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POLICY FOR THE PROTECTION AND RESTORATION OF ESSENTIAL FISH HABITATS FROM ENERGY EXPLORATION AND DEVELOPMENT (March 22, 2024)

Policy Context

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) implementing regulations (CFR Part 600 Subpart J) requires the South Atlantic Fishery Management Council (SAFMC) to designate Essential Fish Habitat (EFH) for each species that it manages and for some species and in some locations, to identify Habitat Areas of Particular Concern (EFH-HAPCs). These habitat identifications protect sensitive habitats from impacts associated with comprehensive energy exploration and development activities as described in the Threats to Marine and Estuarine Resources from Energy Exploration Development, Operational, Site Decommission, and Structure Removal section of this policy. Part 600 Subpart K of the MSA regulations details NOAA Fisheries and Regional Fishery Management responsibilities to consult with federal agencies when activities proposed by those agencies may affect EFH.

This policy has been updated from the SAFMC's December 14, 2015 policy to include offshore wind energy development and associated activities as they represent a new use of marine waters in the region. This document also provides guidance regarding mitigation of impacts throughout the energy exploration and development project life cycles to include energy exploration, site development, operational activities, decommissioning activities, and structure removal, including its potential impact on newly-established EFH. This includes avoidance, minimization and compensatory mitigation.

The guidance herein is 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), the Fishery Ecosystem Plan of the South Atlantic Region (SAFMC 2009a), Comprehensive Ecosystem-Based Amendment 1 (SAFMC 2009b), Comprehensive Ecosystem-Based Amendment 2 (SAFMC 2011), the Fishery Ecosystem Plan II for the South Atlantic region (SAFMC 2018), and the various Fishery Management Plans (FMPs) of the SAFMC. In addition, we have included content from the New England Fishery Management Council's Offshore Wind Energy Policy and the Mid-Atlantic Fishery Management Council's Policy on Wind Energy where appropriate to build upon recently-developed wind energy policy efforts and to strive for policy consistency among the Fishery Management Councils in the Atlantic Region.

For the purposes of policy development, the types of activities within the scope of this document include:

- wind energy;
- oil and gas;
- and estuarine and marine hydrokinetic energy activities. [1]

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 and estuarine systems where EFH occurs, and the processes that could support/enhance those resources or place them at risk. The policies and recommendations established in this document are designed to avoid and minimize impacts and optimize benefits from these activities throughout the life cycle of the project, in accordance with the general habitat policies of the SAFMC as mandated by law. The SAMFC may revise this guidance in response to changes in the types and location of energy exploration and development activities in the South Atlantic region, applicable laws and regulatory guidelines, and knowledge about the impacts of energy exploration and development on habitat.

Policy Goal

The SAFMC supports efforts to mitigate effects of climate change, including the development of renewable energy projects, provided risks to health of marine ecosystems, ecologically and economically sustainable fisheries, and ocean habitats are avoided. To the extent they cannot be avoided, they should be minimized, mitigated, and/or compensated for. This policy supports the Council's commitment to ensuring that energy exploration and development activities are developed in a manner that is compatible with the protection of Council-managed species and their habitats, and with commercial and recreational fishing activities.

EFH At Risk from Energy Exploration and Development

The SAFMC finds that:

1. Energy exploration, development, operational activities, decommissioning activities, and structure removal have the potential to occur within or in proximity to EFH including – but not limited to – coral, coral reefs, and live/hard bottom habitat at all depths in the Exclusive Economic Zone (EEZ); EFH-HAPCs; or other special biological resources essential to commercial and recreational fisheries under SAFMC jurisdiction.

[1] Methane hydrate mining and liquified natural gas (LNG) were listed as potential energy development activities in the Southeast in the previous (2015) energy development policy. Fracking for natural gas has reduced the demand for developing new types of natural gas operations. LNG import and export terminals in the southeast region currently occur at Elba Island, GA. While research is underway regarding methane hydrate mining, there are no existing industrial operations. They are therefore not included in this energy development policy update.

2. Energy exploration, development, operational activities, site decommissioning activities, and structure removal have the potential to cause impacts to a variety of habitats across the shelf and to nearshore, estuarine, and riverine systems and wetlands, including:

   a) waters and benthic habitats in or near drilling and disposal sites, including those potentially affected by sediment movement and by physical disturbance associated with drilling activities and site development;
   b) waters and benthic habitats in or near LNG processing facilities or other energy development sites;
   c) exposed hardbottom (e.g. reefs, live bottom, deepwater *Lophelia* mounds) in shallow and deep waters;
   d) coastal wetlands;
   e) coastal inlets;
   f) riverine systems and associated wetlands; and
   g) intertidal oyster reefs.

