

**PUBLIC HEARING DRAFT**

**FISHERY MANAGEMENT PLAN FOR REGULATING  
OFFSHORE MARINE AQUACULTURE IN THE GULF OF MEXICO**

**(Including a Draft Programmatic Environmental Impact Statement,  
Initial Regulatory Flexibility Analysis and Regulatory Impact Review)**

**SEPTEMBER 2008**

This draft of the Aquaculture FMP contains revisions made to the document since the September 3, 2008 draft, which was published in the *Federal Register* for public comment on September 12, 2008. Most changes to this document are considered minor and include: 1) addition of a table of actions and alternatives in the Executive Summary, 2) corrections to grammatical and spelling errors throughout the document, 3) deletion of an appendix explaining economic terms (previously Appendix E), and 4) addition of a new appendix summarizing scoping hearings held for the subject action. A few additional changes suggested by NOAA General Counsel were also made to Sections 6.12-6.20 and Section 7. Proposed modifications to the range of actions and alternatives will be summarized in a separate document for the October 2008 Council meeting for consideration.



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## Acronyms/Abbreviations

ABC	acceptable biological catch
ACOE	Army Corps of Engineers
ADCNR	Alabama Department of Conservation and Natural Resources
AP	advisory panel
APA	Administrative Procedures Act
APHIS	Animal and Plant Health Inspection Service, US Department of Agriculture
B	biomass
B <sub>CURRENT</sub>	current biomass of stock
B <sub>MSY</sub>	Biomass at MSY
BOD	Biological Oxygen Demand
CFR	Code of Federal Regulations
Council	Gulf of Mexico Fishery Management Council
CPUE	catch per unit effort
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DACS	Florida Department of Agriculture and Consumer Services
DEIS	draft environmental impact statement
DO	dissolved oxygen
DOC	U. S. Department of Commerce
EA	environmental assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EFP	exempted fishing permit
EIS	Environmental Impact Statement
ELMR	Estuarine Living Marine Resources
E.O.	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAO	Food and Agriculture Organization (United Nations)
FMP	fishery management plan
F <sub>MSY</sub>	fishing mortality rate producing MSY
FMU	fishery management unit
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Florida Fish and Wildlife Research Institute
GC	NOAA general counsel
GMFMC	Gulf of Mexico Fishery Management Council
GMMSEP	Gulf of Mexico Marine Stock Enhancement Program
Gulf	Gulf of Mexico
HAPC	Habitat Areas of Particular Concern
HMS	Highly Migratory Species
IFQ	Individual Fishing Quotas
IQA	Information Quality Act
IRFA	initial regulatory flexibility analysis



LDWF	Louisiana Department of Wildlife and Fisheries
LOA	Letter of Acknowledgement
MARFIN	Marine Fisheries Initiative
MFMT	Maximum Fishing Mortality Threshold
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
mp	million pounds
MPA	Marine Protected Area
MRFSS	Marine Recreational Fishery Statistics Survey
MSAP	Mackerel Stock Assessment Panel
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSST	Minimum Stock Size Threshold
MSY	maximum sustainable yield
NEPA	National Environmental Policy Act
nm	nautical mile
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuaries Act
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	Same as NOAA Fisheries Service
NOS	National Ocean Service
NPDES	National Pollutant Discharge Elimination System
OOA	Open Ocean Aquaculture
OMB	Office of Management and Budget
OCSLA	Outer Continental Shelf Lands Act
OY	optimum yield
PEIS	Programmatic Environmental Impact Statement
ppm	parts per million (e.g., oxygen)
ppt	parts per thousand (salinity)
RA	Regional Administrator of NOAA Fisheries Service
RDSAP	Red Drum Stock Assessment Panel
RFA	Regulatory Flexibility Act
RIR	regulatory impact review
SAFMC	South Atlantic Fishery Management Council
SAV	Submerged Aquatic Vegetation
SBA	Small Business Administration
SEAMAP	Southeast Area Monitoring and Assessment Program
SEDAR	Southeast Data Assessment Review (stock assessment)
SEFSC	Southeast Fisheries Science Center of NOAA Fisheries Service
SEIS	supplemental environmental impact statement
SERO	Southeast Regional Office (NOAA Fisheries Service)
SMZ	special management zone
SPL	saltwater products license (FL)
SPR	spawning potential ratio
SRD	Science and Research Director, Southeast Region
SSB	spawning stock biomass
SSB/R	spawning stock biomass per recruit

TAC	total allowable catch
TOC	total organic carbon
TPWD	Texas Parks and Wildlife Department
UNH	University of New Hampshire
U.S.	United States
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WSSV	white spot syndrome virus

