

Draft Supplement to the Final Environmental Impact Statement for the Fishery Management Plan for Regulating Offshore Marine Aquaculture in the Gulf of Mexico (COVER SHEET)

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January 31st, 2014

Type of Action

Administrative

Draft

Legislative

Final

ABSTRACT

In 2009, the Gulf of Mexico Fishery Management Council (Council) submitted the Fishery Management Plan for Regulating Offshore Marine Aquaculture in the Gulf of Mexico (Aquaculture FMP)¹, and its associated rulemaking, to the National Marine Fisheries Service (NMFS) for agency review under procedures of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). The Aquaculture FMP entered into effect by operation of law on September 3, 2009. On the same date, NOAA Administrator, Dr. Jane Lubchenco, announced that the agency would develop a new national policy for marine aquaculture which would include guidance for federal waters. On June 9, 2011, NOAA released its Marine Aquaculture Policy (NOAA Aquaculture Policy) and announced its intentions to move forward with rulemaking for the Aquaculture FMP.

On April 20, 2010, an explosion occurred on the Deepwater Horizon (DWH) Macondo 252 (MC252) oil rig, resulting in the release of million barrels of oil into the Gulf of Mexico (Gulf). In addition, Corexit 9500A dispersant was applied as part of the effort to constrain the spill. After 85 days, the well was successfully capped in a coordinated effort on July 15, 2010.

This draft Supplement to the Final Programmatic Environmental Statement (DSFPEIS) has been created in order to consider new circumstances and information arising from the DWH blowout, including additional analysis of the management alternatives for the Aquaculture FMP and

¹ The Aquaculture FMP includes a Programmatic Environmental Impact Statement (PEIS). A copy of this document can be downloaded at:

http://www.gulfcouncil.org/fishery_management_plans/aquaculture_management.php

associated Final Programmatic Environmental Impact Statement (FPEIS). No new alternatives are being proposed at this time.

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Acronyms/Abbreviations

ACOE	Army Corps of Engineers
AP	Advisory Panel
APHIS	Animal and Plant Health Inspection Service, US Department of Agriculture
Aquaculture FMP	Fishery Management Plan for Regulating Offshore Marine Aquaculture in the Gulf of Mexico
BOEM	Bureau of Ocean Energy Management
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BP	British Petroleum
BSEE	Bureau of Safety and Environmental Enforcement
CEA	Cumulative Effects Analysis
CEQ	Council for Environmental Quality
CFR	Code of Federal Regulations
CMSP	Coastal and Marine Spatial Planning
Council	Gulf of Mexico Fishery Management Council
DOC	U. S. Department of Commerce
DWH	Deepwater Horizon
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EFP	Exempted Fishing Permit
E.O.	Executive Order
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organization of the United Nations
FDA	Food and Drug Administration
FMP	Fishery Management Plan
FMU	Fishery Management Unit
FPEIS	Final Programmatic Environmental Impact Statement
GCCF	Gulf Coast Claims Facility
GMO	Genetically Modified Organism
GPS	Global Positioning System
Gulf	Gulf of Mexico
HAB	Harmful Algal Bloom
HAPC	Habitat Areas of Particular Concern
HMS	Highly Migratory Species
MC252	Macondo 252
MFMT	Maximum Fishing Mortality Threshold
MMS	Minerals Management Service
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSST	Minimum Stock Size Threshold
MSY	Maximum Sustainable Yield
NAA	National Aquaculture Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability

NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRDA	Natural Resource Damage Assessment
OCS	Outer Continental Shelf
OIE	World Organization of Animal Health
OMB	Office of Management and Budget
ONRR	Office of Natural Resources Revenue
OPA	Oil Pollution Act
OY	Optimum Yield
PAH	Polycyclic Aromatic Hydrocarbon
PEIS	Programmatic Environmental Impact Statement
RA	Regional Administrator of NMFS (Southeast Region)
SEDAR	Southeast Data Assessment Review
SEP	Socioeconomic Panel
SFPEIS	Supplement to the Final Programmatic Environmental Impact Statement
SSC	Scientific and Statistical Committee
SMZ	Special Management Zone
USCG	United States Coast Guard
USDA	United States Department of Agriculture

1. EXECUTIVE SUMMARY

The Aquaculture FMP/FPEIS considered ten actions, each with an associated range of management alternatives, for establishing a regional permitting process in the Gulf for marine aquaculture operations. These actions included measures to establish: An aquaculture permitting system; operational conditions and restrictions for permit issuance and use; a list of species allowed for aquaculture; grow-out systems allowed for culture; siting requirements for aquaculture facilities; restricted access zones surrounding aquaculture facilities; recordkeeping and reporting requirements; biological reference points and status determination criteria; and a framework procedure for modifying aquaculture regulations. These measures are in accordance with the procedures prescribed in the MSFCMA.

Prior to the Aquaculture FMP/FPEIS, the only legal avenue for commercial-scale finfish aquaculture in federal waters (exclusive economic zone, EEZ) was under an exempted fishing permit (EFP), as provided at 50 CFR 600.745. However, an EFP is intended to authorize the targeting or incidental harvest of species managed under an FMP or fishery regulations that would otherwise be prohibited. Specifically, an EFP authorizes activities for limited testing, public display, data collection, exploration, health and safety, environmental cleanup, and/or hazard removal purposes. The NMFS also has authority under the Fish and Wildlife Coordination Act, the essential fish habitat (EFH) provisions of the MSFCMA, the Endangered Species Act, and the Marine Mammal Protection Act to comment and provide conservation recommendations on projects permitted, licensed, or funded by other federal agencies. In the case of aquaculture, this may include permits required from the Army Corp of Engineers (ACOE), Environmental Protection Agency (EPA), or other federal agencies.

On September 2, 2004 (69 FR 53682), NMFS published a Notice of Intent (NOI) in the *Federal Register* to prepare a draft PEIS and to announce scoping meetings regarding the actions proposed in the Aquaculture FMP/FPEIS. The purpose of the Aquaculture FMP/FPEIS 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. The Council initiated this action to provide a programmatic approach to evaluating the impacts of aquaculture proposals in the Gulf and a comprehensive framework for regulating such activities.

The range of actions and alternatives considered in the draft PEIS for the Aquaculture FMP were based on information derived from six scoping meetings held by the Council from February 17 – March 1, 2004. Further input was provided through the Council's public hearing comment process prior to submission of the Aquaculture FMP and a 45-day comment period for the draft PEIS, which was announced in the *Federal Register* on September 12, 2008 (73 FR 53001), and through a Fishery Bulletin sent by NMFS to stakeholders that same day. The comment period ended on October 27, 2008. Comments were received by 13 organizations or city governments, and the Chairman of the U.S. House of Representative's Committee on Natural Resources. Additionally, 19 form letters and one petition with 5,773 signatures were received, as well as two additional comments from the general public. These comments were used by NMFS to improve the final PEIS (FPEIS) and the draft rule implementing the Aquaculture FMP. A notice of

availability (NOA) for the FPEIS analyzing impacts on the human environment for the Aquaculture FMP was published in the *Federal Register* on June 26, 2009 (74 FR 30569).

On June 4, 2009, NMFS published in the *Federal Register* a Notice of Availability of the Aquaculture FMP. The public comment period on the Aquaculture FMP ended on August 3, 2009. Pursuant to the MSFCMA, the Secretary may approve, disapprove, or partially approve an FMP within 30 days of the end of the comment period (in this case by September 2, 2009). If the Secretary does not notify the Council within 30 days that he/she has taken one of the specified actions, the statute provides that the FMP shall take effect as if approved. Because the statutory period passed without any action being taken, the Aquaculture FMP entered into effect by operation of law on September 3, 2009.

Also on September 3, 2009, NOAA announced that it would begin development of a new national aquaculture policy which would provide context for the Aquaculture FMP. NOAA solicited public comments and conducted a series of seven public ‘listening sessions’ during April and May 2010. A draft of the policy was released in February 2011 for a 60-day public comment period. On June 9, 2011, the final NOAA Aquaculture Policy was released and an announcement was made that NOAA would move forward with implementing the Aquaculture FMP.²

On January 25, 2013, NMFS published an NOI to create a SFPEIS for the Aquaculture FMP (78 FR 5403). This draft SFPEIS provides additional analysis of the management alternatives in the Aquaculture FMP/FPEIS as it relates to the DWH blowout.

2. INTRODUCTION

The purpose of the Aquaculture FMP/FPEIS is to develop a regional permitting process for regulating and promoting environmentally sound and economically sustainable aquaculture in federal waters of the Gulf. The Aquaculture FMP/FPEIS would allow for an estimated 5 to 20 offshore aquaculture operations to be permitted in the Gulf over a 10 year period, with an estimated annual production of up to 64 million pounds (whole weight, ww).

The actions in the Aquaculture FMP/FPEIS establish a regionally based framework for regulating aquaculture activity in federal waters of the Gulf under the authority of the MSFCMA. The Aquaculture FMP/FPEIS includes measures which:

- Establish an aquaculture permitting process.
- Establish operational conditions and restrictions for permit issuance and use.
- Establish permit duration of 10 years and 5-year renewal periods.
- Allow the culture of native, non-genetically modified and non-transgenic species managed by the Council, with the exception of shrimp and corals.
- Provide guidelines for approval of grow-out systems allowed for culture.

² On February 8th, 2013 the Council approved (vote of 13-4) additional language to the proposed implementing regulations for the Aquaculture FMP/FPEIS. These changes included addition of aquaculture gear types into section 50 CFR 600.725, definition of terms and additional details pertaining to FMP requirements.

- Establish criteria for siting marine aquaculture facilities.
- Create a restricted access zone for each aquaculture facility.
- Establish numerous recordkeeping, reporting and operational requirements designed to minimize or mitigate potential environmental impacts.
- Establish biological reference points and status determination criteria.
- Specify framework procedures for modifying biological reference points and management measures.

Supplementing the harvest of domestic fisheries with cultured product will help the U.S. meet consumers' growing demand for seafood and may reduce the nation's dependence on seafood imports. Currently, the U.S. imports approximately 91% percent of the seafood consumed in the country, and the annual U.S. seafood trade deficit is over \$10.4 billion (NOAA Fish Watch <http://www.fishwatch.gov/faq.htm#faq10>). One-half of imported seafood products are produced by aquaculture operations. This worldwide trend toward aquaculture production is expected to continue in response to consumers' continued demand for safe, healthy seafood.

NOAA's Marine Aquaculture Policy

On June 9, 2011, NOAA released its final Aquaculture Policy. NOAA's Aquaculture Policy (Appendix A) is intended to enable the development of all forms of sustainable U.S. marine aquaculture within the context of NOAA's multiple stewardship missions and broader social and economic goals.³

NOAA held series of regional 'Listening Sessions' in April and May 2010 in order to solicit public input into the policy. In addition, a 60-day public comment period was held on the draft policy. The final policy establishes a framework to allow sustainable domestic marine aquaculture to contribute to the U.S. seafood supply, support coastal communities and important commercial and recreational fisheries, and help to restore species and habitat. The NOAA Aquaculture Policy also includes an appendix which includes guidance for aquaculture in federal waters (see Appendix B).

Priorities in the NOAA Aquaculture Policy include:

- Making timely management decisions based on the best scientific information available;
- Advancing sustainable aquaculture science;
- Ensuring aquaculture decisions protect wild species and healthy coastal and ocean ecosystems;
- Developing sustainable aquaculture in locations compatible with other uses;
- Working with partners domestically and internationally;
- And promoting a level playing field for U.S. aquaculture businesses engaged in international trade.

³ The Department of Commerce (DOC) also released its Aquaculture Policy on the same date. This Aquaculture Policy is intended to guide DOC's actions and decisions on aquaculture and to provide a national approach for supporting aquaculture within the context of DOC's broad economic development, trade, and stewardship missions.

Along with the release of the policy, NOAA announced two initiatives that the agency would be moving forward with. These initiatives included: 1) Developing a ‘National Shellfish Initiative’ to increase shellfish farming and restoration; and 2) drafting implementing regulations for the Aquaculture FMP/FPEIS. On July 11, 2011, NOAA Administrator Dr. Lubchenco, announced a third initiative related to the NOAA Aquaculture Policy, the ‘Aquaculture Technology Transfer Initiative’, which will foster public-private partnerships on regional projects that showcase innovative sustainable practices, jump start private sector investments, and create employment opportunities in coastal communities.

Deepwater Horizon

On April 20, 2010, an explosion occurred on the DWH MC252 oil rig, resulting in the release of millions of barrels of oil into the Gulf. The fire burned for 36 hours before the rig sank, and hydrocarbons leaked into the Gulf for 85 days before the well was closed and sealed. Eleven people died as a result of the explosion and dozens of others were injured. In addition, Corexit 9500A dispersant was applied as part of the effort to constrain the spill.

The initial closed area (May 2, 2010) extended from approximately the mouth of the Mississippi River to south of Pensacola, Florida and covered an area of 6,817 square statute miles. The coordinates of the closed area were then periodically modified in response to changes in the size and location of the area affected by the spill. At its largest size on June 2, 2010, the closed area covered 88,522 square statute miles, or approximately 37% of the Gulf EEZ. On April 19, 2011, the last area closed to fishing was reopened. Approximately one third of the Gulf was closed to fishing and impacted important spawning areas during the spawning season for many species.

A comprehensive description of the affected biological environment in the Gulf was included in the Aquaculture FMP/FPEIS; however, the affected biological environment may have been modified when the DWH blowout occurred. Through the Natural Resource Damage Assessment (NRDA) process, NOAA and the other trustees continue to work toward a better understanding of the effects of the DWH blowout on the environment and resources of the northern Gulf.

1502.22 Incomplete or Unavailable Information

The information in this draft SFPEIS underwent a robust review process to ensure consistency with 40 CFR 1502.22, the relevant text of which reads:

When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking.

- a) If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.
- b) If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement:
 1. A statement that such information is incomplete or unavailable;

2. a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;
 3. a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment;
 4. and the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the purposes of this section, "reasonably foreseeable" includes impacts that have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason.
- c) The amended regulation will be applicable to all environmental impact statements for which a Notice of Intent (40 CFR 1508.22) is published in the Federal Register on or after May 27, 1986. For environmental impact statements in progress, agencies may choose to comply with the requirements of either the original or amended regulation.

Although this document contains analyses of the effects of the DWH blowout on the physical, environmental and socioeconomic resources, there are references to incomplete or unavailable information. At the time this draft SFPEIS was prepared, the best information that was publicly available was used to update the descriptions of the affected environment and impact analyses, and to develop conclusions regarding the various resources.

This draft SFPEIS document was tiered from the Aquaculture FMP/FPEIS⁴, and its authors were tasked with determining if the conclusions made in the Aquaculture FMP/FPEIS had changed based upon new information. The data obtained to support the conclusions within this draft SFPEIS indicate that although the environmental baseline could have been altered by the DWH blowout, impacts to the physical, environmental, and socioeconomic resources are not expected to substantially change from that described in the Aquaculture FMP/FPEIS.

The short- and long-term effects of the DWH blowout in regards to environmental and socioeconomic resources are still being examined and this process could take years or decades. The NRDA process is ongoing and research is also being conducted by the Bureau of Ocean Energy, Management, and Regulation Enforcement (BOEMRE) Environmental Studies Program, as well as numerous state agencies and research institutions. Currently, there is no incomplete or unavailable information that is deemed relevant to making a determination regarding reasonably foreseeable, significant adverse impacts or that is essential to a reasoned choice among alternatives. Therefore, based on the information known at this time, there is no reason to believe that the conclusions reached in the Aquaculture FMP/FPEIS have been altered or changed due to the DWH blowout. If new information becomes available in the future which might change the manner in which marine aquaculture operations are regulated in the Gulf EEZ, appropriate adjustments will be made at that time.

⁴ A copy of the Aquaculture FMP/FPEIS can be downloaded at:
http://www.gulfcouncil.org/fishery_management_plans/aquaculture_management.php

All reasonably foreseeable impacts were considered, including impacts that could have catastrophic consequences, even if their probability of occurrence is low. The analysis of impacts contained herein is supported by credible scientific evidence, is not based on pure conjecture, and it is within the rule of reason.

3. PURPOSE AND NEED

The purpose of this draft SFPEIS is to take into account new circumstances or information resulting from the DWH blowout. This information is needed in order to consider potential changes to the environment linked to the DWH blowout and determine if and how such changes may affect the actions outlined in the Aquaculture FMP/FPEIS.

4. MANAGEMENT ALTERNATIVES

This section provides a summary of the various alternatives considered by the Council for each of the ten actions (see Section 4.0 of the Aquaculture FMP/FPEIS for further discussion). No new alternatives are being proposed at this time.

4.1. Action 1: Aquaculture Permit Requirements, Eligibility, and Transferability

Preferred Alternative 2: Require a NMFS Gulf Aquaculture Permit to authorize a person to:

- Deploy or operate an offshore aquaculture facility in the Gulf EEZ. An offshore aquaculture facility means an installation or structure, including any allowable aquaculture systems (including moorings), hatcheries, equipment, and associated infrastructure used to hold, propagate, and rear allowable aquaculture species in the Gulf EEZ under authority of a Gulf Aquaculture Permit; and,
- Sell, only at the first point of sale, or attempt to sell an allowable aquaculture species cultured at an offshore aquaculture facility in the Gulf EEZ.

Persons issued a Gulf Aquaculture Permit for the activities authorized above would also be authorized to:

- Harvest or designate hatchery personnel or other entities to harvest and retain onboard a vessel wild live broodstock of an allowable aquaculture species native to the Gulf for offshore aquaculture, regardless of where broodstock were harvested or possessed in U.S. waters of the Gulf. Offshore aquaculture means all activities, including the operation of an offshore aquaculture facility, involved in the propagation and rearing of allowable aquaculture species in the Gulf EEZ. (Note: additional requirements for harvesting broodstock are specified in Action 8, Preferred Alternative 2(n)).

- Possess or transport fish or invertebrates in or from the Gulf EEZ to be cultured at an aquaculture facility (e.g., broodstock, fingerlings) or possess or transport fish or invertebrates from an aquaculture facility for landing ashore and sale.

Require a Gulf aquaculture dealer permit to receive cultured organisms from the Gulf EEZ. However, an owner or operator of an aquaculture facility with a Gulf Aquaculture Permit may purchase juvenile fish from a hatchery located in the Gulf EEZ without obtaining a dealer permit. Requirements for obtaining a dealer permit are specified in the Code of Federal Regulations (CFR) at 50 CFR 622.4(a)(4)(iii) and 50 CFR 622.4(b).

Landing of allowable aquaculture species cultured in the Gulf EEZ is prohibited at non-U.S. ports, unless first landed at a U.S. port. In addition, require any vessel, aircraft, or vehicle authorized for use in aquaculture operations have a copy of the Gulf Aquaculture Permit onboard. Each copied permit must include an original signature of the Gulf Aquaculture Permit holder. (Reporting requirements are specified in Table 4.1.2 of the Aquaculture FMP/FPEIS)

Eligibility for a Gulf Aquaculture Permit is limited to U.S. citizens or permanent resident aliens.

A Gulf Aquaculture Permit is:

- (a) transferable only if the geographic location of the aquaculture site remains unchanged. The transferor and transferee must complete the application for permit transfer, have their signatures notarized, and mail the signed application to the Regional Administrator (RA) at least 30 days prior to the date on which the transferee desires to have the transfer effective. Approval of the transfer by the RA is contingent on all applicable permit requirements being completed, and, if necessary, updated. (Preferred)

Rejected Alternatives

Alternative 1: No Action, an EFP for conducting aquaculture would be required.

