# DRAFT

## Environmental Assessment

**Issuance of a Permit to Authorize the Culture and Harvest of a Managed Coral Reef Fish Species (*Seriola rivoliana*) in Federal Waters off the Leeward Coast of the Island of Hawaii, State of Hawaii**

March 17, 2011


Responsible Agency: National Oceanic and Atmospheric Administration
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# NMFS Draft Environmental Assessment for Public Review

## Executive Summary

The National Oceanic Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) is proposing to issue a Special Coral Reef Ecosystem Fishing Permit (SCREFP) to Kona Blue Water Farms (KBWF) for one year in accordance with the Hawaii Fishery Ecosystem Plan and consistent with implementing federal regulations (50 CFR §665.224) pertaining to management of coral reef ecosystem fisheries. The permit would authorize the culture and harvest of a Hawaii coral reef ecosystem Management Unit Species (MUS) using two small, untethered net pens (Aquapods™) deployed in Federal waters (generally from 3-150 nautical miles (nm) offshore) leeward of the Island of Hawaii. The proposed activity would allow KBWF to test the feasibility of raising marine fish species using a new gear-type (drifting net pens) in the U.S. Exclusive Economic Zone (U.S. EEZ).

The applicant proposes to culture up to 6,000 fingerlings obtained from a local fish hatchery that are the first generation offspring of the native Hawaii coral reef MUS, *Seriola rivoliana* (known as "Kona Kampachi®"). The commercially available Aquapods™ would be deployed using a U.S. Coast Guard approved tender/towing vessel that would maintain a controlled drift in an area of the U.S. EEZ from 3 to 150 nm off the Island of Hawaii, State of Hawaii, in oceanic waters between 10,000 and 12,000 feet deep.

NMFS has developed this draft environmental assessment (draft EA) to evaluate the potential environmental impacts of the proposed activity. The applicant has successfully cultured the fish species within a land-based hatchery and in State waters around Hawaii. This experience helped inform this evaluation. The low stocking and rearing density of fishes, established procedures for application of feed, and passive flushing in offshore ocean waters is expected to reduce or eliminate the need to use chemical treatments against diseases or fouling. No large or adverse environmental impacts are anticipated on marine mammals, seabirds, sea turtles, other marine species, or to water quality, and there would be no adverse effects on other fisheries or to maritime traffic. NMFS permit conditions provide for reporting any protected resources interactions, daily log and transshipment requirements as well as conditions for notification prior to any in-water treatments. Such treatments are to be done by the company in consultation with aquatic veterinarians and in compliance with Clean Water Act and other provisions such as the Food and Drug Administration's requirements regarding food safety.

The draft EA was coordinated with relevant agencies, and the public will have an opportunity to review the draft EA, which was posted online on March 17, 2011. To obtain a copy of the draft EA, please contact Michael D. Tosatto, Regional Director, at the above address, or obtain a digital copy online at NOAA Fisheries Service, Pacific Islands Regional Office, web page http://www.fpir.noaa.gov/. Comments on the draft EA can be mailed to the agency contact at the above address. Comments may also be sent by email to: piro-specialpermit@noaa.gov. When replying by email, please add "Comment on Special Permit" to the subject line. Comments will be accepted until 11:59 (midnight), March 27, 2011.

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Table 1. MMPA List of Fisheries 2011 (Source: NMFS 2011)

# List of Acronyms

| | |
|---|---|
| EA | Environmental Assessment |
| EFH | Essential Fish Habitat |
| ESA | Endangered Species Act |
| FAD | Fish Aggregation Device |
| FCR | Feed Conversion Ratio |
| Hawaii FEP | Fishery Ecosystem Plan for the Hawaiian Archipelago |
| HAPC | Habitat Area of Particular Concern |
| HF | Hukilau Foods |
| HOT | Hawaii Oceanic Technology |
| IPCC | Intergovernmental Panel on Climate Change |
| KBWF | Kona Blue Water Farms |
| KPH | Keahole Point Hatcheries, LLC |
| MMPA | Marine Mammal Protection Act |
| MSA | Magnuson-Stevens Fishery Conservation and Management Act/Magnuson-Stevens Act |
| MUS | Management Unit Species |
| NELHA | Natural Energy Laboratory of Hawaii Authority |
| NEPA | National Environmental Policy Act |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| PHCRT | Potentially Harvested Coral Reef Taxa |
| PIRO | Pacific Islands Regional Office |
| PMUS | Pelagic Management Unit Species |
| SCREFP | Special Coral Reef Ecosystem Fishing Permit |
| WPFMC | Western Pacific Regional Fishery Management Council (the Council) |
| WNII | Waldemar Nelson International, Inc. |
| U.S. DOC | United States Department of Commerce |
| U.S. EEZ | United States Exclusive Economic Zone |

# NMFS Draft Environmental Assessment for Public Review

## 1.0 Purpose and Need

NOAA fisheries (NMFS) is proposing to issue a Federal permit to test a new gear-type for culture and harvest of a hatchery reared, native coral reef species in Federal waters off of the Island of Hawaii. The small-scale, limited duration project would allow the applicant to test and refine innovative aquaculture methods intended to support the development and application of environmentally safe and sustainable technologies that could be used to increase domestic aquaculture production.

### 1.1 Summary of the Proposed Action

The proposed activities that would be covered under the permit are described here. Additional details of the operations are provided in Appendix B.

#### *1.1.1 Background*

The National Marine Fisheries Service (NMFS), Pacific Islands Regional Office (PIRO) has received an application from Kona Blue Water Farms, Inc. (KBWF) for a Special Coral Reef Ecosystem Fishing Permit (SCREFP) to culture and harvest a Hawaii coral reef ecosystem Management Unit Species (MUS) using two untethered net pens to be towed by a tender vessel in Federal (U.S. EEZ) waters leeward of the Island of Hawaii (Appendix B). The permit for a limited scale, short term test of this gear-type would be valid for one year and would authorize the permit holder to harvest the MUS, *Seriola rivoliana*, which is classified in the Fisheries Ecosystem Plan for the Hawaiian Archipelago (Hawaii FEP), prepared by the Western Pacific Regional Fishery Management Council (WPFMC or the Council), as a Potentially Harvested Coral Reef Taxa (PHCRT).

A Hawaii coral reef ecosystem special permit from NMFS is required if a vessel is used to harvest any Hawaii coral reef ecosystem MUS in the coral reef ecosystem management area with gear not specifically identified in the governing regulations (50 CRF 665.224)(Appendix C). This environmental analysis is being carried out for this new, unlisted gear-type to fulfill the requirements of the National Environmental Policy Act (NEPA) and the National Oceanic and Atmospheric Administration Order 216-6 to evaluate the potential environmental impacts of the activity and as an aid in developing any conditions to the permit, should it be issued.

#### *1.1.2 Species Harvested and Disposition*

*Seriola rivoliana* is an indigenous species of amberjack, known as the Almaco jack that is relatively common in Hawaiian waters and with roughly a circumtropical distribution. There is no commercial wild fishery for this species in Hawaii due to the occasional occurrence of Ciguatera toxin, and parasitic worms in the flesh of wild-caught animals. KBWF does not propose to harvest wild stock for this project. Instead, KBWF would use fingerlings, free of disease, reared in a land-based hatchery which has commercially cultured this species since 2005 at Kailua-Kona, Hawaii, for its existing offshore State ocean lease and aquaculture net pen facility (KBWF, 2009).

Under the proposed action, i.e., issuance of a permit to test new unlisted fishing gear under the special permit requirement, the two net pens would be stocked with a total of approximately 6,000 fingerlings. At the end of the approximately 10-month grow out cycle, the average fish weight at harvest should be about four pounds. Pens would be brought to the surface in deep water 3 nm or more offshore and fish would be harvested and put on ice for transshipment to shore side facilities for distribution. No processing would occur at sea. KBWF intends to sell the harvested biomass, anticipated to be around

20,000 pounds of fish, through existing distribution channels under its established brand, Kona Kampachi®.

### *1.1.3 Gear and Operation*

The Velella Concept is named for a genus of free floating hydrozoans that live on the surface of the open ocean. The gear to be tested is an untethered (not connected to the sea floor) array consisting of a tender/towing vessel and two small net pens that would be stocked with the MUS. An appropriately Coast Guard registered 80-foot ocean going Staysail Schooner, the *SV Machias*, and highly experienced crew, would be chartered for this work.

The small net pens are sold under the name Aquapod™ 212 and are commercially available from Ocean Farm Technologies Inc., Searsmont, Maine. The Aquapods™ were recently obtained by Kona Blue and assembled on-site in Hawaii. Each net pen is 200 $m^3$ (7062 $ft^3$) in volume, 27 ft in diameter and capable of being operated at the surface or submerged (see Figure 1). The net pens can be raised and lowered in the water column for maintenance using compressed air to displace sea water in ballast tanks attached to the pens. The spherical, geodesic shaped pens are very sturdy, consisting of structural-plastic framing covered with specially made, slightly stiff, brass-mesh netting that resists biofouling and tearing (Figure 2). Having the Aquapod™ net pen towed in a controlled drift for the entire grow out cycle is a new application for this gear.