## Programmatic Environmental Impact Statement (EIS) Cover Sheet

### Responsible Agencies and Contact Persons

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### Name of Action

Fishery Management Plan for Regulating Offshore Marine Aquaculture in the Gulf of Mexico

### Type of Action

Administrative  Legislative  
 Draft  Final

### Filing Dates with EPA

**Scoping Hearings:** February-March 2004 (see Appendix H)  
**Notice of intent (NOI) to prepare EIS published:** September 2, 2004 (69 FR 53682).  
**DPEIS filed with EPA:** September 12, 2008  
**DPEIS comment period ended:** October 27, 2008  
**NOA of FPEIS published:** (insert date; FR citation)  
**FPEIS wait period ends:** (insert date)

### Abstract

Demand for protein is increasing in the United States and commercial wild-capture fisheries will not likely be adequate to meet this growing demand. Aquaculture is one method to meet current and future demands for seafood. The Gulf of Mexico Fishery Management Council has authority to regulate fishing in federal waters, including aquaculture. Currently, NOAA Fisheries Service requires an exempted fishing permit to conduct aquaculture in federal waters. This permit is of limited duration and is not intended for commercial production of fish, making aquaculture in federal waters not viable under the current permitting process.

The purpose of this Aquaculture Fishery Management Plan (FMP) is to maximize benefits to the Nation by establishing a regional permitting process to manage the development of an environmentally sound and economically sustainable aquaculture industry in federal waters of the Gulf of Mexico. The Council initiated this action to provide a programmatic approach to evaluating the impacts of aquaculture proposals in the Gulf of Mexico and a comprehensive framework for regulating such activities. The FMP and associated draft programmatic environmental impact statement (DPEIS) are intended to streamline the regulatory process for authorizing current and future offshore aquaculture proposals by providing the Council and NOAA Fisheries Service the information required to review, authorize, and monitor offshore aquaculture operations. The primary goal of the proposed aquaculture permitting program is to increase the maximum sustainable yield and optimum yield of federal fisheries in the Gulf of Mexico by supplementing the harvest of wild caught species with cultured product. Other objectives for this FMP are summarized in Section 3.0.

**Table of Contents for PDEIS**

Please note this fishery action is presented as an integrated document. It addresses different applicable laws including the National Environmental Policy Act. Therefore, the document does not follow a standard EIS format, however, elements of the DPEIS are presented and identified in the following table of contents for the DPEIS. The Aquaculture FMP contains 10 actions with a total of 28 alternatives. The amount of analysis required to evaluate these alternatives is thus very extensive, causing the DPEIS to exceed 150 pages.

The table of contents and sections comprising the PDEIS are as follows:

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## 1.0 Executive Summary

Demand for protein is increasing in the United States; nearly 80 percent of all seafood consumed is currently imported from other countries. As demand grows, commercial wild-capture fisheries will not likely be adequate to meet this growing demand. Aquaculture is one method to meet current and future demands for seafood.

The Gulf of Mexico Fishery Management Council (Council) has authority to regulate fisheries in federal waters, including aquaculture. Currently, NOAA Fisheries Service requires an exempted fishing permit (EFP) to conduct aquaculture in federal waters. This permit is of limited duration and is not intended for commercial production of fish, making aquaculture in federal waters not viable under the current permitting process.

The purpose of this fishery management plan (FMP) is to develop a regional permitting process for regulating and promoting environmentally sound and economically sustainable aquaculture in the Gulf of Mexico (Gulf) exclusive economic zone (EEZ). If this FMP is approved and implemented, an estimated 5 to 20 offshore aquaculture operations would be permitted in the Gulf over the next 10 years, with an estimated annually production of up to 64 million pounds. Establishing such a process requires the Council to develop a fishery management plan for aquaculture. This FMP, including the Draft Programmatic Environmental Impact Statement (DPEIS), would serve as the basis for evaluating the effects of issuing a permit for Gulf aquaculture operations. Effects falling outside the scope of the actions proposed herein would be further analyzed through additional National Environmental Policy Act analyses conducted by the Council and NOAA Fisheries Service.

