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REVISED DRAFT

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POLICIES FOR THE PROTECTION AND RESTORATION OF ESSENTIAL FISH HABITATS FROM MARINE AQUACULTURE

Tone is Strong – use potential threats or impacts versus threats

Policy Context

This document establishes the policies of the South Atlantic Fishery Management Council (SAFMC) regarding protection of Essential Fish Habitat (EFH) and Essential Fish Habitat - Habitat Areas of Particular Concern (EFH-HAPCs) from threats associated with marine aquaculture. The policies are designed to be consistent with the overall habitat protection policies of the SAFMC as formulated in the Habitat Plan (SAFMC 1998a) and adopted in the Comprehensive EFH Amendment (SAFMC 1998b) and the various Fishery Management Plans (FMPs) of the Council.

The findings presented below assess potential threats 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 whereby those resources are placed at risk. The policies and recommendations established in this document 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. To address any future marine aquaculture projects in the South Atlantic region, the SAFMC reserves the right to revise this policy when more information becomes available.

The recommendations presented here should be applied to aquaculture facilities in reasonable proximity to EFH and EFH-HAPCs, however managed. Current laws, regulations and policies differ for offshore aquaculture, and for aquaculture activities in nearshore and inshore waters managed by the various states. As the federal FMPs in the region are amended to address offshore aquaculture as "fishing" activities, then these recommendations should be factored into those FMPs. Where aquaculture remains outside federal FMP-based management, then EFH protection mechanisms for "non-fishing" activities should be used to protect EFH, wherever possible.

EFH Potentially At Risk from Marine Aquaculture Activities

The SAFMC finds that:

1. Marine aquaculture activities or associated support facilities have the potential to cause impacts to a variety of habitats across the shelf and to nearshore systems including:

   a) waters and benthic habitats in or near marine aquaculture sites,
   b) exposed hardbottom (e.g. reefs and live bottom) in shallow and deep waters,
   c) submersed aquatic vegetation beds,
   d) shellfish beds,
   e) spawning and nursery areas,
   f) coastal wetlands, and
   g) riverine systems and associated wetlands.

7. 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 marine offshore aquaculture activities, including:

   a) coral, coral reef and live/hardbottom habitat, including deepwater coral communities;
   b) marine and estuarine waters;
   c) estuarine wetlands, including mangroves and marshes;
   d) submersed aquatic vegetation;
   e) waters that support diadromous fishes, and their spawning and nursery habitats; and
   f) waters hydrologically and ecologically connected to waters that support EFH.

8. Construction and operation of poorly sited and/or designed aquaculture support facilities could have impacts on wetlands and other EFH, and endangered species' habitats.

9. 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 (SAFMC, 1998b):

   a) summer flounder (various nearshore waters; certain offshore waters);
   b) bluefish (various nearshore waters);
   c) red drum (unconsolidated bottoms in the nearshore);
   d) many snapper and grouper species (live hardbottom from shore to 600 feet, and – for estuarine-dependent species (e.g., gag grouper and gray snapper) – unconsolidated bottoms and live hardbottoms to the 100 foot contour);
   e) black sea bass (various nearshore waters, including unconsolidated bottom and live hardbottom to 100 feet, and hardbottoms to 600 feet);
   f) penaeid shrimp (offshore habitats used for spawning and growth to maturity, and waters connecting to inshore nursery areas);

g) coastal migratory pelagics (e.g., king mackerel, Spanish mackerel) (sandy shoals of capes and bars, barrier island ocean-side waters from the surf zone to the shelf break inshore of the Gulf Stream);
h) corals of various types and associated organisms (on hard substrates in shallow, mid-shelf, and deep water);
i) muddy, silt bottoms from the subtidal to the shelf break, deepwater corals and associated communities; and
j) areas identified as EFH for Highly Migratory Species managed by the Secretary of Commerce (e.g., sharks: inlets and nearshore waters, including pupping and nursery grounds).

10. Many of the habitats potentially affected by these activities have been identified as EFH-HAPCs by the SAFMC. Each habitat and FMP is provided as follows:

a) all hardbottom areas (SAFMC snapper grouper);
b) nearshore spawning and nursery sites (SAFMC penaeid shrimps and red drum);
c) benthic Sargassum (SAFMC snapper grouper);
d) from shore to the ends of the sandy shoals of Cape Lookout, Cape Fear, and Cape Hatteras, North Carolina; Hurl Rocks, South Carolina; and *Phragmatopoma* (worm reefs) reefs off the central coast of Florida and near shore hardbottom south of Cape Canaveral (SAFMC coastal migratory pelagics);
e) Hurl Rocks (South Carolina); the *Phragmatopoma* (worm reefs) off central east coast of Florida; nearshore (0-4 meters; 0-12 feet) hardbottom off the east coast of Florida from Cape Canaveral to Broward County; offshore (5-30 meters; 15-90 feet) hardbottom off the east coast of Florida from Palm Beach County to Fowey Rocks; Biscayne Bay, Florida; Biscayne National Park, Florida; and the Florida Keys National Marine Sanctuary (SAFMC Coral, Coral Reefs and Live Hardbottom Habitat);
f) EFH-HAPCs designated for HMS species (e.g., sharks) in the South Atlantic region (NMFS Highly Migratory Species);
g) *Oculina* Bank HAPC and proposed deepwater coral HAPCs (SAFMC Coral, Coral Reefs and Live Hardbottom Habitat); and
h) HAPCs for diadromous species adopted by the Atlantic States Marine Fisheries Commission (ASMFC).