Operationally, at the beginning of the test deployment, each pen would be stocked with 3,000 fingerlings, available from Keahole Point Hatcheries, LLC (KPH) located at the Natural Energy Laboratory of Hawaii Authority (NELHA) at Kailua-Kona, Hawaii. This biosecure hatchery uses only local, native broodstock of this species. The tender vessel and net pen array would depart from Kawaihae Harbor, a State commercial harbor located in West Hawaii. The vessel and net pens would motor into Federal waters with the pens at the surface and then, once stocked, the pens would be submerged to a depth of 25 ft. Tension would be maintained at all times on the tow lines, and surface floats and pendent weights would be suspended from each pen. Each pen would be equipped with a surface buoy float-line attached at the top, as well as a GPS transmitter and radar reflector, so in the event of detachment the pens can be readily located. Further, the array would be operated and lighted according to Coast Guard regulations.

Husbandry of the stock would be carried out by project staff and divers based on the tender vessel, which would also store the commercially available, compounded fish feed. There are no prophylactic antibiotics or other medications in the feed pellets, which include various agricultural products and approximately 20% fish meal and 10% fish oil from, according to the supplier, sustainable sources. Initially the stock would be fed five times a day (less often as the fish grow) to near satiation through hoses from the ship to the pens into which a feed/sea water slurry would be pumped. Stock would be observed daily by divers and around the clock ("24/7") by cameras attached to the nets.

Divers would enter and leave the net pens to manage stock and collect data through a hatch built into the top of the pen. The hatch would be above water when in use to minimize the possibility of fish escapes. Any stock mortalities (or "morts") would be removed daily, logged in a standard logbook, and frozen for later examination. Experience with the two inshore net pen systems indicates concentrations of waste products around the net pens during the entire grow-out period are likely to be too low to measure in the open ocean due to: the small amount of stock biomass, the carefully applied amounts of food, the nutrient poor (oligotrophic) nature of the deep ocean and its nutrient assimilation capacity, and the constant

movement of the pens through the open ocean, ultimately resulting in large volumes of water passing through the pen to mix fish metabolites and create a "perpetual fallowing" of the mobile net pen (HF, 2009; KBWF, 2009).

### *1.1.4 Ocean Area Utilized*

The tender vessel and stocked pen array would depart Kawaihae Harbor and motor beyond State marine waters that end at three nautical miles (nm) from shore and into the Federal waters of the U.S. EEZ. The testing (controlled drift) would occur in an area of the U.S. EEZ from 3 nm to 150 nm off the Island of Hawaii, in waters between 10,000 and 12,000 ft deep. While the exact course cannot be specified, the test is planned to take place in Federal waters between 156° West longitude and 158° West longitude and 20° North latitude and 19° North latitude. The array would avoid moving close to any sea mounts and banks in the region utilized by fishers.

In moving between Kawaihae Harbor and the U.S. EEZ project site and the desired eddies, the tender vessel and net pen array would pass through, under power, the Hawaiian Islands Humpback Whale National Marine Sanctuary. The boundaries of the Sanctuary near Kawaihae Harbor extend to the 600 foot depth contour or approximately two nm from shore. Whales are known to frequent the Hawaiian Islands in abundance from approximately November to March. The test of the gear in a controlled drift would occur for the most part in waters far from the Whale Sanctuary boundary and would not occur in the Sanctuary.

Central to the testing of the Velella Concept is for the net pens to maintain a controlled drift while attached to the tender vessel. Both the net pens and the tender vessel will be guided by the open ocean currents and surface winds. Thereby, the array will be retained and pushed along by the ocean eddies known to be present in the area. Exact positioning in the eddy would be maintained by the tender vessel using access to a remote sensing satellite and frequent communication with onshore operations. The general approach would be to have the array remain close to the center of the eddy when it is close (but never within 3 nm) to the Big Island. Then as the eddy moves westward, the array would be moved into the outer edges, so that the eddy can be exited and the array can move into the next eddy when it forms. Studies indicate cyclonic eddies (see Figure 4a) form off the leeward coast of Hawaii every 50 to 70 days (Calil et al., 2008; Dickey et al., 2008).

### *1.1.5 Project Duration and Logistics*

The test deployment would be carried out over a timeframe of approximately 10 months. This timeframe encompasses a standard fingerling to market-size grow out cycle for Kona Kampachi®.

The tender vessel would be provisioned about once a week (when the array is within range of Honokohau Small Boat Harbor, Kona or when restocking of the feed is necessary); and less frequently if the array is carried further offshore. These frequent provisioning trips on much smaller (25-35 ft in length) power boats would also allow change of crews. The tender vessel can carry sufficient feed to sustain culture operations for around six months.

## 1.2 Purpose of the Action

This small-scale, beta-test trial of the Velella Concept generally is designed to gain insight into the viability of this gear and harvest method and to provide information on potential environmental impacts of future open ocean aquaculture projects in general. In November 2010, PIRO received an application for a Special Coral Reef Ecosystem Fishing Permit (SCREFP) from KBWF to cultivate and harvest the Hawaii coral reef MUS, *Seriola rivoliana,* in Federal waters with gear not specifically allowed in the governing regulations.

The purpose of this action is to authorize for a limited duration, the use of a new gear type to culture and harvest *Seriola rivoliana* using two untethered net pens towed by a tender vessel in Federal waters leeward of the Island of Hawaii. The Velella Concept project entails deploying and operating an untethered array consisting of a tender/towing vessel and two small net pens (see Figures 1 and 2) that would be stocked with *Seriola rivoliana*, a Hawaii Coral Reef Ecosystem management unit species (MUS). Although not part of the proposed Federal action, KBWF would collect data on the track assumed by the array while deployed, the time and fuel costs required to maintain the array in a desirable location in a selected ocean eddy, and growth performance and health of the stock during the trial. Data collection would also include observations on a daily basis of any marine mammals, sea turtles, and bird life around the array, as well as, fish species that may aggregate around the tender vessel and net pens and any boat traffic that is seen. Permit conditions also include reporting of disease problems and notification prior to in-water treatments.

## 1.3 Need for the Action

### *1.3.1 U.S. Seafood Supply and Demand Trends*

The need for this action is supported by the increasing reliance of American seafood distributors and consumers on imported seafood to satisfy the growing demand and the desirability of expanding domestically produced supplies through encouraging domestic aquaculture, particularly offshore marine aquaculture. NOAA's Aquaculture Program estimates total aquaculture production in the U.S. at around $1.2 billion, with marine aquaculture contributing to 25% of that supply. For comparison, NOAA estimates the world aquaculture production (freshwater and marine) to be near $70 billion. Of the total U.S. aquaculture production, 5% supplies U.S. seafood demand, with only 1.5% of that attributed to marine aquaculture. Hence, to satisfy growing domestic demand, the U.S. imports 84% of its seafood, half of which is from aquaculture production from far reaches of the globe. The result is an annual seafood trade deficit of $9 billion (NOAA 2011). Furthermore, recent studies have suggested that U.S. dependence on seafood imports poses uncertainty and risk over the long-term due to increased pressures on wild stocks to meet global demand and the high volatility of the international marketplace for seafood products (Anderson and Shamshak, 2008; FAO, 2009; Corbin, 2010).

The U.S. Department of Commerce (U.S. DOC) and NOAA have recognized these challenges and are focusing greater effort on developing and encouraging sustainable ocean farming of fish and shellfish (U.S. DOC, 2007; NOAA, 2008). NOAA is currently moving forward to develop a National Aquaculture Policy and has conducted "Listening Sessions" around the country, including Hawaii. The draft NOAA policy was released for public comment on February 9, 2011 and emphasizes protection of wild species and decisions based on sound science. The DOC policy focuses on encouraging economic growth and employment opportunities in the U.S. and of enhancing U.S. competitiveness within global aquaculture

markets (NOAA, 2011). Likewise, the Council has recognized the growing potential of aquaculture to seafood supply in the region and is currently finalizing a Regional Aquaculture Policy for the Western Pacific (WPFMC, 2009a).

The proposed permit is not intended to result in large-scale seafood production, but would allow the permittee to evaluate the performance of the innovative gear-type and make refinements that would benefit decisions about and investments in future production facilities nationwide.

### *1.3.2 Permits and Consultations*

The Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSA) (16 U.S.C. 1801-1882) as amended, serves as the chief authority for fisheries management in the U.S. EEZ. NMFS is the agency within NOAA to which NOAA has delegated authority and stewardship duties of fisheries management under the MSA. NOAA considers landings or possession of fish in the EEZ from commercial marine aquaculture production of species managed under fishery management (ecosystem) plans (FMPs) to constitute "fishing" as defined in the MSA. Fishing includes activities and operations related to the taking, catching, or harvesting of fish.

In the case of the proposed action, issuance of a SCREFP is required under the existing Hawaii FEP if a vessel is used to harvest a Hawaii Coral Reef Ecosystem MUS in a coral reef ecosystem management area with gear not specifically listed in the plan or the governing regulations (50 CRF 665.224)( WPFMC, 2009c). *Seriola rivoliana* is a Hawaii Coral Reef Ecosystem MUS classified by the Hawaii FEP as a Potentially Harvested Coral Reef Taxa (PHCRT) and the proposed use of the Aquapods™ is not listed as a gear-type in the regulations (WPFMC, 2009c).