This FMP considers ten actions, each with an associated range of management alternatives, for establishing a regional permitting process. The full range of alternatives considered in this FMP is described in Section 4.0. A detailed discussion of the environmental consequences associated with each action and alternative is provided in Section 6. The proposed measures and actions in this FMP are all intended to assist the Council and NOAA Fisheries Service in achieving the purpose of this FMP, which is to maximize benefits to the Nation by establishing a regional permitting process to manage the development of an environmentally sound and economically sustainable aquaculture industry in federal waters of the Gulf. By establishing a regional permitting process for aquaculture, the Council will be positioned to achieve their primary goal of increasing maximum sustainable yield (MSY) and optimum yield (OY) of federal fisheries in the Gulf by supplementing harvest of wild caught species with cultured product. Other objectives of this FMP are described in Section 3.0

The actions and management alternatives considered by the Council are listed in Table 1 and are summarized as follows:

**Action 1: Aquaculture Permit Requirements, Eligibility, and Transferability** – This action considers establishing a permit(s) for conducting aquaculture in federal waters of the Gulf. The Council’s preferred alternative (**Preferred Alternative 2**) would authorize

a person to conduct any of the following activities: deploy and operate allowable aquaculture systems, harvest or designate hatchery personnel or other individuals to harvest wild broodstock, possess allowable aquaculture species, transport allowable aquaculture species in or from federal waters of the Gulf, and sell cultured species grown in an allowable aquaculture system. Additionally, **Preferred Alternative 2** would limit eligibility for a Gulf aquaculture permit to U.S. citizens or permanent resident aliens. **Preferred Alternative 2** would also allow transfer of permits, require a dealer permit for receiving cultured organisms, and prohibit landing of cultured species at a non-U.S. port. Other alternatives considered by the Council include maintaining the requirement for an EFP (**Alternative 1**) or requiring separate NOAA Fisheries Service operational and siting permits (**Alternative 3**). Aquaculture under the current EFP process is not viable, while requiring a separate siting permit would be partially duplicative of other federal permitting requirements already in place (e.g., Army Corps of Engineers (ACOE) siting permits). **Preferred Alternative 2** would still provide NOAA Fisheries Service authority to evaluate various siting criteria when deciding whether or not to issue an operational permit. Proposed criteria are summarized in Action 6 (Marine Aquaculture Siting Requirements and Conditions). In order to receive and maintain such a permit, conditions proposed in Actions 2 (Application Requirements, Operational Requirements, and Restrictions), 3 (Permit Duration), and 8 (Recordkeeping and Reporting) would also have to be met. **Alternative 1** would restrict the development of offshore aquaculture in the Gulf and therefore would result in no impacts to the physical, biological, and ecological environments unless an aquaculture facility was able to successfully develop an operation under the current EFP permitting process. **Preferred Alternatives 2 and Alternative 3** would create a regulatory permitting process and therefore would indirectly effect the physical, biological, and ecological environments by allowing for the potential development of an aquaculture industry. Impacts to the physical and biological environments would depend on numerous factors, including where a facility is sited, the potential for fish escapement, types of species allowed for aquaculture, and the business practices of an operation. Preferred alternatives selected in other Actions within this FMP are intended to mitigate or prevent impacts to wild Gulf resources resulting from the permitting of marine aquaculture operations. Such measures include numerous operational, reporting, and recordkeeping requirements (Actions 2 and 8), a requirement to use only native Council managed species for culture (Action 4), case-by-case review of allowable marine aquaculture systems (Action 5), and siting criteria that prohibits facilities from being located in specific areas (Action 6).

**Action 2: Application Requirements, Operational Requirements, and Restrictions** – This action proposes application and operational requirements and restrictions that would have to be met to receive a permit and operate an aquaculture facility. The Council’s preferred alternative (**Preferred Alternative 3**) would require the owner of an aquaculture firm to submit an application for an aquaculture permit at least 120 days prior to the desired date of deployment of any proposed aquaculture system. **Preferred Alternative 3** would also require applicants to submit information to NOAA Fisheries Service when applying for a permit. This would include contact information, the location of the proposed facility, a list of species to be cultured, hatchery information, copies of other federal permits, a description of proposed aquaculture systems and equipment,

documentation for vessels and aircraft, an assurance bond, certification that broodstock used to provide juveniles are from the Gulf, certification that no genetically modified organisms or transgenic animals are used or possessed at the aquaculture facility, identification of an aquatic animal health expert, an emergency disaster plan, and other information necessary for issuance and administration of a permit. Additionally, **Preferred Alternative 3** would specify a use it or lose it provision for permits; require documentation from hatcheries that broodstock are marked or tagged; require a health certificate of inspection prior to stocking of fingerlings, require locating devices be maintained on cages; require permittees monitor feed usage; require permittees report interactions/entanglements with protected resources and migratory birds; require permittees comply with monitoring, drug, pesticide, and biologic regulations from other federal agencies; require cultured fish be maintained with head and fins intact; prohibit possession of wild fish, except when harvesting broodstock; and allow NOAA Fisheries Service employees access to facilities.