Alternative 3: Require separate NMFS siting and operating permits for conducting offshore marine aquaculture in the Gulf EEZ. A siting permit would authorize use of a site for conducting aquaculture. An operating permit would authorize the activities specified in Preferred Alternative 2. Eligibility for Gulf aquaculture operating and siting permits is limited to U.S. citizens or permanent resident aliens.

A Gulf Aquaculture Permit is:

- (b) not transferable.

Discussion

The Council considered three alternatives for permitting aquaculture facilities in the Gulf EEZ. The first alternative (no action) would have maintained the practice of issuing EFPs for

aquaculture. The third alternative would have required both a siting permit as well as an operational permit. The Council chose Preferred Alternative 2, which requires a NMFS Gulf Aquaculture Permit to operate an offshore aquaculture facility.

4.1. Action 2. Application Requirements, Operational Requirements, and Restrictions

Preferred Alternative 3: Establish the following application requirements, operational requirements, and restrictions:

(a) Application Requirements

1. A completed application and all required supporting documents for a Gulf Aquaculture Permit must be submitted by an applicant (in the case of a corporation, an officer or shareholder; in the case of a partnership, a general partner) on a form available from the NMFS RA at least 180 days prior to the date the applicant desires the permit to be effective.
2. An applicant must provide all information indicated on the application form, including, but not limited to:
 - i Applicant's name, address, and telephone number.
 - ii Business name, address, telephone number, and date the business was formed.
 - iii Description of the exact location (i.e., GPS coordinates) and dimensions of the proposed aquaculture facility and proposed site, including a map of the site to scale.
 - iv A list of allowable aquaculture species to be cultured; estimated start up production level by species; and the estimated maximum total annual poundage of each species to be harvested from the aquaculture facility.
 - v Name and address or specific location of each hatchery that would provide juvenile organisms for grow-out at the proposed aquaculture facility located within the Gulf EEZ and a copy of any relevant, valid state or federal aquaculture permits issued to the hatchery.
 - vi Prior to issuance of a Gulf Aquaculture Permit, a copy of all currently valid federal permits (e.g., ACOE Section 10 Permit and EPA NPDES [National Pollutant Discharge Elimination System] permit) applicable to the proposed aquaculture site, facilities, or operations.
 - vii A description of the allowable aquaculture systems to be used, including, but not limited to the size and dimensions of allowable aquaculture systems, a description of the mooring system(s) used to secure the allowable aquaculture system(s), and documentation of the allowable aquaculture system's ability to withstand physical stress, such as hurricanes, wave energy, etc.
 - viii A description of the equipment and methods necessary for feeding, transporting, maintaining, and removing cultured species from allowable aquaculture systems.
 - ix A copy of the valid U.S. Coast Guard (USCG) certificate of documentation or, if not documented, a copy of the valid state registration certificate for each vessel involved in the aquaculture operation; and documentation or identification numbers for any aircraft or vehicles involved.

- x Documentation certifying the applicant has posted an assurance bond sufficient to cover the costs of removal of all components of the aquaculture facility, including cultured organisms remaining in allowable aquaculture systems, from the Gulf EEZ. The assurance bond would not be required to cover the costs of removing an oil and gas platform. The RA will provide applicants a form and associated guidance for complying with the assurance bond requirement.
- xi Certification by the applicant that all broodstock used to provide juveniles to the aquaculture facility were originally harvested from U.S. waters of the Gulf, and were from the same population or subpopulation of fish or invertebrates (based on best available science) where the aquaculture facility is located, or progeny of such wild broodstock, and that each individual broodstock was marked or tagged at the hatchery to allow for identification of those individuals used in spawning.
- xii Certification by the applicant that no genetically modified organisms (GMO) or transgenic organisms are used or possessed in the aquaculture facility. A GMO is an organism that has been transformed by the insertion of one or more transgenes (an isolated gene sequence often, but not always, derived from a different species than that of the recipient). A transgenic animal is an animal whose genome contains a nucleotide sequence that has been intentionally modified in vitro, and the progeny of such an animal. The NMFS may sample cultured organisms to determine genetic lineage and will order the removal of all cultured organisms upon a determination that GMOs or transgenic organisms were used or possessed at an aquaculture facility.
- xiii Certification by the applicant that a contractual arrangement with an identified aquatic animal health expert to provide services to the aquaculture facility has been obtained. An aquatic animal health expert is defined as a licensed doctor of veterinary medicine or is certified by the American Fisheries Society, Fish Health Section, as a “Fish Pathologist” or “Fish Health Inspector”. A copy of the license or certification must also be provided to NMFS.
- xiv A copy of an emergency disaster plan developed for and to be used by operator of the aquaculture facility, that includes, but is not limited to, procedures for preparing allowable aquaculture systems, offshore aquaculture equipment, and cultured organisms in the event of a disaster (e.g., hurricane, tsunami, harmful algal bloom, chemical or oil spill, etc).
- xv Information sufficient to document eligibility as a U.S. citizen or permanent resident alien. This information includes, but is not limited to, corporate structure and shareholder information.
- xvi Any other information concerning the aquaculture facility or its operations or equipment, as specified on the application form.
- xvii Any other information that may be necessary for the issuance or administration of the Gulf Aquaculture Permit, as specified on the application form.

(b) Operational Requirements and Restrictions

1. At least 25 percent of allowable aquaculture systems approved for use at an aquaculture facility at the time of permit issuance must be placed in the water at

the permitted aquaculture site within 2 years of issuance of the Gulf Aquaculture Permit, and allowable species for aquaculture must be placed in the permitted aquaculture system(s) within 3 years of issuance of the permit. Failure to comply with these requirements will be grounds for revocation of the permit. A permittee may request a one-year extension to the above time schedules in the event of a catastrophe (e.g., hurricane). Requests must be made in writing and sent to the RA. The RA will approve or deny the request after determining if catastrophic conditions exist and whether or not the permittee was affected by the catastrophic conditions. The RA shall provide the determination and the basis for it, in writing to the permittee.

2. The permittee must obtain and submit to NMFS a signed certification from the owner(s) of the hatchery from which fingerlings or other juvenile organisms are obtained indicating broodstock have been individually marked or tagged (e.g., via a Passive Integrated Transponder, coded wire, dart, or internal anchor tag) to allow for identification of those individuals used in spawning. The permittee must also obtain and submit to NMFS a signed certification from the owner(s) of the hatchery indicating that fin clips, or other genetic materials, were collected and submitted for each individual brood animal in accordance with procedures specified by NMFS. These certifications must be provided by the permittee each time broodstock are acquired by the hatchery or used for spawning.
3. Prior to stocking cultured animals in an allowable aquaculture system in the Gulf EEZ, the permittee must provide NMFS a copy of a health certificate (suggested form is USDA/APHIS VS 17-141, OMB 0579-0278) signed by an aquatic animal health expert (as defined in (a)(2)(xiv)) certifying cultured animals were inspected and determined to be free of World Organization of Animal Health (OIE) reportable pathogens (or additional pathogens identified as reportable pathogens in the National Aquatic Animal Health Plan as implemented by the USDA [U.S. Department of Agriculture], Commerce, and Interior).
4. Permittee must maintain a minimum of one properly functioning electronic locating device (e.g., GPS device, pinger with radio signal) on each allowable aquaculture system, i.e., net pen or cage, placed in the water at the aquaculture facility.
5. The permittee must conduct feed monitoring and management practices in compliance with EPA regulations at 40 CFR 451.21.
6. Permittee must comply with all applicable monitoring and reporting requirements specified in their valid ACOE Section 10 permit and valid EPA NPDES permit.
7. A permittee must inspect allowable aquaculture systems, including mooring and anchor lines, for entanglements or interactions with marine mammals, protected species, and migratory birds. If entanglements or interactions are observed, they must be reported as specified in Action 8, Preferred Alternative 2(c)(2).
8. Use of drugs, pesticides, and biologics must comply with all applicable Food and Drug Administration (FDA), EPA, and USDA regulations (e.g., Food, Drug and Cosmetic Act, 21 USC 321; Clean Water Act, 40 CFR 122; 9 CFR 101-124; 21 CFR 500-599; and 40 CFR 150-189).

9. Cultured finfish must be maintained whole with heads and fins intact until landed on shore. Until landed on shore, spiny lobster must be maintained whole with the tail intact.
10. Except for authorized broodstock associated with a hatchery in the Gulf EEZ, possession of wild fish or invertebrates at or within the boundaries of an aquaculture facility's restricted access zone is prohibited (Action 7 and Alternative 2(n) in Action 8).
11. Possession and transport of any wild fish or invertebrates aboard an aquaculture operation's transport or service vessels, vehicles, or aircraft is prohibited, except when harvesting broodstock as authorized by NMFS.
12. A permittee must provide NMFS employees and authorized officers access to the aquaculture facility to conduct inspections or sampling necessary to determine compliance with the applicable regulations (e.g., sample cultured organism to determine genetic lineage) relating to aquaculture in the Gulf EEZ. The NMFS shall conduct at least annual inspections of each permitted aquaculture facility.
13. A permittee may only obtain juvenile organisms for grow-out at an aquaculture facility from a hatchery located in the U.S.
14. Species cultured at an aquaculture facility in the Gulf EEZ can only be landed ashore between 6 a.m. and 6 p.m., local time.
15. Any vessel transporting cultured organisms to or from an aquaculture facility must stow fishing gear as follows:
 - i A longline may be left on the drum if all gangions and hooks are disconnected and stowed below deck. Hooks cannot be baited. All buoys must be disconnected from the gear; however, buoys may remain on deck.
 - ii A trawl net may remain on deck, but trawl doors must be disconnected from the trawl gear and must be secured.
 - iii A gillnet must be left on the drum. Any additional gillnets not attached to the drum must be stowed below deck.
 - iv A rod and reel must be removed from the rod holder and stowed securely on or below deck. Terminal gear (i.e., hook, leader, sinker, flasher, or bait) must be disconnected and stowed separately from the rod and reel. Sinkers must be disconnected from the down rigger and stowed separately.
 - v All other fishing gear must be stored below deck or in an area where it is not normally used or readily available for fishing.

Rejected Alternatives

Alternative 1: Do not specify application requirements, operational requirements, or restrictions for aquaculture in the Gulf EEZ.

Alternative 2: Status quo. Require the EFP application and issuance requirements as specified at 50 CFR 600.745(b).

Discussion

Three alternatives were considered by the Council for establishing application and operational requirements and restrictions. Alternative 1 would not have specified any conditions when

issuing a permit to an aquaculture facility, while Alternative 2 would have maintained the conditions set forth in an EFP. The Council chose Preferred Alternative 3 which requires each aquaculture operation to adhere to a number of application and operational requirements and restrictions for the initial issuance, as well as for the continued operation of the facility.

4.3. Action 3. Permit Duration

Preferred Alternative 2: Gulf Aquaculture Permits are effective for:

- a) 5 years
- b) 10 years and may be renewed in 5 year increments (Preferred).
- c) 20 years
- d) Indefinitely.

A Gulf Aquaculture Permit remains valid for the period indicated on the permit unless it is revoked, suspended, or modified pursuant to subpart D of 15 CFR part 904 for non-compliance with applicable aquaculture regulatory requirements or the aquaculture facility is sold and the permit has not been transferred.

Rejected Alternatives

Alternative 1: No Action, EFPs are effective for no longer than one year unless otherwise specified in the EFP or a superseding notice or regulation (50 CFR 600.745(b)(4)).

Discussion

Two alternatives were considered by the Council for this action. Alternative 1 (no action) would have continued to allow an EFP to be effective for one year. Preferred Alternative 2 provided four options for the duration of a Gulf Aquaculture Permit, including 5 years, 10 years (with 5 year renewal increments), 20 years, or indefinitely. The Council chose the Preferred Alternative 2 option which allows permits to be effective for a 10 year period with 5 year renewal increments.

4.4. Action 4. Species Allowed for Aquaculture and included in the Aquaculture Fishery Management Unit.

Preferred Alternative 4: Allow the aquaculture of all species native to the Gulf that are managed by the Council and included in a Council FMP management unit, except those species in the shrimp and coral FMP management units, and include these species in the Aquaculture Fishery Management Unit (FMU). The Council will send a letter to NMFS requesting development of concurrent rulemaking to allow aquaculture of highly migratory species (HMS).

Rejected Alternatives

Alternative 1: No Action, do not specify species allowed for aquaculture and do not develop an Aquaculture FMU.

Alternative 2: Allow the aquaculture of all finfish species native to the Gulf in the reef fish, red drum, and coastal migratory pelagics FMPs and include these species in the Aquaculture FMU.

Alternative 3: Allow the aquaculture of all species native to the Gulf that are managed by the Council and included in a FMP management unit, except goliath grouper, Nassau grouper, and those species in the shrimp and coral fishery management units, and include these species in the Aquaculture FMU.

Discussion

The Council considered four alternatives for Action 4. Alternative 1 (no action) would not have specified which species could be used for aquaculture and would not have allowed for development of an Aquaculture FMU. Alternative 2 would have allowed the culture of red drum and all species in the reef fish and coastal migratory pelagic FMPs. Alternative 3 would have allowed the aquaculture of all marine species managed by the Council, with the exception of shrimp, corals, and goliath and Nassau grouper. The Council chose Preferred Alternative 4 which allows for the culture of all species native to the Gulf managed by the Council (except shrimp and corals), and includes the ability to send a letter to NMFS' Atlantic HMS Management Division to request development of concurrent rulemaking to allow for the culture of HMS (tunas, billfish, sharks, and swordfish).

In regards to the DWH blowout, information regarding the health and size of populations of allowable species for aquaculture under the Aquaculture FMP/FPEIS will be taken into consideration by NMFS when evaluating individual permit applications. Since the Aquaculture FMP/FPEIS entered into effect in 2009, two species (slipper lobster, stone crab) which were originally listed in the Aquaculture FMU are no longer managed by the Council. In the future, the Council may choose to remove other species from the Aquaculture FMU via an amendment to the Aquaculture FMP/FPEIS.

4.5. Action 5. Allowable Marine Aquaculture Systems

Preferred Alternative 3: The NMFS RA will evaluate each proposed aquaculture system on a case-by-case basis and approve or deny use of the proposed system for offshore marine aquaculture in the Gulf EEZ. To assist the RA in evaluating the structural integrity of a proposed aquaculture system, an applicant would be required to submit to the RA documentation (e.g., engineering analyses, computer and physical oceanographic model results) sufficient to evaluate the ability of the aquaculture system(s) (including moorings) to withstand physical stresses associated with major storm events, e.g. hurricanes, storm surge. The RA will also evaluate the proposed aquaculture system and its operations based on potential risks to EFH, endangered or threatened marine species, marine mammals, wild fish or invertebrate stocks, public health, or safety. The RA may

deny use of a proposed aquaculture system or specify conditions for using an aquaculture system based on a determination of such significant risks. The RA's evaluation will be based on information provided by the applicant as well as consultations with NMFS and other NOAA offices/programs. If the RA denies use of a proposed aquaculture system or specifies conditions for its use, the RA shall provide the determination and the basis for it, in writing to the applicant.

Rejected Alternatives

Alternative 1: No Action, do not specify allowable systems for offshore marine aquaculture in the Gulf EEZ.

Alternative 2: Allow only cages and net pens for offshore marine aquaculture in the Gulf EEZ.

Discussion

Three alternatives were considered by the Council for allowable marine aquaculture systems. Alternative 1 (no action) would not have specified the types of marine aquaculture systems (e.g., cages, net pens) allowed in the Gulf. Alternative 2 would have only allowed cages and net pens for offshore aquaculture. The Council chose Preferred Alternative 3 which does not authorize or prohibit specific allowable aquaculture systems; rather, it specifies that NMFS (will) evaluate the marine aquaculture system proposed in each permit application on a case-by-case basis.

Information submitted by the permittee will be used by NMFS to evaluate the proposed system(s) to ensure maximum environmental safeguards while still allowing operations to use the most recent technology developed for aquaculture systems.

4.6. Action 6. Marine Aquaculture Siting Requirements and Conditions

Preferred Alternative 3: Establish the following criteria for siting marine aquaculture facilities:

- (a) Prohibit marine aquaculture in Gulf EEZ marine protected areas and marine reserves, Habitat Areas of Particular Concern (HAPCs), Special Management Zones (SMZs), and permitted artificial reef areas as specified in 50 CFR 622, and coral reef areas as defined in 50 CFR 622.2.
- (b) No offshore aquaculture facility may be sited within 1.6 nautical miles (3 km) of another offshore aquaculture facility.
- (c) To allow fallowing and rotation of allowable aquaculture systems within a site permitted by the ACOE and approved by NMFS, the permitted site must be at least twice as large as the combined area encompassed by the allowable aquaculture systems (e.g., cages and net pens).
- (d) Applicants for a Gulf Aquaculture Permit must conduct and submit a baseline environmental assessment of the proposed aquaculture site to NMFS with their application packet. Data, results, and analyses from the baseline environmental

- assessment must be provided to NMFS for consideration during review of a permit application. The baseline environmental assessment must be conducted, and analyses, data, and results must be summarized, based on guidance and procedures specified by NMFS. If a permit is approved, applicants must also monitor the site in accordance with NMFS guidance and procedures. Baseline environmental assessment and monitoring guidance and procedures will be developed in consultation with the ACOE, EPA, and other federal agencies having authority to regulate offshore aquaculture. Guidance will include, but will not be limited to, procedures and methods for: 1) conducting diver and video surveys, 2) measuring hydrographic conditions, 3) collecting and analyzing benthic sediments and infauna, and 4) measuring water quality characteristics. The guidance and procedures will be available from the RA and on the NMFS aquaculture website.
- (e) The NMFS RA will evaluate siting criteria in addition to those preferred criteria selected by the Council in Alternative 3(a-d) on a case-by-case basis. Criteria considered by the NMFS RA during case-by-case review would include, but would not be limited to, depth of the site, current speeds, substrate type, the frequency of harmful algal blooms (HABs) or hypoxia at the proposed site, marine mammal migratory pathways, and the location of the site relative to commercial and recreational fishing grounds and important natural fishery habitats (e.g., seagrasses). The NMFS RA may deny use of a proposed aquaculture site based on a determination that such a site poses significant risks to EFH, endangered species, or threatened marine species, will result in user conflicts with commercial or recreational fishermen or other marine resource users, the depth of the site is not sufficient for the allowable aquaculture system(s), substrate and currents at the site will inhibit the dispersal of wastes and effluents, the site poses significant risks of mortality to the cultured species due to low dissolved oxygen or HAB, or other grounds inconsistent with FMP objectives or applicable federal laws. The information used by NMFS for siting a facility with regard to proximity to commercial and recreational fishing grounds would include, but is not limited to, electronic logbooks from the shrimp industry, logbook reported fishing locations, siting information from previously proposed or permitted aquaculture facilities, and other data that would provide information regarding how the site would interact with other fisheries. Such a determination by the RA shall be based on consultations with NMFS offices and programs and siting and other information submitted by the permit applicant. If a proposed site is denied, the RA shall provide the determination and the basis for it, in writing to the permit applicant.

Rejected Alternatives

Alternative 1: No Action, do not designate areas in the Gulf EEZ where aquaculture would be allowed. The ACOE would permit sites for aquaculture. The NMFS and the Council would continue to review and comment on ACOE siting permits.