Based on the small scale and remote location of the proposed test activities, and based on results of previous research done by the applicant, additional permits are not required to conduct this gear test in the U.S. EEZ. The U.S. Army Corps of Engineers has jurisdiction over placement of structures in the navigable waters of the U.S., but not free-floating vessels utilizing those waters (33 CFR, Parts 320-330). Aquaculture facilities producing less than 100,000 pounds of product annually are exempted from needing a National Pollutant Discharge Elimination System (NPDES) permit (40 CFR 122.24c). U.S. Coast Guard registration of the vessel is, however, required and has been obtained (46 CFR 170 and 46 CFR 28). A review of the permits for aquaculture in the U.S. EEZ can be found in Cicin-Sain, *et al*. (2005).

Briefly, the process to receive a limited scope and duration SCREFP from NMFS, PIRO, Sustainable Fisheries Division, involves submission and acceptance of a complete application form by the PIRO Regional Administrator (RA). Next, comments on the application are sought from the Council, as well as the U.S. Coast Guard, the State of Hawaii's Department of Land and Natural Resources, and the U.S. Fish and Wildlife Service. Input from these agencies is considered by the RA in the decision for approval or disapproval of the application. Upon receipt of this information, the RA considers the Council's comments and may concur or reject its recommendations, as presented by the Executive Director. The applicant is subsequently informed of the decision to proceed, or in the event of a negative decision, has the opportunity to appeal (50 CFR 665.224, Subpart C Hawaii Fisheries) (Appendix C).

In addition to independently collecting information on the technical and economic feasibility of this approach, KBWF would maintain and submit records including two NOAA Fisheries Service, PIRO,

official forms that would be adapted for this test. The two forms are: 1) the Special Permit/Low-use Marine Protected Areas Coral Reef Taxa Daily Catch Report; and, 2) the NMFS Transshipment Log for Coral Reef Ecosystem Management Unit Species (Appendix D). Additional reports would be provided by the permitee as required by permit conditions, such as the submittance of a Marine Mammal Authorization Form pursuant to section 118 of the Marine Mammal Protection Act (MMPA) should a marine mammal interaction occur resulting in an injury or mortality. For further information on specific permit conditions, regulatory requirements and agency consultations see section 2.2.4 of this EA.

### 1.4 Issues not Considered in Detail with Rationale

#### *1.4.1 Potential Impacts on Air Quality, Viewscape, and Energy Resources*

NMFS considered the potential for the project to result in adverse impacts to air quality, viewscape, and use of energy resources.

As described above, the proposed action would involve a single tender vessel that would utilize sail and diesel power rated at 190 horsepower to tow two small net pens stocked with 3,000 fish each around in Federal waters between 3 and 150 nm off the leeward shoreline of the Island of Hawaii. The intention of the permitee is to maintain the array's position in a westward moving eddy and occasionally adjust the array's position within the eddy and/or closer to the coast, utilizing sail power or diesel power. During virtually the entire ten-month test, the two net pens would be towed submerged 25 ft below the surface with marker buoys and the tender vessel would be visible and have appropriate Coast Guard lighting for navigational safety. The array would also avoid moving over the deep ocean seamounts and banks in the region utilized by fishers. Furthermore, the location of the proposed activity does not occur in any of the designated fishing restricted areas managed in waters around Hawaii.

Given that the location of the tender vessel and net pens would be far from the coast and in the huge expanse of ocean, with water depths of 10,000 to 12,000 ft, and the fact that the array would generally be maintained using wind power and intermittent diesel power, no large adverse impacts on air quality or viewscapes are expected. There is also not expected to be a large requirement for energy resources. Therefore, these issues will not be considered further.

#### *1.4.2 Potential Impacts on Historical or Archaeological Resources*

The activity would be carried out in Federal waters between 3 and 150 nm off the leeward coast of the Island of Hawaii in water with depths ranging between 10,000 ft and 12,000 ft. There are no historical or archeological resources known in these deep ocean waters. Support facilities for the project are located at a well-developed, well-used State small boat harbor at Honokohau, Island of Hawaii. As such, the action of the tender vessel/net pen array and use of the support facilities is not expected have an effect on any historical or archeological resources. Therefore, these issues will not be considered further.

## 2.0 Description of Alternatives

### 2.1 Alternative 1: No Action

This alternative involves not granting the one-year SCREFP to test the Velella Concept of deploying and operating a tender/towing vessel and two net pens that would be stocked with an MUS. Failure to carry out this limited scope test would inhibit the potential successful demonstration of this gear-type and culture method to produce fish in the U.S. EEZ.

## 2.2 Alternative 2: Proposed Permit and Activity

### *2.2.1 Technical and Operational Characteristics of the Velella Concept*

**General**

The requested Special Permit is for a limited scale, short-term test of the Velella Concept. The proposed activity entails deploying and operating an untethered (not connected to the seafloor) array consisting of a tender/towing vessel and two small net pens that would be stocked with *Seriola rivoliana*, a Hawaii Coral Reef Ecosystem management unit species (MUS). The fish would be grown from fingerling size (several inches in length) to approximately four pounds over a ten-month period, a full grow-out cycle.

Data that would be collected for KBWF's own purposes include: the track assumed by the array; the time and full costs required to maintain the array in a desirable location in the eddy; and, growth performance and health of the stock. In addition, there is certain information that would be required as a condition of the special permit and that must be recorded on two special forms obtained from the NOAA Fisheries Service, PIRO, which would be adapted for this test (Appendix D). This information includes environmental data, comments on any gear loss, stock diseases and mortalities and amounts harvested interference with fishing operations, and observations of protected species and aggregations of fish species. Upon harvest of the crop, the fish would be sold through existing market channels under KBWF's brand, Kona Kampachi®.

**Culture System**

An 80-foot ocean going Staysail Schooner, the *SV Machias*, and a highly experienced crew would be chartered for this work. The vessel and its captain have a long history sailing in Hawaiian waters and are appropriately documented and registered by the U.S. Coast Guard for carrying passengers and towing the net pens. The vessel also has ample room for KBWF staff and divers and feed for the fish. The tender vessel also has the capacity to accommodate a NOAA observer, if requested to do so.

Two Aquapod™ 212 net pens would be utilized for the test (Figure 1). The net pen is about 200 $m^3$ (7,062 $ft^3$) in volume, with a diameter of 8.13 m (26.7 ft). This proven technology is available commercially from Ocean Farm Technologies, Inc., Searsmont, Maine, and is capable of operating at the surface or submerged, using a compressed air system and ballast tanks to raise and lower the pen. The spherical, geodesic shaped pens consist of sturdy structural-plastic framing covered with specially made, slightly stiff mesh netting, with a diagonal gap no larger than 50 mm (2 in), made of 1.25 in long woven brass strands (Fig. 2). Metal alloys for sturdier aquaculture netting have been in use for many years around the world, e.g., Japan and Australia (Sims, 2010).

**Figure 1: Aquapod™ 212 being assembled on land showing the basic structure and shape of the net pen** (Source: Kona Blue Water Farms, Inc.)

**Figure 2: A section of the brass mesh netting, with reference measuring tape, that will be used with the Aquapod™ 212 net pen** (Source: Kona Blue Water Farms, Inc.)

Towing the Aquapod™ net pen in a controlled drift for the entire grow-out cycle is a new application for this gear. The towing layout for the array, which was designed by Ocean Farm Technologies, and tested for 50 year storm conditions by University of New Hampshire ocean engineers, is shown in Figure 3. Connections between the pens are reinforced by pipe trusses and cage stability is aided by surface buoys and pendent weights. An umbilical line bundles the towline and feeding hose, air compressor and camera cable. There are two configurations for the array; one with the longer tow line when the pens are being towed by the tender vessel under power, and one with the shorter connection when the pens and vessel are drifting (Figure 3).