3. Certain offshore, nearshore, and riverine habitats are particularly important to the long-term viability of commercial and recreational fisheries under SAFMC management, and potentially threatened by oil, gas, wind, and other energy exploration, development, operational activities, decommissioning activities, and structure removal:

   a) coral, coral reef and live/hard bottom habitat, including deepwater coral communities,
   b) marine and estuarine water column habitat,
   c) estuarine wetlands, including mangroves and marshes,
   d) submerged aquatic vegetation (including seagrass),
   e) waters that support diadromous fishes, and their spawning habitats
   f) waters hydrologically and ecologically connected to waters that support EFH.

4. Siting, design, installation, operations and decommissioning of onshore receiving, holding, transport facilities, pipelines, and transmission cables could have impacts on emergent wetlands, shallow habitats such as oyster reefs and submerged aquatic vegetation, and endangered species' habitats if they are not properly located.

5. Sections of South Atlantic waters potentially affected by these projects, both individually and collectively, have been identified as EFH or EFH-HAPC by the SAFMC. Potentially affected species and their EFH under federal management include *Sargassum* spp., numerous snapper/grouper species, cobia, dolphin, wahoo, shrimp, golden crab, spiny lobster, coral, king mackerel, Spanish mackerel, and tilefish. For a more detailed description of their respective EFH HAPCs, please refer to the EFH User Guide (SAFMC 2021) or for a visual representation, please refer to the SAFMC EFH Mapper. Visit the SAFMC Fishery Management sites for details on each FMP. Many of the habitats potentially affected by these activities have been identified as EFH-HAPCs by the SAFMC. Each threat and the corresponding policy that addresses it is listed in Appendix A.

6. Habitats likely to be affected by energy activities include many recognized in state-level fishery management plans. Examples of these habitats include Strategic Habitat Areas (SHAs) such as those established by the State Marine Fisheries Commissions via FMPs, coastal habitat protection plans, or other management provisions. North Carolina SHAs, are a "subset of the overall system that includes a representative portion of each unique habitat so that overall biodiversity and ecological functions are maintained." NCMFC has established 20 units for Region 1; 67 units for Region 2; and 48 units for Region 3.

Other species of note that reside in the EFH and EFH- HAPC defined by the SAFMC but are not managed by the SAFMC are listed below with their associated EFH definition.

1. Summer Flounder (various nearshore waters, including the surf zone and inlets; certain offshore waters);
2. Bluefish (various nearshore waters, including the surf zone and inlets);
3. Pennatulacea (sea pens and sea pansies) found primarily on muddy, silt bottoms from the subtidal to the shelf break, as well as and deepwater corals and associated communities;
4. Highly Migratory Species (areas identified as EFH for managed by the Secretary of Commerce (e.g., inlets and nearshore waters, including shark pupping and nursery grounds);
5. Diadromous species (riverine and offshore areas that support, including important prey species such as shad, herring and other alosines in addition to Shortnose and Atlantic sturgeon);
6. Endangered Species that live in or migrate through offshore wind areas, such as the North Atlantic right whale; and
7. Birds and bats that live in or migrate through offshore wind areas.

<u>Threats to Marine and Estuarine Resources from Energy Exploration Development, Operational, Site Decommission, and Structure Removal</u>

The SAFMC finds that energy exploration and development activities throughout the project life cycle threaten or potentially threaten EFH and associated SAFMC-managed species through the following mechanisms:

1. Direct mortality and displacement of organisms at and near dredging (Clarke et al. 2000), drilling, or trenching sites due to those activities themselves.

2. Deposition of fine sediments (sedimentation) and drilling muds down-current from drilling, dredging, trenching, and/or backfilling sites, including escapement of drilling mud during horizontal directional drilling (HDD), which can negatively impact structured habitat such as oysters or corals. Increased sedimentation may cause smothering and burial of coral polyps, shading, tissue necrosis, and/or high concentrations of bacteria in coral mucus (Erftemeijer et al. 2012). High turbidity and sedimentation also reduce the recruitment, survival, and settlement of coral larvae, as well as interfere with foraging by fish and shrimp and abrade their gills and other soft tissues (Lindeman and Snyder 1999).

3. Operation of power plants and other energy infrastructure can alter water quality (inclusive of temperature and salinity). The greatest risk to aquatic and estuarine

ecosystems posed by power plant cooling systems is continuous exposure to sublethal stressors, such as changes in water quality, rather than the abrupt mortality of large numbers of organisms due to impingement and entrainment (Clark and Brownell 1973; Laws 2000; Kulkarni et al. 2011). Water quality is known to be a driver of fine scale spatial variation in nearshore fish communities, e.g., in Biscayne Bay (Serafy et al. 1997; 2003; 2005; Faunce and Serafy 2007).