Alternative 2: Establish marine aquaculture zones within which individual sites would be permitted. Marine aquaculture facilities may only be sited in the zones specified (see

Figure 4.6.1 of the Aquaculture FMP/FPEIS). Coordinates for these areas are specified in Table 4.6.1 of the Aquaculture FMP/FPEIS.

Discussion

Action 6 includes three alternatives. Alternative 1 (no action) would not have designated areas in the Gulf EEZ where aquaculture would be allowed. Alternative 2 would have created aquaculture zones where facilities could operate. The Council chose Preferred Alternative 3 which establishes specific siting criteria, but does not establish predefined zones.

The NMFS will evaluate each proposed site on a case-by-case basis and therefore could deny the use of a proposed site if it were determined that the site is unsuitable for aquaculture due to impacts from the DWH blowout and/or does not fall within the criteria outlined in Preferred Alternative 3.

4.7. Action 7. Establish Restricted Access Zones for Marine Aquaculture Facilities

Preferred Alternative 2: Create a restricted access zone for each aquaculture facility. The boundaries of an aquaculture facility's restricted access zone shall correspond with the coordinates on the approved ACOE Section 10 permit. No recreational and no commercial fishing other than offshore aquaculture may occur in the restricted access zone. No fishing vessels may operate in or transit through the restricted access zone unless the vessel has on board a signed copy (i.e., a permit with an original signature and not a copy of the signature) of the facilities' Gulf Aquaculture Permit onboard. The permittee must mark the restricted access zone with a floating device such as a buoy at each corner of the zone. Each floating device must clearly display the aquaculture facility's permit number and the words "RESTRICTED ACCESS" in block letters at least 6 inches in height and in a color that contrasts with the color of the floating device.

Rejected Alternatives

Alternative 1: No Action, Do not establish restricted access zones around marine aquaculture facilities.

Alternative 3: Prohibit recreational and commercial fishing and the operation or transit of federally permitted fishing vessels within:

- (a) 100 feet (30 meters) of allowable marine aquaculture systems.
- (b) 500 feet (152 meters) of allowable marine aquacultures systems.
- (c) 1,640 feet (500 meters) of allowable marine aquaculture systems.

Discussion

Three alternatives were considered for Action 7. Alternative 1 (no action) would not have restricted access around marine aquaculture facilities. For Alternative 3, fishermen and vessels would have been prohibited within either 100, 500, or 1,640 feet of allowable aquaculture systems. The Council chose Preferred Alternative 2, which specifies that restricted access zones

will correspond to the coordinates on the ACOE Section 10 siting permit. This area should be at least twice as large as the total area encompassed by the allowable aquaculture systems (e.g., cages and net pens) as required in the siting criteria for Preferred Alternative 3 in Action 6.

4.8. Action 8. Recordkeeping and Reporting

Preferred Alternative 2: Establish the following reporting and recordkeeping requirements for aquaculture permittees:

- (a) On a continuing basis, provide NMFS currently valid copies of all state and federal permits (e.g., ACOE Section 10 permit, EPA NPDES permit) required for conducting offshore aquaculture. Maintain and make available upon request monitoring reports required by each of these permits for the most recent three years.
- (b) Notify NMFS via phone or an electronic web-based form within 24 hours of discovery of any of the following events:
 1. Major escapement. Major escapement is defined as the escape of 10 percent of the cultured organisms from a single allowable aquaculture system (e.g., one cage or one net pen) within a 24 hour period or the cumulative escape within a 24 hour period from all allowable aquaculture systems (e.g., all cages or net pens) at an aquaculture facility representing 5 percent or more of the total cultured organisms or the cumulative escape of 10 percent or more of the cultured organisms from all allowable aquaculture systems at an aquaculture facility in any 30-day consecutive period. A permittee shall provide NMFS with the following information if major escapement occurs or is suspected of having occurred: Gulf Aquaculture Permit number, contact person name and phone number, specific location of escapement, cause(s) for escapement and the number, type of species, size, and percent of cultured organisms that escaped, and actions being taken to address the escapement. If no major escapement occurs during a given year, then the permittee shall provide the NMFS RA with an annual report via an electronic web-based form on or before January 31 each year indicating no major escapement occurred.
 2. Entanglements or interactions with marine mammals, endangered species, and migratory birds. A permittee shall provide the NMFS RA with the following information if entanglements or interactions with marine mammals, endangered species, or migratory birds occur: 1) Date, time, and location of entanglement or interaction, 2) Species entangled or involved in interactions and number of individuals affected; 3) number of mortalities and acute injuries observed, 4) cause of entanglement or interaction, and 5) actions being taken to prevent future entanglements or interactions. If no entanglement or interaction occurs during a given year, then the permittee shall provide the NMFS RA with an annual report via an electronic web-based form on or before January 31 each year indicating no entanglement or interaction occurred.
- (c) Report via phone or an electronic web-based form all findings or suspected findings of any OIE-reportable pathogen episodes or additional pathogens identified as

- reportable pathogens in the National Aquatic Animal Health Plan as implemented by the USDA, or U.S. Departments of Commerce or Interior that are known to infect the cultured species within 24 hours of diagnosis to NMFS. Information reported must include: OIE-reportable pathogen, percent of cultured organisms infected, findings of the aquatic animal health expert, plans for submission of specimens for confirmatory testing (as required by the USDA), testing results (when available), and actions being taken to address the reportable pathogen episode. The NMFS, in cooperation with USDA/APHIS (U.S. Department of Agriculture/Animal and Plant Health Inspection Service) , may order the removal of all cultured organisms from an allowable aquaculture system upon confirmation by an USDA/APHIS-approved reference laboratory that an OIE-reportable pathogen exists and USDA/APHIS and NMFS find that the event poses a significant risk to the health of wild or farmed aquatic organisms (Note: the Animal Health Protection Act of 2002 provides the Secretary of Agriculture authority to carry out operations and measures to detect, control, or eradicate any pest or disease of livestock, including animals at a slaughterhouse, stockyard, or other point of concentration. The NMFS would coordinate with the USDA in ordering the removal of cultured organisms). If no finding or suspected finding of an OIE suspected pathogen episode occurs during a given year, then the permittee shall provide the NMFS RA with an annual report via an electronic web-based form on or before January 31 each year indicating no finding or suspected finding of an OIE suspected pathogen episode.
- (d) Notify NMFS within 30 days of any changes in hatcheries used for providing fingerlings or other juvenile organisms and provide updated names and addresses/locations for the applicable hatcheries.
 - (e) Keep original purchase invoices or copies of purchase invoices for feed on file for three years from the date of purchase and make available to NMFS or authorized officers during inspection or upon request.
 - (f) Submit sale records electronically using a web-based form and maintain and make available to NMFS personnel or authorized officers during inspection(s) or upon request, sale records for the most recent three years. Sale records must include the species and quantity of cultured organisms sold in pounds whole weight, the estimated average weight of cultured organisms sold to the nearest tenth of a pound, the date of sale, and the names of companies or individuals to whom fish were sold.
 - (g) Notify NMFS via phone or electronically using a web-based form of the intended time, date, species and number of fingerlings or other juvenile organisms that will be transported from a hatchery, other than a hatchery that is integrated within the aquaculture facility, to an aquaculture facility at least 72 hours prior to transport.
 - (h) Notify NMFS via phone or electronically using a web-based form of the intended time, date and estimated amount in pounds whole weight by species of fish to be harvested from the aquaculture facility at least 72 hours prior to harvest.
 - (i) Notify NMFS via phone or electronically using a web-based form of the intended time, date, and port of landing for any vessel landing cultured organisms harvested from an aquaculture facility at least 72 hours prior to landing.
 - (j) Any cultured organisms harvested from an offshore aquaculture facility and being transported for landing ashore or sale must be accompanied by the applicable bill of lading through the first point of sale. The bill of lading must include species name,

- quantity in numbers or pounds, Gulf Aquaculture Permit number of the aquaculture facility from which the fish were harvested, and name and address of purchaser.
- (k) Maintain and make available to NMFS personnel or authorized officers upon request a written or electronic daily record of the number of cultured animals introduced into and number or pounds and average weight of fish removed from each allowable aquaculture system, including mortalities, for the most recent three years.
 - (l) Permittee must provide NMFS current information (i.e. updates if changed since application) regarding names, addresses, and phone numbers of captains, pilots, aircraft owners, and vessel owners, along with documentation or identification numbers for project vessels and aircraft.
 - (m) Permit applicants must provide NMFS copies of valid state and federal aquaculture permits for each hatchery they obtain fingerlings from.
 - (n) At least 30 days prior to each time a permittee or their designee intends to harvest broodstock from the EEZ or state waters, that would be used to produce juvenile fish for an aquaculture facility in the Gulf EEZ, submit a request electronically via a web-based form to the NMFS RA, including the following information: the number of animals, species, and size, the methods, gears, and vessels (including USCG documentation or state registration) to be used for capturing, holding, and transporting broodstock, the date and specific location of intended harvest, and the location to which broodstock will be delivered. Allowable methods or gears used for broodstock capture include those identified for each respective fishery in 50 CFR 600.725, except red drum, which may be harvested only with handline or rod and reel. The NMFS RA may deny or modify a request for broodstock collection if allowable methods or gears are not proposed for use, the number of fish harvested for broodstock is more than necessary for purposes of spawning and rearing activities, or other grounds inconsistent with FMP objectives or other federal laws. If a broodstock collection request is denied or modified, the RA shall provide the determination and the basis for it, in writing to the permittee. If a broodstock collection request is approved, the permittee shall submit a report to the RA including the number and species of broodstock collected, their size (length and weight), and the geographic location where the broodstock were captured. The report must be submitted on a web-based form to the NMFS RA no later than 15 days after the date of harvest.
 - (o) During catastrophic conditions only, the RA may authorize use of paper-based components for basic required functions as a backup to what would normally be reported electronically. The RA will determine when catastrophic conditions exist, the duration of the catastrophic conditions, and which participants or geographic areas are deemed affected by the catastrophic conditions. The RA will provide timely notice to affected participants via publication of notification in the *Federal Register* and other appropriate means and will authorize the affected participants' use of paper-based components for the duration of the catastrophic conditions NMFS will provide each Gulf Aquaculture Permit holder the necessary paper forms, sequentially coded, and instructions for submission of the forms to the RA. The paper forms will also be available upon request from the RA. The program functions available to participants or geographic areas deemed affected by catastrophic conditions may be limited under the paper-based system. Assistance in complying with the requirements of the paper-

based system will be available via Customer Service Monday through Friday between 8 a.m. and 4:30 p.m. eastern time.

- (p) Any other appropriate recordkeeping and reporting requirements necessary for evaluating and assessing the environmental impacts of an aquaculture operation.

Rejected Alternatives

Alternative 1: No Action, the RA has authority to specify recordkeeping and reporting requirements in an EFP (50 CFR 600.745).

Discussion

The Council considered two alternatives for Action 8. Alternative 1 (no action) would have provided NMFS authority to specify EFP recordkeeping and reporting requirements, but only if Action 1, Alternative 1 (EFP option) had been selected as the preferred alternative. Since Alternative 2 was selected by the Council as the Preferred Alternative for Action 1, only Alternative 2 could have been selected for this particular Action (Action 8). Thus, the Council chose Preferred Alternative 2 which establishes 17 recordkeeping and reporting requirements.

4.9. Action 9. Biological Reference Points and Status Determination Criteria

Preferred Alternative 2: Establish the following new biological reference points and status determination criteria for aquaculture in the Gulf EEZ:

The proxy for maximum sustainable yield (MSY) is:

- (a) the total yield harvested by all aquaculture operations in a given year within the management regime established in this FMP.
- (b) 16 million pounds whole weight (mp ww).
- (c) 32 mp ww.
- (d) 36 mp ww.
- (e) 64 mp ww (Preferred).
- (f) 190 mp ww.

The proxy for optimum yield (OY) is the total yield harvested by all permitted aquaculture operations annually, but not to exceed:

- (a) 16 mp ww.
- (b) 32 mp ww.
- (c) 36 mp ww.
- (d) 64 mp ww; Equal to MSY (Preferred).
- (e) 190 mp ww.

No individual, corporation, or other entity can be permitted to produce more than:

- (a) 5 percent of the maximum level of OY.
- (b) 10 percent of the maximum level of OY.
- (c) 20 percent of the maximum level of OY (Preferred).

Production of juvenile fish by a hatchery in the Gulf EEZ will not be counted toward optimum yield or the 20-percent production restriction because those fish would be accounted for subsequently via reported harvest at the aquaculture facility where grow-out occurs.

If planned aquaculture production exceeds the preferred OY specified in Alternative 2 than the Council would initiate review of the OY proxy and aquaculture program, and NMFS would publish a control date, after which entry into the aquaculture industry may be limited or restricted.

Overfished (i.e., minimum stock size threshold; MSST) and overfishing (i.e., maximum fishing mortality threshold; MFMT) definitions contained in the various FMPs to manage wild stocks will be used as proxies for assessing the status of those wild stocks potentially affected by excessive production in aquaculture operations.

Rejected Alternatives

Alternative 1: No Action. Do not establish biological reference points (MSY, OY) or status determination criteria (MFMT, MSST) specific to aquaculture in the Gulf EEZ.

Discussion

Two alternatives were considered for Action 9. Alternative 1 (no action) would not have specified biological reference points or status determination criteria for aquaculture in the Gulf. The Council chose Preferred Alternative 2, which: establishes biological reference points and status determination criteria for aquaculture in the Gulf, specifies MSY and OY for the entire aquaculture fishery, sets a cap on planned production for any individual, corporation, or other entity equal to 20 percent of OY, requires NMFS to publish a control rule if planned aquaculture exceeds OY, and also limits production of cultured species in the Gulf until more is known about the impacts of offshore aquaculture.

4.10. Action 10. Framework Procedures

Preferred Alternative 3: Specify the following framework procedures for modifying biological reference points (MSY, OY), and management measures for offshore marine aquaculture in the Gulf EEZ.

A. The Council will appoint an Aquaculture Advisory Panel (AP) to meet at least bi-annually to evaluate the aquaculture management program proposed in this FMP (and as amended by subsequent Council actions). The group shall be composed of Council staff, NMFS biologists and social scientists, Scientific and Statistical Committee (SSC) members, Socioeconomic Panel (SEP) members, and other state, university, or private scientists with expertise related to aquaculture. The AP will address and review the following:

1. Annual planned aquaculture production levels relative to MSY and OY.

2. Whether or not the condition and status of wild stocks, marine mammals, protected resources, EFH, and other resources managed by the Council and NMFS are adversely affected by aquaculture through:
 - a. OIE reportable pathogens;
 - b. organic and benthic loading and changes in water quality;
 - c. entanglements and interactions;
 - d. escapement of cultured fish;
 - e. other factors.
 3. Economic and social considerations of aquaculture in the EEZ as they relate to Gulf fishing communities.
 4. Management measures for regulating aquaculture, including:
 - a. permit application requirements (Action 2);
 - b. aquaculture operational requirements and restrictions, including monitoring (Action 2);
 - c. allowable aquaculture system requirements (Action 5);
 - d. siting requirements (Action 6); and,
 - e. recordkeeping and reporting requirements (Action 8).
- B. The AP will prepare a written report with its recommendations for submission to the Council. The report will provide the scientific basis for their recommendations, and may include, but is not limited to:
- a. a summary of annual aquaculture landings and planned production;
 - b. a summary of whether or not Council and NMFS managed resources have been adversely affected by aquaculture;
 - c. recommended changes to permit application requirements, operational requirements and restrictions, allowable aquaculture system requirements, siting requirements, and recordkeeping and reporting requirements; and
 - d. a summary of ongoing research activities related to aquaculture in the Gulf EEZ, including important findings and results; and,
 - e. recommendations for revising MSY or OY.
- C. If the AP determines aquaculture is adversely affecting wild stocks, stock complexes, marine mammals, protected resources, essential and critical habitat, fishing communities, or other resources managed by the Council or NMFS, they may recommend MSY and OY be reduced. Any decrease in MSY or OY shall include the scientific basis for the recommendation.
- D. If the AP determines aquaculture is not adversely affecting wild stocks, stock complexes, marine mammals, protected resources, essential and critical habitat, fishing communities, or other resources managed by the Council or NMFS, they may recommend to the Council that MSY and OY be increased. Any increase in MSY or OY shall include the scientific basis for the recommendation.
- E. If the AP determines changes to permit application requirements, operational requirements and restrictions, allowable aquaculture system requirements, siting requirements, and recordkeeping and reporting requirements are warranted, they shall provide the Council with recommended changes, including rationale for such changes.
- F. The Council will review and consider the AP's recommendations and hold a public hearing to obtain comments on the AP's report. After public input, the Council will

- determine if changes to aquaculture management measures or MSY/OY are warranted. If changes are warranted, then the Council will develop a regulatory amendment. The Council may convene the SEP or SSC to provide additional advice prior to taking final action on the regulatory amendment. The Council will provide an opportunity for public input when taking final action.
- G. If changes are needed to MSY, OY, or management measures listed above, the Council will submit to the RA a regulatory amendment, accompanied by the AP's report and any relevant public comments.
- H. The RA will review the Council's regulatory amendment for consistency with the goals and objectives of the Aquaculture FMP, national standards, the MSFCMA, and other applicable law. If the RA concurs with the recommendations, regulations will be drafted and implemented through regulatory amendment in the *Federal Register*. If the RA rejects the recommendations, the RA shall notify the Council in writing of the reasons for rejection and existing regulations would remain in effect. Regulatory changes that may be established or modified by the RA through regulatory amendment in the *Federal Register* include:
- a. adjustments to MSY;
 - b. adjustments to OY;
 - c. permit application requirements;
 - d. aquaculture operational requirements and restrictions, including monitoring requirements;
 - e. allowable aquaculture system requirements;
 - f. siting requirements for aquaculture facilities; and,
 - g. recordkeeping and reporting requirements.

Rejected Alternatives

Alternative 1: No action (status quo), do not specify framework procedures for modifying aquaculture management measures or biological reference points.

Alternative 2: Specify the following framework procedures for modifying biological reference points (MSY, OY) for offshore marine aquaculture in the Gulf EEZ.