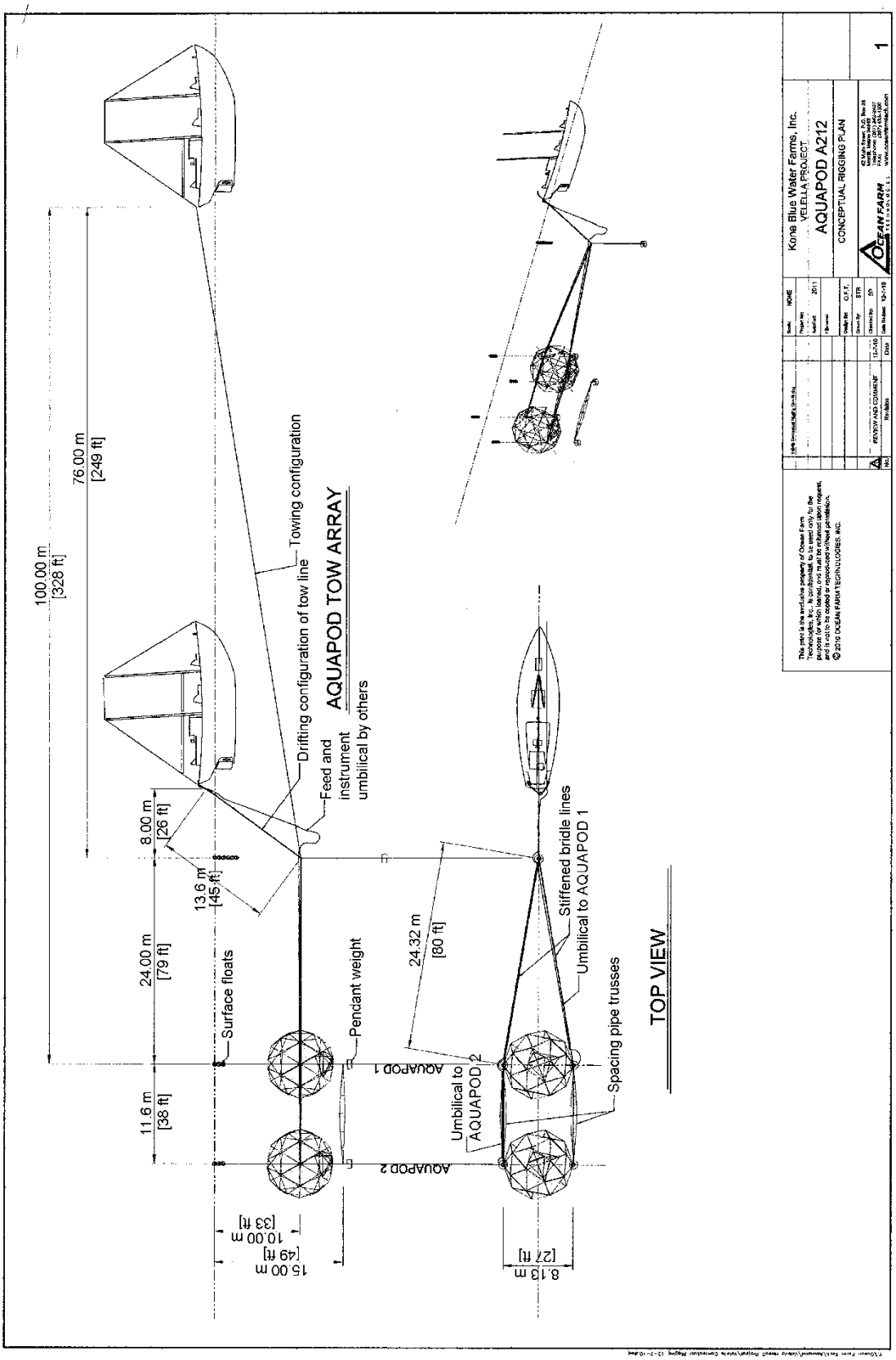


**Figure 3: Structure and layout of the towing array for two net pens with tender vessel** (Source: KBWF, 2010, modified)

**Species Choice and Stocking**

The test of the Velella Concept would utilize the same indigenous species that is grown at KBWF's State ocean lease site off Kailua-Kona, Hawaii, the Almaco jack, *Seriola rivoliana*. KBWF has grown and marketed up to one million pounds a year of this fish over the past five years, with no significant environmental impacts, as documented though extensive monitoring of the existing net pen systems (KBWF, 2009). Kona Kampachi® has been successfully sold in Hawaii and on the Mainland as a premium quality, cultured product.

Fingerlings to stock the two Aquapod™ net pens are available from the KPH hatchery at NELHA. Once the fingerlings are of sufficient size (approximately 60 days old and 12 to 15 grams, or roughly half an ounce), they would be transported to Kawaihae Harbor for stocking into the net pens, which would be staged offshore. Fish would be gently pumped from holding tanks on a work boat into the cages when the array is beyond 3 nm. Once acclimated, the tender vessel and stocked net pens would continue the voyage into Federal waters.

**Feeds and Feeding**

The feed used in this test is the same specially developed feed formulation that is used at KBWF's State ocean lease site. It is produced by Skretting, Inc. in Canada, a leading producer of aquaculture feeds, from sustainable ingredients (Skretting, 2010). The feed pellets are composed of fish meal (20%) and fish oil (10%), and agricultural oils and proteins such as soybean meal, corn gluten, wheat gluten, canola oil, poultry meal and poultry oil. There are no prophylactic antibiotics or other medications included in the feed.

Fish would be fed daily through two 3-in diameter hoses from the tender vessel that would pump a seawater and feed pellet slurry into the submerged pens. Initially, the small fish would be fed five times a day, but as fish get larger, they would be fed less frequently. Fish are fed each time to a level just below satiation to assure minimal feed is wasted.

It is anticipated the tender vessel can carry six months of feed and would have to return to Kawaihae for additional feed once during the course of the test. Another smaller vessel would take up station with the net pens while this occurs.

**Harvesting**

Fish would be harvested for sale at the end of the test at a market size of about four pounds. In ideal conditions, approximately 20,000 lb of fish would be harvested. The net pens would be raised to the surface and a "hatch" in the top of the pen would be accessed to facilitate harvest of fish using a seine to "brail" the fish out of the pen into an ice slurry in a separate harvest vessel. Fish would be transshipped in the ice slurry to Honokohau Harbor for off-loading and sale and distribution. No processing of the fish would be carried out at sea.

**Maintenance and Security**

Net pens would be maintained by experienced KBWF dive staff aboard the tender vessel. Divers would utilize small boats to access the pens and enter and leave the pen interior through the "hatch" previously

discussed. Pens, rigging and stock would be inspected daily for data collection, "wear and tear" on the equipment, and fish mortalities, which will be removed and frozen for later examination. Repairs would be made at sea as needed, with diver safety being the first priority for any specific operation and for the entire test period. Other maintenance, such as periodic net cleaning, is expected to be minimal since the array is in open-ocean and constantly moving water.

Net pens would have two surface floats each to mark their position at all times, particularly as a navigational precaution for any boats that may approach the array. In addition to daily diver inspection and relatively constant surveillance from the stern of the tender vessel, the pens would be equipped with cameras for 24/7 observation of the equipment and the stock. Pens would also be equipped with a light, GPS transmitter and radar reflector, so in the event of detachment they can be located and retrieved.

### *2.2.2 Economic Characteristics*

The scale and duration of this ten-month test of the Velella Concept is quite limited and economic impacts of the project would be small and of short duration. The tender vessel and crew would be chartered for the time necessary to stage and complete the test. KBWF would lease space at Kawaihae Harbor as needed and utilized the existing facilities at Honokohau Harbor to support the effort. Direct jobs generated could be few or none depending on how many KBWF existing staff are involved in the project.

KBWF anticipates around 20,000 pounds of fish would be harvested at the end of the test, assuming an 80% survival, and records would be kept of the amount harvested and stock survival as prescribed under the special permit reporting requirements. This expected amount of surviving fish (approximately 5,000 individuals) could represent about two weeks of harvested production of the KBWF fully stocked Kailua-Kona farm (KBWF, 2009). Should the test of the Velella Concept be successful, KBWF's intention is to market the grown out fish under the KBWF brand, Kona Kampachi®, through the company's established marketing and distribution channels. Some or all of the fish are likely to be sold locally, while some may go to the U.S. mainland. However, ex-vessel distribution falls outside of the scope of this EA.

### *2.2.3 Sociocultural Characteristics*

This small scale, limited duration test would take place in three locations: 1) Kawaihae Commercial Harbor, in West Hawaii to support launch of the array; 2) Honokohau Small Boat Harbor, Kona, where support facilities are available for rent to stage and load and unload project staff, supplies and equipment; and, 3) State and Federal ocean waters between 156° West longitude and 158° West longitude and 20° North latitude and 19° North latitude. The project array would briefly transit State waters only during the initial deployment and upon project completion. All proposed activities pertaining to culture and harvest operations addressed in this EA will be conducted in Federal waters.

Arrangements for carrying out the activities at Kawaihae Harbor and Honokohau Harbor would be made by the permittee in coordination with the Harbor Masters for the duration of the project. Project activities are not likely to adversely affect the use of the harbors by other patrons or the public and simply be another contributor to everyday use of the facilities. As actively managed coastal sites that have been in use for many years, any culturally significant areas of the harbors are well known and would be respected by KBWF.

The tender vessel and stocked net pens once under way would be in constant motion either by wind, wave and current or under power. The plan is to position the array in westward moving eddies in Federal waters that are between 10,000 and 12,000 ft deep (Calil et al., 2008). The array would be operated and lighted according to Coast Guard regulations (46 CFR §170 and 46 CFR §28). KBWF intends to deploy and navigate the net pen array to stay away from the tops of seamounts and deep sea banks that may be frequented by recreational and commercial fishers using a combination of ocean charts and sophisticated satellite communication.

The array may become an attractant to various popular pelagic fish species, in the same way that State deployed Fish Aggregation Devices (FADS) are and may attract curious fishers that venture far offshore.

### *2.2.4 Administration, Compliance, and Enforcement*

**Permit Conditions**

The following terms and conditions would be applied to the Special Coral Reef Ecosystem Permit:

Pursuant to federal regulations found in 50 CFR §665.224, the Regional Administrator may attach conditions to the special permit as may be necessary to ensure compliance with the purposes of the special permit consistent with the management objectives of the Hawaii FEP. Failure of the holder of a special permit to comply with the terms and conditions of a special permit is grounds for revocation, suspension or modification of a special permit. Any action taken by the Regional Administrator to revoke, suspend, or modify a special permit will be governed by 15 CFR §904 subpart D and 50 CFR §665.224.

