initiating operation. .	High	BOEM, NOAA NMFS, USACOE, EPA, State Agencies	2018	Ongoing
	12. Bonds must be required and must be adequate to assure that resources will be available for unanticipated	A. Provide the EED policy with all the required components to regulatory agencies to ensure compliance with the SAFMC	High	BOEM, NOAA NMFS, USACOE, EPA, State	2018	Ongoing

Energy Exploration and Development (EED):	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	environmental impacts, spill response, clean-up and environmental impact assessment.	policy.		Agencies2018		
	13. Exploration and development activities should not disrupt or impede known migratory patterns of endangered and threated species, nor shall they disrupt or impede the breeding or nesting seasons of endangered and threatened species. This may necessitate the imposition of seasonal, spatial, or other constraints on exploration and development activities.	A. Compile, and make available to agencies and applicants, spatial data on protected species occurrences to facilitate siting and construction of EED operations that minimize interactions with protected species.	High	BOEM, NOAA NMFS, USACOE, EPA, State Agencies	2018	Ongoing

Energy Exploration and Development (EED):	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	14. Licenses and permits clearly should describe required monitoring before, during and after the project in sufficient detail to document pre-project conditions and the initial, long-term, and cumulative impacts of the project on EFH. Monitoring and, if necessary, for adaptive management shall be required for the life of the project. The monitoring methods should reflect input from resource trustees and be conducted by experienced personnel.	A. Provide the EED policy with all the required components to regulatory agencies to ensure compliance with the SAFMC policy.	High	BOEM, NOAA NMFS, USACOE, EPA, State Agencies	2018	Ongoing
	15. Third party environmental inspectors shall be required on all projects to provide for independent monitoring and permit compliance.	A. Require companies associated with energy development to fund compliance monitoring positions that will inspect and assess if requirements are being adhered to.	Medium	Applicants or BOEM?	2018	Ongoing
	16. Hydrotest chemicals that may be harmful to fish and wildlife resources should not be discharged into waters of the United States.	A. Provide the EED policy with all the required components to regulatory agencies to ensure compliance with the SAFMC policy.	High	BOEM, NOAA NMFS, USACOE, EPA, State Agencies	2018	Ongoing

Energy Exploration and Development (EED):	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	17. Licenses or permits should require all project-related work vessels that traverse any reef system or sensitive habitat to be equipped with standard navigation aids, safety lighting and communication equipment. Equipment, such as tow lines, that could drag along the bottom and impact benthic habitat should be secured during transit. U.S. Coast Guard automated identification system (AIS) requirements must be followed.	A. Develop BMPs for applicants that may be traversing through or working near coral and other sensitive bottom habitats.	High	BOEM, NOAA NMFS, USACOE, State Agencies	2018	Ongoing
	18. Any anchor placement should completely avoid corals and be visually verified by diver or remote camera. In addition, measures to avoid anchor sweep should be developed and implemented.	A. Develop BMPs for applicants that may be traversing through or working near coral and other sensitive bottom habitats.	High	BOEM, NOAA NMFS, USACOE, State Agencies	2018	Ongoing
	19. Appropriate buffers should be designated around sensitive marine habitats.	A. Coordinate a workshop with federal, state, and university scientists to develop science-based buffers from sensitive habitats for EED projects	High	BOEM, NOAA NMFS, USACOE, State Agencies	2018	Ongoing

Energy Exploration and Development (EED):	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	20. A contingency plan should be required to address catastrophic blowouts or more chronic material losses from LNG facilities, including trajectory and other impact analyses and remediation measures and responsibilities.	A. Provide the EED policy with all the required components to regulatory agencies to ensure compliance with the SAFMC policy.	High	BOEM, NOAA NMFS, USACOE, State Agencies	2018	Ongoing
	21. Licenses and permits should require the development of resource sensitivity training modules specific to each project, construction procedures, and habitat types found within the project impact area. This training should be provided to all contractors and sub-contractors that are anticipated to work in or adjacent to areas that support sensitive habitats.	A. Work with federal and state resource agencies to compile guidelines on contents to include in training modules, and review training modules before finalized.	Medium	BOEM	2019	Ongoing

Chapter 7. Alterations to Riverine, Estuarine, and Nearshore Flows

POLICIES FOR THE PROTECTION AND RESTORATION OF ESSENTIAL FISH HABITATS FROM ALTERATIONS TO RIVERINE, ESTUARINE AND NEARSHORE FLOWS (Adopted June 2014)

Introduction to Policy Statement

This policy establishes the SAFMC's guidance regarding protection of the essential fish habitats (EFH) and habitat areas of particular concern (EFH-HAPCs) associated with alterations of riverine, estuarine and nearshore flows. Such hydrologic alterations occur through activities such as dam operations, water supply and irrigation withdrawals, and other modifications to the normative hydrograph. The policies are designed to be consistent with the overall habitat protection policies of the SAFMC as formulated and adopted in the Habitat Plan and the Comprehensive EFH Amendment, Fishery Ecosystem Plan for the South Atlantic Region, Comprehensive Ecosystem-Based Management Amendment 1, Comprehensive Ecosystem-Based Amendment 2 and the various Fishery Management Plans of the Council.

Policy Considerations

The policy assesses the threats to EFH potentially posed by activities related to the alteration of flows in southeast rivers, estuaries and nearshore ocean habitats, and the processes whereby those resources are placed at risk. The policies are designed to avoid, minimize and offset damage caused by these activities, in accordance with the general habitat policies of the SAFMC as mandated by law.

Link to Complete Policy Statement: http://cdn1.safmc.net/wp-content/uploads/2016/11/28102846/SAFMCInstreamFlowPolFinalJune14.pdf

Table 7. FEP II Policy to Action Excel spreadsheet: Riverine, Estuarine and Nearshore Flows Sheet presenting General Policy, Policy Components and Action Items (recommendations on how to best implement the policy statement).

Riverine, Estuarine, and Nearshore Flows: Policy Component	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
I. Projects should avoid, minimize and where possible offset damage to EFH and EFH-HAPCs, diadromous fishes, state and federally-listed species, Federal critical habitat, and State Critical Habitat Areas (CHAs).	A. Work with federal, state, and university scientists to characterize baseline natural flows and flow regimes for each South Atlantic river basins, estuary and nearshore habitats natural function necessary to support healthy ecosystem function and fishery production. Provide resulting information to appropriate federal and state agencies, as well as applicants.	High	USGS, USFWS, NOAA, hydrology and fishery experts in state and federal agencies, universities	2018	2020
II. Projects should: Provide a detailed analyses a full range of alternatives, along with assessments of the relative impacts of each on each type of EFH, EFH-HAPC, diadromous fishes, state and federally-listed species, Federal critical habitat, and CHAs. Avoid impacts on EFH, EFH-HAPCs, diadromous fishes, state and federally-listed species, Federal critical habitat, and CHAs that are shown to be avoidable through the alternatives analysis, and minimize impacts that are not. Include assessments of potential unavoidable damage to EFH and other marine resources. Be conditioned on the avoidance of impacts, and the minimization of unavoidable impacts. Compensatory mitigation should be required for all unavoidable impacts Include baseline and project-related monitoring	A. Provide the EED policy with all the required components to regulatory agencies to ensure compliance with the SAFMC policy. Provide resulting information to appropriate federal and state agencies, as well as applicants.	Medium	SAFMC, NOAA, USFWS	2018	Ongoing