- A. The Council will appoint an Aquaculture Advisory Panel to meet at least bi-annually to evaluate the aquaculture management program proposed in this FMP (and as amended by subsequent Council actions). The group shall be composed of Council staff, NMFS biologists and social scientists, Scientific and Statistical Committee (SSC) members, Socioeconomic Panel (SEP) members, and other state, university, or private scientists with expertise related to aquaculture. The AP will address and review the following:
1. Annual planned aquaculture production levels relative to MSY and OY.
 2. Whether or not the condition and status of wild stocks, marine mammals, protected resources, EFH, and other resources managed by the Council and NMFS are adversely affected by aquaculture through:
 - a. OIE reportable pathogens;
 - b. organic and benthic loading and changes in water quality;
 - c. entanglements and interactions;

- d. escapement of cultured fish;
 - e. other factors.
- 3. Economic and social considerations of aquaculture in the EEZ as they relate to Gulf fishing communities.
- B. The AP will prepare a written report with its recommendations for submission to the Council. The report will provide the scientific basis for their recommendations, and may include, but is not limited to:
 - a. a summary of annual aquaculture landings and planned production;
 - b. a summary of whether or not Council and NMFS managed resources have been adversely affected by aquaculture;
 - c. a summary of ongoing research activities related to aquaculture in the Gulf EEZ, including important findings and results; and,
 - d. recommendations for revising MSY or OY.
- C. If the AP determines aquaculture is adversely affecting wild stocks, stock complexes, marine mammals, protected resources, essential and critical habitat, fishing communities, or other resources managed by the Council or NMFS, they may recommend MSY and OY be reduced. Any decrease in MSY or OY shall include the scientific basis for the recommendation.
- D. If the AP determines aquaculture is not adversely affecting wild stocks, stock complexes, marine mammals, protected resources, essential and critical habitat, fishing communities, or other resources managed by the Council and NMFS, they may recommend to the Council that MSY and OY be increased. Any increase in MSY or OY shall include the scientific basis for the recommendation.
- E. The Council will review and consider the AP's recommendations and hold a public hearing to obtain comments on the AP's report. The Council may convene the SEP or SSC to provide additional advice prior to taking final action. After public input, the Council will make findings on the need for changes.
- F. If changes are needed to MSY or OY, the Council will advise the RA in writing of their recommendations, accompanied by the AP's report, relevant background material, and public comments.
- G. The RA will review the Council's recommendations for consistency with the goals and objectives of the Aquaculture FMP, national standards, the MSFCMA, and other applicable laws. If the RA concurs with the recommendations, regulations will be drafted and implemented through notice in the *Federal Register*. If the RA rejects the recommendations, the RA shall notify the Council in writing of the reasons for rejection and existing regulations would remain in effect. Regulatory changes that may be established or modified by the RA by notice in the *Federal Register* include:
 - a. adjustments to MSY; and,
 - b. adjustments to OY.

Discussion

Three alternatives were considered for Action 10. Alternative 1 (no action) would not have specified framework procedures for aquaculture. Alternative 2 would have specified framework procedures for modifying biological reference points. The Council chose Preferred Alternative 3, which specifies framework procedures for modifying various biological reference points (e.g.,

adjustments to MSY and OY) and management measures (e.g., siting requirements) for offshore marine aquaculture in the Gulf EEZ.

5. AFFECTED ENVIRONMENT

Section 1502.15 of the Council on Environmental Quality (CEQ) regulations states “environmental impact statements shall succinctly describe the area(s) to be affected or created by the alternatives under consideration.” Although a comprehensive description of the affected physical, biological, economic and social, and administrative environment in the Gulf was included in Section 5.0 of the Aquaculture FMP/FPEIS, this may have been modified in April 2010, when the DWH MC252 deep-sea drilling rig exploded and sank off the coast of Louisiana. The following section provides additional information as it relates to the DWH blowout.

5.1 Physical Environment

The DWH blowout affected more than one-third of the Gulf area from western Louisiana east to the panhandle of Florida and south to the Campeche Bank in Mexico. The impacts of the DWH blowout on the physical environment are expected to be significant and long-term.

Oil is dispersed on the surface, and because of the heavy use of dispersants, oil is also documented as being suspended within the water column, some even deeper than the location of the broken well head. Floating and suspended oil washed onto shore in several areas of the Gulf as well as non-floating tar balls. Whereas suspended and floating oil degrades over time, tar balls are more persistent in the environment and can be transported hundreds of miles. Oil on the surface of the water could restrict the normal process of atmospheric oxygen mixing into and replenishing oxygen concentrations in the water column. In addition, light penetration would be reduced in oiled areas, inhibiting photosynthesis and phytoplankton growth (Gonzalez et al., 2009).

According to the National Research Council (2003), the Gulf seeps oil at an amount of about 40×10^6 million gallons (151 x 106 liters) per year and these seeps help to support a community of microbes which aid in oil biodegradation. In the case of the DWH blowout, millions of barrels of oil were released into the Gulf over a period of 85 days with approximately 25% was directly recovered or burned at sea, leaving ~75% to be degraded naturally or with the aid of chemical dispersants (Kerr 2010). Redmond and Valentine (2011) found evidence that the microbial community response to the oil released from the DWH blowout was distinct from that observed in previous spills or mesocosm studies. Microbial communities consume oxygen when breaking down oil hydrocarbons, leading to a decrease in the available oxygen in the marine environment. Low oxygen levels can result in negative impacts to phytoplankton and zooplankton communities, resulting in further trophic effects.

Effects on the physical environment such as low oxygen and the inter-related effects that culminate and magnify through the food web could impact the ability of larvae and post-larvae to survive, even if they never encounter oil. While oil exposure may not always be lethal, it can

have sub-lethal effects on the early life stages (eggs, larvae). For instance, oil exposure in combination with other stressors (e.g., low oxygen) could result in additive effects which could lead to mortality. However, the actual impact(s) of the oil on Gulf species (e.g., reduced spawning potential, decreased fishing success) will not be evident until those individuals that were affected enter the fishery, and this would need to be taken into consideration during stock assessment processes.

5.2. Biological Environment

While the short- and long-term oil and dispersant effects on the environment and marine life are currently under investigation, it is possible that the oil and dispersant may have an immediate negative impacts on the eggs and larvae of fish species. Results of toxicity tests conducted by Hamdan et al. (2011) found that the dispersant used during the DWH blowout (Corexit 9500A) did not pose a significant threat to invertebrate and adult fish populations; however, microbial populations were found to be susceptible to toxicity from the use of this dispersant when applied at prescribed concentrations. Such data suggest that hydro-carbon-degrading bacteria are inhibited by chemical dispersants, and that the use of dispersants has the potential to diminish the capacity of the environment to bioremediate spills.

Evidence from Seuront (2010) demonstrated that zooplankton organisms have the potential to avoid hydrocarbon-contaminated waters, due to their chemosensory abilities. However, this may not be the case in heavily oiled areas or in the case of persistent exposure. Results of a five-year survey of seagrass associated fish communities (2006-2010) which ultimately spanned the oil-affected area of the Gulf did not find reductions in juvenile abundances following the DWH blowout (Fodrie and Heck 2011). Still, damage to fish stocks in the form of chronic effects caused by lingering oil and/or dispersants in the environment may not be fully documented for years.

Oil entered areas considered important spawning grounds during the spawning season for many Gulf species. For example, the Gulf serves as the sole breeding ground for western Atlantic bluefin tuna from April through June (Abbriano et al. 2011). However, the possibility exists that some species would be able to detect environmental cues when moving toward the oiled area that would prevent them from entering the area. These fish might then remain outside the area where oil was in high concentrations, but still continue to spawn. The highest concern is that the oil may have impacted spawning success of species that spawn in the summer months, either by reducing spawning activity or by reducing survival of the eggs and larvae. Still, many species managed by the Council have a protracted spawning period that extends beyond the months of when oil was released, and thus may not have been as impacted as initially thought.

To date, there have been no observed fish kills from the DWH blowout in federal waters and there are no current data available that the oil has affected current stock biomass levels. If eggs and larvae were affected, impacts on harvestable-size species would become evident when the 2010 year class becomes large enough to enter the fishery and be retained. The impacts would

be felt as reduced fishing success and reduced spawning potential, and would need to be taken into consideration in the next Southeast Data Assessment Review (SEDAR) assessment.

In a study conducted during the summer of 2011, University of South Florida researchers found more unhealthy fish in the area of the 2010 oil spill compared to other areas. Although some scientists have suggested that these incidences of sick fish may be related to the spill, others have pointed out that there is no baseline from which to judge the prevalence of sick fish, and no connection has been determined. Studies are continuing to check whether the sick fish suffer from immune system and fertility problems (Tampa Bay Times 2012).

The oil spill may have adverse effects on protected species populations. Cetaceans, manatees, and sea turtles may be exposed to oil or dispersants. These toxic chemicals can affect them externally by swimming in oil or dispersants or internally from eating or swallowing oil, consuming prey that has also come in to contact with oil, or breathing volatile compounds that the oil gives off. Sea turtles could be at additional risk from oil washing ashore on nesting beaches where nesting females and/or their nests may be exposed to chemicals, which may result in decreased survival of eggs and/or developmental defects in hatchlings.

Changes in the population size structure as a result of shifting fishing effort to specific geographic segments of fish populations, combined with any anthropogenically-induced natural mortality that may occur from the impacts of the DWH blowout, could lead to changes in the distribution and abundance of populations throughout the Gulf. Impacts to federally managed species in the Gulf as a result of the DWH blowout will similarly impact other species that may be preyed upon by those species, or that might benefit from a reduced stock.

5.3. Economic and Social Environment

In response to the expanding area of the Gulf surface waters covered by the spill, NMFS issued an emergency rule to temporarily close a portion of the Gulf EEZ to all fishing [75 FR 24822] to ensure seafood safety. The initial closed area (May 2, 2010) extended from approximately the mouth of the Mississippi River to south of Pensacola, Florida and covered an area of 6,817 square statute miles. The coordinates of the closed area were then periodically modified in response to changes in the size and location of the area affected by the spill. At its largest size on June 2, 2010, the closed area covered 88,522 square statute miles, or approximately 37% of the Gulf EEZ. On April 19, 2011, the last area closed to fishing was reopened. The economic impacts of the DWH blowout are still being examined.

On May 24, 2010, then Secretary of Commerce, Gary Locke, declared a fishery disaster in the Gulf due to the economic impact on commercial and recreational fisheries. This determination was made under Section 312(a) of the MSFCMA, and included the states of Louisiana, Mississippi and Alabama under the affected area. The declaration was made in response to requests from the Governors of Louisiana and Mississippi based on the loss of access to many commercial fisheries and the existing and anticipated environmental damage.

According to the 2010 Fisheries of the U.S. (NMFS 2011), U.S. domestic landings for commercial fisheries in the Gulf decreased from 1,583,117 thousand pounds in 2009 to 1,282,848 thousand pounds in 2010. However, revenue slightly increased from \$693 million (\$693,393,000) to \$635 million (\$635,096,000) from 2009 to 2010. In 2010, 2.7 million residents of Gulf coast states participated in marine recreational fishing. All participants, including visitors, took nearly 22 million trips and caught 147 million fish. This was slightly lower than in 2009 where 2.8 million residents of Gulf Coast states participated in marine recreational fishing; and over 23 million trips were taken and more than 173 million fish were caught by all participants (visitors included) (NMFS 2010). Additionally, huge losses to the Gulf region's \$20 billion tourism industry (EPA 2011) were also expected as a result of the DWH blowout.

Information on the full range of social and economic impacts to the Gulf as a result of the DWH blowout is not available at this time. Short and long term effects are still being examined and this process could take years or even decades. Pursuant to the Oil Pollution Act of 1990 (OPA), British Petroleum (BP) as a responsible party was required to establish a procedure for the payment or settlement of claims for costs and damages incurred as a result of the DWH blowout. Although BP established such a procedure, on June 16, 2010, the White House issued a press release announcing that BP would replace its claims facility with the Gulf Coast Claims Facility (GCCF). The GCCF program operated from May 2010 to August 22, 2010. Starting June 4, 2012, the BP Claims Program began accepting claims under the Oil Pollution Act of 1990. The BP Claims Program is open to claimants that wish to file a claim for economic and property damages related to the Deepwater Horizon incident. As of February 28, 2013, BP had paid out \$8,748,551,683 in DWH blowout related claims to individuals and businesses (<http://www.bp.com/sectiongenericarticle.do?categoryId=9036580&contentId=7067577>). A separate process has been established to manage claims and funding requests for government and other entities.

5.4. Administrative Environment

As a result of the DWH blowout, on May 19, 2010, Secretary of the Interior, Ken Salazar, issued Order No. 3299 which established BOEMRE. The BOEMRE was charged with taking over all of the responsibilities of the Minerals Management Service (MMS) until the full implementation of BOEMRE's reorganization. The purpose of the order was to 'separate and reassign the responsibilities that had been assigned to the MMS into new management structures that will improve the management, oversight, and accountability of activities on the outer continental shelf (OCS); ensure a fair return to the taxpayer from royalty and revenue collection and disbursement activities; and provide independent safety and environmental oversight and enforcement of offshore activities.'

On October 1, 2011, it was announced that BOEMRE would be separated into two new organizations: Bureau of Ocean Energy Management (BOEM), and Bureau of Safety and Environmental Enforcement (BSEE). The purpose of BOEM is to exercise the conventional (e.g., oil and gas) and renewable energy-related management functions of MMS not otherwise

transferred pursuant to Secretary Salazar's Order 3299 including, but not limited to, activities involving resource evaluation, planning and leasing. The purpose of the BSEE is to oversee the safety and environmental enforcement functions of MMS including, but not limited to, the authority to inspect, investigate, summon witnesses and produce evidence, levy penalties, cancel or suspend activities, and oversee safety, response, and removal preparedness. Additionally, the royalty and revenue management functions of MMS including, but not limited to, royalty and revenue collection, distribution, auditing and compliance, investigation and enforcement, and asset management for both onshore and offshore activities are being transferred to the Office of Natural Resources Revenue (ONRR). More information on the reorganization can be found at <http://www.boemre.gov/>.

The DWH blowout also resulted in the development of major monitoring programs by NMFS and other agencies, as well as by numerous research institutions. Of particular concern was the potential health hazard to humans from consumption of contaminated fish and shellfish. The NOAA, FDA, EPA, and Gulf States implemented a comprehensive, coordinated, multi-agency program to ensure that seafood from the Gulf is safe for consumption. Prior to reopening an area, protocol required NOAA to demonstrate the area was oil-free and had little risk of being re-exposed to oil. Seafood tissue samples were also taken and had to successfully pass both a sensory examination and chemical analysis in an approved laboratory. The protocol involved sensory testing for polycyclic aromatic hydrocarbon (PAH) components of the oil and dispersant, and chemical-based testing for PAH as a confirmatory measure. The duration of elevated PAH levels in seafood after previous oil spills has varied from several weeks to several years (Gohlke et al. 2011). In the case of the DWH blowout, testing was performed on finfish, shrimp, crabs, and mollusks (e.g. oysters/mussels) from areas that were closed but reopened as well as from nearby areas that were never closed. More information about the testing protocol and the response of NMFS can be found at: http://sero.nmfs.noaa.gov/deepwater_horizon_oil_spill.htm.

As mentioned previously, NOAA's Aquaculture Policy (Appendix A) was released in June 2011 and includes an appendix with detailed guidance for aquaculture in federal waters (Appendix B). In February 2013, the Council approved additional language to the implementing regulations by a vote of 13-4. These changes are highlighted in Tab F of the briefing book (<http://ftp.gulfcouncil.org/Web%20Client/ListDir.htm&dir=/Briefing%20Books/Briefing%20Book%202013-02>). Currently, NMFS is in the process of reviewing the implementing regulations for the Aquaculture FMP/FPEIS. A notice will be published in the Federal Register when the draft regulations are available for public comment.

6. ENVIRONMENTAL CONSEQUENCES

Detailed discussion on the direct and indirect impacts on the physical, biological, ecological, economic and social, and administrative environment for the ten actions and their associated alternatives can be found in Sections 6.2 through 6.11 of the Aquaculture FMP/FPEIS. The following section provides a summary of those impacts and includes additional details related to the DWH blowout.

6.1 General Description of the Marine Aquaculture Environment

Section 6.1 of the Aquaculture FMP/FPEIS discussed a range of issues surrounding marine aquaculture including: impacts on local stocks (escapement, genetic diversity, competition), aquatic animal health (transmission between wild and farmed fish, therapies/vaccines, preventative measures), effluent effects (benthos, water column), interactions with marine wildlife (entanglement, attraction, predator control), competing uses (fishing grounds, navigation), economic and social impacts on domestic fisheries, and harvest of prey species for feed.

6.2. Aquaculture Permit Requirements, Eligibility, and Transferability

Action 1 contains alternatives that would (or would not) establish a permitting system for offshore marine aquaculture in the Gulf EEZ. The Council chose Preferred Alternative 2, which creates a NMFS permit to operate an offshore aquaculture facility, requires that permittees be U.S. citizens or permanent resident aliens, and establishes transferability requirements. Other alternatives considered, but not chosen, are Alternative 1 which would have maintained the previous practice of issuing EFPs for aquaculture facilities, and Alternative 3 which would have required both a siting and operational permit.

Of the three alternatives considered, Alternative 1 would have resulted in the least effect on the **physical, biological, and ecological environment** since it would have maintained the status quo of requiring an EFP for the operation of aquaculture facilities and continued the lack of development of the offshore aquaculture industry. The two-tier permit process in Alternative 3 would have required separate siting and operational permits, but provided no additional safeguards to the physical, biological, and ecological environment. The chosen alternative, Preferred Alternative 2, creates a NMFS permit to operate an offshore aquaculture facility and also includes operating requirements and restrictions, as well as recordkeeping and reporting requirements (Actions 2 and 8) which are tied to the continued operation of the facility under the permit. This information will help to provide managers with the necessary tools for monitoring and maintaining the integrity of the physical, biological, and ecological environment.

Under Alternative 1, any entity seeking to engage in activities associated with commercial offshore aquaculture operations that involve species managed under an FMP or activities in violation of fishery regulations in the Gulf EEZ would have had to apply for an EFP, which would not have resulted in additional impacts to the **economic and social environment**. The economic and social costs of Alternative 3 would have been expected to be the same as those of Preferred Alternative 2, with the exception that Alternative 3 would have potentially created compatibility issues due to the dual permit process. Preferred Alternative 2 allows development of the aquaculture industry in the Gulf EEZ and this may result in both positive (e.g., job creation due to new jobs in aquaculture sector) and negative (e.g., potential competition with wild capture fisheries) economic and social impacts.

All three alternatives considered would have a direct negative effect on the **administrative environment** since issuance of a permit is primarily administrative in nature. Alternative 1 would have required that the EFP process and application requirements be followed for issuance of permits. Alternative 3 would have created a dual permit process, leading to redundancy and unnecessary burden on potential applicants. Preferred Alternative 2 creates a single permit for regulating aquaculture in the Gulf EEZ, and thus does not place undue burden on potential applicants by creating a redundant permitting process. It should also be noted that facilities must adhere to recordkeeping and reporting requirements (Actions 2 and 8) in order to continue operating under the permit.

The impacts from the DWH blowout are not expected to change the direct and indirect effects of the alternatives considered in Action 1 that were identified in Aquaculture FMP/FPEIS. The alternatives evaluated in Action 1 address the mechanism to permit offshore aquaculture facilities and are primarily administrative in nature. Thus, although the affected environment has changed as a result of the DWH blowout, the direct and indirect effects of these alternatives are anticipated to remain the same.

6.3. Action 2: Application Requirements, Operational Requirements and Restrictions

Action 2 considered alternatives that would (or would not) establish application and operational requirements and restrictions. The Council chose Preferred Alternative 3 which requires that aquaculture operations adhere to a number of application and operational requirements and restrictions for both the initial issuance of a permit and the continued operation of the facility under the permit. The Council considered two other alternatives: Alternative 1 which would not have specified any conditions when issuing a permit to an aquaculture facility, and Alternative 2 which would have required that a facility meet the conditions set forth in an EFP.

Alternative 1 would not have specified application or operational requirements other restrictions, and thus could have had negative impacts on the **physical, biological and ecological environment**. Alternative 2 would have required that those applying for a Gulf Aquaculture Permit meet the conditions specified in an EFP; however, those conditions are less comprehensive than that which is required in Preferred Alternative 3. The chosen alternative, Preferred Alternative 3, specifies numerous application and operational requirements for permit issuance and facility operation and thus would have the least negative impact of the three alternatives.

