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Options for Limited Entry and Environmental Monitoring for Offshore Aquaculture in the Western Pacific Region

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1.0 Summary

Aquaculture in the Pacific is a multi-million dollar industry that cultivates everything from algae and pearls to crustaceans and pelagic fish. While most of these activities are land-based operations, Hawaii has been the pioneer for developing and successfully operating aquaculture operations in the ocean. There are currently two operations producing fish for commercial purposes in Hawaii with up to three more in different proposal stages. Offshore aquaculture is also being considered in other areas of the western Pacific as a means to reduce overfishing and provide seafood for island communities as well as commerce.

NMFS states that "fishing" includes aquaculture under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and bases this on a 1993 legal opinion issued by NOAA General Counsel. In June 2010, at its 148th meeting, the Council took action to recommend permitting and reporting be established for aquaculture in the Western Pacific region. This amendment is currently in review. Also at this meeting, the Council directed staff to develop options to establish a limited entry program and environmental monitoring.

The Council and NMFS have been receiving increasing interest from other individuals in Hawaii, CNMI and Guam to start up operations in the EEZ. This interest can be attributed to increasing costs in freshwater operations such as land value, electricity, feed, etc, but also as a way for island communities to develop industries to support their struggling economies. There has also been one operation recently permitted by NMFS to conduct an experiment in the EEZ utilizing offshore aquaculture technology. Through the Council's recommended permitting process, there could be an unconstrained increase in the number of operations in the near future.

There is little known about the effects of aquaculture to the environment and wild fisheries and there is concern from both fishermen and environmental groups. The Council supports offshore aquaculture but needs to provide management and regulations for the fishery without hampering its development and growth. Options have developed for the Council's consideration to provide the fishery with the ability to develop and grow, but at the same time reduce the chance for unrestrained participation and growth and doing harm to the environment. The Council, at its 151st meeting will consider these options for management of offshore aquaculture in the Western Pacific region.

Table 1: Proposed Options for Aquaculture Management

Option	Description
1-No Action	Offshore aquaculture would continue to be open to everyone and environmental responsibilities would remain with existing agencies.
2-Establish a Control Date	A control date would be established for any persons interested in developing an aquaculture operation, after which participation is not guaranteed.
3-Establish a Limited Entry Program	A limited entry program would be established to limit the number of participants and provide other restrictions.
4-Establish an Environmental Monitoring Program	An environmental monitoring program would be developed to determine what would be monitored and who would be responsible for the monitoring.

Table of Contents

List of Tables

List of Figures

List of Acronyms

CNMI	Commonwealth of the Northern Mariana Islands
EEZ	Exclusive Economic Zone
FEP	Fishery Ecosystem Plan
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
PRIA	U.S. Pacific Remote Island Areas (includes Howland, Jarvis, Wake and Baker Islands; Johnston and Palmyra Atolls; and Kingman Reef)
WPRFMC or Council	Western Pacific Regional Fishery Management Council

2.0 Introduction

In a 1993 legal opinion by the NOAA Office of General Counsel, "fishing" was determined to encompass aquaculture under the Magnuson-Stevens Act. The legal opinion states in part that:

> *...The Act contains an exceptionally broad definition of the term "fishing" encompassing not only the catching or taking of fish, but also "harvesting" of fish and "any other activity" expected to result in, or "other operations at sea" in support of, "the catching, taking, or harvesting of fish." Use of the term "harvesting" is particularly significant since it adds an additional a concept beyond "catching" or "taking"-harvesting connotes the gathering of a crop-which brings within the purview of the Act any aquaculture facility located in the EEZ.*

At its 137th meeting in March 2007, the Western Pacific Regional Fishery Management Council (Council) adopted a policy to guide the Council in dealing with aquaculture operations. The Council's aquaculture policy defines aquaculture as "the raising and cultivation of plants or animals, both freshwater and marine, for food or other purposes." This definition includes the terms fish farming, fish culturing, ocean ranching and mariculture. The Council encourages potential operations to adhere to the guidelines put forth by the Council. To date, aquaculture operations being proposed for Hawaii have been given this policy to consider in the development of their plans and operations. While this policy provides guidelines for any potential operations, these are not regulations and merely suggestions for the operations to consider, including species selection, habitat assessment, indigenous people's rights and access, and permitting and reporting.