Riverine, Estuarine, and Nearshore Flows: Policy Component	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
Be adequate to document pre-project conditions and impacts All assessments should be based upon the best available science and take into account the cumulative impacts associated with other projects in the same southeast watershed. Meet state and Federal water quality standards.					
III. To the extent that it is reasonably practicable, construction activities should not be scheduled to coincide with the spawning migrations or early development of sensitive species that are present in the proposed project areas.	A. NOAA Fisheries in cooperation with the Council, develop a list of regionally specific requirements or BMPs for flow-altering projects that can potentially impact EFH or other resources; BMPs should include in-water work windows; location and orientation of intakes to avoid and minimize impingement and entrainment; and seasonal restrictions on peak flows and flow rate changes.	High	SAFMC, NOAA Fisheries, USFWS, state fishery agencies	2019	2020
IV. Water intakes should not be placed in areas that would negatively affect EFH's, EFH-HAPCs, CHAs, Federal critical habitat or impinge and entrain diadromous fishes, and state and federally-listed species.	B. NOAA Fisheries in cooperation with the Council, develop a list of regionally specific requirements or BMPs for flow-altering projects that can potentially impact EFH or other resources.	High	SAFMC, NOAA, USFWS, state fishery agencies	2019	2020
V. When developing the intake design, intake screens in rivers and streams should be constructed following details specified in the Council policy statement.	A. NOAA Fisheries in cooperation with the Council, develop a list of regionally specific requirements or BMPs for flow-altering projects that can potentially impact EFH or other resources; BMPs should include in-water work windows; location and	High	SAFMC, NOAA Fisheries, USFWS, state fishery agencies	2018	2020

Riverine, Estuarine, and Nearshore Flows: Policy Component	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	orientation of intakes to avoid and minimize impingement and entrainment; and seasonal restrictions on peak flows and flow rate changes.				
VI. An on-going maintenance and repair program is necessary to ensure water intake facilities are kept free from debris and that screen mesh and other components are functioning correctly. Adequate facilities need to be in place for handling floating and submerged debris large enough to damage the screen.	A. Council work with the appropriate federal and state regulatory agencies to see that applicants provide proof of adequate funding to cover future maintenance and repairs. Would probably require statute or rule.	Medium	SAFMC, NOAA, USFWS	2019	2021
VII. Multiple years of post-construction monitoring should be used to study impingement and entrainment rates of sensitive species, and if a bypass system is included, for monitoring mortality through the bypass. Monitoring results need to confirm that the design criteria were met and that unexpectedly high mortality rates are not occurring. Monitoring results can then be used to improve the water intake structure, if needed.	A. Work with universities to analyze monitoring data to assess success of design criteria in minimizing impingement and entrainment.	Medium	Universities	2019	2021
VIII. Components of the natural flow regime should be altered as little as possible. Although achieving a natural hydrograph in its entirety may not be possible, restoration of some of the natural flow regime components can restore ecosystem elements that would be lost or reduced as a consequence of flow regulation.	A. Council provide the policy with all the required components to the appropriate federal and state regulatory agencies to emphasize the importance of selecting the alternative that retains as much of the natural flow regime as possible.	High	SAFMC, NOAA Fisheries, USFWS, SARP, Instream Flow Network	2018	2019

Riverine, Estuarine, and Nearshore Flows: Policy Component	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
IX. For hydropower peaking projects, consider the implementation of ramping rate restrictions before and after the peaking operation and a non-peaking window during the critical reproductive and rearing periods of sensitive species.	A. The Council, NOAA Fisheries and regional partners, develop a list of regionally specific requirements or BMPs for flow-altering projects that can potentially impact EFH or other resources; BMPs should include in-water work windows; location and orientation of intakes to avoid and minimize impingement and entrainment; and seasonal restrictions on peak flows and flow rate changes.	High	SAFMC, NOAA Fisheries, USFWS, state fishery agencies, SARP, Instream Flow Network	2019	2020

Chapter 8. Non-Native and Invasive Species

POLICIES FOR THE PROTECTION OF SOUTH ATLANTIC MARINE AND ESTUARINE ECOSYSTEMS FROM NON-NATIVE AND INVASIVE SPECIES (Adopted June 2014)

Introduction to Policy Statement

This policy establishes the SAFMC's guidance regarding protection of South Atlantic estuarine ecosystems from potential impacts associated with invasive species. The policy designed to be consistent with the overall habitat protection policies of the SAFMC as formulated in the Habitat Plan and adopted in the Comprehensive EFH Amendment, Fishery Ecosystem Plan for the South Atlantic Region, Comprehensive Ecosystem-Based Management Amendment 1, Comprehensive Ecosystem-Based Amendment 2 and the various Fishery Management Plans (FMPs) of the Council.

Policy Considerations

The policy assesses potential impacts to the South Atlantic's marine and estuarine ecosystems posed by invasion of non-native species and the processes which could place those resources at risk. In adhering to a precautionary approach to management, the SAFMC establishes in this document policies and recommendations designed to avoid, minimize, and offset potential impacts to South Atlantic estuarine ecosystems.

Link to Complete Policy Statement: http://cdn1.safmc.net/wp-content/uploads/2016/11/28102846/SAFMCMarEstInvasPolFinalJune14.pdf

Table 8. FEP II Policy to Action Excel spreadsheet: Non-Native and Invasive Species Sheet presenting General Policy, Policy Components and Action Items (recommendations on how to best implement the policy).

Non-Native and Invasive Species:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
I. In instances where an invasive species belongs to a group of organisms included in the Fishery Management Unit, the species would need to be excluded from the FMU via a plan amendment (or an existing framework) before a control or eradication strategy could be implemented.		A. Determine if any species in Fishery Management Unit are considered invasive species.	Low	SAFMC	2018	Ongoing
II. The Council encourages NOAA Fisheries Habitat Conservation Division (HCD) to consider recommending removal of invasive species as a compensatory mitigation measure. When removal of an invasive species is proposed in designated EFH, EFH-HAPCs or CHAPCs, the Council and HCD will work together to evaluate proposed removal techniques to ensure the method selected will avoid or minimize environmental damage.		A. Document, if encountered, invasive species distribution, use of habitat, place in the food web and estimated biomass as part of characterizing managed species use of EFH, EFH-HAPCs, or CHAPCs.	Low	SAFMC, NOAA Fisheries HCD	2018	Ongoing
		B. Request NOAA Fisheries HCD recommend removal of invasive species as a compensatory mitigation measure during the EFH consultation process, when appropriate.	Low	SAFMC, NOAA Fisheries HCD	2018	Ongoing

Non-Native and Invasive Species:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
III. Regarding compensatory mitigation projects or restoration activities that have a planting component, a requirement that plant materials be obtained through local nurseries within a certain radius around the estuary should be considered. Studies have shown different growth patterns of Spartina reared from nurseries located on the east coast of Florida versus the west coast of Florida.		A. Using plants cultured in nurseries for compensatory mitigation activities may be dependent on appropriate plant broodstock sourcing in addition to or instead of proximity of the nursery to a coastal construction project. SAFMC should first reconsider this issue in totality before taking any action.	Low	States, NOAA Fisheries	2020	2022
IV. The Council supports the availability of grant funding to promote research targeting invasive species -- including prevention of introductions, evaluation of impacts, expansion control and removal -- through existing partnerships (i.e., SARP) and in cooperation with state and federal agencies including NOAA's Invasive Species Program, the National Invasive Species Council and the Gulf and South Atlantic Regional Panel of the National Aquatic Nuisance Species Task Force.		A. Provide support as opportunities present themselves (whether it be with a letter from the Council or voicing support in a meeting).	Low	SAFMC, SARP, NOAA	2019	Ongoing
V. The Council supports the availability of grant funding to promote education and outreach efforts targeting invasive species.		A. Provide support as opportunities present themselves (whether it be with a letter from the Council or voicing support in a meeting).	Medium	SAFMC	2018	Ongoing