While Alternative 1 could have produced negative externalities on the **economic and social environment** since it would not have specified application or operational requirements, or restrictions for aquaculture in the Gulf EEZ, it could have also resulted in economic benefits to offshore aquaculture operations due to reduced costs and restrictions. Alternative 2 would have imposed the same restrictions as those required by the application and issuance requirements of an EFP, and may have had the same or slightly reduced economic and social costs as Alternative 1. Preferred Alternative 3 establishes specific application and operational requirements and

restrictions which are expected to reduce the magnitude of negative externalities that would be produced by an unrestricted aquaculture industry.

Preferred Alternative 3 is the most burdensome alternative in terms of the **administrative environment** since it requires that those applying for and operating an aquaculture facility in the Gulf EEZ fulfill numerous application and operational requirements and restrictions. Alternative 1 would have been the least burdensome from an administrative standpoint since it does not specify requirements or restrictions. Alternative 2 would have required that one abide by the EFP guidelines and thus would have represented a significant administrative burden, although less so compared to Preferred Alternative 3.

The impacts from the DWH blowout are not expected to change the direct and indirect effects of the alternatives considered in Action 2 that were identified in the Aquaculture FMP/FPEIS. As discussed in Chapter 5, the DWH blowout resulted in changes to the affected environment, however, the short- and long-term effects of the blowout are still being examined. The effects of the alternatives considered in Action 2, which consider application and operational requirements, are not directly related to the current status of the affected environment. Thus, these effects, as previously described, are not expected to change regardless of the ultimate impacts of the DWH blowout.

6.4. Action 3: Duration of the Permit

Action 3 considered two alternatives in regards to the length of time that a Gulf Aquaculture Permit would remain effective. The Council chose Preferred Alternative 2b which specifies that a permit is effective for 10 years, with 5-year renewal increments. Other alternatives considered under Alternative 2 included: permits effective for 5 years (a), 20 years (c), or indefinitely (d). Alternative 1 (no action) would have continued to allow an EFP to remain effective for no longer than 1 year unless specified in the permit or superseding notice or regulation.

With the recordkeeping and reporting requirements specified in Action 8 and conditions attached to a permit in Action 2, it is not expected that a facility would be able to operate for any extended period of time while engaging in activities which may be detrimental to the **physical, biological, or ecological environment**. Still, Alternative 1 would have had the potential for the least negative consequences since it would have resulted in permit duration of only a year, while the opposite would have been true for Alternative 2d (indefinite permit duration). Alternative 2a, Preferred Alternative 2b and Alternative 2c represent permit durations which fall between 1 year and indefinitely.

Impacts on the **economic and social environment** as they pertain to permit duration would be expected as a result of all of the alternatives considered. The potential for negative impacts on fishermen would depend on the magnitude and duration of loss of traditional fishing grounds, landings, revenues, and employment opportunities as a result of aquaculture operations. Impacts on the aquaculture industry would also be felt if the permit duration was not long enough to allow time to become profitable.

The two alternatives considered would also have impacts on the **administrative environment**. The administrative environment would have been the most affected by the continued use of EFPs (Alternative 1) and the least affected if an indefinite permit duration (Alternative 2d) had been chosen. All of the other options (Alternative 2a, c; Preferred Alternative 2b) would result in less impact on the administrative environment compared to Alternative 1.

The impacts from the DWH blowout are not expected to change the direct and indirect effects of the alternatives considered in Action 3 that were identified in the Aquaculture FMP/FPEIS. As discussed in Chapter 5, the DWH blowout resulted in changes to the affected environment, however, the short- and long-term effects of the blowout are still being examined. The effects associated with the alternatives considered in Action 3, which address permit duration and renewal periods, are not related to the current status of the affected environment. Thus, these effects are expected to remain the same as previously discussed in the Aquaculture FMP/FPEIS regardless of the ultimate impacts of the DWH blowout.

6.5. Action 4: Species Allowed for Aquaculture and Included in the Aquaculture Fishery Management Unit

Action 4 considered which species would be allowed for culture under a Gulf Aquaculture Permit. The Council chose Preferred Alternative 4 which allows the aquaculture of all marine species native to the Gulf and managed by the Council, with the exception of shrimp and corals, and includes these species in the Aquaculture FMU. Preferred Alternative 4 would also allow the Council to send a request to the Atlantic HMS Management Division to allow the culture of species managed under their authority (tunas, billfish, swordfish, sharks. Alternative 1 would not have specified those species allowed for aquaculture or develop an Aquaculture FMU. Alternative 2 would have allowed aquaculture of all finfish native to the Gulf in the reef fish, red drum, and coastal migratory pelagic FMPs and included those species in the Aquaculture FMU. Alternative 3 would have allowed aquaculture of all species native to the Gulf that are managed by Council, except goliath and Nassau grouper, shrimp and corals, and included those species in the Aquaculture FMU.

The effects on the **physical, biological, and ecological environment** were expected to be similar for alternatives 2-4 since these alternatives differed in the number of species allowed, but prohibited the culture of non-native species. Conversely, Alternative 1 is the only alternative that would have allowed non-native species to be used in aquaculture operations and the negative impacts of this particular alternative was expected to be greatest as it would have posed the highest risk for detrimental effects to wild populations if escapement occurred. The impact of broodstock collection on wild stocks was also considered; however, allowing the culture of only those species native to the Gulf and managed by the Council will ensure that species being cultured are under an FMP and managed according to National Standards.

Alternative 1 could have had the greatest adverse impacts to the **economic and social environment** since it allowed culture of any species, whether it was native to the Gulf or not.

Under Alternative 1, all Gulf fishermen as well as on-land aquaculture producers could be impacted by direct competition with Gulf offshore operations. Alternatives 2 and 3 would have restricted the allowable species to be cultured, while Preferred Alternative 4 set the number of allowable species greater than Alternatives 2 and 3, but less than that which would have been allowed by Alternative 1. While restrictions on the number of allowable species could be beneficial for Gulf fishermen, it would also reduce the potential benefits to offshore aquaculture operators and associated businesses.

The costs associated with the **administrative environment** would be expected to be greatest for Alternatives 1, 2, and Preferred Alternative 4 due to the fact that these options would allow for culture of goliath and Nassau grouper and this could result in increased expenses associated with enforcement. Alternative 3 would have prohibited culture of these species of grouper, thereby reducing such expenses.

The Aquaculture FMP/FPEIS describes how each of the alternatives in Action could directly or indirectly impact wild stocks through escapement of cultured species or the collection of wild stocks for broodstock. Wild stocks may have been impacted by the DWH blowout, however, until information on the short- and long-term impacts of the DWH blowout on the population structure and reproductive potential of wild stocks becomes available it is not possible to determine which stocks may have experienced detrimental effects and the magnitude of those effects. As more information becomes available, the Council can react accordingly by adding or removing species from the Aquaculture FMU (via a future amendment). In addition, preferred Alternative 2 in Action 8 requires the permit holder to submit a request to harvest broodstock for culture purposes. This request may be denied if future information indicates that certain stocks have been negatively affected by the DWH blowout to the extent that allowing culture of these species would compromise FMP or management objectives.

As noted in Section 5.2 of this document, several studies have produced preliminary information on the impacts of the DWH blow-out on marine organisms and ecosystems in the Gulf; however information on the short- and long-term effects of the blowout is incomplete or unavailable as these effects are still being examined. Currently, there is no incomplete or unavailable information that is deemed relevant to making a determination regarding reasonably foreseeable, significant adverse impacts or that is essential to a reasoned choice among alternatives for this action. Ongoing research into the impact of the DWH blowout is being conducted and information from these studies will be used to inform the permitting process and operating procedures of aquaculture operations in the Gulf EEZ. However, at this time, there is no reason to believe that the conclusions reached in the Aquaculture FMP/FPEIS have been altered or changed due to the DWH blowout. If new information becomes available in the future which might change the manner in which marine aquaculture operations are regulated in the Gulf EEZ, appropriate adjustments will be made at that time.

6.6. Action 5: Allowable Marine Aquaculture Systems

Action 5 considered allowable aquaculture systems for offshore aquaculture operations in the Gulf EEZ. Alternative 1 would not have specified allowable systems for growing cultured organisms, while Alternative 2 would have only allowed cages and net pens for use in offshore aquaculture operations. The Council chose Preferred Alternative 3, which would not authorize (or prohibit) specific allowable aquaculture systems, thereby allowing the RA to consider proposed systems on a case-by-case basis.

Alternative 1 does not specify allowable aquaculture systems, nor does it provide guidance for evaluating systems proposed by aquaculture operations and this could lead to negative effects on the **physical, biological, and ecological environment**. Alternative 2 would have only allowed net pens or cages; however, it did not contain requirements for evaluation of these systems. In contrast, Preferred Alternative 3 will base approval not on the type of system proposed, but on a case-by-case evaluation by the RA, who will consider the soundness of the preferred design, and this is expected to be the best alternative with the least effects on the physical, biological, and ecological environment.

Since Alternative 1 did not specify types of allowable systems or requirements for review criteria, it is possible that adverse **economic and social environmental effects** could have occurred. Alternative 2 would have restricted the types of systems used to cages and net pens (the most restrictive) and this alternative would have offered the greatest benefit in terms of reducing the negative externalities of inadequate or inappropriate systems and economic and social costs associated with these externalities. Preferred Alternative 3 does not specify allowable systems, rather it specifies a process and criteria for system approval and thus has the potential flexibility to allow the use of a system that best meets the operation's production goals, while addressing the need to reduce potential negative externalities and associated economic and social costs associated with those externalities.

Alternatives 1 and 2 would have had the least effects on the **administrative environment** since it would not have required any additional NMFS review of the proposed aquaculture system before it was deployed. On the other hand, Preferred Alternative 3 will require case-by-case review of each system proposed and would therefore directly affect the administrative environment more than the other alternatives.

The impacts from the DWH blowout are not expected to change the direct and indirect effects of the alternatives considered in Action 5 that were identified in Aquaculture FMP/FPEIS. As discussed in Chapter 5, the DWH blowout resulted in changes to the affected environment; however, the effects associated with the alternatives considered in Action 5, which address allowable aquaculture systems, are not related to the current status of the affected environment. Thus, these effects are expected to remain the same as previously discussed in the Aquaculture FMP/FPEIS regardless of the ultimate impacts of the DWH blowout. Further, as noted above, Preferred Alternative 3 allows the RA to consider each system on a case-by-case basis. Thus, the Preferred Alternative 3 would provide greater protection to physical, biological, and ecological environment than alternatives 1 or 2, by requiring the RA to consider proposed systems on a case-by-case basis and providing guidance on evaluating whether use of the proposed system is appropriate. The RA will consider any changes to the affected environment that resulted from

the DWH blowout when evaluating potential risks to EFH, endangered or threatened marine species, marine mammals, wild fish stocks, public health, or safety.

6.7. Action 6: Marine Aquaculture Siting Requirements and Conditions

Action 6 considered 3 alternatives for siting marine aquaculture operations. Alternative 1 (no action) would not have designated areas in the Gulf EEZ for aquaculture. Alternative 2 would have created marine aquaculture zones (and limited operations to these zones). The Council ultimately chose Preferred Alternative 3 which establishes criteria and includes specific prohibitions for siting a proposed aquaculture facility.

If Alternative 1 had been chosen, NMFS would have evaluated each proposal as part of the Section 10 process of the ACOE, although the ACOE's evaluation may not have addressed critical factors related to the **physical, biological and ecological environment** which may have been important to NMFS. Alternatives 2 and 3 would have allowed NMFS to evaluate the suitability of a proposed site and its potential impacts to the physical, biological, and ecological environment. However, Alternative 2 would not have allowed NMFS to evaluate the characteristics of a potential site on a localized scale. Preferred Alternative 3 will prohibit aquaculture operations from being sited in certain areas and will allow NMFS to review proposed aquaculture sites on a case-by-case basis. Preferred Alternative 3 will also allow some flexibility in the siting review process without compromising environmental safeguards for the protection of EFH and other marine resources, and therefore would provide the greatest net benefits to the physical and biological environments.

Alternative 1 would have lead to the most negative impact on the **economic and social environment** as it would not have designated areas where aquaculture would have been allowed, thus allowing operating to be sited anywhere in the Gulf EEZ subject to ACOE siting permits. Alternative 2 would have restricted the areas where aquaculture could occur by establishing 13 marine aquaculture zones, whereas Preferred Alternative 3 not only restricts the areas where offshore aquaculture can occur but also the distance between sites and total area of each site. Restricting the areas where aquaculture operations could be located, would be expected to reduce the likelihood of site placement in traditional fishing areas, thereby reducing potential economic and social impacts. While any restrictions would result in higher set-up and operating costs to the aquaculture industry, Preferred Alternative 3 allows greater flexibility than Alternative 2 (but less than Alternative 1).

Preferred Alternative 3 results in the greatest impact to the **administrative environment** due to estimated costs and time spent reviewing sites. Alternative 2 would have streamlined the permitting process and reduced the burden on the administrative environment since operations would have only been allowed in 13 predetermined zones. Alternative 1 would have required the least direct effects on the administrative environment since NMFS would have only been commenting on the application for an ACOE permit, however indirect effects would have resulted if the ACOE had sited a facility in areas that NMFS would have recommended against.

As discussed in Chapter 5, the DWH blowout resulted in changes to the affected environment, however, the short- and long-term effects of the blowout are still being examined. The alternatives in Action 6 consider different methods to determine where it is appropriate to site aquaculture facilities. The impacts from the DWH blowout are not expected to change the direct and indirect effects of the alternatives considered in Action 6 that were identified in the Aquaculture FMP/FPEIS. However, the DWH blowout raises questions about whether these facilities should be permitted in close proximity to the DWH wellhead, or more generally whether there should be zones around active oil rigs where siting is prohibited. These questions can be addressed under Preferred Alternative 3, which will allow NMFS to evaluate the proposed site on a case-by-case basis, including the characteristics of a potential site on a localized scale. This would provide NMFS with the most flexibility in evaluating facility siting decisions and determine whether a proposed site is unsuitable for aquaculture operations as a result of DWH blowout-related effects or proximity to an active oil rig.

6.8. Action 7: Restricted Access Zones for Marine Aquaculture Facilities

Three alternatives were considered for Action 7 which would have (or have not) established restricted access zones around aquaculture facilities. Alternative 1 would not have established restricted access zones, while Alternative 3 would have restricted access to fishermen and vessels within either 100, 500, or 1,640 feet of aquaculture systems. The Council chose Preferred Alternative 2 which establishes restricted access zones which correspond to the coordinates on the ACOE siting permit for each operation.

Overall, Preferred Alternative 2 or Alternative 3 would have provided the greatest benefit to the **physical, biological, and ecological environment** as compared to Alternative 1. Restricting access around aquaculture systems will reduce the possibility of damage to the facility as a result of vessels transiting through an area or damages caused by gear from fishing vessels. Preferred Alternative 2 establishes restricted access zones which correspond to the coordinates on the ACOE permit for operations, and this area must be at least twice as large as the total area encompassed by the allowable aquaculture systems as required in Action 6.

Impacts on the **economic and social environment** vary across the three alternatives. For instance, Alternative 1 would not have prohibited transit or fishing near marine aquaculture facilities, however, this would have increased the likelihood of damage and associated costs to the facility. Alternative 3 considered buffer zones for fishing vessels of 100 feet, 500 feet, or 1,640 feet from a marine aquaculture system, yet this alternative did not include mandatory zone marking which would have made it difficult to determine the location of buffer zones. Preferred Alternative 2 establishes restricted zones (corresponding to ACOE permit coordinates) and requires that these zones be marked and maintained.

Preferred Alternative 2 results in the greatest effects on the **administrative environment** as compared to the other alternatives considered since it does not establish a size standard for restricted access. Administrative effects for Alternative 3 would have been similar to Preferred Alternative 2, although Alternative 3 may have been easier to enforce due to standardization in

the size of restricted access zones. No administrative effects would have been expected for Alternative 1 since this alternative did not establish restricted access zones.

The impacts from the DWH blowout are not expected to change the direct and indirect effects of the alternatives considered in Action 7 that were identified in Aquaculture FMP/FPEIS. As discussed in Chapter 5, the DWH blowout resulted in changes to the affected environment, however, the short- and long-term effects of the blowout are still being examined. The effects of the alternatives considered in Action 7, which consider restricted access zones around aquaculture facilities, are not directly related to the current status of the affected environment. Thus, these effects, as previously described, are not expected to change regardless of the ultimate impacts of the DWH blowout.

6.9. Action 8: Recordkeeping and Reporting Requirements

Action 8 considered two alternatives: Alternative 1 (no action) which would have required recordkeeping and reporting requirements specified in an EFP, and Preferred Alternative 2 which establishes 17 recordkeeping and reporting requirements for offshore aquaculture operations in the Gulf EEZ. The Council chose Preferred Alternative 2 which specifies recordkeeping and reporting requirements that are intended to mitigate impacts associated with marine aquaculture and alert managers to potential problems.

By establishing recordkeeping and reporting requirements (Preferred Alternative 2), information can be gathered to inform managers about the effects of aquaculture operations on the **physical, biological, and ecological environment**. The Council did not choose Alternative 1, which would have specified EFP recordkeeping and reporting requirements. The 17 recordkeeping and reporting requirements specified by Preferred Alternative 2 will provide NMFS with sufficient information to monitor and assess impacts of aquaculture facilities and provide information to aid in enforcing regulations.

Compared to Alternative 1, Preferred Alternative 2 is expected to reduce adverse affects on the **economic and social environment** since Preferred Alternative 2 specifies numerous recordkeeping and reporting requirements which could reduce the incidence and severity of events on the human environment. It should also be noted that these requirements may impose additional expense on the aquaculture operation.

Preferred Alternative 2 will have the greatest effect on the **administrative environment** since recordkeeping and reporting are administrative in nature. Although such requirements may be more burdensome to NMFS and the aquaculture industry compared to Alternative 1, such requirements are considered necessary to monitor potential impacts of aquaculture operations.

The impacts from the DWH blowout are not expected to change the direct and indirect effects of the alternatives considered in Action 8 that were identified in Aquaculture FMP/FPEIS. The alternatives evaluated in Action 8 address reporting requirements and are primarily administrative in nature. Thus, although the affected environment has changed as a result of the

DWH blowout, the direct and indirect effects of these alternatives are anticipated to remain the same.

6.10. Action 9: Biological Reference Points and Status Determination Criteria

Action 9 considers two alternatives. Alternative 1 (no action) would have specified biological reference points or status determination criteria for aquaculture in the Gulf. The Council chose Preferred Alternative 2 which establishes biological reference points and status determination criteria for aquaculture in the Gulf, including MSY and OY, cap production for any individual, corporation, or other entity, and require NMFS to publish a control rule if planned aquaculture production exceeds OY.

Alternative 1 would not have established status criteria or reference points, essentially allowing aquaculture production to go unregulated, and this could have lead to negative impacts on the **physical, biological, and ecological environment**. Conversely, Preferred Alternative 2 establishes biological reference points and status determination criteria for aquaculture in the Gulf which allows for increased regulation of the industry and thus reduces the potential for negative impacts compared to Alternative 1.

Effects on the **economic and social environment** for Alternative 1 may have been negative for Gulf fishermen targeting wild species, but also positive for the aquaculture industry since there would have been no constraints on aquaculture production. Preferred Alternative 2 reduces the potential for competition of aquacultured product with Gulf fishermen, while still allowing growth of the aquaculture industry.