4. Impact on organisms' life cycle stages, including larval dispersal and spawning.

5. Direct mortality of eggs and larvae of marine organisms from coolant water intake (Gallaway et al. 2007).

6. Direct mortality of post-larvae, juvenile, and adult marine and estuarine organisms due to spills from pipelines.

7. Direct mortality of adult marine and estuarine organisms from vessels in transit near or close to inlet areas.

8. Alteration of migration of marine species, including birds and bats, with complex ecological consequences due to the placement of facilities (nearshore/offshore.)

9. Permanent conversion of soft bottom habitat to artificial hard bottom habitat through installing concrete mattresses and hard linear structures (e.g., a pipe covered in articulated concrete mats, transmission cables and interarray cables) or scour protection (e.g., around wind turbine foundations). These structures are likely to alter community diversity, composition, food webs and energy flow due to addition of structure (Sammarco, Paul W. 2014; Claisse et al. 2014; Degraer et al 2020).

10. The creation of vertical structured habitat (e.g., wind turbine foundations and towers) extending from the seafloor to the surface may alter the marine community (Paxton et al. 2020).

11. Fish and other marine life may become entangled in offshore energy infrastructure (primary entanglement; low risk) or in debris, such as fishing gear, that itself is entangled with infrastructure (secondary entanglement; unknown risk).

12. Impacts to seafloor habitats from placement and shifting of anchors (Rogers and Garrison 2001), cables (Messing 2011; Gilliam and Walker 2012), pipelines, and other types of direct mechanical damage such as damage from deployment of instrumentation (e.g., Acoustic Doppler Current Profiles).

13. Submerged electrical transmission cables produce electromagnetic fields (EMF) that may influence the behavior of magneto-sensitive animals, including some species of fish (Ohman et al. 2020).

14. Fish behavior and welfare may be negatively impacted by anthropogenic noise depending on sound pressure levels and the duration of the sound-producing activity (Popper et al 2014). Noise sources that may be detrimental to fish include construction noise (e.g., pile

driving), operation noise, and vessel noise. Effects to fish may include short-term or permanent hearing loss, displacement, and inhibition of reproductive activities.

15. The interactions among all project life cycle effects (including lethal and sub-lethal; direct and indirect; short-term, long-term, and cumulative) affect the magnitude of the overall impacts. Such interactions may result in a scale of effect that is multiplicative rather than additive. The effects of those interactions are largely unstudied and almost completely unknown.

16. Alterations in amount and timing of river flow and significant blockage or reduction in area of critical spawning habitat resulting from damming or diverting rivers are addressed in the SAFMC Estuarine and River Flow policy.

Threats to Marine and Estuarine Resources from Wind Energy Development, Operational Activities, Site Decommissioning, and Structure Removal

Short and long-term impacts of wind facility operations on aquatic species and ecosystems impact-producing factors include habitat changes, specifically reef effects and habitat conversion, electromagnetic fields, hydrodynamic changes, and turbine noise. Individually and in combination these factors may alter managed species' distributions, behaviors, and predator-prey relationships. In addition to the threats listed for other energy activities, the SAFMC finds that wind energy development and operation activities throughout the project life cycle threaten or potentially threaten EFH through the following mechanisms:

1. Impact of noise on fish and marine mammal communication. Fish behavior and health may be negatively impacted by anthropogenic ocean noise/sound depending on sound pressure levels and the duration of the sound producing activity (Popper et al 2014).

2. Impact on bird and bat migration and movement. There is limited information on the impacts of offshore wind turbines on birds and bats. Collision risk models and monitoring can be used to minimize impacts (SEER 2022). Additionally painting turbines has been shown to minimize bird collisions (May, 2020)

3. Impact on local magnetic field and animal orientation and navigation

4. The interactions among all project life cycle effects (including lethal and sub-lethal; direct and indirect; short-term, long-term, and cumulative) affect the magnitude of the overall impacts. Such interactions may result in a scale of effect that is multiplicative rather than additive. The effects of those interactions are largely unstudied and almost completely unknown.

SAFMC Best Management Practices for Energy Exploration Development, Operational, Site Decommissioning, and Structure Removal

In general, energy development activities occurring in the United States southeast region may cause measurable impact to EFH under the jurisdiction of the SAFMC. Projects should avoid, minimize, and – where possible – offset damage to EFH, EFH-HAPCs, and SHAs.