The following terms and conditions would be applied to this special permit.

1. The special permit holder shall comply with all applicable federal, state and county laws, rules and regulations;

2. The special permit holder shall comply with all applicable federal fishing regulations found in 50 CFR part 665 subpart A and subpart C, including but not limited to permit and reporting requirements and landing notification requirements;

3. The special permit holder shall operate two net pens, none larger than 200 cubic meters in volume and together totaling no greater than the capacity of 400 cubic meters;

4. The almaco jack (*Seriola rivoliana*) is the only species approved for stocking of and harvest from the net pens. No other species is approved;

5. Each net pen shall hold no more than 3,000 individual fish at any given time, and together no more than 6,000 individual fish at any given time;

6. The activities authorized under the special permit are confined to within federal waters bounded by the following coordinates (see Figure 6):

| Point | N. lat. | W. long. |
|---|---|---|
| A | 20° 00’ | 158 ° 00’ |
| B | 20° 00’ | 156 ° 00’ |
| C | 19° 00’ | 156 ° 00’ |
| D | 19° 00’ | 158 ° 00’ |

7. With the exception of vessel and gear provisioning and powered transit to and from federal waters, the activities authorized under the special permit may not be conducted within marine waters of the State of Hawaii (0-3 nautical miles), or within the boundaries of the Hawaiian Islands Humpback Whale National Marine Sanctuary, as defined in 15 CFR §922.181;

8. The use of feeds containing prophylactic antibiotics or other medications shall not be allowed;

9. The special permit holder shall monitor the condition of the net pens on a continual basis, including fish within the net pens. When weather and ocean conditions do not permit physical monitoring, visual or remote monitoring shall be conducted;

10. In the event of a disease problem, the special permit holder will inform NMFS PIRO of the problem immediately, and before administering any treatment;

11. Dead fish shall not be disposed of in the surrounding waters, but shall be removed from the site and disposed at a County approved site; and

12. The special permit holder will comply with the Velella Project Emergency Reporting Plan and the Marine Protected Species Monitoring and Reporting Plan as described in Appendix E for the duration of the of the permit.

13. Failure to comply with the terms and conditions of the special permit is grounds for revocation, suspension or modification of the special permit.

14. In issuing the permit, NMFS PIR and the Regional Administrator have relied on the information and data which the applicant has provided in connection with the permit application. If, subsequent to the issuance of the permit such information and data have proved to be false, incomplete or inaccurate, this permit may be revoked, suspended or modified.

The permit applicant, KBWF, would be responsible for complying with all applicable maritime and other civil laws in the conduct of its test operations under the permit. As with all permits NOAA issues, compliance would be enforced by NOAA law enforcement officers. The Coast Guard is also authorized to enforce MSA regulations. No large additional administration or law enforcement costs are anticipated because the proposed activity is of a small scale and periodic reporting would promote monitoring of the activity.

The applicant would not need to expend a large amount of money to comply with the terms and conditions of the permit.

***Additional General Special Permit Information (Hawaii FEP §5.6 (Source: WPFMC 2009c))***

Special Permits are required for any directed fisheries on potentially harvested coral reef taxa (PHCRT) or to fish for any CRE MUS with any gear not normally permitted.
Permits are only valid for fishing in the fishery management subarea specified on the permit.

**Notification**
Any special permit holder must contact the appropriate NMFS enforcement agent in Hawaii at least 24 hours before landing any CRE MUS harvested under a special permit, and report the port and the approximate date and time at which the catch will be landed.

**Gear Restrictions**
New fishing gears that are not included in the allowable gear list may be allowed under the special permit provision. CRE MUS may not be taken by means of poisons, explosives, or intoxicating substances. Possession and use of these materials is prohibited.

## Consistency with Applicable Laws

**National Environmental Policy Act (NEPA).** The environmental impact analysis of this EA fulfills the requirements of the National Environmental Policy Act (NEPA) and the National Oceanic and Atmospheric Administration's (NOAA) Administrative Order 216-6 covering the agency's need to analyze the environmental impacts of a proposed federal action. The purpose and need, description of alternatives and an environmental analysis of the proposed action can be found in sections 1, 2 and 3 of this EA, respectively.

**Magnuson-Stevens Act (MSA)**

Implementation and regulations concerning the Special Permit for Coral Reef Ecosystem Fisheries fall under the Hawaii Archipelagic Fishery Ecosystem Plan which is consistent with the MSA and National Standards contained therein. Additional compliance requirements can be found in the Hawaii FEP (WPFMC 2009c) and are briefly discussed in sections 1.3.2 and 2.2.4 of this EA.

**Paperwork Reduction Act (PRA)**

The PRA for this action is covered by OMB Control Number 0648-0462 and is valid until 08/31/2012. This covers information collected under a special permit for coral reef fisheries and includes 1) the Coral Reef Ecosystem Daily Catch Report as well as 2) the Pacific Islands Region Coral Reef Ecosystem Transshipment Log (see Appendix D).

**Coastal Zone Management Act (CZMA)**

The CZMA requires that any required federal license or permit activity affecting any coastal use or resource be conducted in a manner consistent with the State's approved coastal zone management program. The State is required to maintain a list of federal license and permit activities which affect any coastal use or resource, and which the State wishes to review for consistency with its management program. For those license and permit activities that are not on the State's list, the federal agency is required to provide the State with actual or constructive notice of the proposed activity so the State may

determine, within 30 days of such notice, whether coastal effects are reasonably foreseeable. Aquaculture is not on the list of license and permit activities which Hawaii wishes to review for consistency. Pursuant to 50 CFR §665.224 and 15 CFR § 930, as a condition of issuing a special permit under the Hawaii FEP, on February 3, 2011, PIRO mailed a copy of the completed application package to the State of Hawaii with a request for recommendations concerning this project. No recommendations were received within the 30-day response period. Additional consideration was given to the fact that the State of Hawaii has permitted nearshore operations on an industrial scale, including issuing permits for Kona Blue through a rigorous permitting process overseen by the U.S. Army Corps of Engineers. Knowledge of Kona Blue's State operations helped inform some of the analysis in this EA and is referenced accordingly throughout this document. Additionally, no effect on State resources is anticipated as the proposed action will be limited to in Federal waters (aside from minimal transit to and from Kona Blue's dock). Further CZMA compliance measures covering both Coral Reef and Pelagic Ecosystems can be found in the Hawaii FEP and the Pelagic FEP respectively (WCPFC 2009c and 2009d).

**Clean Water Act (CWA)**

The National Pollutant Discharge Elimination System (NPDES) program (CWA Section 402) controls direct discharges into navigable waters. The proposed activity falls below the EPA commercial culture thresholds (i.e., the project size would involve less than100,000 lb of fish) and is, therefore, not subject to a NPDES permit due to the small scale of the proposed activity. However, for comparison and applicant evaluation purposes only, Kona Blue has obtained NPDES permits for their nearshore operations that have covered a much larger scale of aquaculture production. NPDES discharge requirements are regulated by the Environmental Protection Agency (EPA) and are discussed in sections 1.3.2 and 3.2.1 of this EA as they pertain to the proposed activity.

**Marine Mammal Protection Act (MMPA)**

The MMPA prohibits, with certain exceptions, the take of marine mammals in the U.S. and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the United States. Pursuant to the MMPA, NMFS has promulgated specific regulations that govern the incidental take of marine mammals during fishing operations (50 CFR §229). Under section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries (LOF) that classifies U.S. commercial fisheries into one of three categories listed below.

- Category I designates fisheries with frequent serious injuries and mortalities incidental to commercial fishing;
- Category II designates fisheries with occasional serious injuries and mortalities; and
- Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities.

These categories are based on the level of serious injury and mortality of marine mammals that occurs incidental to each fishery. In 2006 the NMFS added the ''HI offshore pen culture fishery'' to the LOF as a Category III fishery (71 FR 20941; April 24, 2006). To date there have been no documented marine

mammal serious injuries or incidental mortalities recorded on the LOF for HI offshore pen culture fisheries (see Table 1).

Following consultations with marine mammal personnel in the Protected Resources Division (PRD) at PIRO, it was determined that the proposed activity, for the purposes of the MMPA, is considered a Category III Fishery under the Hawaii Offshore Pen Culture designation. Thus, in addition to the aforementioned permit conditions, the applicant would be required to complete a Marine Mammal Authorization Form for every marine mammal interaction that would occur during the permitted activity as well as comply with other requirements of the MMPA §229.5. These MMPA reporting forms will be provided to the applicant with the permit should one be issued.

Table 1 shows all U.S. marine aquaculture fisheries evaluated under the MMPA for the 2011 LOF (75 FR 68468; November 8, 2010).