Both Alternative 1 and Preferred Alternative 2 would impact the **administrative environment**. However, Alternative 1 would have resulted in increased administrative burden and costs compared to Preferred Alternative 2, since Alternative 1 would have required an additional amendment to the FMP to satisfy MSFCMA requirements of establishing biological reference points and status criteria.

The DWH blowout may have additional direct or indirect effects relative to the alternatives considered in Action 9. The biological reference points and status determination criteria specified in this Action are based on estimations of what may be safely produced at aquaculture facilities in the Gulf, and on existing parameters established for wild stocks in the area. Until information on the short- and long-term impacts of the DWH blowout on the population structure and reproductive potential of Gulf species becomes available, it will not be possible to determine which stocks may have experienced detrimental effects and the magnitude of those effects. As additional information becomes available, it will be incorporated into decisions relative to the permitting of aquaculture facilities in the Gulf. In the future, the Council and NMFS may choose to modify the biological reference points or status determination criteria outlined in the Aquaculture FMP/FPEIS in order to account for additional factors relevant to the DWH blowout that may not already be considered.

As noted in Section 5.2 of this document, several studies have produced preliminary information on the impacts of the DWH blow-out on marine organisms and ecosystems in the Gulf; however information on the short- and long-term effects of the blowout is incomplete or unavailable as these effects are still being examined. Currently, there is no incomplete or unavailable information that is deemed relevant to making a determination regarding reasonably foreseeable, significant adverse impacts or that is essential to a reasoned choice among alternatives for this action. Ongoing research into the impact of the DWH blowout is being conducted and information from these studies will be used to inform the permitting process and operating procedures of aquaculture operations in the Gulf EEZ. However, at this time, there is no reason to believe that the conclusions reached in the Aquaculture FMP/FPEIS have been altered or changed due to the DWH blowout. If new information becomes available in the future which might change the manner in which marine aquaculture operations are regulated in the Gulf EEZ, appropriate adjustments will be made at that time.

6.11. Action 10: Framework Procedures

Action 10 considered three alternatives to establishing a framework procedure for implementing changes to various aquaculture regulatory measures in a timely fashion. Alternative 1 (no action) would not have specified framework procedures for modifying aquaculture management measures, status determination criteria, or biological reference points. Alternative 2 and Preferred Alternative 3 specified framework procedures for modifying biological reference points for offshore marine aquaculture in the Gulf EEZ. The Council chose Preferred Alternative 3 since it provides the Council with broader authority to make regulatory changes compared to Alternative 2.

Alternative 1 would not have specified framework procedures for aquaculture and thus considerable time could have passed before regulations would have been put in place that benefitted the **physical, biological and ecological environment** and the overall aquaculture program. Conversely both Alternative 2 and Preferred Alternative 3 provide oversight and review of the aquaculture program through the use of an Aquaculture AP and this could indirectly benefit the physical and biological environments by providing regular review. Preferred Alternative 3 will also provide for numerous modifications or additions to aquaculture regulations, as opposed to Alternative 2.

Under Alternative 1, the Council would have had to develop a full amendment to the FMP to make any changes and this could have resulted in negative effects to the **economic and social environment**. Preferred Alternative 3 will provide the Council with broader authority to make regulatory changes than Alternative 2, and Preferred Alternative 3 will establish a more flexible regulatory process that could adapt to ongoing changes in the offshore aquaculture industry, which could both support the developing industry and reduce negative externalities and associated economic and social costs caused by the industry. Preferred Alternative 3 is expected to result in greater economic costs to the Council and NMFS than Alternative 2, but less economic costs than Alternative 1.

Since Alternative 1 would not have established framework procedures, any changes to regulations or MSY/OY would have had to be made through a subsequent plan amendment and this could have resulted in additional effects to the **administrative environment** as compared to Alternative 2 and Preferred Alternative 3. While Preferred Alternative 3 would have had similar effects on the administrative environment as Alternative 2, one major difference is that Preferred Alternative 3 will require the Council to develop a regulatory amendment for changes recommended by the AP. Development of a regulatory amendment would have been more time consuming than simply submitting a recommendation to NMFS (as proposed in Alternative 2), but less time consuming than preparation of a full plan amendment.

The impacts from the DWH blowout are not expected to change the direct and indirect effects of the alternatives considered in Action 10 that were identified in Aquaculture FMP/FPEIS. The alternatives evaluated in Action 10 address the mechanism for modifying the biological reference points and management measures established in the FMP, which is primarily administrative in nature. Thus, although the affected environment has changed as a result of the DWH blowout, the direct and indirect effects of these alternatives are anticipated to remain the same.

6.12. Mitigation Measures

Regulations for implementing the National Environmental Policy Act (NEPA) require that environmental impact statements include appropriate mitigation measures not already included in the proposed action or alternatives (40 CFR 1502.14(f) and 1502.16(h)). The preferred alternatives in the Aquaculture FMP/FPEIS would establish a permit process for commercial aquaculture in the Gulf. The Aquaculture FMP/FPEIS discusses the mitigation measures for each of the ten actions and the impacts from the DWH blowout are not expected to alter the conclusions contained in the Aquaculture FMP/FPEIS. A summary of the Mitigation Measures for each of the ten actions outlined in the Aquaculture FMP/FPEIS is provided below (see Section 6.14 of the Aquaculture FMP/FPEIS for more information).

6.12.1 Action 1: Aquaculture permit requirements, eligibility, and transferability

Alternative 1 would have required an EFP and would have likely continued to constrain development of commercial aquaculture in the EEZ. **Preferred Alternative 2** and **Alternative 3** would have required either a single aquaculture permit (**Alternative 2**) or an operating and siting permit (**Alternative 3**) to conduct aquaculture, and the applicant must also meet various application and operational requirements (Action 2). These additional requirements would require additional administrative costs compared to an EFP and would also likely cost the applicant more than would an EFP. Such administrative costs and costs to the applicant are mitigated by the positive effects on the <http://www.youtube.com/watch?v=zt4AITbQmpU>, physical, and biological environments which would result from such a thorough evaluation of a permit before it was issued.

6.12.2 Action 2: Application requirements, operational requirements, and restrictions

Alternative 1 would not have specified application or operational requirements for aquaculture operations. **Alternative 2** would have maintained the same permit requirements as required by an EFP, whereas **Preferred Alternative 3** requirements are the most comprehensive (and require the most applicant preparation time and cost, as well as the most agency review) since they require that applicants obtain an assurance bond, prohibits genetically modified and transgenic species, requires collection of broodstock from U.S. waters of the Gulf, and identification of an aquatic animal health expert. Negative administrative and economic effects to the applicant and NMFS are mitigated by the positive effects on the administrative, physical, and biological environments resulting from completion of a permit with such conditions and the assurance that aquaculture structures will be removed in the event an operation terminates.

6.12.3 Action 3: Duration of the permit

Alternative 2(d) would have allowed for the longest permit duration (indefinite) and therefore be most beneficial to aquaculture operations seeking to obtain financial backing. **Alternative 1** would have provided the shortest permit duration (1 year with a possibility of renewal) and would likely continue to constrain commercial aquaculture production from developing in the Gulf. **Alternatives 2(a-c)** provide intermediate permit durations ranging from 5 to 20 years. Although the 10-year preferred permit duration would provide less financial benefits (more difficult to obtain financing and less desirable to investors) than longer permit durations, the negative effects of this alternative are believed to be mitigated by the benefits of more frequent permit review.

6.12.4 Action 4: Species allowed for aquaculture and included in the aquaculture fishery management unit

Alternative 1, would not have precluded culture of exotic species or the culture of genetically modified native species in the Gulf EEZ, and thus could have resulted in negative effects to the administrative, biological, physical, and ecological environments. **Alternatives 2, 3, and 4** would not allow aquaculture of exotic species and differ from each other only in the particular native species which could be cultured. **Preferred Alternative 4** allows for the culture of all marine species in the Gulf managed by the Council with the exception of shrimp species and coral species (there currently is a separate permitting system for live rock) and would request that NMFS develop concurrent rulemaking to allow aquaculture of HMS. Any negative economic effects to the applicant from limiting the number of species that could be cultured would be mitigated by the positive effects of keeping non-native and/or genetically modified species out of the Gulf in the event of escapement. Impacts to non-target species, such as menhaden, will be mitigated by potential adjustments to management measures following periodic stock assessments.

6.12.5 Action 5: Allowable marine aquaculture systems

Alternative 1 would not have specified allowable aquaculture systems. **Alternative 2** would have only allowed applicants to use cages and net pens for aquaculture. In contrast, **Preferred Alternative 3**, allows for case-by-case review of each aquaculture system by NMFS to allow for technological innovations that may provide added protection to the physical and biological environments. The negative effect of limiting the type of system an applicant could use would be mitigated by the positive benefits to the administrative, biological, physical, and ecological environment of allowing only robust systems to be deployed in the Gulf EEZ. Additionally, **Preferred Alternative 3** would mitigate negative effects to applicants by allowing future designs of aquaculture systems that have greater structural integrity.

6.12.6 Action 6: Marine aquaculture siting requirements and conditions

Alternative 1 would have relied on NMFS' review of site permits issued by the ACOE to evaluate proposed aquaculture sites. **Alternatives 2 and 3** would provide NMFS with authority to use either pre-permitted aquaculture zones or to evaluate a proposed aquaculture site on a case-by-case basis. **Preferred Alternative 3** also requires permit applicants to conduct a baseline assessment at their proposed site as well as subsequent environmental monitoring. While **Preferred Alternative 3** may duplicate to an extent the ACOE's siting requirements, this duplication is expected to mitigate potential environmental impacts to the physical and biological environments since NMFS and the ACOE have different authorities and management objectives. The case-by-case review required by **Preferred Alternative 3** is expected to increase the amount of time needed to review a permit application relative to **Alternatives 1 or 2**; however, this inconvenience to the applicant and increased administrative costs to the government is mitigated by the detailed site-specific evaluation allowed.

6.12.7 Action 7: Restricted access zones for marine aquaculture facilities

Alternative 1 would not have established restricted access zones around offshore aquaculture facilities, while **Preferred Alternative 2** establishes restricted access zones around marine aquaculture facilities where fishing activities are prohibited. It is well known that many fish aggregate around structures, and the aquaculture systems could attract fish from outside such a zone and keep fishermen from catching them; however such negative economic effects are expected to be mitigated by proper siting of facilities.

6.12.8 Action 8: Recordkeeping and reporting

Keeping records and making reports to NMFS and other federal agencies, as described in **Preferred Alternative 2**, could be seen as an administrative burden to aquaculture companies.

Alternative 1, would not have required such recordkeeping and reporting requirements and thus would not have incurred such a burden. However, if recordkeeping and reporting were not required, problems with an aquaculture facility could result in negative effects to the administrative, economic, biological, physical, and ecological environments could go undetected and unresolved. Therefore, the benefits of prevention and review of environmental impacts are expected to mitigate any administrative and economic burdens suffered by the aquaculture operations.

6.12.9 Action 9: Biological reference points and status determination criteria

Alternative 1 would not have established biological reference points and status criteria for the aquaculture fishery; however, **Preferred Alternative 2** does. Since the MSFCMA requires these criteria and reference points be estimated and established, **Preferred Alternative 2** will help mitigate the potential for legal challenges. The lower that the OY is set, the more environmental impacts could be prevented or mitigated. The Council's preferred OY (64 million pounds) provides a balance between environmental considerations and socio-economic considerations (i.e., allowing development of aquaculture industry in the Gulf EEZ). Procedures established in Action 10 can be used to adjust OY and minimize or mitigate environmental impacts in the future.

6.12.10 Action 10: Framework procedures

Alternative 1 would not have specified framework procedures. Therefore, the Council would have been required to implement changes to aquaculture management measures through a full plan amendment, resulting in lengthy processes and (the potential for) additional negative impacts to the environment until such changes were implemented. Under **Alternative 2** and **Preferred Alternative 3**, framework procedures were specified and the Aquaculture Advisory Panel (AP) would conduct annual reviews of the aquaculture program. Both of these alternatives contain measures which provide regular oversight of ongoing aquaculture activities and operations and help to mitigate environmental, social, and economic impacts if they are determined to occur.

6.13. Cumulative Effects Analysis

The CEQ regulations dictate that federal agencies assess not only the indirect and direct impacts associated with regulatory actions, but also the cumulative impacts associated with those actions. The CEQ regulations define a cumulative impact as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7) and can

either be additive or synergistic. A synergistic effect is when the combined effects are greater than the sum of the individual effects.

The CEQ guidance (Council for Environmental Quality, 1997) outlines 11 items for consideration in drafting a Cumulative Effects Analysis (CEA) for a proposed action, including:

1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.
2. Establish the geographic scope of the analysis.
3. Establish the timeframe for the analysis.
4. Identify the other actions affecting the resources, ecosystems, and human communities of concern.
5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stress.
6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.
7. Define a baseline condition for the resources, ecosystems, and human communities.
8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.
9. Determine the magnitude and significance of cumulative effects.
10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.
11. Monitor the cumulative effects of the selected alternative and adapt management.

A detailed CEA can be found in Section 6.15 of the Gulf Aquaculture FMP/FPEIS⁵. This information is summarized below and includes additional information specific to this SFPEIS.

1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.

The CEQ cumulative effects guidance states this step is accomplished through the following three activities:

- I. The direct and indirect effects of the proposed actions (see Sections 6.2-6.9 of the Aquaculture FMP/FPEIS).
- II. Which resources, ecosystems, and human communities are affected (see Section 5.0 of the Aquaculture FMP/FPEIS).
- III. Which effects are important from a cumulative effects perspective (see Section 6.15 of the Aquaculture FMP/FPEIS).

2. Establish the geographic scope of the analysis.

The immediate areas affecting managed resources, non-target fisheries, habitat, and protected resources are waters of the Gulf, including both state and federal waters. Additional information on the geographic scope for this analysis is summarized in Section 6.15 of the Aquaculture FMP/FPEIS.

⁵A copy of the Aquaculture FMP/FPEIS can be downloaded at:
http://www.gulfcouncil.org/fishery_management_plans/aquaculture_management.php

3. Establish the timeframe for the analysis.

Sections 2.2 and 5.3 of the Aquaculture FMP/FPEIS describe the history of management for aquaculture nationally and in the Gulf. A national policy on aquaculture was first approved in 1980 through the passage of the National Aquaculture Act (NAA). The NAA was reauthorized in 1985 and in subsequent Farm Bills. Legislation specific to offshore aquaculture was proposed for Congressional consideration in 2005 and 2007. In 2011, NOAA released a new Marine Aquaculture Policy which includes guidance for aquaculture in federal waters.⁶

The timeframe for the CEA should take into account both historical efforts to establish regional and national aquaculture programs, as well as future considerations if the regulations for the Aquaculture FMP/FPEIS are approved and implemented by NMFS. The timeframe for the CEA begins in 1980, with the passage of the NAA, and extends for 10 years after the regulations for the Aquaculture FMP/FPEIS would be implemented. The end of the CEA also corresponds to the preferred duration of aquaculture permits (i.e., 10 years) as described in Action 3 of the Aquaculture FMP/FPEIS.

4. Identify the other actions affecting the resources, ecosystems, and human communities of concern.

Actions affecting the Gulf are summarized in Section 6.15 of the Aquaculture FMP/FPEIS. The DWH blow-out occurred in 2010, after the Aquaculture FMP/FPEIS entered into effect. Section 5.2 of this document provides information on initial impact(s) resulting from the DWH blowout.

5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stress.

This step should identify the trends, existing conditions, and the ability to withstand stresses of the environmental components. According to the CEQ guidance describing stress factors, there are two types of information needed. The first is the socioeconomic driving variables identifying the types, distribution, and intensity of key social and economic activities within the region. The second is the indicators of stress on specific resources, ecosystems, and communities.

The CEA factor 5 in Section 6.15 of the Aquaculture FMP/FPEIS describes the resources, ecosystems, and human communities to withstand stress. The capacity to withstand stress may have been impacted by the DWH blow-out and as noted in Section 5.2 of this document, several studies have produced preliminary information on the impacts of the DWH blow-out on marine organisms and ecosystems in the Gulf. Additional information on the short- and long-term effects of the DWH blowout is needed to assess the magnitude of any changes to the capacity of resources, ecosystems, and communities to withstand stress.

6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.

This section examines whether resources, ecosystems, and human communities are approaching conditions where additional stresses could have an important cumulative effect beyond any

⁶ A copy of the NOAA Marine Aquaculture Policy can be found at:
http://www.nmfs.noaa.gov/aquaculture/docs/policy/noaa_aquaculture_policy_2011.pdf

current plan, regulatory, or sustainability threshold (CEQ 1997). Sustainability thresholds can be identified for some resources, which are levels of impact beyond which the resources cannot be sustained in a stable state. Other thresholds are established through numerical standards, qualitative standards, or management goals.

Section 6.15 of the Aquaculture FMP/FPEIS addresses these stresses and their relation to regulatory thresholds. These stresses and regulatory thresholds remain the same. Additionally, the DWH blow-out represents a source of stress to the Gulf. As noted in Section 5.2 of this document, several studies have produced preliminary information on the impacts of the DWH blow-out to marine organisms and ecosystems in the Gulf. More information on the short- and long-term impacts of the DWH blow-out is needed to assess whether the additional stress caused by the DWH blow-out has resulted in a cumulative effect beyond current thresholds.

7. Define a baseline condition for the resources, ecosystems, and human communities.

The purpose of defining a baseline condition for the resource and ecosystems in the area of the proposed action is to establish a point of reference for evaluating the extent and significance of expected cumulative effects.

The status of Council managed resources are summarized in the annual status report to Congress on the Status of U.S. Fisheries (http://www.nmfs.noaa.gov/stories/2013/05/docs/2012_sos_rtc.pdf). The baseline status of Council managed species is also described in Section 5.0 of the Aquaculture FMP/FPEIS.⁷ Additionally, the status and health of EFH is extensively described in the Council's Generic Essential Fish Habitat Amendment of 2004 (<http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20EFH%20EIS.pdf>) and Generic Amendment Number 3 (http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/FINAL3_EFH_Amendment.pdf). Section 5.3.3 of the Aquaculture FMP/FPEIS describes baseline conditions for fishing communities throughout the Gulf and the Generic Essential Fish Habitat Amendment of 2004 (<http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20EFH%20EIS.pdf>) provides more extensive characterization of fishing-dependent communities throughout the Gulf.

Although the environmental baseline could have been altered by the DWH blowout, impacts to the physical, environmental, and socioeconomic resources are not expected to substantially change from that described in the Aquaculture FMP/FPEIS.

8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.

Cause-and-effect relationships for various aspects of offshore marine aquaculture and measures proposed to address these potential effects are summarized in Table 6.12.1 of the Aquaculture FMP/FPEIS. These relationships remain the same.

⁷ www.gulfcouncil.org/beta/gmfmcweb/downloads/FINAL3_EFH_Amendment.pdf

9. Determine the magnitude and significance of cumulative effects.

Section 6.15 of the Aquaculture FMP/FPEIS discusses the magnitude and significance of cumulative effects relative to past, present, and reasonably foreseeable future actions. More information on the short- and long-term impacts of the DWH blow-out is needed to assess whether the DWH blow-out and response may increase the magnitude and significance of previous identified cumulative effects.

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.