All of these conditions would have to be met to issue an aquaculture permit or operate an aquaculture facility. The assurance bond would require an operation remove all components of an aquaculture facility, including cultured species, as a condition of the permit; thereby diminishing long-term impacts that could result from structures and cultured organisms remaining in the environment. Certification that native, pathogen free, non-transgenic and non-genetically modified organisms would be used for aquaculture would minimize risks to wild stocks in the event escapement occurs. The “use it or lose it” provision would require permit holders to begin operation of a facility within two years of permit issuance and stock allowable species within 3 years. This will discourage speculative entry. The other requirements of the preferred alternative require other information to aid in enforcement, monitoring, and permit administration.

**Preferred Alternative 3** would result in the greatest benefits to the biological and physical environments by providing necessary safeguards for authorizing, monitoring, and enforcing marine aquaculture. These safeguards would assist the Council, NOAA Fisheries Service, and other federal agencies in preventing, or minimizing to the extent practicable, impacts on water quality, benthic habitat, and wild fish stocks. **Preferred Alternative 3** results in the greatest economic and administrative costs of any of the alternatives considered, but these costs are more than offset by the benefits to the biological, physical, and social environments.

**Action 3: Permit Duration** – This action proposes permit durations ranging from one year (EFP permit) (**Alternative 1**) to indefinitely (**Alternative 2(d)**). The Council’s preferred alternative (**Preferred Alternative 2(b)**) would allow permits to be effective for 10 years, with renewals every five years thereafter. Ten years is considered by many to be the minimum permit duration necessary to attract financial investment at reasonable rates of return. The duration of permit issuance will not have any direct effects on the physical, biological, or ecological environments, but will indirectly effect those environments. Regardless of the length of the permit, NOAA Fisheries Service would regularly review operations for compliance with governing regulations (see Actions 2 and 8). This will ensure operations are operating properly and not causing unacceptable impacts to the biological or ecological environments. Aquaculture permits would remain

valid for the period of time indicated on the permit unless revoked, suspended, or modified pursuant to subpart D of 15 CFR part 904 for non-compliance with applicable aquaculture regulatory requirements.

**Action 4: Species Allowed for Aquaculture and Included in the Aquaculture Fishery Management Unit** – This action considers species that would be allowed for aquaculture and included in the Council’s Aquaculture Fishery Management Unit. The Council’s preferred alternative (**Preferred Alternative 4**) would allow the aquaculture of all Council managed species, except corals and shrimp. Only species native to the Gulf would be allowed for culture. The Council would also request NOAA Fisheries Service develop concurrent rulemaking to allow aquaculture of highly migratory species (HMS). There is some evidence of the detrimental effects of non-native species on ecosystems. By allowing only native, non-genetically modified and non-transgenic species (see Action 2, Preferred Alternative 3(a)(2)(xii)) for culture, the potential for negative impacts on the biological, physical, and ecological environments will be eliminated or significantly reduced in the event escapement occurs. Other alternatives considered by the Council included not specifying allowable species for aquaculture (**Alternative 1**), only allowing Council managed finfish to be cultured (**Alternative 2**), and allowing all species managed by the Council, except shrimp, corals, and goliath and Nassau grouper (**Alternative 3**). Under all the alternatives in Action 4, the culture of live rock would continue to be regulated by management measures approved in Amendments 2 and 3 to the Coral and Coral Reef FMP.

**Action 5: Allowable Marine Aquaculture Systems** – This action specifies the types of aquaculture systems that would be allowed for culture. The Council’s preferred alternative (**Preferred Alternative 3**) would provide NOAA Fisheries Service authority to evaluate each proposed aquaculture system on a case-by-case basis. Proposed systems would be evaluated based on potential risks to essential fish habitat (EFH), endangered and threatened species, wild fish stocks, and public health and safety. Applicants would be required to submit documentation, such as computer and oceanographic model results, sufficient to evaluate the ability of an aquaculture system to withstand physical stresses associated with major storm events. The Regional Administrator (RA) could approve or deny a proposed system, or specify conditions for its use. Other alternatives considered include: not specifying allowable systems (**Alternative 1**), and allowing only cages and net pens (**Alternative 2**). Unlike **Alternative 2**, **Preferred Alternative 3** would allow for novel new aquaculture systems to be used as they are developed and provide aquaculture operations with the greatest amount of flexibility when selecting systems for culture of a wide-array of species. **Preferred Alternative 3** would also provide for the most rigorous review of proposed aquaculture systems by NOAA Fisheries Service. For these reasons, **Preferred Alternative 3** would provide the greatest benefits to the physical, biological, social, and economic environments. However, because aquaculture grow-out systems would be reviewed on a case-by-case basis, the preferred alternative would also provide for a greater burden on NOAA Fisheries Service staff.