Non-Native and Invasive Species:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
VI. The Council will recommend to the National Aquatic Nuisance Species Task Force, as appropriate, that management plans be developed for potentially invasive species in South Atlantic waters (this does not imply plans developed by the Council).		A. Send a letter to the National Aquatic Nuisance Species Task Force requesting that they develop management plans (independent of SAFMC Fishery Management Plans) for potentially invasive species in South Atlantic waters.	Low	SAFMC, NANS Task Force	2019	2019
VII. The Council encourages the development of novel gears (other than those prohibited by the Council, such as fish traps) that effectively remove invasive species but do not compromise the integrity of South Atlantic habitats and ecosystems. The Council encourages consulting with appropriate law enforcement agencies to ensure compliance with existing regulations and to address possible enforceability challenges.		A. Sent letter to NOAA Fisheries RA reiterating that the SAFMC would like to review every EFP application received for the development of novel gears that target non-native and invasive species.		SAFMC, NOAA Fisheries	2019	2019
III. The Council strongly supports integrating monitoring of invasive species into existing fishery-independent and dependent programs.		A. Encourage NOAA Southeast Fishery Science Center and state wildlife agencies to integrate monitoring of non-native and invasive species into existing fishery-independent and dependent monitoring programs and support those efforts already in existence.	Low	SAFMC, State Agencies, NOAA Fisheries	2019	2019

Non-Native and Invasive Species:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
IX. The Council strongly suggests that permits for offshore placement of infrastructure for energy generation (e.g. oil platforms, windmills) include provisions for monitoring the settlement and dispersal of non-indigenous species on and among such structures and in potentially affected natural habitats.		A. Get involved with the review process for energy project documents, Programmatic Environmental Impact Statements, 5-Year Plans, etc., and develop a non-native/invasive species monitoring condition for HCD or SAFMC comments or staff to put in comments.	Medium	SAFMC, NOAA Fisheries, US BOEM	2018	Ongoing
X. The Council strongly suggests inspection and thorough cleaning of surfaces prior to placement of Fish Attracting Devices (FAD). The potential risk of inadvertently expanding the range of a non-native species through transport or establishment of new habitats should be carefully considered.		A. Provide NOAA Fisheries HCD staff (conducting EFH review) with the Non-Native and Invasive Policy to develop and provide a condition that requires the inspection and thorough cleaning of surfaces prior to placement of FADs for HCD to put forward in their comments, and also provide HCD with an SAFMC contact for them to coordinate with if needed.	High	SAFMC, NOAA Fisheries HCD	2018	2018
XI. The Council supports programs to control invasive species' populations in areas of high ecological/economic importance. The Council supports harvest, eradication, and/or removal strategies that do not impact populations of managed species or their habitats.		A. Provide support as opportunities present themselves (whether it be with a letter from the Council or voicing support in a meeting) for invasive species control programs and strategies in areas of high ecological/economic importance that do not impacts populations of managed species or their habitats.	Medium	SAFMC, NOAA Fisheries HCD, SARP	2019	Ongoing

Non-Native and Invasive Species:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
XII. The Council strongly discourages the use of any non-indigenous species in aquaculture operations in the South Atlantic region.	1. Species being raised in South Atlantic aquaculture facilities	A. Addressed by the Marine Aquaculture Policy Implementation Spreadsheet Policy Component #VIII.	High	SAFMC, NOAA Fisheries, State Agencies	2018	Ongoing
XIII. The Council supports its regional partners in their endeavor to promulgate regulations for ballast water and their efforts toward research and development to advance treatment technology for ballast water.	1. Ballast water in vessels transiting the South Atlantic region	B. Evaluate annual level of ballast water from vessels transiting the South Atlantic region.	Low	NOAA Fisheries	2019	2019

Chapter 9. Artificial Reefs (Draft Policy Statement- In Review)

POLICY CONSIDERATIONS FOR DEVELOPMENT OF ARTIFICIAL REEFS IN THE SOUTH ATLANTIC REGION AND PROTECTION OF ESSENTIAL FISH HABITAT (Draft August 2017)

Introduction to Policy Statement

This policy establishes the SAFMC guidance regarding protection and mitigation of Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (EFH-HAPCs) related to artificial reef development, placement, and maintenance.

Policy Considerations

In addition to serving as EFH, this policy highlights that the Council has designated artificial reefs Special Management Zones (SMZs) as EFH-HAPCs. As a whole, the guidance is consistent with the overall habitat protection policies of the SAFMC as formulated and adopted in the Habitat Plan, the Comprehensive EFH Amendment, the Fishery Ecosystem Plan of the South Atlantic Region, Comprehensive Ecosystem-Based Amendment 1, Comprehensive Ecosystem-Based Amendment 2, and the various Fishery Management Plans (FMPs) of the Council.

For the purposes of policy, the findings assess potential threats and impacts to managed species EFH and EFH-HAPCs and the South Atlantic ecosystem associated with artificial reefs and processes that could improve those resources or place them at risk.

Link to Complete Policy Statement: (under development)

Table 9. FEP II Policy to Action Excel spreadsheet: Policy Considerations for Developing Artificial Reefs Sheet presenting General Policy, Policy Components and Action Items (recommendations on how to best implement the policy statement).

Artificial Reefs:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
I. Uses	1. Artificial reefs can serve a variety of purposes beyond recreational and commercial activities. These potential purposes include areas for spawning, breeding, feeding, and refuge for growth to maturity of numerous marine organisms including Council-managed species.	A. Characterize species observed on artificial reefs (by material types and season) along with relative abundance by life stage to determine use and value.	High	Researchers and State Artificial Reef Programs	2019	Ongoing
		B. Verify species spawning on artificial reefs through direct observation of behavior and/or gross histology.	High	Researchers and State Artificial Reef Programs	2019	Ongoing
	2. The Council supports state requests to designate specific artificial reefs as SMZs for research and production in an effort to prevent overexploitation of specific artificial reef sites.	A. Develop simple guidelines and protocol to assist states and other partners in getting artificial reefs designated as a SMZ when states desire such classification. Include agencies and contacts that would be important through the process.	High	State Reef Programs, ASMFC Artificial Reef Committee, SAFMC, USACOE, NOAA	2018	2019

Artificial Reefs:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		A. Develop protocols to determine the ideal candidate reef sites for designation and protection and regionally prioritize reef sites for SMZ designation with specific justifications as to potential value and intended goals for the sites.	High	State Reef Programs, ASMFC Artificial Reef Committee, SAFMC, USACOE, NOAA	2018	ongoing
		A. Increase law enforcement of designated areas by determining the feasibility, challenges and costs of providing adequate enforcement.	High	State Reef Programs, State and Federal Law Enforcement, SAFMC, NOAA	2018	Ongoing
	3. Artificial reefs can be used to support fisheries management by providing a more standardized comparison for scientific investigations.	A. Prioritize research needs and explore mechanisms (including designated research areas) to support, coordinate and accomplish research necessary to answer questions related to using artificial reefs in ways that better support fisheries management.	High	State Reef Programs, ASMFC Artificial Reef Committee, SAFMC, USACOE, NOAA	2019	Ongoing
		A. Develop appropriate regulations to allow for establishment, use of and protection for artificial reefs used for short-term or long-term research	High	State Reef Programs, ASMFC Artificial Reef Committee, SAFMC, USACOE, NOAA	2019	Ongoing