As discussed in factor 10 of Section 6.15 in the Aquaculture FMP/FPEIS, the cumulative effects of developing a regional aquaculture permitting system on the socioeconomic environment are expected to be positive, although some negative social and biological impacts may result if aquaculture is not conducted in an environmentally sustainable manner. To prevent or minimize impacts associated with aquaculture, the actions and alternatives in the Aquaculture FMP/FPEIS include various measures to mitigate impacts.

11. Monitor the cumulative effects of the selected alternatives and adapt management.

The effects of the actions outlined in the Aquaculture FMP/FPEIS will be monitored through the submission of periodic reports to NMFS and other agencies, such as the EPA and ACOE. In addition, Action 2 requires aquaculture permit applicants to meet numerous operating requirements and restrictions, while Action 8 requires permit holders to maintain various records and submit various reports to NMFS regarding issues ranging from disease outbreaks to entanglement of protected resources. This information, as well as water quality data provided to the EPA, will allow NMFS and other federal agencies to monitor the cumulative effects of the preferred alternatives and make management adjustments, as necessary.

As noted in Section 5.2 of this document, several studies have produced preliminary information on the impacts of the DWH blow-out on marine organisms and ecosystems in the Gulf; however information on the short- and long-term effects of the blowout is incomplete or unavailable as these effects are still being examined. Currently, there is no incomplete or unavailable information that is deemed relevant to making a determination regarding reasonably foreseeable, significant adverse impacts or that is essential to a reasoned choice among alternatives for this action. Ongoing research into the impact of the DWH blowout is being conducted and information from these studies will be used to inform the permitting process and operating procedures of aquaculture operations in the Gulf EEZ. However, at this time, there is no reason to believe that the conclusions reached in the Aquaculture FMP/FPEIS have been altered or changed due to the DWH blowout. If new information becomes available in the future which might change the manner in which marine aquaculture operations are regulated in the Gulf EEZ, appropriate adjustments will be made at that time.

Climate Change

While it is likely that global climate change could have significant effects on Gulf of Mexico aquaculture operations, the extent of these effects is not known at this time. Possible impacts of climate change include temperature changes which can influence organism metabolism and alter

ecological processes such as productivity and species interactions; changes in precipitation patterns and a rise in sea level which could change the water balance of coastal ecosystems; altering patterns of wind and water circulation in the ocean environment; and influencing the productivity of critical coastal ecosystems such as wetlands, estuaries, and coral reefs (IPCC, 2007). Additionally, climate change may affect the severity of extreme weather (e.g., hurricanes), potentially generating more intense storms which could lead to increases in storm-induced damage to equipment and facilities (IPCC, 2007). Aquaculture is considered to make a minor, contribution to greenhouse gas emissions although the extent to which this occurs depends on the species, size and location of facilities (FAO 2009).

Global climate change can impact marine ecosystems through ocean warming by increased thermal stratification, reduced upwelling, sea level rise; and through increases in wave height and frequency, loss of sea ice, and increased risk of diseases in marine biota. Decreases in surface ocean pH due to absorption of anthropogenic CO₂ emissions may impact a wide range of organisms and ecosystems, particularly organism that absorb calcium from surface waters, such as corals and crustaceans (IPCC, 2007; and references therein). These influences could affect biological factors such as migration, range, larval and juvenile survival, prey availability, and susceptibility to predators. At this time, the level of impacts cannot be quantified, nor is the time frame known in which these impacts will occur.

According to the Food and Agriculture Organization of the United Nations (FAO), adoption of multi-trophic aquaculture could present a form of adaptation in regards to climate change (FAO, 2008). Climate change may also affect the availability and price of ingredients used for fish feeds. The aquaculture industry has been gradually shifting away from dependence on feeds sourced from wild-capture fisheries (i.e., containing fish meal and fish oil) towards the use of alternative dietary ingredients (e.g., soy and other plants, fish processing trimmings, agricultural byproducts, animal renderings, algae, yeasts, insects, and worms). The use and development of alternative feeds has been the focus of projects such as the NOAA-USDA Alternative Feeds Initiative. While the use of alternative feeds may reduce fishing pressure on wild-capture fisheries, it may impact other resources such as freshwater if there is increased demand for terrestrial-based feeds (e.g., soybeans).

6.14. Unavoidable Adverse Effects

A summary of the unavoidable adverse effects of the aquaculture permitting program in the Gulf EEZ is provided below (see Section 6.16 of the Aquaculture FMP/FPEIS for more information).

Administrative Costs

Implementing and administering a permitting program for aquaculture will result in additional unavoidable costs to federal agencies, particularly NMFS. Costs to other federal agencies, such as the ACOE, EPA, MMS, USDA, and USCG may also increase because of additional review and administration to issue siting, lease, chemical (drug, pesticide, and biologics), pollution discharge, and navigational permits.

Loss of Fishing Grounds

The development of offshore aquaculture will require the production facility to have exclusive access to the portion of the ocean where they operate, and this could result in competition between offshore aquaculture firms and other activities (e.g., recreational and commercial fishing). As discussed in Action 6, information regarding important fishing grounds will be taken into consideration when approving or disapproving a particular location for offshore aquaculture. However, in some instances the loss of fishing areas may be unavoidable given the numerous other siting criteria that will be considered by NMFS and the ACOE.

Localized Water Quality and Benthic Changes

The effects of aquaculture operations in the offshore environment on water quality and the benthos may include an increase in organic loading and nutrient enrichment. Action 2 of the Aquaculture FMP/FPEIS requires that aquaculture applicants to abide by EPA feed management and water quality standards. Additionally, NMFS will use siting criteria to avoid or minimize any adverse affects of aquaculture facilities on areas of critical habitat and EFH. Since offshore aquaculture operations will involve feeding and maintaining fish in a contained area, localized small-scale impacts to water quality and benthos may be unavoidable, but will be mitigated to the extent possible by siting criteria and feed management practices.

Exclusive Use of a Public Resource

Siting and permitting requirements in the Aquaculture FMP/FPEIS will afford aquaculture operations the privilege to conduct aquaculture at a specified site in the Gulf EEZ. However, siting of each facility will be contingent upon ACOE and NMFS review. Although an aquaculture operation may occupy both the water column and benthos at a particular site within the Gulf EEZ, the operation would not be provided ownership of the site, nor would they be leasing the site. With regard to biological resources, the number or amount of wild fish used for broodstock purposes would be contingent on NMFS approval (as specified in Action 8).

Fishing Communities

It is not well-known whether aquaculture will positively or negatively benefit fishing communities. The severity and direction of the impact will to some extent depend on the species cultured, the degree of participation of the local fishing and seafood industry, and location of an aquaculture facility relative to a fishing community. Unavoidable adverse impacts to fishing communities may occur if aquaculture operations depress wild-caught fish prices and create competition for fishing-industry jobs.

6.15. Relationship Between Short-Term and Long-Term Productivity

(The following section is summarized from Section 6.17 of the Aquaculture FMP/FPEIS.)

Increasing the domestic supply of seafood will assist in alleviating the U.S. seafood deficit while providing a safer, sustainable supply of seafood. Potential long-term benefits of an offshore

aquaculture industry in the U.S. could include decreased pressure on wild fish stocks and increased opportunities for employment in Gulf coast communities; short-term benefits will largely stem from the creation of profitable aquaculture operations. Since financial investments for offshore aquaculture operations are often substantial, it may be many years before an operation is profitable. Should operations succeed financially over the short-term, then the social and economic environments will benefit from the long-term productivity of sustainably-produced aquaculture products that comply with stringent federal environmental standards.

6.16. Irreversible and Irretrievable Commitments of Resources

(The following section is summarized from Section 6.18 of the Aquaculture FMP/FPEIS.)

Alternatives and actions in the Aquaculture FMP/FPEIS are largely intended to prevent irreversible commitments. Such measures include: preventing non-native, GMO, and transgenic species from being used for aquaculture; inspection of cultured species for disease prior to stocking; case-by-case review of aquaculture systems and siting criteria; and various recordkeeping and reporting requirements.

Irreversible commitments which could potentially result from offshore aquaculture include habitat damage or degradation (if aquaculture structures are damaged or destroyed during storm events). In the event of escapement, the requirement that only native, non-GMO cultured species are allowed for culture is expected to prevent negative biological and ecological impacts to wild stocks. An irretrievable commitment resulting from aquaculture would be the temporary loss of fishing grounds where an aquaculture facility is sited; however, siting criteria will assist NMFS in identifying sites that minimize losses of important fishing grounds and other habitat.

6.17. Any Other Disclosures

The CEQ guidance on environmental consequences (40 CFR §1502.16) indicates the following elements should be considered for the scientific and analytic basis for comparisons of alternatives, including:

- a) Direct effects and their significance.
- b) Indirect effects and their significance.
- c) Possible conflicts between the proposed action and the objectives of federal, regional, state, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned.
- d) The environmental effects of alternatives including the proposed action.
- e) Energy requirements and conservation potential of various alternatives and mitigation measures.

- f) Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures.
- g) Urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures.
- h) Means to mitigate adverse environmental impacts.

Items a, b, d, e, f, and h are addressed in Sections 4.0, 5.0, and 6.0 of the Aquaculture FMP/FPEIS. The other elements (c and g) are not applicable to the actions in the Aquaculture FMP/FPEIS (please refer to Section 6.19 of the Aquaculture FMP/FPEIS for more information).

6.18. Evaluation of Significance Factors

NOAA's Administrative Order 216-6 (NAO 216-6) contains criteria for determining the significance of the impacts of a proposed action. In addition, the CEQ regulations at 40 CFR 1508.27 contain criteria for determining the significance of the impacts of a proposed action. CEQ regulations state that the significance of an action should be analyzed both in terms of "context" and "intensity." The significance of the Aquaculture FMP/FPEIS was analyzed based on criteria contained in both CEQ regulations and NOAA's Administrative Order 216-6. See Section 6.20 of the Aquaculture FMP/FPEIS for more information.

6.19. Environmental Justice (Executive Order [E.O.] 12898)

Federal agencies are required to conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, national origin, or income level. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. The following information is summarized from Section 6.21 of the Aquaculture FMP/FPEIS.

Section 5.4.3 of the Aquaculture FMP/FPEIS provided a description of five fishing communities along the Gulf coast which were identified as key communities involved in the fishing industry based on fishing permit and employment data. Since the demographic information reported for these communities were derived from census data (and census data describes community-wide demographics and cannot be partitioned into just those populations that rely on federally managed Gulf fisheries), demographic information on fishing communities was not available for use in evaluating the effects of the proposed actions on low-income and minority populations. However, the actions outlined in the Aquaculture FMP/FPEIS would apply to all participants in the fishery, regardless of their race, color, national origin, or income level and, as were therefore not considered discriminatory. No environmental justice issues were anticipated and no modifications to any proposed actions were made to address environmental justice issues.

Additionally, none of the proposed actions were expected to affect any existing subsistence consumption patterns or raise any issues.

7. REFERENCES

Abbriano, R.M., M.M. Carranza, S.L. Hogle, R.A. Levin, A.N. Netburn, K.L. Seto, S.M. Snyder, SIO280, and P.J.S. Franks. 2011. Deepwater Horizon oil spill: A review of the planktonic response. *Oceanography* 24(3):294–301, <http://dx.doi.org/10.5670/oceanog.2011.80>

Council on Environmental Quality. 1997. Considering cumulative effects under the National Environmental Policy Act. Council on Environmental Policy, Executive Office of the President. 64 pp. plus appendices. <http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm>

EPA (Environmental Protection Agency). 2011. *General Facts about the Gulf of Mexico*. Available online at: <http://www.epa.gov/gmpo/about/facts.html> (accessed July 22, 2011).

FAO. 2008. Climate Change for Fisheries and Aquaculture. Technical Background Document from the Expert Consultation, April 7-9, 2008. 18 pp.

FAO. 2009. Climate Change Implications for Fisheries and Aquaculture: Overview of Current Scientific Knowledge. Technical Paper 530. 221 pp.

Fodrie, F.J., K.L. Heck, Jr. 2011. Response of Coastal Fishes to the Gulf of Mexico Oil Disaster. *PLoS ONE* 6(7): e21609. doi:10.1371/journal.pone.0021609

Gohlke, J.M., D. Dzigbodi, M. Tipre, M. Leader, and T. Fitzgerald. 2011. A Review of Seafood Safety after the *Deepwater Horizon* Blowout. *Environmental Health Perspectives* 119(8): 1062-1069.

Gonzalez, J., F.G. Figueiras, M. Aranguren-Gassis, B.G. Crespo, E. Fernandez, X.A.G. Moran, and M. Nieto-Cid. 2009. Effect of a simulated oil spill on natural assemblages of marine phytoplankton enclosed in microcosms. *Estuarine, Coastal, and Shelf Science* 83:265–276, <http://dx.doi.org/10.1016/j.ecss.2009.04.001>

Hamdan, L.J. and P.A. Fulmer. 2011. Effects of COREXIT® EC9500A on bacteria from a beach oiled by the Deepwater Horizon spill. *Aquatic Microbial Ecology* 63: 101–109 doi: 10.3354/ame01482

IPCC. 2007. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

Kerr, R.A. 2010. A lot of oil on the loose, not so much to be found. *Science* 329:734–5

National Research Council. 2003. *Oil in the Sea: Inputs, Fates, and Effects*. National Academies Press, Washington, DC.

NMFS. 2010. Fisheries of the U.S. 2009. Silver Spring, Maryland.

NMFS. 2011. Fisheries of the U.S. 2010. Silver Spring, Maryland.

Redmond, M.C. and D.L. Valentine. 2011. Science Applications in the Deepwater Horizon Oil Spill Special Feature: Natural gas and temperature structured a microbial community response to the Deepwater Horizon oil. *Proceedings of the National Academy of Sciences of the United States of America* doi:[10.1073/pnas.1108756108](https://doi.org/10.1073/pnas.1108756108)

Seuront, L. 2010. Zooplankton avoidance behaviour as a response to point sources of hydrocarbon-contaminated water. *Marine and Freshwater Research* 61:263–270, <http://dx.doi.org/10.1071/MF09055>

Tampa Bay Times article: USF study finds more sick fish in oil spill area than rest of Gulf of Mexico, January 14, 2012. Available at: <http://www.tampabay.com/news/environment/wildlife/article1210495.ece>

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Department of Commerce Office of General Counsel
Texas Parks and Wildlife Department
Alabama Department of Conservation and Natural Resources/Marine Resources Division
Louisiana Department of Wildlife and Fisheries
Mississippi Department of Marine Resources
Florida Fish and Wildlife Conservation Commission
Georgia Department of Natural Resources/Coastal Resources Division
South Carolina Department of Natural Resources/Marine Resources Division
North Carolina Division of Marine Fisheries
NMFS Office of General Counsel
NMFS Office of General Counsel Southeast Region
NMFS Southeast Regional Office
NMFS Southeast Fisheries Science Center
NMFS Silver Spring Office
NMFS Office of Law Enforcement
United States Coast Guard
United States Fish and Wildlife Service

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11. Appendix A: NOAA MARINE AQUACULTURE POLICY

Purpose

The purpose of this policy is to enable the development of sustainable marine aquaculture⁸ within the context of the National Oceanic and Atmospheric Administration's (NOAA) multiple stewardship missions and broader social and economic goals. Meeting this objective will require NOAA to integrate environmental, social, and economic considerations in management decisions concerning aquaculture. This policy reaffirms that aquaculture is an important component of NOAA's efforts to maintain healthy and productive marine and coastal ecosystems, protect special marine areas, rebuild overfished wild stocks, restore populations of endangered species, restore and conserve marine and coastal habitat, balance competing uses of the marine environment, create employment and business opportunities in coastal communities, and enable the production of safe and sustainable seafood.

Statement of Policy

For purposes of this policy, aquaculture is defined as the propagation and rearing of aquatic organisms for any commercial, recreational, or public purpose. This definition covers all production of finfish, shellfish, plants, algae, and other marine organisms⁹ for 1) food and other commercial products; 2) wild stock replenishment for commercial and recreational fisheries; 3) rebuilding populations of threatened or endangered species under species recovery and conservation plans; and 4) restoration and conservation of marine and Great Lakes habitat.

It is the policy of NOAA, within the context of its marine stewardship missions and its strategic goals with respect to healthy oceans and resilient coastal communities and economies, to:

1. Encourage and foster sustainable aquaculture development that provides domestic jobs, products, and services and that is in harmony with healthy, productive, and resilient marine ecosystems, compatible with other uses of the marine environment, and consistent with the National Policy for the Stewardship of the Ocean, our Coasts, and the Great Lakes (National Ocean Policy).¹⁰
2. Ensure agency aquaculture decisions protect wild species and healthy, productive, and resilient coastal and ocean ecosystems, including the protecting of sensitive marine areas.
3. Advance scientific knowledge concerning sustainable aquaculture in cooperation with academic and federal partners.
4. Make timely and unbiased aquaculture management decisions based upon the best scientific information available.
5. Support aquaculture innovation and investments that benefit the Nation's coastal ecosystems, communities, seafood consumers, industry, and economy.

⁸ The term "marine aquaculture" is used because the majority of NOAA's aquaculture authorities and activities relate to marine species. However, this policy applies to all of NOAA's aquaculture authorities and activities, including those related to marine, freshwater, and anadromous species and includes the Great Lakes.

⁹ This definition does not include marine mammals or birds.

¹⁰ E.O. 13547, which adopts the final recommendations of the Interagency Ocean Policy Task Force (July 19, 2010) is available online at <http://www.whitehouse.gov/oceans>.

6. Advance public understanding of sustainable aquaculture practices; the associated environmental, social, and economic challenges and benefits; and the services NOAA has to offer in support of sustainable aquaculture.
7. Work with our federal partners, through the Joint Subcommittee on Aquaculture¹¹ and other avenues, to provide the depth of resources and expertise needed to address the challenges facing expansion of aquaculture in the United States.
8. Work internationally to learn from aquaculture best practices around the world and encourage the adoption of science-based sustainable practices and systems.
9. Integrate federal, regional, state, local, and tribal priorities along with commercial priorities into marine aquaculture siting and management and ensure aquaculture development is considered within other existing and potential marine uses to reduce potential conflicts.

Basis for the Policy

NOAA has a long history of conducting regulatory, research, outreach, and international activities on marine aquaculture issues within the context of its missions of service, science, and environmental stewardship. The National Aquaculture Act of 1980, which applies to all federal agencies, states that it is “in the national interest, and it is the national policy, to encourage the development of aquaculture in the United States.” The statutory basis for NOAA’s aquaculture activities includes the Magnuson-Stevens Fishery Conservation and Management Act, the Marine Mammal Protection Act, the Endangered Species Act, the Coastal Zone Management Act, the National Marine Sanctuaries Act, and the Fish and Wildlife Coordination Act. Under these laws, in addition to the National Environmental Policy Act, NOAA is responsible for considering and preventing and/or mitigating the potential adverse environmental impacts of planned and existing marine aquaculture facilities through the development of fishery management plans, sanctuary management plans, permit actions, proper siting, and consultations with other regulatory agencies at the federal, state, and local levels. Other statutes, including the National Sea Grant College Program Act, the Saltonstall-Kennedy Act, the Anadromous Fish Conservation Act, the Interjurisdictional Fisheries Act, the Merchant Marine Act, and the Agricultural Marketing Act, authorize NOAA to enable and provide assistance for both public and private sector aquaculture. In addition, the Oceans and Human Health Act calls for research related to aquaculture.