**Action 6: Marine Aquaculture Siting Requirements and Conditions** – This action proposes designating sites or areas for marine aquaculture. Proper siting of an



aquaculture facility is critical to both an operation's success and the protection of the surrounding physical, biological, and ecological environments. If a facility is not properly sited, there is potential for significant environmental impacts to occur. These could range from habitat degradation of surrounding benthos to changes in water quality (e.g., low dissolved oxygen or increased nutrients). To prevent impacts to the biological and physical environments, Action 6 proposes either developing pre-authorized areas for marine aquaculture (**Alternative 2**) or developing siting criteria for facilities (**Preferred Alternative 3**). The Council also considered not specifying criteria or designating areas where aquaculture may occur (**Alternative 1**). NOAA Fisheries Service would continue to comment on permits issued by the ACOE. **Alternative 2** would establish 13 aquaculture zones throughout the Gulf, encompassing approximately 5 percent of the total Gulf EEZ. These zones would allow for more rapid approval of siting locations, but additional site-specific data within a zone may be necessary to determine the suitability of a particular site. The Council's preferred alternative (**Preferred Alternative 3**) would prohibit marine aquaculture in specific areas, such as marine protected areas and habitat areas of particular concern (HAPC). **Preferred Alternative 3** would also require facilities to be sited at least 1.6 nm from another facility. The permitted site would also have to be twice as large as the total area encompassed by allowable aquaculture systems to allow for fallowing and rotation of systems. Permit applicants would also have to submit a video survey of benthic habitat at the proposed site. Lastly, NOAA Fisheries Service would be provided authority to conduct case-by-case review of sites based on additional criteria, such as depth and current speeds. The intent of this alternative is to determine siting locations that minimize or eliminate the potential for environmental impacts. The benefits to the biological and physical environments are expected to be greater than **Alternative 1** and **2**. **Alternative 2** would provide the least flexibility to aquaculture firms when siting a facility, while **Alternatives 1** would provide the most. **Preferred Alternative 3** would allow for rigorous case-by-case review of a proposed site by NOAA Fisheries Service.

**Action 7: Establish Restricted Access Zones for Marine Aquaculture Facilities** – This action proposes establishing restricted access zones around marine aquaculture facilities. **Alternative 1** would not restrict access around a marine aquaculture facility. **Preferred Alternative 2** and **Alternative 3** would restrict access around a marine aquaculture facility. Fishing and transit in or through restricted access zones by fishing vessels would be prohibited. The size of the restricted access zone for **Preferred Alternative 2** would correspond to the coordinates on the approved ACOE permit. For **Alternative 3**, access would be restricted within 100, 500, or 1,640 feet of allowable aquaculture systems. The Council does have authority to create restricted access zones that exclude fishing or fishing vessels. Creation of restricted access zones for aquaculture facilities would potentially provide benefits to investors; particularly in terms of liability issues and protection of investment. Restricting access around a facility may directly affect the physical, biological, and ecological environment by protecting species known to aggregate around structure. Aquaculture facilities have been shown as aggregation sites for many wild species. Additionally, the lack of anchoring or any other interactions that may occur with the physical environment will benefit the benthos of these restricted sites. Also, preventing access around a facility will reduce the likelihood of damage to a

facility, and particularly cages and net pens, thereby reducing any potential impacts associated with fish escapement. Overall, **Preferred Alternative 2** and **Alternative 3** would provide greater benefits to the physical, biological, economic, and ecological environments when compared to **Alternative 1**. However, the social environment may be negatively effected if restricted access zones are perceived as a form of marine protected area that limits where fishermen can catch fish or operate fishing vessels. Siting requirements in Action 6 require NOAA Fisheries Service to evaluate the location of a site relative to important commercial and recreational fishing grounds.

**Action 8: Recordkeeping and Reporting** – This action proposes recordkeeping and reporting requirements for aquaculture operations. As mentioned in the discussion for Actions 1 and 3 above, these requirements would be part of the conditions for maintaining an aquaculture permit and would allow NOAA Fisheries Service to evaluate the impacts of a marine aquaculture operation. The Council’s preferred alternative (**Preferred Alternative 2**) includes numerous recordkeeping and reporting requirements. Requirements would include: submitting an annual report to NOAA Fisheries Service, providing copies of aquaculture permits from other federal agencies, notifying NOAA Fisheries Service of major escapement, pathogen outbreaks, or entanglements and interactions with marine mammals and protected resources, and numerous other recordkeeping and reporting requirements. The intent of these requirements is to minimize or prevent impacts to wild stocks, habitat, and other biological resources. The Council also considered another alternative (**Alternative 1**) that would allow the RA to specify recordkeeping and reporting requirements as specified in EFP regulations. Several other recordkeeping and reporting requirements were also moved to the considered, but rejected section (see Appendix D). **Preferred Alternative 2** requires a more comprehensive list of recordkeeping and reporting requirements than **Alternative 1**, and therefore would benefit the physical and biological environments more. Recordkeeping and reporting is an administrative function and would directly affect the administrative environment. Applicants would incur costs associated with preparing reports and maintaining records and the burden on NOAA Fisheries Service would be increased to review records and reports for compliance with permit conditions. However, these costs are outweighed by the environmental safeguards afforded to the physical and biological environments.