Pilot scale projects should not occur in areas where full-scale efforts are predicted to be environmentally unacceptable (e.g., MPAs, CHAPCs, and Spawning SMZs). Projects should avoid intersection or overlap with Allowable Fishing Areas within the Deepwater Coral HAPCs. This should be accomplished, in part, by integrating the best available and least damaging technologies into the complete life cycle of the project.

The SAFMC establishes best management practices (BMPs) related to the entire project life cycle of energy development activities to clarify and augment the general policies already adopted in the Habitat Plan and Comprehensive Habitat Amendment (SAFMC 1998a; SAFMC 1998b; SAFMC 2009a). For each project, a comprehensive environmental document should be prepared based on the best available information and should adhere to the following guidance for best management practices (BMPs) as described below. The following BMPs are intended to include existing state of knowledge and information needs (See: https://tethys.pnnl.gov/us-offshore-wind-synthesis-environmental-effects-research-seer).

Best Management Practices - Project Siting and Environmental Regulatory Review

1. Determination of the physical and chemical oceanographic and meteorological characteristics of the area should be conducted through field studies by lead state and federal 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 Plan or Development and Production Plan in order to have adequate information upon which to base decisions related to site-specific proposed activities.

2. Developers should accurately map and characterize all benthic habitat types throughout the entire project area (including cable corridors, especially complex habitat and deep-sea coral habitats that are sensitive to impacts, in accordance with NOAA Fisheries Recommendations for Mapping Fish Habitat. These maps are essential for EFH consultations and to support other management and science needs.

3. Surveys should be completed as early as possible in the development process with associated data shared to the maximum extent possible to facilitate the review of each project. Robust survey information should be collected to facilitate the review of each project and should also be collected to facilitate micrositing of foundations and alternative cable routing if complex habitat is detected.

4. Habitat characterization and benthic monitoring should occur over the life cycle of the project to track changes over time.

5. Transmission cables, wind turbines, electrical service platforms, or other structures should not be placed in areas with complex habitats. Complex habitat is defined in NOAA Fisheries' Recommendations for Mapping Fish Habitat (March 2021) as 1) hard

bottom substrates; hard bottom substrates with epifauna or macroalgae; and vegetated habitats (e.g., submerged aquatic vegetation and tidal wetlands).

6. 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.

7. The EIS, EA, or EFH Assessment should address the development of contingency plans to be implemented if problems arise due to 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.

8. EFH Assessments prepared for energy-related projects include the mandatory components set forth in 50 CFR Part 600, Subpart K:

    a. A description of the proposed action;
    b. An analysis of the effects, including cumulative effects, of the action on EFH, the managed species, and associated species by life history stage;
    c. The Federal agency's views regarding the effects of the action on EFH; and
    d. Proposed mitigation

9. All EFH assessments should be based upon the best available science and technologies, 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 characterize project sites (e.g., see Vinick et al. 2012). The methods used for habitat mapping and characterization work should reflect input from resource trustees and be performed with experienced personnel.

10. 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 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.

11. Impact evaluations should include quantitative assessments for each habitat based on recent scientific studies, habitat characterizations, and the best available information. Impact modeling efforts should fully characterize assumptions applied and disclose any potential biases that may affect results.

12. Third party environmental inspectors shall be required on all projects to provide for

independent monitoring and permit compliance.

13. The Council endorses developing and analyzing alternatives in the EIS that are explicitly designed to avoid, minimize, and mitigate habitat and fisheries impacts.

Best Management Practices for Biological Considerations

14. Energy exploration, development, operational activities, site decommission activities and structure removal should not disrupt or impede known migratory patterns of endangered and threatened species, nor shall they disrupt or impede the spawning, breeding or nesting seasons of endangered and threatened species, including the North Atlantic right whale.

    This may necessitate the imposition of seasonal, spatial, or other constraints on exploration and development activities

15. The effects of sound from proposed projects on fish behavior and health should be considered in EFH Assessments.

16. Because individual wind projects do not occur in isolation from one another, or from other types of development, it is very important to consider the potential for cumulative effects to Council-managed species and their habitats, when siting and designing projects. This applies across multiple projects within a single lease area as well as across multiple wind energy projects across the region (considering the effects across adjoining lease areas), and considering other actions which impact the sustainability of the fisheries.

Best Management Practices for Licensing/Permitting

17. 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, adaptive management shall be required for the life cycle of the project. The monitoring methods should reflect input from resource trustees and be conducted by experienced personnel.

18. 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.

19. 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.