NOAA may engage in regulatory actions in the Exclusive Economic Zone under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) through Fishery Management Plans for species in need of conservation and management. NOAA may also engage in regulatory action under National Marine Sanctuaries Act (NMSA) authority with respect to aquaculture activities within or potentially affecting Sanctuaries. NOAA has a direct regulatory role for aquaculture within the sanctuaries, in both state and federal waters, except in state waters when limited by formal written agreement with the Governor of that state. NOAA also engages in consultations with other federal permitting

¹¹ The Joint Subcommittee on Aquaculture of the Federal Coordinating Council on Science, Engineering, and Technology was created in the National Aquaculture Act of 1980. The purpose of the coordinating group is to increase the overall effectiveness and productivity of federal aquaculture research, transfer, and assistance programs.

agencies under the authority of the Endangered Species Act, Marine Mammal Protection Act, the Essential Fish Habitat provisions of the Magnuson-Stevens Fishery Conservation and Management Act, the National Environmental Policy Act, and other statutes. Through the Coastal Zone Management Act, NOAA also reviews and approves state coastal management programs, which identify permissible uses in the coastal zone, and oversees federal consistency with these programs.¹²

In developing this policy, NOAA evaluated the application of past NOAA and Department of Commerce aquaculture policies and planning documents and considered the specific challenges and opportunities of today and tomorrow, drawing on the agency's institutional knowledge of the state of science on aquaculture and its potential impacts. In addition, NOAA considered public input provided via an initial public comment period and a series of seven public listening sessions during April and May 2010, and a 60-day public comment period on a public draft of this policy released in February 2011.¹³ The policy also aligns with several objectives in NOAA's Next Generation Strategic Plan and is a primary component of NOAA's strategic objective for safe and sustainable seafood.¹⁴

This policy was also informed by the National Ocean Policy and the framework for effective coastal and marine spatial planning (CMSP).¹⁵ Many of the themes found in the National Ocean Policy – such as protecting, maintaining, and restoring healthy and diverse ecosystems; supporting sustainable uses of the ocean; and increasing scientific understanding and applying that knowledge to make better decisions – are echoed in this document. This policy also mirrors the National Goals for CMSP, setting the stage for aquaculture to be properly considered within the CMSP process. NOAA, as the primary bureau within the Department of Commerce with programmatic aquaculture responsibilities, developed this policy as a complement to the broader Department of Commerce aquaculture policy.

Background

Approximately 84 percent of the seafood consumed in the United States is imported¹⁶, about half of which is sourced from aquaculture. In 2009, aquaculture crossed the threshold of providing more than half of all seafood consumed worldwide.¹⁷ However, domestic aquaculture provides only about 5 percent of the seafood consumed in the United States.¹⁸ Growing U.S. and worldwide demand for seafood is likely to continue as a result of increases in population and

¹² Some federal permit actions are subject to state review under the consistency certification provisions of the Coastal Zone Management Act.

¹³ Summaries of the listening sessions and all comments submitted as public input to the development of the NOAA aquaculture policy are posted online at <http://aquaculture.noaa.gov>

¹⁴ Available at http://www.ppi.noaa.gov/strategic_planning.html

¹⁵ Final Recommendations of the Interagency Ocean Policy Task Force. Available online at <http://www.whitehouse.gov/administration/eop/ceq/oceans>

¹⁶ Source: U.S Department of Commerce, *Fisheries of the United States 2009*.

¹⁷ United Nations Food and Agriculture Organization. (2009). FISHSTAT Plus: Universal Software for Fishery Statistical Time Series (Food and Agriculture Organization, Rome). Version 2.32. This figure includes both freshwater and marine production.

¹⁸ This figure includes both freshwater and marine production. Not included in this figure is the amount of salmon produced in Alaska by regional aquaculture associations and others in Alaska's salmon stock enhancement program. In 2009, Alaska's salmon aquaculture stock enhancement programs produced over 45 million salmon, mostly pink and chum salmon.

consumer awareness of seafood's health benefits. The most recent federal *Dietary Guidelines for Americans* (2010) recommend Americans more than double their current seafood consumption.¹⁹ Because wild stocks are not projected to meet increased demand even with rebuilding efforts, future increases in supply are likely to come either from foreign aquaculture or increased domestic aquaculture production, or some combination of both.

The existing domestic marine aquaculture community is mainly comprised of shellfish growing, but also includes finfish and algae production in coastal waters and hatchery production of fish and shellfish to replenish stocks of important commercial, recreational, and endangered species and to restore marine habitat (e.g., oyster reefs). Emerging technologies for marine aquaculture include land-based closed-recirculating systems, marine algae production technologies for biofuels and non-food products, systems that integrate different types of aquaculture or combine aquaculture with other uses, and systems in exposed open-ocean waters.

Federal support, engagement, and authorities related to aquaculture development span a number of agencies, in particular the Food and Drug Administration, Environmental Protection Agency, Army Corps of Engineers, Fish and Wildlife Service, and the U.S. Department of Agriculture. These agencies collaborate with each other, industry, states, and academia to address issues related to aquaculture facilities²⁰ and to promote the development of new technologies that improve the sustainability of the industry. This policy sets the stage for NOAA's continued involvement in these coordinated efforts.

Benefits and Challenges

As interest in commercial aquaculture production and wild species restoration in the marine environment has increased, so too has debate about the potential economic, environmental, and social effects of aquaculture – and the need for better public understanding with respect to these issues. Benefits of sustainable aquaculture may include species and habitat restoration and conservation; nutrient removal; provision of safe, local seafood that contributes to food security and human health and nutrition; increased production of low trophic-level seafood; and synergies with fishing (e.g., using fish processing trimmings in aquaculture feeds). Sustainable aquaculture can also contribute economic and social benefits by creating jobs in local communities and helping to maintain the cultural identity of working waterfronts.

Environmental challenges posed by aquaculture, depending upon the type, scope, and location of aquaculture activity, may include nutrient and chemical wastes, water use demands, aquatic animal diseases and invasive species, potential competitive and genetic effects on wild species, effects on endangered or protected species, effects on protected and sensitive marine areas, effects on habitat for other species, and the use of forage fish for aquaculture feeds. Economic and social challenges may include market competition affecting the viability of domestic aquaculture and/or the prices U.S. fishermen receive for their wild seafood products; competition with other uses of the marine environment; degraded habitats and ecosystem services; and

¹⁹ See www.mypyramid.gov

²⁰ A recent example is the National Aquatic Animal Health Plan, which was developed in response to the growing need for a coordinated government effort to ensure aquatic animal health. See <http://aquaculture.noaa.gov/news/naahp.html>

impacts to diverse cultural traditions and values.

Growing consumer demand for safe, local, and sustainably produced seafood, increasing energy costs, increasing seafood demand in countries that currently export seafood to the United States, and growing interest in maintaining working waterfronts are emerging drivers that support sustainable domestic aquaculture production. U.S. aquaculture production – both small-scale and large-scale – has evolved and improved over time through regulations at the federal and state levels, scientific advancements, consumer demand, technological innovation, industry best management practices, and protocols for responsible stock replenishment and hatchery practices. This policy will allow NOAA to further advance these developments through the actions described below.

NOAA Aquaculture Priorities

To implement the Statement of Policy, NOAA has identified the following priorities:

Science and Research

- Expand NOAA’s research portfolio to (1) provide the necessary ecological, technological, economic, and social data and analysis to effectively and sustainably develop, support, manage, and regulate private and public sector marine aquaculture and species restoration, including technologies deemed necessary under recovery and conservation plans for depleted, threatened, and endangered species and habitat; (2) monitor, assess, and address the environmental and socioeconomic effects of marine aquaculture, including cumulative impacts; and (3) complement the scientific work of our federal, state, and academic partners.
- Evaluate alternative protein and lipid sources to be used in lieu of wild fish and fish oil in aquaculture feeds and develop cost-effective alternative feeds that maintain the human health benefits of seafood and reduce reliance on the use of wild forage fish in the diets of farmed fish.
- Develop and evaluate the cost-effectiveness of methodologies to prevent, minimize, and mitigate potential adverse ecosystem and socioeconomic impacts of aquaculture.
- Monitor and assess the effects of ocean acidification and climate change on marine aquaculture and develop adaptation strategies.

Regulation

- Actively engage federal agencies, Fishery Management Councils, federal advisory councils or committees, coastal states, tribes, other stakeholders, and Congress to clarify NOAA’s regulatory authority related to aquaculture in federal waters in the context of other federal, state, and tribal authorities and to establish a coordinated, comprehensive, science-based, transparent, and efficient regulatory program, taking into account relevant international standards, as appropriate, for aquaculture in federal waters consistent with the President’s Executive Order on Improving Regulation and Regulatory Review.
- Work with federal, state, local, tribal, and regional agencies and organizations to clarify regulatory requirements and to establish coordinated, comprehensive, science-based, transparent, and efficient processes for permit reviews, permit consultations, and other

regulatory and management actions for marine aquaculture in state waters – taking into account existing authorities, international standards, and regional, state, and local goals, policies, and objectives.

- Engage in coastal and marine spatial planning with other agencies and jurisdictions, including the Regional Planning Bodies being created under the National Ocean Council, to ensure siting of marine aquaculture that reduces conflicts among competing uses, minimize adverse impacts on the environment, and identify activities for potential collocation with aquaculture operations.

Innovation, Partnerships, and Outreach

- Collaborate with federal partners, coastal communities, states, tribes, the aquaculture industry, non-governmental organizations, and other stakeholders to transition innovative aquaculture technologies from laboratory studies to commercial and restoration projects and document and assess their environmental, ecosystem, and socioeconomic impacts. Focus on projects that will create jobs in coastal communities, produce healthful local seafood, revitalize working waterfronts, support traditional fishing communities, avoid impacts to protected areas, and restore depleted species and habitat.
- Work with extension and outreach services to interpret technical and scientific data and provide informational products to transfer that knowledge to other stakeholders and the public.
- Support restoration and commercial shellfish aquaculture initiatives to restore shellfish populations that provide locally produced food and jobs, help improve water quality, and restore and conserve coastal habitat.
- Develop synergies among NOAA’s fisheries management, enforcement, financial assistance, aquaculture, seafood inspection, Coastal Zone Management, National Marine Sanctuaries, and National Sea Grant programs to rebuild wild fish stocks and support alternative or supplemental economic options for fishermen.
- Engage within the Joint Subcommittee on Aquaculture and National Ocean Council to promote coordination among federal agencies on marine aquaculture regulatory and science issues and pursue opportunities for collaboration, such as integrating aquaculture with other ocean uses and using aquaculture facilities as a platform for more comprehensive environmental monitoring.

International Cooperation

- Work with other federal agencies to establish a coordinated, consistent, and comprehensive international strategy on sustainable marine aquaculture that supports and is consistent with U.S. policies and priorities regarding food security, international trade, healthy oceans, and economic well-being.
- Work with other nations, as appropriate, to adopt sustainable aquaculture and seafood safety approaches using the best practices.
- Exchange scientific insights with other nations and promote joint participation in cooperative research that is of potential multinational value, including addressing impacts of aquaculture that breach international boundaries.

Implementation and Periodic Review

NOAA will begin to implement this policy immediately upon release. This policy will henceforth guide all NOAA activities with respect to marine aquaculture, until such time as it is amended or rescinded by the NOAA Administrator.

Appendices

NOAA will take a tiered approach with respect to this policy and may publish more detailed policies related to specific authority to regulate aquaculture activities. These tiered documents will be included as appendices to the overarching policy.

12. Appendix B. NOAA GUIDANCE FOR AQUACULTURE IN FEDERAL WATERS

The purpose of this appendix is to establish a set of goals to guide NOAA's regulatory and programmatic actions with respect to aquaculture production in federal waters of the U.S. Exclusive Economic Zone and to provide a list of implementing actions that NOAA will take to achieve each goal. NOAA will take these actions to the extent of the agency's discretion and funding availability under relevant authorities and in coordination with our federal partners. These goals and implementing actions are an extension of the NOAA Aquaculture Policy, which applies broadly to all marine aquaculture-related activities at NOAA.

Goal 1. Ecosystem compatibility – Aquaculture development in federal waters is compatible with the functioning of healthy, productive, and resilient marine ecosystems.

NOAA will achieve this goal by:

- developing, implementing, and enforcing ecosystem-based conservation and management measures for aquaculture that fulfill the agency's marine stewardship responsibilities to protect and restore healthy coastal and ocean ecosystems and to conserve living marine resources, their habitats, and other protected areas
- developing, implementing, and enforcing conservation and management measures for aquaculture designed to maintain the health, genetics, habitats, and populations of wild species; maintain water quality; prevent escapes and accidental discharges into the environment; and avoid harmful interactions with wild fish stock, marine mammals, birds, and protected species
- pursuing efforts to restore wild stocks
- supporting the use of only native or naturalized species in federal waters unless best available science demonstrates use of non-native or other species in federal waters would not cause undue harm to wild species, habitats, or ecosystems in the event of an escape
- employing science-based adaptive management
- taking into account the cumulative impacts of aquaculture throughout all trophic levels of the marine environment and in combination with the impacts of other activities
- encouraging the use of aquaculture feeds that either use fish from sustainably managed fisheries or alternative protein and lipid sources
- considering interactions with marine resources managed by other agencies and jurisdictions
- conducting programmatic or site-specific reviews of impacts related to proposed facilities in federal waters in compliance with National Environmental Policy Act requirements

Goal 2. Compatibility with other uses – Aquaculture facilities in federal waters are sited and operated in a manner that is compatible with other authorized uses of the marine environment.

NOAA will achieve this goal by:

- coordinating with other agencies to develop tools to properly site aquaculture in federal waters, including tools to reduce conflicts among competing uses and identify activities for potential co-location with aquaculture operations, in the context of regional and national coastal and marine spatial planning (CMSP) activities and ecosystem compatibility goals

- incorporating the preferences of states in decisions about aquaculture development in federal waters
- facilitating discussions among interested aquaculture developers, concerned state agencies, Fishery Management Councils, tribes, other federal agencies, federal advisory committees, and the public as early as possible in project planning and development
- promoting the safety of human life at sea and providing situational awareness for those working on offshore aquaculture operations, including coastal and marine forecasts and marine navigation weather

Goal 3. Best available science and information – Management decisions for aquaculture in Federal waters are based upon the best available science and information.

NOAA will achieve this goal by:

- basing management decisions on best available scientific information – including biological, technological, ecological, economic, and social data – in management decisions
- synthesizing and delivering information on the current state of scientific understanding about the observed and potential impacts and benefits of open ocean aquaculture
- identifying gaps and uncertainties associated with the current body of knowledge and taking these uncertainties into account in agency decisions
- conducting and supporting scientific studies to inform agency decision-makers on open ocean aquaculture technologies, practices, benefits, costs, and risks and to develop new and improve existing sustainable practices and products
- monitoring, evaluating, and maintaining databases on the impacts of aquaculture, including cumulative impacts, on biodiversity, predator-prey relationships, and other important characteristics of healthy and productive ecosystems
- working with state and federal agencies, academia, tribes, and other entities to improve scientific understanding of the effects of open ocean aquaculture and to develop cost effective open ocean aquaculture technologies and practices that prevent, minimize, or mitigate negative environmental or societal effects
- updating and adapting conservation and management measures to reflect the best available scientific information
- incorporating the insights gained by other countries that actively participate in open ocean aquaculture activities

Goal 4. Social and economic benefits – Investments in sustainable aquaculture in federal waters provide a net benefit to the Nation’s economy, coastal communities, and seafood consumers while considering regional and state goals and objectives.

NOAA will achieve this goal by:

- creating opportunities for new aquaculture jobs and economic growth for U.S. communities that complement commercial and recreational fishing, maintain and revitalize working waterfronts, provide upstream and downstream economic opportunities throughout the U.S. economy and provide additional domestic seafood choices for U.S. consumers
- assessing the food safety and human health effects of consumption of aquaculture products (foreign and domestic) in coordination with other federal agencies

- making the agency's fee-for-service seafood inspection services available to aquaculture producers operating in federal waters
- assessing the likely positive and negative social, economic, and cultural impacts of management decisions, individually and cumulatively, over both the short and long term, on permit applicants, individual communities, the group of all affected communities identified, and the U.S. economy, including impacts on employment and the economic viability of working waterfronts
- identifying, developing, and supporting mitigation measures to address social, economic, and cultural impacts

Goal 5. Industry Accountability – To secure long-term access to operate aquaculture facilities in federal waters, operators are held accountable for protecting the environment, wild species, and human safety and for conducting and reporting ongoing monitoring.

NOAA will achieve this goal by working with federal agencies and other partners to develop an appropriate framework through which operators of aquaculture facilities will:

- conduct a baseline environmental analysis of the proposed site prior to permit review
- prepare and implement a broodstock management plan, an aquatic animal health plan, and a contingency plan for responding to emergencies
- prepare, obtain federal approval for, and comply with an operating plan that uses recognized best management practices to ensure good husbandry, biosecurity, predator control, and maintenance practices that minimize the number and frequency of escapes, disease outbreaks, noise impacts, and entanglements
- prepare, obtain federal approval for, and comply with a monitoring plan to meet all monitoring and reporting requirements, including reports of escapes, disease outbreaks, drug or chemical applications, nutrient discharges, and other environmental monitoring as required by NOAA or other federal agencies
- incorporate environmentally efficient and responsible management practices that limit inputs and waste discharges into the environment from drugs, chemicals, feeds, etc.
- allow regular inspection of facilities by authorized officers
- provide, upon request, evidence of compliance with applicable laws, including those governing use of drugs and feeds and other operational details that are under the jurisdiction of other agencies
- provide evidence of an assurance bond to address facility removal and site remediation
- safely remove facilities and organisms once operations end and, to the extent necessary and practicable, restore environmental conditions of the site
- ensure the safety of human life at sea

Goal 6. Approval process – Management decisions for aquaculture operations in federal waters are made in an efficient and transparent manner that produces timely, unbiased, and scientifically based decisions.

NOAA will achieve this goal by:

- implementing efficient, coordinated, transparent, and timely processes for science-based permit review and issuance and making easily understood information about the permitting process and requirements available on the agency's website

- reducing regulatory uncertainty and minimizing unnecessary regulatory burden on individuals, private or public organizations, or federal, state, tribal, or local governments
- coordinating permit review, approval, and enforcement, both internally and with other federal agencies, to ensure compliance with existing regulatory requirements and to foster an efficient and timely regulatory process
- providing public notice and opportunities for Fishery Management Council, state, tribal, local government and stakeholder input on agency management decisions
- providing leadership in conducting periodic reviews of federal statutory and regulatory requirements to identify gaps or overlaps in federal authority, clarify federal agency roles and responsibilities, and develop streamlined processes for authorizing aquaculture and enforcing regulatory requirements in federal waters, in consultation with Congress, other federal agencies, Fishery Management Councils, and states

Goal 7. Public information – The public has an accurate understanding of sustainable aquaculture development in federal waters and the associated environmental, social, and economic challenges and benefits; monitoring information is readily available to the public.

NOAA will achieve this goal by:

- developing, widely disseminating, and effectively communicating regional and national informational materials on the merits, trade-offs, technologies, species, and practices used to conduct aquaculture in federal waters
- making publicly available – in a timely manner and in accordance with applicable standards for transparency and confidentiality – monitoring data, results, and information submitted by aquaculture facilities operating in federal waters, analyses of the data reported by aquaculture operators in federal waters, and the results of research conducted by NOAA and others
- communicating to the public, through extension or other outreach services, new research findings, particularly those from local research and demonstration projects