**Action 9: Biological Reference Points and Status Determination Criteria** – The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) was written in part to establish the legal framework for managing wild fisheries resources of the United States. Many of the principles and concepts that guide wild stock management under the MSFCMA are either of little utility or are not generally applicable to the management of offshore aquaculture. Despite this lack of conceptual similarity, offshore aquaculture falls within the realm of activities subject to regulatory control under the MSFCMA, and therefore must meet the MSFCMA legal requirements, until additional legal authority specifically suited for management of offshore aquaculture is established. One such legal requirement is establishment of biological reference points (maximum sustainable yield (MSY), optimum yield (OY)) and status determination criteria (minimum stock size threshold (MSST), maximum fishing mortality threshold (MFMT)).

**Alternative 1** would not establish biological reference points and status determination criteria specific to aquaculture in the Gulf. This alternative would not satisfy MSFCMA legal requirements to establish such criteria and reference points. **Preferred Alternative 2** would establish biological reference points and status determination. MSY would be set equivalent to either the total annual production capacity of all aquaculture operations in the Gulf EEZ, or set equal to optimum yield. The Council's preferred alternative is to set MSY equal to OY. Optimum yield would be specified as the total yield harvested by all permitted aquaculture operations annually, but could not exceed 16, 32, 36, 64, or 190 million pounds annually. The Council's preferred value for OY is 64 million pounds. These OY proxies are likely substantially less than the yield that can be achieved by aquaculture operations over the long-term, allowing the Council to take a more precautionary approach to management while the aquaculture industry develops and more becomes known about offshore aquaculture. If, however, planned production happens to meet or exceed the OY specified by the Council, then the Council would initiate review of the aquaculture program and OY proxy, and NOAA Fisheries Service would publish a control date, after which entry into the industry may be limited or restricted. **Preferred Alternative 2** also specifies that definitions for overfished and overfishing status used for wild stocks would be used as proxies to assess the effects of aquaculture production on these stocks. Additionally, **Preferred Alternative 2** would cap production by individuals, corporations, or other entities at 5, 10, or 20 percent of OY. This provision is necessary to ensure entities do not obtain an excessive share of the allowable yield. The Council's preferred alternative is to cap production at 20 percent of OY for any individual, corporation, or other entity. **Preferred Alternative 2** is preferable because it specifies status criteria and biological reference points, and it establishes conservative levels of production until more is known about the impacts of aquaculture in the Gulf.

**Action 10: Framework Procedures** – This action includes three alternatives.

**Alternative 1** would not specify framework procedures, while **Alternative 2** and **Preferred Alternative 3** would specify framework procedures. Both **Alternatives 2** and **3** would rely on an Aquaculture Advisory Panel that would meet annually to provide recommendations to the Council. The authority of the Advisory Panel would be much more limited under **Alternative 2**; they could only recommend changes to MSY and OY. Under **Preferred Alternative 3**, the Panel would have broader authority, which would include recommending changes to: MSY and OY; application and operating requirements; recordkeeping and reporting requirements; siting requirements; and allowable aquaculture system requirements.

Under **Alternative 2**, if the Council supported the Panel's recommendations, it could then submit the recommendations to the RA for further consideration. The RA would have the authority to approve or deny the proposed changes to MSY and OY. If the RA approved the changes, then they would be published in the *Federal Register*. **Preferred Alternative 3** is similar to **Alternative 2**, except the Council would need to develop a regulatory amendment for proposed regulatory changes recommended by the Panel. The framework procedures described in **Alternatives 2** and **3** are both intended to allow timelier implementation of regulatory measures necessary to prevent or mitigate impacts to the physical, biological, social, economic, and administrative environments. For both

**Alternatives 2 and 3**, several opportunities for public comment and input would be available before any proposed changes to regulatory measures are approved.

Table 1. Actions and alternatives considered by the Council in the Aquaculture FMP.