20. 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 subcontractors that are anticipated to work in or adjacent to areas that support sensitive habitats.

21. When ongoing research identifies new fisheries or habitat-related concerns in energy development areas, BOEM should consider these results and data in siting and permitting decisions and apply the precautionary principle.[2]

Best Management Practices for Structural/Construction Considerations

22. All facilities associated with energy project life cycles should be designed to avoid or minimize to the maximum extent practicable impacts on coastal ecosystems and sand sharing systems. This includes cable corridors.

23. Boulder relocation should be minimized. If boulders or unexploded ordnance must be relocated, their new locations should be clearly documented and this information disseminated to the fishing community.

24. Noise generated by wind facilities should be minimized, including sounds produced during surveys (e.g., survey vessel operations and acoustic sampling devices), construction (e.g., installation vessel operations, pile driving, cofferdam installation), and operation (e.g., maintenance vessel operations, spinning turbines).

25. Open-loop LNG import/export 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.

26. Appropriate buffers should be designated around sensitive marine habitats.

27. Hydrotest chemicals that may be harmful to fish and wildlife resources should not be

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[2] The Food and Agriculture Organization of the United Nations states "Management according to the precautionary approach exercises prudent foresight to avoid unacceptable or undesirable situations, taking into account that changes in fisheries systems are only slowly reversible, difficult to control, not well understood, and subject to change in the environment and human values" https://www.fao.org/3/w3592e/w3592e07.htm

For examples, see:

Glarou, M., M. Zrust and J. C. Svendsen (2020). "Using Artificial-Reef Knowledge to Enhance the Ecological Function of Offshore Wind Turbine Foundations: Implications for Fish Abundance and Diversity." Journal of Marine Science and Engineering 8(5).

Hermans, A., O. G. Bos and I. Prusina (2020). Nature-Inclusive Design: a catalogue for offshore wind infrastructure. Den Haag, The Netherlands, Wageningen Marine Research: 121p.

Lengkeek, W., K. Didderen, M. Teunis, F. Driessen, J. W. P. Coolen, O. G. Bos, S. A. Vergouwen, T. C. Raaijmakers, M. B. de Vries and M. van Koningsveld (2017). "Eco-friendly design of scour protection: potential enhancement of ecological functioning in offshore wind farms. Towards an implementation guide and experimental set-up." (17-001): 87p.

discharged into waters of the United States.

28. Adequate spill containment and clean-up equipment should be maintained for all development facilities, support vessels and platforms. Equipment shall be available on-site or located so as to be on-site within the landing time trajectory. Fuel spill response plans should address 1) identification of sensitive marine habitats; 2) methods to track the movement of spills; 3) adequate response equipment should be immediately available, and 4) researchers should have timely access to impacted areas, as needed.

29. 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.

30. 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.

31. Projects should comply with existing standards and requirements regulating domestic and international transportation of energy products including but not limited to, regulated waste disposal and emissions which are intended to minimize negative impacts on and preserve the quality of the marine environment.

32. Consideration should be given to utilization of existing fishing communities and other stakeholder resources (e.g., fishing vessels) for construction and operations activities.

<u>Best Management Practices for Cable Location Considerations</u>

33. Transmission cables should not be placed in areas with sensitive fish habitat such as shellfish beds, fish spawning and/or nursery habitat areas, submerged aquatic vegetation, or hard/structured habitat.

34. The best available technology should be used for transmission cable installation to reduce potential impacts on aquatic ecosystems. This may include horizontal directional drilling to avoid impacts to sensitive fish habitat.

35. Transmission cables should be buried to an adequate depth to reduce conflicts with other ocean uses, including fishing operations. Cables should be monitored after installation to ensure bathymetry is restored, and after large storm/meteorological events to ensure cables remain buried.

36. Export and inter-array cables should be buried to an adequate depth to reduce conflicts with other ocean uses, including fishing operations and fishery surveys, and to minimize effects of heat and electromagnetic field emissions. Cables should be monitored after installation and large storm events to ensure bathymetry is restored and to ensure cables remain buried. All cables should be removed during decommissioning.

37. If scour protection or cable armoring is needed, the materials should be selected based on

value to commercial and recreational fishery species. The locations where cable armoring materials (e.g., concrete mattresses) are installed should be documented, disseminated, and monitored. Natural materials, or materials that mimic natural habitats, should be used whenever possible. These materials should not be obtained from existing marine habitats. The materials used must not be toxic.

Best Management Practices for Navigation and Safety

38. The Council supports turbine and transit lane arrangement and spacing that will reduce impacts to fishing and transit vessel navigation. These issues should be coordinated across offshore wind projects and developers. Developers should consult directly with affected fishermen to develop project layouts that minimize impacts.