**Table 1: MMPA List of Fisheries 2011**

Source: NOAA 2011 (http://www.nmfs.noaa.gov/pr/interactions/lof/final2011.htm)

| Fishery Description | Estimated # of vessels/ persons | Marine mammal species/ stocks incidentally killed/ injured |
|---|---|---|
| **Category III: Pacific Ocean** | | |
| MARINE AQUACULTURE FISHERIES: | | |
| CA marine shellfish aquaculture | unknown | None documented |
| CA salmon enhancement rearing pen | >1 | None documented |
| CA white seabass enhancement net pens | 13 | • California sea lion, U.S. |
| HI offshore pen culture | 2 | None documented |
| OR salmon ranch | 1 | None documented |
| WA/OR salmon net pens | 14 | • California sea lion, U.S.<br>• Harbor seal, WA inland waters |
| **Category III: Atlantic, Gulf of Mexico and Caribbean** | | |
| MARINE AQUACULTURE FISHERIES: | | |
| Finfish aquaculture | 48 | • Harbor seal, WNA |
| Shellfish aquaculture | unknown | None documented |

In general, regulations governing Category III fisheries, which include Hawaii offshore aquaculture fisheries, are listed below (50 CFR 229.5):

§ 229.5 Requirements for Category III fisheries

(a) *General.* Vessel owners and crew members of such vessels engaged only in Category

III fisheries may incidentally take marine mammals without registering for or receiving an Authorization Certificate.

(b) *Reporting.* Vessel owners engaged in a Category III fishery must comply with the reporting requirements specified in §229.6.

(c) *Disposition of marine mammals.* Any marine mammal incidentally taken must be immediately returned to the sea with a minimum of further injury unless directed otherwise by NMFS personnel, a designated contractor, or an official observer, or authorized otherwise by a scientific research permit in the possession of the operator.

(d) *Monitoring.* Vessel owners engaged in a Category III fishery must comply with the observer requirements specified under §229.7(d).

(e) *Deterrence.* When necessary to deter a marine mammal from damaging fishing gear, catch, or other private property, or from endangering personal safety, vessel owners and crew members engaged in commercial fishing operations must comply with all deterrence provisions set forth in the MMPA and any other applicable guidelines and prohibitions.

(f) *Self-defense.* When imminently necessary in self-defense or to save the life of a person in immediate danger, a marine mammal may be lethally taken if such taking is reported to NMFS in accordance with the requirements of §229.6.

(g) *Emergency regulations.* Vessel owners engaged in a Category III fishery must comply with any applicable emergency regulations.

**Endangered Species Act (ESA)**

Preliminary consultations with PRD, PIRO addressed ESA issues that are discussed in the EA, including, but not limited to entanglements, gear design, mitigation techniques, best practices and noise concerns. Conditional on the completion of consultation, PIRO has preliminarily determined that this activity may affect, but will not likely adversely affect endangered or threatened species that occur in the proposed action area. A thorough discussion of the impacts to ESA listed species, along with other protected species, can be found in sections 2.2.5 and 3.2.4.

***Critical Habitat***

The only ESA-designated critical habitat in the region was designated for the Hawaiian monk seal on May 26, 1988, and extends from the shore, out to a depth of 20 fathoms, in ten areas of the Northwestern Hawaiian Islands (NWHI). Thus, the proposed action will have no effect on designated critical habitat given that operations would be confined to the west side of the Big Island of Hawaii.

**Essential Fish Habitat (EFH)**

PIRO SF consulted with PIRO Habitat Conservation Division (HCD) on EFH and HAPC concerning the proposed project by completing an authorized worksheet evaluating potential impacts on EFH and HAPC. HCD concurred that there will be no significant impacts to EFH and HAPC under the proposed

activity. Impacts to EFH can be found in section 3.2.3. Additional information is provided below for reference.

***Description of General Mitigation Measures for Identified Activities and Impacts***
Established policies and procedures of the Council and NMFS provide the framework for conserving and enhancing EFH. In general these could be considered as best management practices (BMPs) that can help to minimize or avoid the adverse effects of identified activities on EFH. Components of this framework include adverse impact avoidance and minimization, provision of compensatory mitigation whenever the impact is significant and unavoidable, and incorporation of enhancement. New and expanded responsibilities contained in the MSA will be met through appropriate application of these policies and principles. In assessing the potential impacts of proposed projects, the Council and the NMFS are guided by the following general considerations:

• The extent to which the activity would directly and indirectly affect the occurrence, abundance, health, and continued existence of fishery resources.

• The extent to which the potential for cumulative impacts exists.

• The extent to which adverse impacts can be avoided through project modification, alternative site selection, or other safeguards.

• The extent to which the activity is water dependent if loss or degradation of EFH is involved.

• The extent to which mitigation may be used to offset unavoidable loss of habitat functions and values.

Additionally, the Hawaii FEP for coral reef fisheries (WPFMC 2009c) identifies aquaculture activities that could directly or indirectly affect habitat used by MUS. Impacts and conservation measures are summarized below as they address aquaculture facilities, and in particular cage/net pen use (#4 and #6).

*Impacts*

- Discharge of organic waste from the farms
- Impacts to the seafloor below the cages or pens (including moorings or anchors)
- Introduction of disease through transmission from cultured organisms to wild stocks.

*Conservation Measures*

1. Facilities should be located in upland areas as often as possible. Tidally influenced wetlands should not be enclosed or impounded for mariculture purposes. This includes hatchery and grow-out operations. Siting of facilities should also take into account the size of the facility, the presence or absence of submerged aquatic vegetation and coral reef ecosystems, proximity of wild fish stocks, migratory patterns, competing uses, hydrographic conditions, and upstream uses. Benthic productivity should be determined by sampling prior to any operations. Areas of high productivity should be avoided to the maximum extent possible. Sampling design should be developed with input from state and federal resource agencies.

2. To the extent practicable, water intakes should be designed to avoid entrainment and impingement of native fauna.

3. Water discharge should be treated to avoid contamination of the receiving water and should be located only in areas having good mixing characteristics.

4. Where cage mariculture operations are undertaken, water depths and circulation patterns should be investigated and should be adequate to preclude the buildup of waste products, excess feed and chemical agents.

5. Non-native, ecologically undesirable species that are reared may pose a risk of escape or accidental release, which could adversely affect the ecological balance of an area. A thorough scientific review and risk assessment should be undertaken before any nonnative species are allowed to be introduced.

6. Any net pen structure should have small enough webbing to prevent entanglement of prey species.

7. Mitigation should be provided for the EFH areas impacted by the facility.

**Consultations and Recommendations**

Pursuant to the Coral Reef FEP Special Permit regulations, 50 CFR §665.224, PIRO forwarded copies of the completed application to the Council, the USCG, the State of Hawaii, and the USFWS. The USFWS and the State of Hawaii did not respond to this request for recommendations. The USCG did respond within the 30 day requirement but did not have any further recommendations outside of the basic navigational requirements (see section 1.3.2). The Council and interested parties who had identified themselves to the Council provided recommendations as highlighted below. The Council does not object to the project, but requests the applicant and/or PIRO to address some concerns. The Council's recommendations were considered by both the applicant and PIRO and are generally addressed throughout this EA.

Major concerns from the Council are as follows:

I. *The Council suggests that NMFS delineate the boundaries of this project to a known set of coordinates off of Kona, Hawaii, that forms a box with straight lines for ease of enforcement.*

II. *To reduce conflicts with navigation, the Council suggests NMFS require that the applicant provide the coordinates of the project (to be delineated by NMFS) to the U.S. Coast Guard for inclusion on their "notice to mariners" and properly mark the gear as the USCG advises.*

III. *The Council suggests NMFS provide a recommendation to the applicant to consider using the Automatic Information System (AIS) technology to identify itself to the maritime shipping industry.*

IV. *The Council suggests NMFS recommend the applicant provide for fishing around the operation, within reason, taking into account security and other factors, and promote this opportunity to the community through education and outreach about the project.*

V. *The Council suggests that these distinguishing marks or characteristics of the cultured species be documented with comparisons to wild stock to provide outreach to the fishermen and the community.*

VI. *The Council suggests that the NMFS require this type of emergency plan be developed prior to approval of the permit.*

*VII. The Council suggests that NMFS request a timeline of activities from the applicant and base the permit expiration date accordingly.*

*VIII. The Council requests, as a condition of the permit, NMFS require the applicant to allow a NOAA observer on the tendering vessel during stocking, monitoring, and/or harvesting activities to collect additional information, as well as any protected species sightings/interactions.*

Specific responses provided by the applicant and not already mentioned in the EA are provided below:

*Regarding recommendation II*. The response from the Coast Guard indicates that a "Notice to Mariners" would not be necessary. See also discussion below about concerns over publicity and safety for this test project.

*Regarding recommendation III*. KBWF has considered using AIS and is not planning to use it. KBWF would prefer not to excessively publicize the project due to concerns with the safety of dive personnel that would be in the water every day and potential for interference with the project objectives. Once the project is underway and working, public statements would be made at some point. KBWF anticipates that the Captain of the *Machias* would communicate with any approaching marine traffic as required by the "rules of the road".

*Regarding recommendation IV*. KBWF plans to accept and allow fishing around the array, as described in the EA. But due to safety concerns, promotion of the project as a fishing site would be counterproductive .Therefore, KBWF would prefer not to publicize this research project as a fishing site.