Artificial Reefs:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		purposes. Identify prioritized research cost estimates and potential funding sources.				
		B. Work closely with individual state artificial reef programs and marine resource management agencies to accomplish this work in ways that take into consideration the individual states levels of interest, goals, commitment, regulatory and legal ability and capabilities.	High	State Reef Programs, ASMFC Artificial Reef Committee, SAFMC, USACOE, NOAA	2019	Ongoing
II. Siting	1. Artificial reef managers should consult with all stakeholders prior to siting in order to reduce user conflict and maximize the value of artificial reefs as EFH.	A. Utilize existing permit review processes to engage stakeholders and support outreach and education.	High	State Reef Programs, SAFMC	2018	Ongoing
	2. Artificial reefs should be sited in a manner that connects the various life history stages of the target species (i.e., reduces habitat bottlenecks at specific life stages) or enhances a bottlenecked life history stage.	A. Conduct life history studies to determine the spatial and temporal components of spawning and larval recruitment for key species on artificial reefs.	Medium	State Reef Programs, SAFMC, researchers	2020	Ongoing

Artificial Reefs:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		B. Create an autonomous acoustic array within and between artificial reefs to detect movements of species from one reef (structure) to the next.	Medium	State Reef Programs, SAFMC, researchers	2020	Ongoing
	3. Properly sited artificial reefs are EFH and are not detrimental to migratory species such as right whales or Atlantic sturgeon.	A. Deployment: Plan deployments to minimize impacts of endangered species and marine mammals (e.g., right whales.)	Medium	State Reef Programs, SAFMC, NOAA Protected Resources Division, State marine mammal and sea turtle biologists, Grant Resources such as NOAA Section 6.	2020	Ongoing
		B. Deployment: Insure proper clearance. Use materials that are free of potential entanglements and allow ingress and egress to the structure. EFH: Deployed properly, artificial reefs can provide haven and food sources for sea turtles and sturgeon. Studies are encouraged to examine artificial reef impacts on protected resources in NC to GA.	Medium	State Reef Programs, SAFMC, NOAA Protected Resources Division, State marine mammal and sea turtle biologists, Grant Resources such as NOAA Section 6.	2020	Ongoing
	4. Properly sited artificial reefs are not hazards to navigation; they are charted and deployed with navigation as part of the design.	A. Use existing permit process to ensure artificial reefs meet the minimum clearance requirements to	High	State Reef Programs, USACOE, US Coast Guard	2018	Ongoing

Artificial Reefs:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		avoid hazards to navigations.				
III. Construction	1. The SAFMC requires the use of environmentally-safe, long-lasting materials for reef construction, which are stable in their location and avoid any potential danger to other species (e.g., sea turtles).	A. Insure State and Federal management and operation plans are up to date and meet the guidelines put forth by ASMFC Artificial Reef Committee and as permitted by USCOE	High	State Reef Programs, USACOE, US Coast Guard, NOAA Protected Resources	2018	2019, update every 5 years
	2. Managers should use proper design and placement (e.g., relief, distance from shore, proximity to other habitats) to target specific life stages and species.	A. Artificial reef permits should take into account adjacent structures and materials, sediment types, live bottoms, natural rock outcroppings.	High	State Reef Programs, ASMFC, NOAA, SAFMC	2018	2019, update every 5 years
	3. The impacts of decommissioning structures such as oil or gas platforms, offshore wind foundations, tactical aircrew combat training system (TACTS) towers, or navigational aids, should be considered on a case-by-case basis.	A. State management and operation plans should work through suitability and use of structures on a case by case basis through the existing permitting process.	Low	State Reef Programs, USACOE, US Coast Guard, NOAA Protected Resources, BOEM, Military, Private Energy Companies	2018	Ongoing
IV. Mitigation	1. There should be mitigation measures specified if the function of an artificial reef is lost. Artificial reefs can be used to mitigate for damage to natural reefs and for damage to artificial reefs. However, natural (and to an extent artificial) reef habitat is not perfectly replaceable, so caution should be taken to reduce damage to natural and artificial reefs when possible.	A. Use artificial reefs as mitigation for offshore dredging operations - whether it is permitting for sand mining or creating offshore dredge spoil areas.	Low	State Reef Programs, ASMFC Artificial Reef Committee, SAFMC, USACOE, NOAA	2020	Ongoing

Artificial Reefs:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		B. Reefs should be assessed on a regular basis both visually and by side-scan sonar to assess settling. If function is lost at a particular spot over a relatively short period, then future deployments in that area should be avoided.	Low	State Reef Programs, ASMFC Artificial Reef Committee, SAFMC, USACOE, NOAA	2020	Ongoing
	2. Investigation on the potential of artificial reef construction to compensate fishers (as in "buy-back") for any future expansion of no harvest SMZ areas should be conducted.	A. Siting and deploying new artificial reefs nearby limited harvest SMZ areas only if non-state funding is available.	Low	State Reef Programs, SAFMC, USACOE, NOAA, Commercial and recreational fishing organizations	2020	Ongoing
		B. Develop policies in artificial reef management plans that address this issue.	Low	State Reef Programs, SAFMC, USACOE, NOAA, Commercial and recreational fishing organizations	2020	Ongoing
	Biological					
	1. Site selection and spatial habitat utilization by life stages and species life histories (e.g., nursery, spawning, etc.).	A. Habitat utilization and life history studies including visual census, video monitoring, trapping, etc.	High	State Reef Programs, SAFMC, NOAA, Researchers	2020	Ongoing
	2. Community dynamics on artificial reefs and how they interact with communities on adjacent habitats.	A. Ecosystem Management - Examine the connectivity between the artificial reefs and adjacent live bottom and nearshore habitats. Acoustic tagging could be	Medium	State Reef Programs, SAFMC, NOAA, Researchers	2020	2025/ Ongoing

Artificial Reefs:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
		used to explore movements from one reef to the next.				
	3. Understanding the application of small scale scientific results to large scale regional fisheries management. e.g., how to apply results from local or specific individual artificial reef sites to a state or regional basis.	A. Compile results from research efforts and incorporate and apply them as appropriate and practicable within the management practices of artificial reef programs.	Low	State Artificial Reef Programs	2022	Ongoing
	4. The feasibility of incorporating artificial reef habitat into ecosystem management and understanding the potential role of artificial reefs in fisheries management.	A. Question to answer: 1. How best, and to what degree can artificial reefs be used to augment productivity occurring from existence of natural hard bottom reefs?	Medium	State Reef Programs, SAFMC, NOAA, Researchers	2020	2025
	5. The role of artificial reefs in the recruitment and expansion of invasive species.	A. Regularly assessment and monitoring of reefs should produce numbers and distribution of invasive over time	Low	State Reef Programs, SAFMC, NOAA, Researchers	2020	ongoing
	6. Explore the connectivity of the designated reef areas regionally, relative to migration between and residence time on, specific sites (e.g., acoustic tagging studies).	A. Support the expansion of a regional system of acoustic receivers which includes existing and new artificial reef sites in areas useful to ongoing and new work regarding movement patterns and residence times of fish and other species of interest.	Low	University, State and Federal Researchers	2020	Ongoing