11. Habitats likely to be affected by marine aquaculture activities include many recognised in state-level fishery management plans and interstate fishery management plans of the ASMFC. Examples of these habitats include state-designated Critical Habitat Areas (CHAs) established by the North Carolina Marine Fisheries Commission, either in FMPs or in Coastal Habitat Protection Plans. Many state-managed and interstate-managed species serve as key prey for SAFMC-managed species.

P3 of 9 and elsewhere CHAs – NC in process of role change to designate as strategic Habitat Areas (SHAs)

12. Scientists in east Florida have documented exceptionally important habitat values for nearshore hardbottom used by over 500 species of fishes and invertebrates, including juveniles of many reef fishes. Equivalent scientific work is just beginning in other South Atlantic states, but life histories suggest that similar habitat use patterns will be found.

Threats to EFH from Marine Aquaculture Activities

Aquaculture-related development without adequate safeguards may threaten wild stocks and the habitats that support them. The future of some aquaculture sectors is inextricably intertwined with fisheries and the health of marine ecosystems. Some coastal forms of aquaculture are known to degrade marine ecosystems, and may result in a net loss of fish. Finfish netpens in offshore waters may be expected to pose risks similar to netpens in inshore waters, where several important types of environmental problems are now well-documented (summarized in Naylor et al., 2000; Naylor et al., 2005).

An analysis of the potential cumulative impacts of aquaculture development in the Southeast region is essential prior to any large-scale expansion, onshore or offshore. Experimental or small-scale commercial fish farms are unlikely to have major environmental effects. However, if farming booms, and becomes a major means of food production, the potential impacts on marine ecosystems and wild fisheries – and the communities that depend upon them – could be significant.

The SAFMC finds the following to constitute threats to EFH:

1) *Escapement:* Ecological damage caused by escaped organisms is well documented, including the introduction of non-native species, and reduced fitness of wild stocks as a result of interbreeding with escapees of the same species. The likelihood of large-scale escapes from farms may be high, if cages are sited in storm-prone areas, either offshore on nearshore. Even without storms, escapes frequently occur – in the Caribbean and Hawaii, sharks have torn open fish cages, letting fish escape.

   Moreover, species potentially targeted for offshore or nearshore production may spawn in netpens. Atlantic cod, for example, spawn in ocean enclosures. In addition, ocean fish cages are incapable of containing fish eggs. The impacts of fertilized egg releases on the health of wild fisheries could be significant if farmed fish are genetically less well-adapted to the ocean environment, as a result of selective breeding, genetic engineering, or simply because animals being farmed were taken from a geographic area with different ecological conditions.

2) *Spread of pathogens and use of antibiotics and other drugs:* Concentration of large numbers of animals in a small area almost inevitably facilitates outbreaks of disease and parasites, potentially jeopardizing wild stocks. For example, salmon farms in British

Columbia spread parasitic sea lice to wild pink and chum salmon (Krosek et al., 2005).

Disease and parasite outbreaks also lead producers to administer antibiotics and other drugs, usually via feed. Drugs can end up in marine ecosystems where they can select for resistant bacteria, sometimes in species targeted by fisheries (Ervik et al., 1994).

3) *Water pollution:* Concentrated animal production operations use substantial amounts of feeds. Even very efficient operations lose significant fractions of the nutrients in feeds through uneaten food and through oxygen-demanding wastes, which are transmitted to surrounding waters.

A $5 billion U.S. marine aquaculture industry (a target figure used by NOAA) would generate annually an amount of nitrogen equivalent to that in untreated waste from 17.1 million people or the entire North Carolina hog industry of about 10 million hogs (estimated using typical discharge rates from salmon farming by Goldberg and Naylor, 2005). Nitrogen is the nutrient primarily responsible for eutrophication in marine waters in the U.S. southeast, resulting in algal blooms and deoxygenation. In inshore waters, both nitrogen and phosphorus are nutrients of concern.

Widely-spaced marine farms sited in areas with strong currents would have less localized impact. Nevertheless, fish farms may cluster geographically near infrastructure such as processing plants and transportation~~, like~~ and terrestrial hog farms, concentrating potential impacts.