*Regarding recommendation: VIII*. KBWF does not have funds to support an additional observer, but has no objection to accommodating a NOAA funded observer if requested.

### *2.2.5 Environmental Characteristics*

**Regional Setting and Climate**

The test project would be carried out in Federal waters of the U.S, EEZ on the leeward side of the Island of Hawaii, State of Hawaii, between 156° West longitude and 158° West longitude and 20° North latitude and 19° North latitude (Figures 4a & 4b). The tender vessel and net pen array would be operated between 3 and 150 nm from the coast, after departing from Kawaihae Harbor in West Hawaii. Water depths in this area of Federal waters average 10,000 to 12,000 ft in the deepest areas, though there are several seamounts and deep banks that rise from the ocean floor (Figure 5). Notably, water depths drop off quickly in West Hawaii, with the coral reef habitat extending approximately 0.54 nm from shore at its widest point (Coyne et al., 2003).

The prevailing weather pattern throughout the Hawaiian island chain is Northeast trade winds, which blow around 80% of the time at average speeds of 8 to 12 kts. Kona winds, where the direction is from the Southeast or Southwest, occur about 20% of the time (Juvik and Juvik, 1998). On the Island of Hawaii, Mauna Loa and Mauna Kea provide some shelter to reduce the intensity of wind, rain and seas generated by trade winds, making coastal waters of South facing shores attractive to offshore aquaculture. The planned test would take place in open ocean waters but would still be in these semi-sheltered lee areas off of Hawaii.

**Ocean Setting**

State marine waters extend to 3 nm and the U.S. EEZ extends from 3 nm to 200 nm. The test area in the lee of West Hawaii encompasses approximately 7,200 sq nm. Surface water temperatures vary between 18°C to 28°C (64°F to 82°F) over the year and the depth of the mixed layer can vary between 400 ft (122 m) in winter and 100 ft (30 m) in summer (FPEIS, 2009).

The area was chosen because of the oceanographic characteristic that major Mid-Pacific current systems (i.e., the North Equatorial Current, the Hawaii Lee Current, and the Hawaiian Lee Counter Current) impacting the Island of Hawaii consistently form eddies, which rotate clockwise or counterclockwise as they spin off in a Westward direction and eventually dissipate (Figures 4a & 4b). Eddies can be described as generally short- to medium-term water movements that spin off the surface currents and can play important roles in regional climate (e.g., heat exchange), as well as distribution and abundance of marine organisms (WPFMC, 2009b). In this area of the ocean, the eddies form consistently every 50 to 70 days (Calil et al., 2008; Dickey et al., 2008).

The Velella Concept includes using the energy in the eddy to push along the array and using the sail and diesel power of the tender vessel to optimally position the array in the eddy. The general approach would be to stay close to the center when the eddy is 3 nm or more from the Big Island and outside the Whale Sanctuary, then as the eddy moves away, start to move the array to the outer edges, so it can exit the eddy and wait for the next one to develop. In this way, the array would be in constant motion but would not move too far West for logistical efficiency.

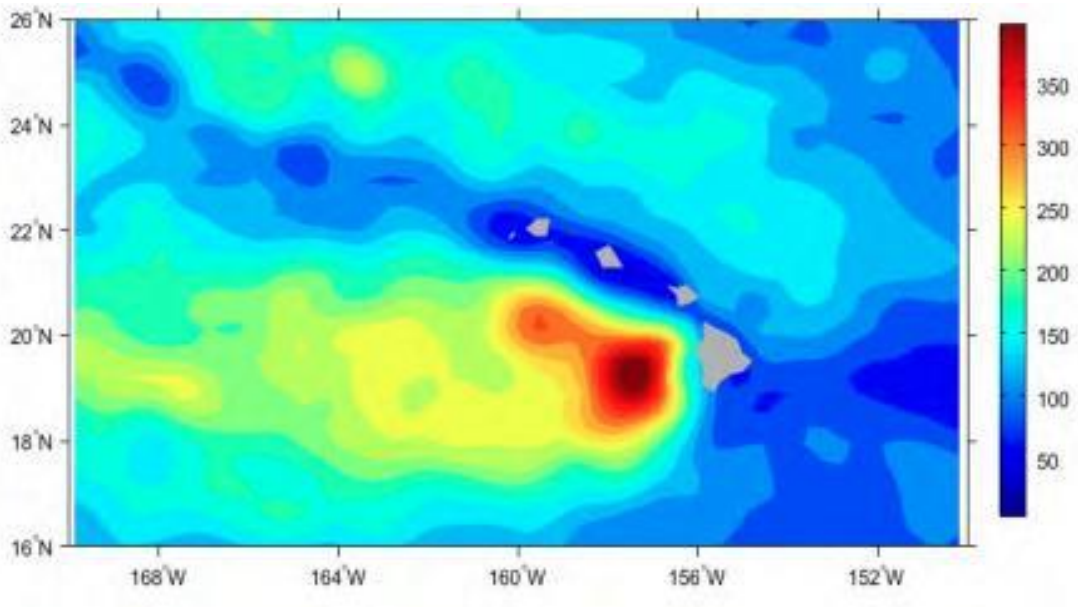


**Figure 4a: Mean eddy kinetic energy ($cm^2/s^2$), from 1992-2005, calculated from AVISO merged satellite altimetry** (Source: Calil et al., 2008)

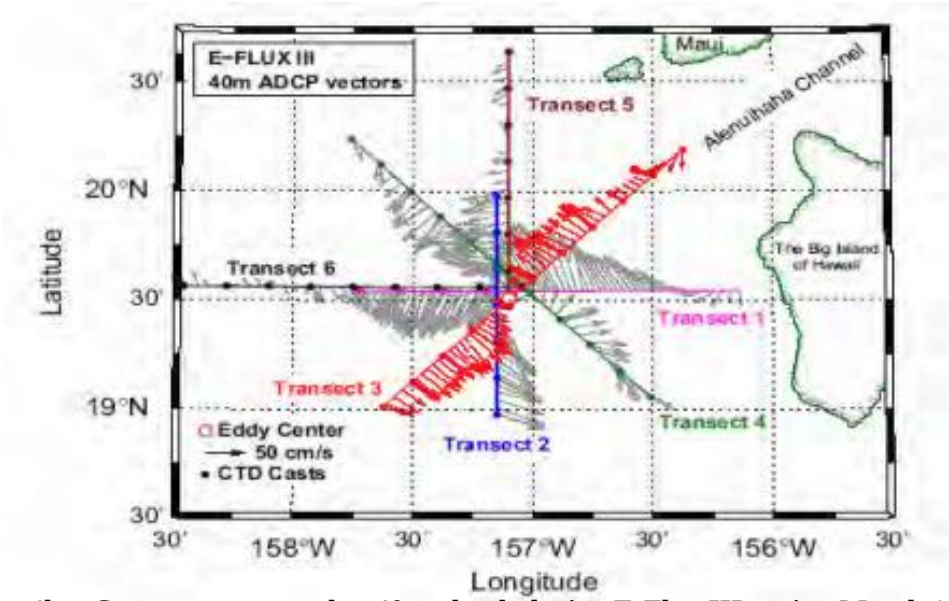


**Figure 4b: Currents measured at 40 m depth during E-Flux III cruise, March 10-27, 2005. A strong cyclonic eddy was centered near the open circle in the center of the figure**
(Source: Dickey et al., 2008)

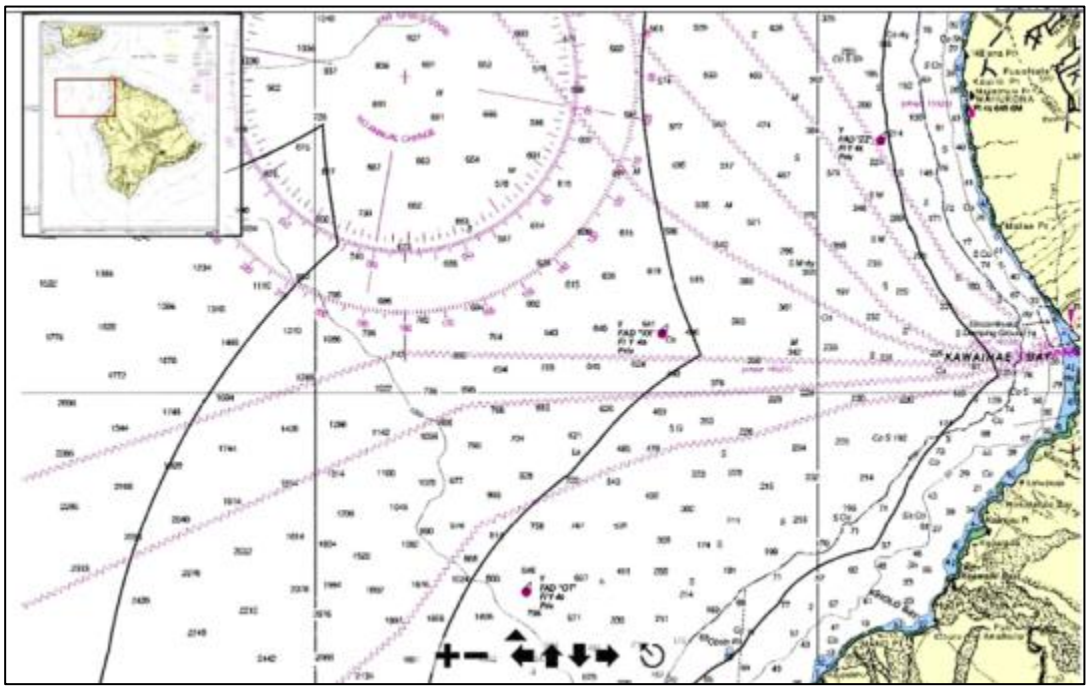

**Figure 5: Ocean depths in fathoms on the leeward side of the Island of Hawaii, near Kawaihae Commercial Harbor** (Source: NOAA nautical chart 19320)