Artificial Reefs:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	Socioeconomics					
	1. The socioeconomic impacts of artificial reefs relative to the fishing and diving communities, in addition to the economic impact to local coastal municipalities.	A. Conduct surveys of anglers and divers to determine how often they visit artificial reefs, which ones they visit, what species they target and catch, and cost estimates per trip. 2. Conduct a similar survey of charter, head, and dive boats.	Medium	State Reef Programs, SAFMC, NOAA, Researchers	2019	2021, every 5 years after
	Physical					
	1. The stability, durability, sedimentation, and subsidence of various reef structure metrics and placement in order to maximize ecological benefits and reduce entrapment or secondary effects and debris.	A. Regularly scheduled visual and side-scan assessments of materials, establishment attached sponges and corals, and structural settlement (stability) rates. 2. State and federal artificial management plans should address preparation of the various materials to reduce entrapment and the collection of debris (removing potential snags)	Low	State Reef Programs, SAFMC, NOAA, Researchers	2020	annually
	The SAFMC also encourages:					

Artificial Reefs:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	1. Long-term, multi-year standardized monitoring of artificial reefs and their communities, with the necessary long-term funding to provide multi-year trends in reef fish productivity and allow valid future comparisons of temporal and spatial data.	A. Seek and secure funding for state programs.	High	State Reef Programs, ASMFC	2019	2020
		B. ASMFC Artificial Reef Committee establish and accept standards for monitoring	High	State Reef Programs, ASMFC	2019	2020
	2. Inter-state and/or national collaboration by developing similar data collections with regional or national data access.	A. 1. National Artificial Reef Symposium	Low	State Reef Programs, ASMFC, NOAA, SAFMC, Researchers	2021	2023
	3. Development and application of new innovations and techniques to ensure that regulations established for artificial reefs, especially no harvest areas, are enforced and violators are apprehended and prosecuted for illegal use of gears and/or poaching to the fullest extent of the law.	A. Satellite imagery to assess times and places of highest activity (increase potential interactions).	High	State Reef Programs, NOAA, SAFMC, Law Enforcement, Satellite Imaging Organizations	2022	ongoing
		B. Radar to determine when vessels are in no harvest SMZs.	High	State Reef Programs, NOAA, SAFMC, Law Enforcement, Satellite Imaging Organizations	2022	ongoing
		C. Establish strict penalties in all states for violators	High	State Reef Programs, NOAA, SAFMC, Law Enforcement, Satellite Imaging Organizations	2022	ongoing
	4. Develop and coordinate multifaceted education and outreach efforts to reach	A. Create PSAs for TV and radio.	Medium	State Reef Programs, NOAA, SAFMC, Fishing	2020	2022

Artificial Reefs:	**Policy Component**	**Actions Supporting Policy**	**Priority**	**Program, Organization, Agency**	**Start**	**Completion**
	various sectors of the public.			and Diving Organizations		
		B. Enhance states' artificial reef webpages to provide a unified message	Medium	State Reef Programs, NOAA, SAFMC, Fishing and Diving Organizations	2020	2022
	5. Increasing public awareness and collaboration with regional recreational divers to remove debris, document fish species and maintain the cleanliness of the reefs.	A. Conduct training workshops at dive shops and dive clubs to insure safety first.	Medium	State Reef Programs, NOAA, SAFMC, Diving Organizations and Businesses	2020	2022

Monitoring/Revisions to FEP II Implementation Plan

SAFMC Fishery Ecosystem Plan II (FEP II) and this supporting Implementation Plan are considered active and living documents. The Implementation Plan will be reviewed and updated periodically. The current Implementation plan is scheduled to be adopted by the Council in December 2017. The following schedule will support the Council's response to emerging issues by engaging their advisors and regional experts in monitoring the habitat conservation, research, and ecosystem-based actions presented in the implementation plan.

Council staff, in cooperation with NOAA Fisheries staff and regional partners, will monitor habitat conservation and ecosystem actions specified in the FEP II Implementation Plan. During the spring Habitat and Ecosystem Advisory Panel meeting, Council staff will provide an overview of progress. In addition, The Advisory Panel will, as new policy statements are adopted, develop associated actions for inclusion into the implementation plan.

During their spring meeting in 2021and every three years following, the Habitat Protection and Ecosystem Based Management Advisory Panel will engage regional experts as needed, to determine whether additional actions addressing council policies should be added to the implementation plan. The Council's Habitat Protection and Ecosystem Based Management Committee will review, revise and refine those recommendations for Council consideration and approval for inclusion into the implementation plan.

Acknowledgements

The FEP II Implementation Plan core team drafted the plan. Roger Pugliese facilitated Team activities and Brian Cheuvront and Gregg Waugh provided overall guidance, editing, and assistance.

FEP II Implementation Plan Core Team:

Pat Geer (Chair)	Habitat-Ecosystem AP Chair and GA Sub-Panel Chair
Anne Deaton	NC Habitat Ecosystem AP Sub-Panel Chair
Pricilla Wendt	SC Habitat Ecosystem AP Sub-Panel Chair
Amber Whittle	FL Habitat Ecosystem AP Sub-Panel Chair
Ben Hartig	FL Council Member
Mel Bell	SC Council Member
Wilson Laney	Habitat Ecosystem Committee Co-Chair
Lora Clarke	FEP II Climate Section Writing Team Co-Chair
Ruoying He	FEP II Climate Section Writing Team Co-Chair
Tracey Smart	FEP II Food Webs and Connectivity Team Co-Chair
Dave Chagaris	FEP II Food Webs and Connectivity Team Co-Chair
Marcel Reichert	SAFMC SSC Chair and Ecosystem Model WG
Roger Pugliese	Habitat Ecosystem Staff

Policy to Action Section of Chapters: Team Member Assignments

South Atlantic Food Webs and Connectivity - Dave Chagaris, Tracey Smart and Lora Clarke
South Atlantic Climate Variability and Fisheries - Lora Clarke, Ruoying He and Ben Hartig
Marine Aquaculture – Anne Deaton and Amber Whittle
Submerged Aquatic Vegetation – Anne Deaton and Amber Whittle
Beach Dredging/ Re-nourishment – Priscilla Wendt and Wilson Laney
Energy Exploration – Priscilla Wendt, Mel Bell and Amber Whittle
Alterations to Riverine, Estuarine, and Nearshore Flows - Wilson Laney and Priscilla Wendt
Marine and Estuarine Non-Native and Invasive Species – Wilson Laney and Amber Whittle
Artificial Reefs - Pat Geer and Mel Bel

South Atlantic Fishery Independent Research and Data Needs- Excerpt from SEAMAP 2016-2020 Plan

The following research and data needs are excerpted from the SEAMAP 5 year plan and are included because they represent short and long-term research and data needs that support ecosystem based fishery management and habitat conservation in the South Atlantic Region. Actions identified in the FEP II Implementation Plan would be addressed in advancing research and monitoring refinements and expansions identified in the 5 year plan.