<b>Action 1: Aquaculture Permits Requirements, Eligibility, and Transferability</b>	
Alternative 1	No Action: an exempted fishing permit for conducting aquaculture is required.
Alternative 2 (Preferred)	Require an aquaculture permit for conducting offshore marine aquaculture. The permit would authorize: deployment and operation of allowable aquaculture systems for growout, harvest of broodstock, operation of a hatchery in the EEZ, and possession, transport, and sale of allowable aquaculture species. Dealer permits are required to receive cultured organisms. Permits are not transferable and eligibility is limited to U.S. citizens and permanent resident aliens.
Alternative 3	Require separate siting and operating permits for conducting offshore marine aquaculture. Eligibility for permits is limited to U.S. citizens and permanent resident aliens.

<b>Action 2: Application Requirements, Operational Requirements, and Restrictions</b>	
Alternative 1	Do not specify application or operational requirements or restrictions.
Alternative 2	Require exempted fishing permit application and issuance requirements as specified at 50 CFR 600.745(b).
Alternative 3 (Preferred)	Establish application requirements, operational requirements, and restrictions for aquaculture permits. Application requirements include submission of an application, providing general contact information, descriptions of allowable aquaculture systems and equipment, providing site location coordinates, documentation of an assurance bond, an emergency disaster plan, identification of an aquatic animal health expert, certification that broodstock used for juveniles were harvested from waters of the U.S. Gulf, and certification that no genetically modified or transgenic species will be used for culture. Operational requirements would include: a use it or lose it provision, documentation that broodstock are marked or tagged at the hatchery, certification that cultured animals are pathogen free prior to stocking, and various monitoring requirements. Requirements also include the use of drugs, biologics, and pesticides in compliance with regulations of other federal agencies, and maintenance of one locating device on each allowable aquaculture system used for grow-out.

<b>Action 3: Duration of the Permit</b>	
Alternative 1	No Action: an exempted fishing permit is effective for no longer than 1-year unless otherwise specified in the permit or a superseding notice or regulation
Alternative 2 (Preferred)	An aquaculture permit(s) is effective for: a) 5 years, b) 10 years and may be renewed in 5-year increments (Preferred), c) 20 years, or d) indefinitely.

<b>Action 4: Species allowed for Aquaculture and Included in Fishery Management Unit</b>	
Alternative 1	No Action: do not specify species allowed for aquaculture and do not develop an Aquaculture FMU.
Alternative 2	Allow aquaculture of all reef fish, red drum, and coastal migratory pelagic fish native to the Gulf and include them in the Aquaculture FMU.
Alternative 3	Allow aquaculture of all species native to the Gulf that are managed by the Council, except goliath and Nassau grouper, shrimp, and corals, and include these species in the Aquaculture FMU.
Alternative 4 (Preferred)	Allow the aquaculture of all species native to the Gulf managed by the

	Council, except shrimp and corals, and include those species in the Aquaculture FMU. The Council will request NOAA Fisheries Service develop concurrent rulemaking to allow aquaculture of highly migratory species.
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<b>Action 5: Allowable Marine Aquaculture Systems</b>	
Alternative 1	No Action: do not specify allowable systems for growing cultured organisms in the Gulf EEZ.
Alternative 2	Allow only cages and net pens for aquaculture in the Gulf EEZ.
Alternative 3 (Preferred)	Evaluate each proposed aquaculture system used for culturing organisms on a case-by-case basis. Applicants must submit documentation sufficient to evaluate a system's ability to withstand physical stresses associated with storm events. NOAA Fisheries Service may deny use of a proposed system or specify conditions for its use if it poses potential risks to essential fish habitat, endangered and threatened species, marine mammals, wild fish and invertebrate stocks, public health, or safety.

<b>Action 6: Marine Aquaculture Siting Requirements and Conditions</b>	
Alternative 1	No Action: do not designate areas in the Gulf EEZ where offshore aquaculture would be allowed. NOAA Fisheries Service and the Council would continue to comment on ACOE siting permits.
Alternative 2	Establish 13 marine aquaculture zones throughout the Gulf EEZ, within which individual sites would be permitted (see Figure 4.6.1).
Alternative 3 (Preferred)	Prohibit marine aquaculture in Gulf EEZ marine protected areas and marine reserves, HAPCs, SMZs, permitted artificial reef areas, and coral reef areas. No aquaculture facility may be sited within 1.6 nm of another facility. Permitted sites must be 2X as large as the area encompassed by the allowable aquaculture systems used for growing organisms to allow for fallowing and rotation of growout systems. Applicants must provide NOAA Fisheries Service a video survey of the benthic habitat at the proposed aquaculture site. Additionally, NOAA Fisheries Service will review other siting criteria on a case-by-case basis. These criteria include, but are not limited to: the depth of the site, current speeds and substrates at the site, the frequency of harmful algal blooms or hypoxia, marine mammal migratory pathways, and the location of the site relative to important fishing grounds and habitats.