39. Threats to safety and navigation (e.g., radar disruption, ice shedding, vessel allisions and collisions, security threats, and impacts on search and rescue efforts) should be routinely monitored within and around wind projects. Safety issues should be efficiently identified and addressed using best management practices.

40. For floating wind turbines, locations of inter array cables, mooring lines, and anchors in the water column around each turbine should be clearly marked using the most appropriate technology.

41. Wind service platforms should implement adequate fuel spill response plans and protocols that are consistent with the US Coast Guard, US Environmental Protection Agency, Occupational Safety & Health Administration/HAZMAT, and other state or federal requirements for support vessels and platforms.

Best Management Practices for Mitigation/Compensation

42. All consultations related to siting, design, execution, operations and decommissioning should take an "early and often" approach, whenever possible, to communicate concerns during the design phase, thus increasing opportunities to avoid and reduce, rather than mitigate, impacts.

43. The Council supports the development of a compensatory mitigation fund for damages that occur to the marine environment and fish habitat as well as damages or losses to fishing vessels or their gear, or reductions in operations/revenues, resulting from wind activities.

44. The Council supports the creation of a fisheries development and research fund related to ecosystem changes associated with offshore wind energy development, for example to facilitate development of new fisheries or fishing techniques or enhance existing fisheries.

45. Federal and state-operated fishery independent monitoring surveys are critically important for stock assessments and setting fishery catch limits. Impacts to these surveys should be avoided whenever possible and minimized and mitigated where avoidance is not possible.

46. Bonds must be required and must be adequate to assure that resources will be available for unanticipated environmental impacts, spill response, clean-up and environmental impact assessment.

47. 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 impacts. Mitigation throughout all phases of the project should be local, "up-front," and "in-kind," and include long-term monitoring to assess and ensure the efficacy of the mitigation program selected.

Best Management Practices for Monitoring and Advancement of Scientific Research/Exploration

48. The Council's Habitat Protection and Ecosystem-based Management Advisory Panel recommends coordination with researchers to consider possible multiple uses for wind platforms, such as innovative monitoring technologies to collect acoustic telemetry, meteorological data and explore innovative sampling technologies as well as new floating offshore wind energy technologies.

49. In advancing scientific uses of wind platforms, the NOAA Fisheries and BOEM's passive acoustic monitoring framework, the NOAA Fisheries and the Regional Offshore Science Alliance offshore wind project monitoring framework and guidelines, and NOAA's Ocean Noise strategy will be considered.

50. Research and monitoring should be conducted at project and regional scales to understand project-specific and cumulative effects on aquatic species, habitats, and ecosystems. Important research topics include but are not limited to acoustic issues, including impacts of geotechnical and geophysical surveys, benefits of applying additional noise dampening technology during construction or operations, and differential acoustic impacts of larger vs. smaller turbines on the ecosystem, including on fish behavior.

51. The Council develops and routinely updates a list of research priorities, including priorities related to fisheries and offshore wind. Work supporting these priorities is also recommended.

52. Monitoring should occur 2-3 years before, during, and after construction for the life of the project at regular intervals.

53. There may be important area-specific / project-specific issues that require tailored research in project areas to understand effects that go beyond what is described above. Once preliminary impacts are determined, expertise should be sought (from the Fishery Management Councils) to fully understand impacts.

54. Developers should coordinate monitoring survey designs and methods across projects wherever possible to generate datasets that can be used in combination. Benthic habitat, geological and geophysical, and fisheries surveys should be coordinated to ensure that the prosecution of one survey does not affect the results of another. Coordinated monitoring will support cumulative impacts analysis.

55. Consideration should be given to the impacts of research and monitoring on fisheries. For example, research which may negatively impact fisheries should not be carried out during peak fishing seasons. Developers should consult with the regional fishery management councils and commercial and recreational fishermen regarding the most important times of year.

56. Monitoring and survey designs should be consistent with regionally developed survey mitigation and monitoring protocols, including the Responsible Offshore Science Alliance's monitoring framework and guidelines[6], NOAA Fisheries regional survey mitigation protocols (under development), and NOAA Fisheries habitat monitoring recommendations (under development).

57. Developer-funded monitoring and research data should be made publicly available on a timely and regular basis, while protecting fishermen's confidential business information.

58. Consideration should be given to utilization of existing fishing communities and other

stakeholder resources (e.g., fishing vessels) for research and monitoring activities.