The three SEAMAP committees regularly discuss future SEAMAP activities, and each developed a list of activities that would implement changes according to the following priorities:

I. **Operate existing programs at full utilization**
II. **Expand current projects to collect additional data on existing platforms**
III. **Develop new fishery-independent data collection programs**

The SEAMAP Joint Committee supports priorities that restore and maximize ongoing program activities over the implementation of any new fishery-independent data collection efforts. Lack of adequate funding is the major impediment for maintaining and expanding surveys. In recent years, the level funding and loss of funding has led many of the components to reduce sampling and these reductions are reflected within Tier I of this list. The Committee notes that surveys not included in Tier I currently are at risk of being added in the near future should funding remain level or decrease

further. The projects below are designed specifically to rebuild and expand upon existing SEAMAP data collection activities and as such, will continue to have a high benefit to cost ratio and all cost estimates are based on current rates (August 2016).

I – OPERATE EXISTING PROGRAMS AT FULL UTILIZATION

(Increase of $662,500/year and $75,000 once)

Coastal Trawl Survey

Due to reduced funding and increased cost of the survey, (see Budget in Chapter 2) in particular as a result of the new Fair Labor Standard Act, current funding levels will not allow the continuation of three sampling seasons each year. We considered reducing the number of stations, but unless this reduction is in the northernmost and southernmost area, the cost reduction would be marginal, relative to the large loss in data and geographic coverage. We are currently investigating the effect of dropping one of the sampling seasons on data and analyses for assessments etc., which can be considerable. Maintaining the current sampling efforts (3 seasons, 112 stations per season) would require additional funding of ≈$100,000 annually.

Reef Fish Survey and Bottom Mapping

SEAMAP-SA contributes 40% to 45% of the SCDNR Reef Fish Survey components (SEAMAP-SA and MARMAP), and about 20% of total current funding for the regional Reef Fish Survey (SERFS). The Reef Fish Survey has seen considerable funding reductions over the years, most significantly through reduced funding for MARMAP. In addition to increases in vessel cost per sea day, and increases in personnel and other costs, this has led to a reduction in sea days, the halting of the short and long bottom long-line surveys in 2012 and the gag ingress study in 2015. Due to incidental funding, mostly as a result of the need for data for deep water snapper/grouper species, the long line surveys were, partially resumed in 2014.

A full utilization of the Reef Fish Survey will require:

1. Restoring sampling effort to at least 50 sea day per year (25 each for MARMAP and SEAMAP-SA). Required funding: $ 62,000 annually (~6.5 seadays). It's important to realize that the current reef fish survey is, and can only be, conducted in collaboration with MARMAP (funding between $600K and 850K annually in recent years) and SEFIS (SEFSC program with funding of about $1,300K - $1,500K annually).
2. Restoring the longline surveys as laid out in the SAFIMP and Longline Workshop Reports (See Carmichael et al. 2009 and Carmichael et al. 2016). Participants in this workshop, as well as the SAFMC and others, have recognized the importance of a comprehensive fisheries independent deep water snapper grouper survey. Data for these species are lacking and funding reductions over time have reduced, and in several years eliminated, the sea days available for the long line survey. This would require 10 additional sea days for the R/V Palmetto and 15 sea days for the R/V Lady Lisa. Required funding $ 100,000.
3. Funding to process all life history samples (in particular the otoliths and reproductive tissues) and keeping up with this processing the samples within one year after collection. This will allow the survey to respond to the frequent and unexpected changes in the stock assessment schedules and provide critical information to all assessments. Required funding one time funding of $75,000 and subsequent $30,000 annually.
4. The gag ingress study was halted in 2015 as a result of funding cuts. Evaluation of the cost/benefits of resuming this study is needed, and if resumption is considered, this study should become part of a comprehensive larval and juvenile fish survey plan. Full restoration

of a multi-state juvenile ingress study at the level of the 2015 efforts is expected to require $150,000 annually.

Coastal Longline Surveys

Coastal Longline Survey are designed to provide a long-term fishery independent database on the distribution, relative abundance, catch per unit effort, size distribution and age composition of red drum along the South Atlantic coast. Additionally, the surveys provide information on the relative abundance, size distribution, sex, and maturity of multiple species of small and large coastal sharks.

North Carolina: Unless additional funding is available, there will be a reduction in the number of North Carolina longline days and a reduction of an equivalent amount of data for stock assessments. This means that there is no support to sample the full number of sampling sites per week (72 samples). One week of sampling (8 samples) would need to be omitted and precision in estimates would be reduced. The survey needs restoration of $6,500 annually to maintain current sampling efforts. ($6,500 annually)

South Carolina: To return to the historical breakdown of funding to this survey (75% federal, 25% state funded) the survey would require a restoration of $39,000 (based on FY17 levels). ($39,000 annually)

Georgia: SEAMAP presently covers 55% the costs to fund this survey May to December (8 months, 44 sea days). GADNR has offset the annual costs for years with a combination of state and other federal fund sources to cover personnel services and vessel maintenance. However, these funds continue to be cut and can no longer support 8 months (44 sea days) of sampling. The total FY16 cost for this survey was $140,560 (SEAMAP portion was $77,276). In the future, sampling will need to be reduced to address these shortfalls and may include: reducing the number of months sampled; reducing sampling periodicity to every six weeks (similar to SC); or eliminating a sampling season (May to August – impacts shark sampling, or September to December impacts red drum sampling). (~$63,000 annually)

Data Management

To maintain the current level of data management, which would include uploading new survey data annually, and minimum maintenance of the data base, an increase in operating costs of $10,000 is needed to cover increases in staff and other costs. Additional funds are also essential for standard database maintenance, application refinements, additional queries, bug correction or programming errors that have been discovered within the structure of the database or associated extraction reports. Furthermore, for other partner data management staff, reduced SEAMAP funding has been temporarily offset by outside funding sources. Fully restored funding is necessary to ensure the crucial database support for these critical database aspects. ($30,000 annually)

SERTC

SERTC funding has been severely reduced in recent years. This has significantly affected the support for diet studies in the SEAMAP-SA surveys at SCDNR. To restore SERTC support for the surveys would require a minimum of $82,000 annually, which is roughly the FY14 requested funding level for SERTC through SEAMAP-SA. Note that this would restore activities to fully support for SEAMAP-SA activities, in particular the Coastal Trawl Survey and the Reef Fish Survey. Specifically, the will allow SERTC to once again support the diet studies, curating the SEAMAP-SA biological reference collection, maintain and expand the computerized and searchable literature, and some minor outreach activities (such as publishing diet and other identification guides, etc.). ($82,000 annually)

II – EXPAND CURRENT PROJECTS TO COLLECT ADDITIONAL DATA ON EXISTING PLATFORMS

II – South Atlantic

(Increase of $730,000 annually and $410,000 once)

Coastal Trawl Survey

After an initial increase in life history study activities in 2009/2010, these studies have gradually been reduced as a result of available funding. However, age information, reproductive parameters, and other data such as diet composition in fish and black gill disease in shrimp, are critical for stock assessment and management decisions. As the samples are being collected as part of the ongoing survey, the cost of obtaining this important information is mostly in processing on-board and in the laboratory. The additional cost to the Coastal Trawl Survey of collecting and processing of relevant life history information for key managed species is expected to be $50,000, mostly in staff cost and some supplies.

Reef Fish Survey

If activities under "Tier I" are realized, the R/V Palmetto will be fully utilized and further expansion of activities may require additional vessels. However, life history studies (in particular diet studies) and additional data acquisition equipment are an expansions that can be made without additional vessel time and will greatly enhance data collection, especially in the areas of oceanographic and bottom habitat characterization and ecosystem based assessment and management. Reef Fish diet studies were mostly halted in 2015 due to funding. Resuming these studies would require minimal field effort. Costs would mostly be in supporting staff to examine the sample and analyze the data and some supplies. One biologist would allow processing and samples of 2-6 species each year, depending on the number of samples collected for each species, each year. The collected species would rotate on a set schedule to collect and update diet composition for most managed species over time (estimated costs $80,000 annually, including fringe, overhead, and supplies).