In June 2010, at its 148th meeting, the Council took action to recommend permitting and reporting be established for aquaculture in the Western Pacific region. This amendment is currently in review. Also at this meeting, the Council directed staff to develop options to establish a limited entry program and environmental monitoring. At its 151st meeting, the Council will consider these options and may make recommendations for management of offshore aquaculture in the Western Pacific region.

3.0 Purpose and Need

The Council has authority over the fisheries in the US Exclusive Economic Zone (EEZ) around the State of Hawaii, the Territory of American Samoa, the Territory of Guam, the Commonwealth of the Northern Mariana Islands, and the U.S. Pacific Remote Island Areas (PRIA) of the Western Pacific Region. The Council provides management recommendations based upon the Fishery Ecosystem Plans (FEPs) implemented by the National Marine Fisheries Service (NMFS). The FEPs contain MUS that should be properly monitored to ensure the sustainability of the fishery. Since the 1993 legal opinion by the NOAA Office of General Counsel determined that aquaculture is fishing under the MSA, the Council has the statutory obligation to promulgate conservation and management measures for the fishery when required.

Offshore aquaculture has been increasing in the State of Hawaii waters in the past 10 years, to include two currently businesses in operation and three more in the permitting process (Figure 1). There has also been interest from other individuals in Hawaii, CNMI and Guam to start up operations in the EEZ. This interest can be attributed to increasing costs in freshwater operations such as land value, electricity, feed, etc, but also as a way for island communities to develop industries to support their struggling economies. There has also been one operation recently

permitted by NMFS to conduct an experiment in the EEZ utilizing offshore aquaculture technology.

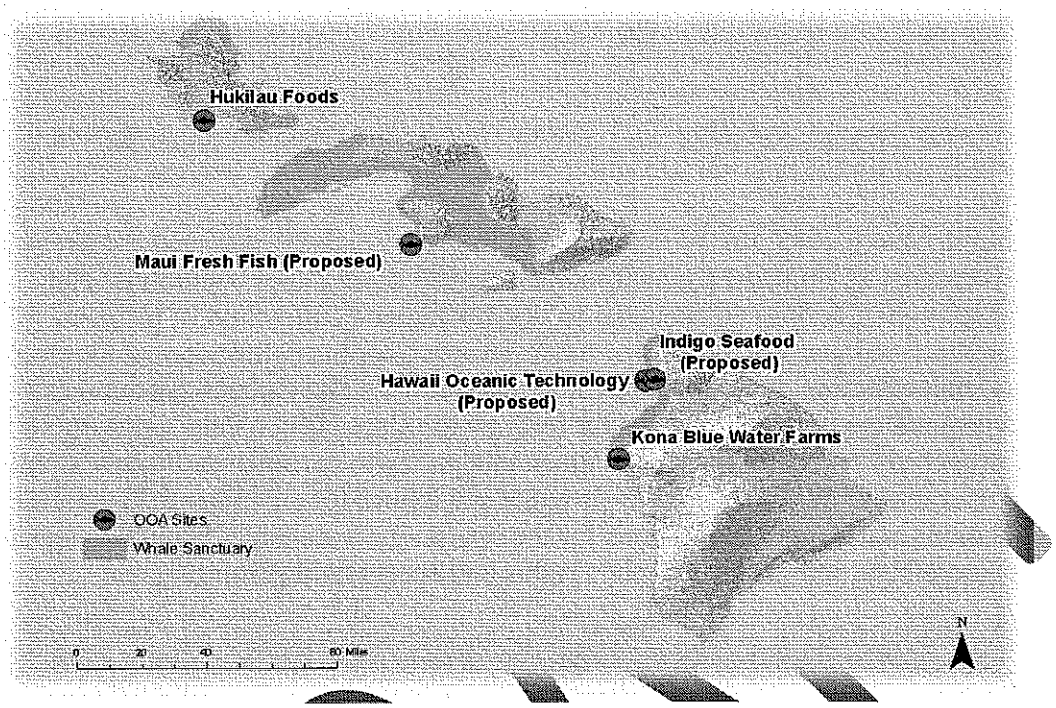

Figure 1: Hawaii Offshore Aquaculture Sites

Source: Food and Water Watch (http://www.foodandwaterwatch.org/fish/fish-farming/hawaii/a)