Best Management Practices for Collaboration and Stakeholder Engagement

59. All energy projects will provide BOEM, other federal agencies, states, tribes and stakeholders with information on fishing operations and the potential socioeconomic impacts of offshore wind projects on fishing communities.

60. Offshore wind energy development and associated activities represent a new use of marine waters and should be compatible with other ocean co-uses, including commercial, recreational, and tribal fishing while maintaining biodiversity. Fishing community impacts as defined by NOAA Fisheries Offshore Wind Energy should be considered. Working closely with NOAA and BOEM, collaborators should also include a range of groups on emerging offshore wind energy development. These groups include, but are not limited to state coastal zone Management, US Department of Defense, SECOORA, State Universities, National Marine Sanctuaries, SEAMAP, Council Coordination Habitat Working Group, State Fisheries Agencies, Regional Wildlife Science Collaborative for offshore wind and many others.

61. Engagement should focus on collaboration, shared problem identification, option generation, problem solving moving beyond only information sharing and communication as its primary purpose and intent.

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Appendix A. Below are two tables from the Habitat and Ecosystem Blueprint defining habitat threats and the policies that address them. (SAFMC, 2023)

Table 1. Non-fishing threats identified for the South Atlantic region and the policies that address these threats.

SAFMC EFH Policy Statements										
Policy	**Food Web Connectivity**	**Climate Variability**	**Marine Aquaculture**	**SAV**	**Beach Nourishment**	**Energy Exploration**	**Flows**	**Invasive**	**Artificial Reefs**	
Non-fishing Threat										**Policies Addressing Threat**
Navigation	X		X	X	X	X	X	X	X	8
Hydrologic Alterations	X		X	X	X		X	X	X	7
Natural Events and Climate Change	X	X	X	X			X	X	X	7
Urban/Suburban Development	X			X	X	X	X	X	X	7
Offshore Mining, Beach Dredge and Fill	X		X		X			X	X	5
Oil and Gas			X		X	X		X	X	5
Transportation (roadways and bridges)	X			X	X		X	X		5
Alternative Energy Technologies			X		X	X		X		4
Dredged Material Disposal	X			X	X			X		4
Industrial/ Commercial Activities			X			X		X	X	4
Non-native or nuisance species			X	X				X	X	4
Agriculture	X			X			X			3
Aquaculture			X	X				X		3
Artificial Reefs			X					X	X	3
Dams, Impoundments, Barriers to Passage	X						X	X		3
Inshore Mining			X		X			X		3
Marine Debris			X					X	X	3
Nonpoint-source Pollution			X	X						2
Silviculture										0

Table 2. SAFMC policies and threats addressed by each.

SAFMC EFH Policies	What is addressed
South Atlantic Food Webs and Connectivity **Developed - Dec 2016**	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. • Incorporate into management strategies the potential indirect effects of fisheries on food web linkages and identify unintended consequences; • Use food web models to simulate the ecosystem, understand food web linkages, inform single species assessment and management, generate reference points and ecosystem-level indicators to enhance ecosystem stability and resilience.
South Atlantic Climate Variability and Fisheries **Developed - Dec 2016**	Assess 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. • Develop indicators to track ecological, social, and changing fisheries trends that appear to be due to changing ocean environmental conditions; • Consider tradeoffs and necessary responses to account for predicted and realized increases or decreases in productivity; • Apply the precautionary approach and careful scientific and management evaluation as new fisheries develop.
Marine Aquaculture **Developed- June 2014**	Provide guidance for marine aquaculture development in offshore and coastal waters, riverine systems, and adjacent wetland habitats to protect EFH. • Require effective regulation under MSA and other applicable federal statutes; • Require at least a 10-year permit with annual reporting, operational and option for revocation; • Require only drugs, biologics, and other chemicals approved for aquaculture by the FDA, EPA, or USDA be used; • Allow only native species for aquaculture in federal waters of the South Atlantic and prohibit use of genetically modified organisms unless approved by FDA; • Require applicant to provide all information necessary to thoroughly evaluate the suitability of potential aquaculture sites; • Require applicant/permit holder to develop environmental monitoring plans for projects authorized under MSA and have adequate funds committed to ensure removal of organisms and decommissioning of facilities; • NOAA Fisheries specify conditions of use and outline process to repeal, modify or revoke permits.
Marine Submerged Aquatic Vegetation **In Comprehensive EFH Amend (1998)** **June 2014**	Protect remaining habitat and support actions to restore SAV in locations where they have occurred in the past. • Develop a comprehensive adaptive management strategy to address SAV decline; • Adopt a reliable status and trend survey methodology (mapping and monitoring) to verify the location, health, and coverage of SAV at sub-regional and/or local scales.
Beach Dredging and Filling, Beach Renourishment and Large-Scale Coastal Engineering **In Comp EFH Amend (1998)** **Revised March 2015**	Avoid, minimize and offset damage to EFH from large-scale dredging and disposal of sediments in the coastal ocean and adjacent habitats. • Require a comprehensive environmental document be prepared for each project; • Specify fill material match the sediment characteristics of the recipient beach as closely as possible; • Limit dredging to bathymetric peaks and the shallowest depths possible to reduce the likelihood of infilling with fine-grained sediments.
Energy Exploration, Development, Transportation and Hydropower Relicensing **In Comp EFH Amend (1998)** **Revised June 2005** **Revised December 2015**	Provide guidance for energy exploration, development and transportation in offshore and coastal waters, riverine systems and adjacent wetland habitats. Avoid and minimize impacts to EFH and EFH-HAPCs and optimize benefits from these activities. • Use best available, least damaging technologies to avoid, minimize, and offset damage to EFH, EFH-HAPCs and avoid intersection or overlap with allowable fishing areas within the Deepwater Coral HAPCs; • Design energy exploration activities and facilities to avoid impacts on coastal ecosystems and sand sharing systems. • Comply with existing standards and requirements regulating domestic and international energy transportation including regulated waste disposal and emissions. • Avoid open-loop LNG processing facilities in favor of closed-loop systems with water intake minimized and establish baseline studies and project monitoring. • Recommend that pilot scale projects not occur in areas where full-scale efforts are predicted to be environmentally unacceptable (e.g., MPAs, CHAPCs, and Spawning SMZs).