An Acoustic Doppler Current Profiler will allow estimates of the current speed and direction (corrected for vessel speed and direction) throughout the water column. This ocean current data can be used in the survey and provided to other (SEAMAP) programs and researchers to improve sampling efficiency and enhancement and ground-truthing of oceanographic modeling efforts in the region (e.g., SECOORA efforts). It is also important in decisions for safe gear deployment and reducing the risk of losing gear. The cost of purchase and installation of an ADCP is $60,000)

Multi-beam equipment can provide information on bottom relief and habitat type. Various vessels utilized by SEAMAP surveys cross the southeast region on a regular basis. During transit (or during sampling, depending on the survey) multibeam equipment (either towed or on independently operated under water vehicles) could be used to obtain bottom habitat information that would otherwise not become available unless additional targeted cruises are conducted. Besides the cost of the equipment, a possible additional crew member on the research cruises is needed to operate and maintain the equipment and assure proper data collection. Extra costs would be associated with post sampling data analysis, but this can be done in collaboration with academic or federal partners. The advantage of integrating the field activities is that there is no need for additional cruises, which would otherwise come at a considerable additional cost. (The

cost of a multibeam unit is dependent on the type of gear/vehicle (estimated $350,000), and the extra field staff would be $80,000 incl. fringe and indirect)

Bottom Mapping

Managed areas offshore of SEAMAP-South Atlantic states, of specific concern to fishery managers, include Marine Protected Areas (MPAs), deepwater coral HAPCs, Spawning Special Management Zones and other bathymetric features or unique benthic habitats that warrant specific characterization due in part to their unique habitat characteristics or importance as essential fish habitats for managed species (see Appendix I, Figures 1-7 for existing managed areas). Bottom mapping priorities and objectives vary at both the state and management council levels (at least 20 managed areas are identified in the South Atlantic Habitat and Ecosystem Atlas[5]). Bottom mapping initiatives conducted under SEAMAP would build from previous efforts to expand coverage of known benthic habitats to essentially begin filling the gaps along depth contours (current coverage is shown in Figure 7. in Appendix I). Offshore habitat has been subdivided into 10 depth strata to capture target species and significant habitat distribution evaluate mapped and characterization accomplished to date and focus future mapping on priority needs for management. These areas were identified for a baseline of the South Atlantic Mapping Strategy being developed as a supporting tool for the SAFMC Fishery Ecosystem Plan II. Further review of existing habitat and mapping information and species associated will provide the opportunity to direct sampling to expand and complete mapping habitat north and south between known habitats and in managed areas.

5 http://safmc.net/habitat-and-ecosystems/safmc-habitat-and-ecosystem-atlas/

Bottom mapping can be accomplished with use of side-scan (generally for shallower depths) or multi-beam sonar systems (generally for deeper depths). For areas within 200 m bottom depths and utilizing a multi-beam system on a vessel moving at 10 knots, during a 24-hour period of survey operations with a bottom resolution swath width of 200 m, 24 n. mi.^{2} of bottom can be mapped.

Using SEAMAP/MARMAP vessels of opportunity, SCDNR/SAFMC is developing regional partnerships investigating purchase or lease new technology such as an AUV (e.g., Submarine by Ocean Areo) to be used in conjunction with existing operations. For bottom mapping costs, 25 sea days of bottom mapping could be accomplished for $300,000 and would provide approximately 600 n. mi^2 of bottom mapping coverage. In general, the final data product would include raw and processed multibeam sonar data in ArcVIEW and ASCII formats, metadata describing survey methods, and processed image files. ($300,000 annually)

The newer NOAA fisheries research vessels (NOAA Ships *Pisces* and *Henry Bigelow* in the Atlantic) are equipped with the Simrad ME70 multibeam sonar capable of mapping the bottom. The NMFS SEFSC Southeast Fishery-Independent Survey (SEFIS) group typically has ~ 30 days at sea each year in the South Atlantic region on the NOAA ship *Pisces*, during which mapping efforts occur at night (trap-video surveys occur during the day). SEFIS mapping efforts typically result in ~ 250 km^2 of newly mapped areas each year.

Pamlico Sound Survey

The Pamlico Sound Survey began in March 1997 and initially covered the months of March, June, September, and December. The December, leg of the cruise was discontinued in 1990, and the March portion was discontinued in 1991. This decision was made because it was felt that

limited data was being collected during winter months and effort would be better allocated towards other projects. However, recent Pamlico Sound Survey annual reports have recommended adding an additional leg of the cruise at the end of July/beginning of August to increase temporal coverage. Adding additional cruises would increase the amount, and temporal distribution of biological data collected including length frequency and age data. Expanded sampling may also be useful in producing more accurate indices of abundance for target species and potentially for species not currently targeted. In addition, reinitiating sampling during the winter would begin a baseline of winter estuarine habitat use by species as ranges shift due to environmental changes. Approximately $25,000 are budgeted each year to cover expenses for the June and September cruises. Adding two additional months would double this figure while adding one would require an additional $12,500. ($25,000 annually)

Coastal Longline Surveys

The longline surveys were initiated in 2006 as part of ACFCMA supplemental funding with the primary objective to monitor the adult population of red drum as they move offshore in the fall. The survey has also proven to be very success at monitoring several shark species with SEAMAP data from SC and GA being used in stock assessments. Presently, SCDNR conducts their survey from August 15th to December 15th with three six-week sampling periods. In order to assess multiple shark species populations, it will be necessary to add an additional sampling period (July 1 – August 14th) into expanding Georgia's longline sampling, which presently samples monthly from May to December. ($15,000 annually)

Data Management

The SEAMAP-South Atlantic data management system could require expansion to address new data sets or analytical needs that arise with expanded SEAMAP surveys. There is a likelihood of the need to take advantage of technological advances, as well as expanding to include database aspects such as diet study data, an image library of sampled species, the winter tagging cruise, and bottom habitat information into the comprehensive SEAMAP-South Atlantic data management system. An estimated budget increase of $80,000 for SEAMAP-South Atlantic data management would be needed to accommodate these expansions. ($80,000 annually)

SERTC

Over the years there has been a significant increase in the collection and use of genetic samples by SEAMAP-SA surveys ate SCDNR. The cataloguing and curating these samples and making them available for third parties has been largely unfunded. Given the current expertise, this would be a task the SERTC is uniquely qualified for. The annual cost would be ≈ $75,000 and $100,000 including a (part-time) salary for a biologist and supplies for curation. ($100,000 annually)

III – DEVELOP NEW FISHERY INDEPENDENT DATA COLLECTION PROGRAMS

These items include new fishery-independent surveys for data that is needed on a regional basis and is not sufficiently collected now. Specific survey methodology will be determined at the time of survey design with known funding.