In addition, nutrient impacts can be considerable in oligotrophic oceanic systems at levels significantly below those used as benchmarks for pollution in inshore and estuarine waters. The importance of the surface microlayer to larval ecology and its vulnerability to perturbations from airborne or locally-sourced excess nutrients cannot be overstated. Standards and criteria for nutrient-related water quality impacts on these oceanic ecological functions do not yet exist; compliance with state-based water quality standards and national water quality criteria for nutrients may not prevent loading-based impacts.

Finally, other feed amendments (feed additives?), including metals and persistent organic pollutants, may contribute to longer-term bioaccumulation.

4) *Farming carnivores:* Species likely targeted for offshore culture in the southeast, such as flounders, cobia, mutton snapper, and groupers, are typically raised on feeds with high levels of fish meal and fish oil derived from wild-caught fish. Using current practices, aquaculture of such predators will likely consume two to four times more wild fish than is ultimately harvested. A growing aquaculture industry could increase fishing pressure on wild fish populations. Increased capture of small prey species such as sardines, anchovies, squid, herrings and mackerel to manufacture feed could deprive marine predators, including many commercially important fish, of their prey – an important

element of EFH (Naylor and Burke, 2005).

In the South Atlantic region, SAFMC-managed species are unusual in their degree of estuarine dependence, and in the prevalence of cross-shelf ontogenetic life histories. Nearly all such species depend upon prey species that in turn are subject to potential fishing for the production of fish meal. Especially important examples are Atlantic menhaden, the alosine fishes, juvenile sciaenids, and bay anchovy. Of these species, most are either overfished in their own right (e.g. the river herrings) or are in unknown condition and largely unmanaged (e.g. bay anchovy). Little or no potential exists for parsimonious (What is this?)harvest of such fish for use as fish meal. The current remnant reduction fishery for Atlantic menhaden is already under fire in the Chesapeake Bay.

SAFMC Policies for Marine Aquaculture Projects

The SAFMC establishes the following general policies related to marine aquaculture projects, to clarify and augment the general policies already adopted in the Habitat Plan and Comprehensive Habitat Amendment (SAFMC 1998a; SAFMC 1998b):

1. The Council strongly supports thorough public review and effective regulation, marine aquaculture activities in the EEZ, which minimize any potential impact on EFH and EFH Habitat Areas of Particular Concern (HAPCs). South Atlantic fisheries are exceptionally dependent upon healthy habitat already under attack from many sources.

2. The Council is concerned over the "op-out" provision for coastal states proposed for addition to Section 4(a)(3) of the National Offshore Aquaculture Act It is believed that the opt-out provision of the will weaken the rule-making process. It is the Council's position that states should use their coastal management programs and consistency review procedure in the process to approve aquaculture permits. Also, we would support including language in the legislation that if a state determines that issuance of a permit for offshore aquaculture activities is inconsistent with the state's coastal management program, then the state's inconsistency determination will not be challenged by NOAA and the permit will not be issued.

3. The Council remains concerned that the proposed regulatory structure provides inadequate protection for EFH. The EFH doctrine depends upon twin pillars (consultation and elevation) to balance agency oversight. The Council recommends that the NMFS EFH elevation authority be retained to ensure a more balanced treatment of permit applications.

4. The Council supports at least a ten-year duration for permits, but also supports annual reporting requirements (activity reports) and a five-year comprehensive operational review with the option to revoke such permits at any time in the event there is no activity or there is documented adverse impacts to marine resources. Given the changes underway in coastal

ecosystems in response to storm events, rising seas and introduced species, the Council feels that shorter review cycles are mandatory.

5. Environmental review and performance expectations must be very high. This is a new and totally optional class of private uses being imposed on already at-risk ecosystems where the likelihood of unacceptable ecological cascades is high. In each case, the proposed language should be upgraded on at least one level towards a "negligible risk" standard.

6. Use of therapeutic agents and feed additives, that have been approved by the FDA specifically for use in open-water or net pen aquaculture, may be used in an offshore aquaculture operation. (Are there alternatives to antibiotics?)

7. Use of genetically modified and non-native species should be prohibited.

8. Use of genetically incompatible organisms is prohibited, thus minimizing the potential genetic impact to the wild stock when an escape occurs.

9. Given the essential nature of proper siting, the applicant is required to collect all needed information to evaluate in full the suitability of potential sites. If sufficient information is not provided in the application review time allotted by existing processes, the permit should be denied and the applicant should reapply when they have all of the necessary information available.

10. Monitoring plans (if necessary) should be funded and developed by the applicant/permit holder, but it should also be required that monitoring plans must be approved by NOAA (with input from the fishery management councils) prior to implementing them.

11. Permitees should have adequate resources legally committed to ensure proper decommissioning of obsolete or storm-damaged facilities and to fund environmental restoration work should damage occur.

12. The issuing agency should have clear authority to repeal or condition permits in order to prevent environmental damage and repeal permits when and if it becomes evident that environmental damage is occurring or if permit conditions are not met.

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