<b>Action 7: Restricted Access Zones for Marine Aquaculture Facilities</b>	
Alternative 1	No Action: do not establish restricted access zones around marine aquaculture facilities.
Alternative 2 (Preferred)	Create a restricted access zone for each aquaculture facility. The size of the restricted access zone would correspond with the coordinates on the approved ACOE siting permit. No fishing may occur in the restricted access zone and no fishing vessels may operate in or transit through the zone unless they have a copy of the facilities' aquaculture permit onboard.
Alternative 3	Prohibit fishing and the operation and transit of federally permitted fishing vessels within: a) 100 feet, b) 500 feet, or c) 1,640 feet of allowable marine aquaculture systems used for growing cultured organisms.

<b>Action 8: Recordkeeping and Reporting Requirements</b>	
Alternative 1	No Action: the NOAA Fisheries Service RA has authority to specify recordkeeping and reporting requirements in an EFP.
Alternative 2 (Preferred)	Establish 16 recordkeeping and reporting requirements that address escapement, entanglements and interactions with marine species and migratory birds, pathogens and disease, broodstock harvest, and numerous

	law enforcement requirements. An electronic reporting process would be used to collect and monitor most data and information submitted by permittees. See Section 4.8 for a detailed list of these recordkeeping and reporting requirements.
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<b>Action 9: Biological Reference Points and Status Determination Criteria</b>	
Alternative 1	No Action: do not establish biological reference points or status determination criteria specific to aquaculture in the Gulf EEZ.
Alternative 2 (Preferred)	The proxy for maximum sustainable yield is: a) the total yield harvested by all aquaculture operations in a given year or b) equal to optimum yield (Preferred). The proxy for optimum yield is the total yield harvested by all permitted aquaculture operations annually, but not to exceed: a) 16 mp, b) 32 mp, c) 36 mp, d) 64 mp (Preferred), or e) 190 mp. No individual corporation or other entity can produce more than: a) 5 percent, b) 10 percent, or c) 20 percent (Preferred) of optimum yield. If planned production exceeds optimum yield, NOAA Fisheries Service would publish a control date after which entry in to the aquaculture fishery may be limited or restricted. Overfishing and overfished definitions contained in the various FMPs to manage wild stocks will be used as proxies for assessing the status of wild stocks potentially affected by excessive aquaculture production.

<b>Action 10: Framework Procedures</b>	
Alternative 1	No Action: do not specify framework procedures for modifying aquaculture management measures, status determination criteria, or biological reference points.
Alternative 2	Specify framework procedures for modifying biological reference points (i.e., maximum sustainable yield and optimum yield) for offshore marine aquaculture in the Gulf EEZ.
Alternative 3 (Preferred)	Specify framework procedures for modifying biological reference points and management measures for offshore marine aquaculture in the Gulf EEZ. Measures that could be adjusted through framework procedures include: a) adjustments to maximum sustainable yield and optimum yield, b) permit application requirements, c) aquaculture operational requirements and restrictions, d) requirements for allowable aquaculture systems used for growing cultured organisms, e) siting requirements, and f) recordkeeping and reporting requirements.

## Areas of Controversy

Development of a regulatory framework for aquaculture has been controversial. Controversy has stemmed from several factors including, but not limited to:

- Concerns about potential impacts to the environment (e.g., water quality, habitat degradation, etc.) and wild fish stocks (e.g., genetic modification, competition, entanglement, etc.);
- Competing interests between fishermen, fishing communities, and aquaculture operations;
- The exclusive use of public resources for private profit; and,
- Multiple federal agencies having authority to regulate various aspects of offshore marine aquaculture.

Section 6.1 discusses each of these potential impacts and environmental consequences in greater detail and Section 6.16 discusses several unavoidable adverse effects that may result from the proposed actions. The proposed actions and preferred alternatives in this FMP are intended to minimize, to the extent practicable, impacts to the physical, biological, social, and economic environments. Measures to mitigate the impacts mentioned above, which are often the major causes of controversy, are discussed in Section 6.14. These include the exclusive use of non-genetically modified, non-transgenic, native species from the Gulf (Actions 2 and 4) for aquaculture, extensive permitting, siting, and recordkeeping requirements (Actions 2, 6, and 8), and the use of reliable offshore aquaculture systems that would be approved on a case-by-case basis (Action 5). Implementation of the Council's Aquaculture FMP will require NOAA Fisheries Service to closely coordinate with other federal agencies when approving, monitoring, and reviewing offshore aquaculture operations.