III – South Atlantic

(Increase of $2,364,000/year and $320,000 once)

Pelagic Survey

Currently, there is no fishery-independent survey to monitor pelagic fish such as mackerels, dolphin, wahoo, and other species in the Southeast region, all of which are of considerable

importance for commercial and recreational fisheries. Several of these species have undergone SEDAR stock assessments and the need for fishery-independent data was clearly identified in the research recommendations A pelagic survey would require initiating a new monitoring effort since it would require gear specific to the pelagic environment (pelagic long line and acoustic equipment). This cannot be done in a consistent manner during any of the current SEAMAP-South Atlantic monitoring efforts, and a new effort would require new funding. The level of funding would depend on the level of effort and geographic area covered, but is estimated to be between $500,000-$750,000/year if an appropriate survey vessel is available. This new survey could potentially be done in collaboration with the fishing industry. (750,000 annually)

Regional (Ichthyo) Plankton Surveys

The initial concept for SEAMAP-South Atlantic included a plankton survey. Larval distribution of fish and crustacean species remains largely unknown. Such a survey, which was recommended as part of an optimal fishery-independent sampling strategy in South Atlantic waters (SAFIMP)[6], might be run as a stand-alone project standardized among researchers regionally or associated with the trawl survey. The lower tiers (phyto- and non-ichthyo-zooplankton) should also be considered. ($500,000/yr).

6 SAFIMP. 2009. Final report: South Atlantic fishery independent monitoring program workshop. In: Willams EH, Carmichael J (eds), Beaufort, NC, 85 pp.

Early Life Stage Sampling; Support Ongoing Collaborator Subregional Ichthyoplankton Surveys

Long-term ichthyoplankton surveys are operated out of the NOAA Beaufort, North Carolina Laboratory and the Belle W. Baruch Institute for Marine and Coastal Sciences in Georgetown, South Carolina. In combination with a long-term ichthyoplankton survey in New Jersey operated by Rutgers University, these fixed-site collection programs offer the potential for combined, large-scale assessments of changes in larval recruitment patterns over space and time, with implications ranging from fishery applications (developing recruitment indices for use in stock assessments) to assessing impacts of climate change.

The NOAA Beaufort Bridgenet Ichthyoplankton Sampling Program

Initiated in 1986, the Beaufort Bridgenet Ichthyoplankton Sampling Program (BBISP) at the NOAA Beaufort Laboratory represents a multi-decade time series of larval fish ingress through Beaufort Inlet, North Carolina. Fall/winter spawned larvae are sampled weekly from mid-November through April/May at the Pivers Island Bridge. As of 2016, more than 868,000 larval fish from > 100 taxa have been identified from BBISP samples, including multiple species of recreational and management importance [e.g., Atlantic croaker (*Micropogonias undulatus*), spot (*Leiostomus xanthurus*), summer and southern flounder (*Paralichthys dentatus* and *lethostigma*, respectively), American eel (*Anguilla rostrata*), Atlantic menhaden (*Brevoortia tyrannus*) and striped mullet (*Mugil cephalus*)]. Research efforts using these data include examining the link between estuarine ingress, juvenile abundance, adult abundance, and climate variability for a variety of estuarine-dependent fish species along the U.S. East Coast. Operational indices of larval abundance have been used as tuning indices for stock assessments of southern flounder (NC DMF 2008). Ingress densities for other species could serve similar needs in stock assessments (American eel, Atlantic croaker, striped mullet, spot, summer flounder) or as fish community indicators of climate variability or anthropogenic impacts. Catch and densities are available for 1986-2013. The sampling is ongoing and performed by volunteers, but sample processing from 2013-present is currently unfunded. ($29,000 annually including data uploads to SEAMAP database)

North Inlet-Winyah Bay, SC Ichthyoplankton Survey

Collections of larval fishes and more that 45 zooplankton (invertebrate) taxa have been made in North Inlet estuary, South Carolina since the survey's inception in 1981. Based out of the Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina in Georgetown, the survey samples biweekly and year-round. Replicated collections with 365 and 153 micron nets have provided insights into seasonal and interannual patterns of occurrence for fishes and crustaceans of economic importance. The collections have also provided an understanding of the factors that influence early life stages of fishes and other planktonic species. Impacts of climate variability on the timing of larval production of resident species and the timing of ingress of ocean-spawned larvae have been demonstrated. This program appears to be the longest, comprehensive zooplankton time series from Atlantic and Gulf estuaries. Along with other multi-decadal time series from North Carolina and New Jersey, South Carolina ichthyoplankton data through 2013 are now available at http://www.seamap.org/seamapDatabase.html . The survey and associated short-term studies have been supported by multiple, non-permanent sources over the decades including the North Inlet- Winyah Bay NERR. Additional funds are necessary to sustain the collection program and sample processing. ($35,000 annually including data uploads to SEAMAP database)

Develop Nearshore Live Bottom Surveys

Most studies of "live bottom" habitats have been conducted seaward of the ten-fathom line off the Carolinas and Georgia. Biologists acknowledge that substantial live bottom areas exist inside of ten fathoms and are important fishing grounds for recreational fishermen.
These areas provide habitat for black sea bass, red drum, weakfish, and others. A combined live-bottom mapping and finfish trapping program could identify and categorize these poorly-known habitats. These nearshore habitats are at risk to channel-deepening projects, dredge material disposal, and heavy fishing pressure. Include purchase of passive mapping system, e.g., towfish. ($475,000/yr)

Stock Structure Studies

Several state fisheries agencies and university researchers in the South Atlantic region conduct tagging studies of fish, sea turtles, and marine mammals to better understand movements, migrations, and geographic population structure. A variety of acoustic and conventional physical tags have been deployed on species ranging from red drum, cobia, striped bass, and sturgeon. Applying tagging study results to stock identification, stock assessments, and other products for fisheries management can be challenging because individual studies are often 1) limited in temporal and geographic scale, and 2) inhibited by inconsistencies between research groups in data storage and sharing capabilities. Presently, the southeast has several acoustic arrays located off the Georgia, South Carolina, and Florida coast extending from the shoreline out to approximately 12 miles. These arrays have proven effective at capturing the migratory behavior of many species including Atlantic Sturgeon, Lemon Sharks, Bull Sharks, White Sharks, Red Drum, Black Drum, and Tripletail. Expansion of these arrays could include additional array transacts to fill in gaps off north Georgia (Savannah region), north Florida (Jacksonville region) and North Carolina, in addition to providing funding for maintenance and tagging supplies. SEAMAP, in conjunction with the ASMFC Interstate Tagging Committee, could expand evaluations of tag types and protocols in conjunction with ongoing SEAMAP surveys. Funds could be allocated to complete and maintain strategically placed ocean acoustic gates in order to track migration across states. Given its experience with developing the SEAMAP_SA database in Oracle, its Data Management Work Group could evaluate the various tagging projects data schemas and databases and recommend best data processes, and data sharing considerations in

order to enhance the use of tagging study results to answer stock structure and other fisheries management questions. ($300,000 initially, divided between the three states and $225,000 divided between each state annually for subsequent maintenance)

Cooperation of the SE Regional Estuarine Trawl Surveys

There are several trawl surveys conducted in the southeast that SEAMAP has identified as partners or potential partners. These surveys all have a long time-series that can provide information for Commission managed species. Additionally, SEAMAP's Crustacean Committee would greatly benefit from data sharing from many of these surveys. Ultimately, these data can be shared within the SEAMAP data portal for broader use. Costs per survey (or state) would be similar to that for the Pamlico Sound Trawl Survey ($50,000) to provide QA/QC, management, and uploading of the data to the portal. Surveys may include: State Agency and Survey

NC NCDMF Anadromous Trawl Survey (Program 100)

NCDMF Estuarine Trawl Survey (Program 120)

SC SCDNR Crustacean Monitoring Trawl Sampling