However, there is little known about the effects of aquaculture to the environment and wild fisheries and there is concern from both the fishermen and environmental groups. The purpose of these options are to provide the Council with an opportunity to be proactive in managing offshore aquaculture by providing management and regulations for the fishery but still allowing its development and growth. There is also a need for the Council to consider these options as the NMFS and Council have been receiving interest in developing this fishery in EEZ waters around Hawaii, Guam and CNMI. Through the Council's recommended permitting process, there could be an unconstrained increase in the number of operations in the near future.

4.0 Objective

The objective of this action is for the Council to be proactive and limit the expansion of an aquaculture fishery without restricting the development, growth and production of aquaculture in the Western Pacific region.

5.0Description of Options

The following options are proposed for consideration to achieve the stated objective:

5.1 Option 1-No Action

The option of No Action will continue the status quo and provide open access to all those that are interested in developing an offshore aquaculture operation.

5.2 Option 2-Establish a Control Date for Aquaculture in the Western Pacific EEZ

This option would require the Council to set a control date, after which participation in the fishery would not be guaranteed.

5.3 Option 3-Establish a Limited Entry Program for Aquaculture in the EEZ

Under this option, a limit would be placed on the fishery, including the number of aquaculture operations able to conduct business in the EEZ, requirements for entry, permitting and renewal requirements, and other restrictions.

Limits on Number of Operations

Included in the establishment of a limited entry program, this option would set a limit on the number of operations able to conduct business in the EEZ.

Entrance Requirements

A limited entry program would also require entry to the fishery based on a control date, a lottery system, potential qualifications, etc.

Permitting and Renewal Requirements

The development of a limited entry permit could require provisions on landings and/or requirements for renewal (i.e. use it or lose it). It could also require limits on transferability of permits or combining permits.

Other Restrictions

Limited entry programs may also propose additional restrictions on the permit to include, but not limit to, gear restrictions (to prevent escapes and protected species interactions), area restrictions, and effort limitations (number of cages).

5.4 Option 4-Environmental Monitoring

Option 4 would propose environmental monitoring for aquaculture operations and determine what would be monitored and who would be responsible for the monitoring.

Responsibility for Monitoring

This option would determine if NOAA, the aquaculture operation, or another agency would be responsible for monitoring waters surrounding the aquaculture operation.

What to Monitor

This option would also include determining what should be monitored (e.g. escapes, waste from food, fish, production, habitat changes, etc.)

6.0 Introduction to Limited Entry

Limited Entry is a management tool which is used to limit participation in the fishery. It prevents the entry of new participants with the aim of controlling potential effort. If the use of this tool is successful, the limit on effort helps to conserve the resource and generates higher incomes for the license holders. This is because limited entry creates a use right (a right to participate in the fishery) (Cochrane 2002). This right assigns exclusivity to the use of a public resource.

Establishing limited entry programs have been used in marine fisheries to address overcrowding and overcapitalization in marine fisheries. The tool has been considered a way to solve the problems of overfishing, bycatch, waste, user conflicts, high management costs and economic inefficiency. The use of limited entry is often seen by fishermen as highly controversial in that it revokes their traditional rights to a public resource and inhibits historic fishing patterns (Hinman and Paulsen 1993).

The application of this tool may halt the growth in the number of participants, and combined with other measures, could lead to improvements in fisheries. The success of limited entry is also greater if it is put in place before the number of participants in the fishery becomes too large. (Cochrane 2002).