SAFMC EFH Policies	What is addressed
Alterations to Riverine, Estuarine and Nearshore Flows **June 2014**	Avoid, minimize, and offset damage to EFH and EFH-HAPCs, diadromous fishes, state and federally-listed species, Federal critical habitat, and State Critical Habitat Areas (CHAs) caused by alteration of flows in southeast rivers, estuaries and nearshore ocean habitats. • Provide detailed impact analyses, assessments of potential unavoidable damage to EFH and other marine resources; • Avoid impacts, require compensatory mitigation for unavoidable impacts, and account for the cumulative impacts in the same watershed; • Recommend that projects meet state and Federal water quality standards, include baseline monitoring, and establish on-going maintenance and repair programs; • Recommend that construction not coincide with spawning migrations or early development of sensitive species; • Avoid impingement and entrainment of sensitive species at water intakes and provide detailed requirements for developing the intake design; • Natural flow regime should be altered as little as possible; • Hydropower projects implement ramping rate restrictions and a non-peaking window during the critical reproductive and rearing periods.
South Atlantic Marine & Estuarine Ecosystems from Non-Native and Invasive Species **Developed 2014**	Prevent invasive species from impacting marine and estuarine habitats in the South Atlantic region. • Remove species from the FMU to allow control or eradication strategy to be implemented; • NOAA Fisheries remove invasive species as a compensatory mitigation measure and require plant materials be obtained through local nurseries; • Grant funding to promote research and education and outreach efforts targeting invasive species; • National Aquatic Nuisance Species Task Force support developing management plans for potentially invasive species in South Atlantic waters; • Develop novel gears and invasive species harvest, eradication, and/or removal strategies/programs which do not impact South Atlantic habitats and ecosystems and encourage removal from areas of high ecological/economic importance; • Integrate monitoring of invasive species into existing fishery-independent and dependent programs; • Require inspection/surface cleaning prior to placement of Fish Attracting Devices; • Discourage use of non-indigenous species in aquaculture in the SA region and ensure compliance with existing regulations; • Energy infrastructure permits require monitoring the settlement and dispersal of non-indigenous species; • Regional partners develop regulations controlling ballast water and research and development to advance treatment technology.
Artificial Reefs **Developed 2017**	Protection and mitigation (avoidance, minimization, and compensatory mitigation) of EFH and EFH-HAPCs related to artificial reef development, placement, and maintenance. • Defines uses of ARs: recreational and commercial activities, spawning, breeding, feeding, and refuge for growth to maturity; • Support state requests to designate specific ARs as SMZs; • Provide a more standardized comparison for scientific investigations; • Managers consult with stakeholders prior to siting in order to reduce user conflict and maximize the value of ARs as EFH; • Properly site ARs to connect life stages of target species, do not impact right whales/Atlantic sturgeon or hazards to navigation; • Require the use of environmentally safe, long-lasting materials for reef construction; • Consider impacts of decommissioning structures on a case-by-case basis; • Mitigation measures are specified if the function of an AR is lost.