In the case of the aquaculture fishery, limited entry would limit the number of operations in the EEZ and prevent the development of new operations. Currently, there are no operations in the EEZ and only a handful of interest in its development. However, the capacity for numerous and large aquaculture operations in the EEZ is unknown.

7.0 Discussion of the Options and Potential Impacts

This section discusses the proposed options and potential impacts to the affected environment.

7.1 Option 1-No Action

The no action option would provide open access and allow participation by everyone in offshore aquaculture in the Western Pacific. Currently, there is no one participating in open ocean aquaculture, although one participant has been permitted through the special coral reef ecosystem permitting process to conduct an aquaculture experiment. This option would also not pre-empt any impending aquaculture buildup in the region. Since there is no one currently operating an offshore aquaculture facility in the EEZ, an increase in participation is inevitable. However, this increase may not be rapid and may not warrant instituting a limited entry program.

The recommendations made by the Council at its 148th meeting provides the Council with an opportunity to comment on permit applicants, at which time they may request NMFS to decline an application due to environmental concerns or increased effort.

Environmental monitoring is currently conducted by individual aquaculture operations in State waters and submitted to the Hawaii Department of Health. There is no mandate for aquaculture operations to submit environmental monitoring data (e.g. turbidity, benthic sampling, nitrogen levels, etc) for EEZ operations, and no agency in charge of collecting this data to compare to

baseline data. No action would not provide for who would monitor the environmental health or what to monitor.

7.2 Option 2-Control Date

Setting a control date would have no direct impact on the environment, protected species, administration or enforcement at this time, as the Council would only set a date after which participation wouldn't be guaranteed. Fishing communities could be impacted depending on which date the Council selected, as there are no current aquaculture operations in the US EEZ of the Western Pacific.

As in the no-action option, setting a control date also does not provide resolution to issues regarding environmental monitoring.

7.3 Option 3-Limited Entry

Developing a limited entry program will have an impact on fishing communities through the loss of open access to develop aquaculture operations in the EEZ. A limit on the number of operations would also give those holding an aquaculture permit a private user-right to public resource and at the same time an economic benefit. Since each aquaculture operation may use different cages (size and number) and may require different layouts, the capacity for the number of operations may vary by island and by area, but would ultimately remain unknown until there was an applicant.

Entrance to the fishery would need to be determined because there are no current aquaculture operations. Determining who would be eligible and what the criteria would be for entrance to the fishery could not be based upon historical participation, but would rather be on a "first-come, first-served" basis. Also needed is to determine if the permits will be "use or lose" or if they can be combined with other permits to create larger operations or utilize larger area, and how permits can be transferred (sold, returned to NMFS, waiting list for new permits, etc.)

This option would increase administration and enforcement costs, as a limited entry program would need to be developed, monitored and enforced. Protected species may benefit from a limited entry program as a limited number of operations would limit potential interactions with protected species such as Hawaiian monk seals, humpback whales, and sea turtles. Concerns regarding habitat issues could also benefit as the fishery participation is limited.

7.4 Option 4-Environmental Monitoring

The responsibility for environmental monitoring is currently unknown. Aquaculture operations in the State of Hawaii submit reports on such things as nitrate/nitrite levels, turbidity and other measurables to the State Department of Health. For operations in the EEZ, there is no Federal entity that would be responsible for receiving these reports. NMFS could make the aquaculture operations submit environmental monitoring reports as part of the permitting process.

This would increase administration burden, as the NMFS would need to collect these reports and analyze results of the environmental monitoring year to year. Enforcement of this monitoring would be done through the permitting process, adding to the administration of the permits.

References

Cochrane, Kevern L., ed. A Fishery Managers Guidebook, Management Measures and Their Application. United Nations Fishery and Agriculture Organization, Fisheries Technical Paper 424. Rome, 2002.

Hinman, Ken and Carl Paulsen. 1993. "The Crowded Sea: an issue paper on limiting entry to marine fisheries." National Coalition for Marine Conservation. www.savethefish.org.