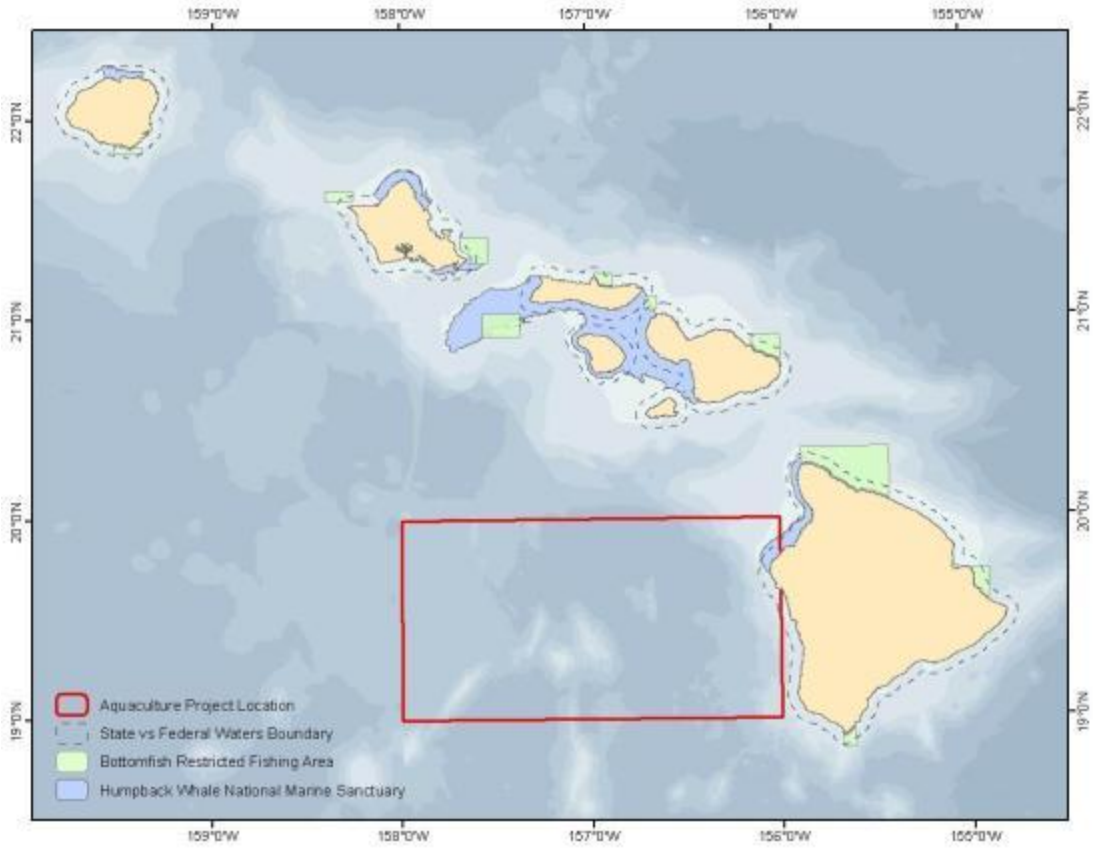


**Figure 6: Boundaries of proposed activity in relation to the Main Hawaiian Islands**
(Source: PIRO 2011; Map provided by Robert O'Conner, NOAA)

## Fauna and Flora

The Velella Concept test area is located on the leeward side of the Island of Hawaii in subtropical, deep ocean waters encompassing a large area of approximately 7,200 sq. nm. The epipelagic portion of the deep ocean ecosystem, the surface to 200 m (656 ft) is home to a variety of primary and secondary producers (phytoplankton and zooplankton), forage species and pelagic fishes (WPFMC, 2009b). Importantly, the State and Federal waters around the Main Hawaiian Islands are the location of several of Hawaii's pelagic fisheries, which include longline, troll and handline, offshore handline, and aku boat (pole and line) fisheries, and which are the largest and most valuable in the state. The most important species in terms of value and volume in the Hawaiian pelagic fisheries are: big eye and yellowfin tuna (*Thunnus obesus* and *T. albacares*), swordfish (*Xiphias gladius*); blue marlin (*Makaira mazara*); striped marlin (*Tetrapturus audax*); mahi mahi (*Coryphaena* spp.); wahoo (*Acanthocybium solandri*); and moonfish (*Lampris* spp.)(WPFMC, 2009b). All of these species are highly migratory and probably all are present in various life stages in the test area.

**Protected Species**

There are a number of protected species that may occur in the test area, year round, or seasonally, but populations of most species of concern are relatively small and widely dispersed (WPFMC, 2009b). No critical habitat has been designated in the project area.

Reliable reports indicate several species of sea turtles occur in Hawaiian waters. Green turtles (*Chelonia mydas*) and hawksbill turtles (*Eretmochelys imbricata*) occur in nearshore waters through the archipelago. The loggerhead turtle (*Caretta caretta*), leatherback turtle (*Dermochelys coriacea*) and olive ridley turtle (*Lepidochelys olivacea*) have been incidentally caught by Hawaii-based pelagic longline vessels and occasional sightings have been reported (WCPFMC 2009b).

Many seabirds of concern are known to frequent the main Hawaiian Islands. Those of particular concern to pelagic fisheries are: the black-footed and Laysan albatrosses (*Phoebastria nigripes* and *P. immutabilis*); Christmas, Newell's, flesh-footed, wedge-tailed, and sooty shearwaters (*Puffinus nativitatis, P. newelli, P. carneipes, P. pacificus, and P. griseus*); and the masked, brown and red-footed boobies (*Sula dactylatra, S. leucogaster, S. sula*). More detailed information on seabirds and interactions with Hawaii-based pelagic fisheries can be found in the Pelagic FEP (WPFMC 2009d).

Monk seals (*Monachus schauinslandi*) are found mainly in the Northwest Hawaiian Islands, with many islands serving as reproductive sites. However, occasionally animals will be seen in beaches around the Main Hawaiian Islands (WPFMC, 2009b). Total population size is estimated at about 1,300 to 1,400 animals (WPFMC, 2009c).

Cetaceans listed as endangered that have been observed around the Main Hawaiian Islands include: the humpback whale (*Megaptera novaeangliae*); sperm whale (*Physeter macrocephalus*); blue whale (*Balaenoptera musculus*); fin whale (B. physalus); and sei whale (*B. borealis*). Humpback whales winter in Hawaii in shallow waters, 600 ft. deep or less, about five months of the year. Their abundance (approximately 7,000 individuals) and ESA status caused the formation of a humpback whale national marine sanctuary in the Islands. There are not sufficient data to speculate on abundance of the other whale species in Hawaiian waters and sighting are relatively rare (WPFMC, 2009c).

Of non-endangered cetaceans, two species, the bottlenose dolphin (*Tursiops truncatus*) and the spinner dolphin (*Stenella longirostris*) are known to be year-round residents of the Hawaiian Islands. The bottlenose dolphin is considered to be primarily a coastal animal, but the spinner dolphin has been observed in both the oceanic and coastal environments off West Hawaii (HOT, 2009).

Several Marine Mammal Protection Act (MMPA)-listed species, odontocetes, may be found in the oceanic waters off West Hawaii. These include: pygmy and dwarf sperm whales (*Kogia breviceps* and *K. sima*); killer whales (*Orcinus orca*); false killer whales (*Pseudorca crassidens*); pygmy killer whales (*Feresa attenuata*); pilot whales (*Globicephala macrorhynchus*); melon-headed whales (*Peponocephala electra*); rough-toothed dolphins (*Steno bredanensis*); and several species of spotted dolphins (e.g., *Stenella attenuata*). Data on population numbers and distribution of these species are sparse (HOT, 2009).

## 3.0 Potential Environmental Consequences and Mitigation

### 3.1 Alternative 1: No Action

NMFS would not issue a one year Special Permit to carry out the proposed culture and harvest of a managed MUS using two small net pens to be towed in a controlled drift in Federal waters off the leeward coast of the Island of Hawaii. Lack of this activity in the U.S. EEZ would mean no environmental consequences related to the proposed activity to manage or mitigate. However, not conducting this small-scale test would also deprive both NOAA and the private sector applicant of the data and insight as to whether this innovative approach could lead to larger scale, sustainable projects to culture fish in the U.S. EEZ and thereby begin to significantly address the growing reliance on imports by America's seafood industry. KBWF is not aware of any public entity or private company in the U.S. or around the world that is pursuing this forward-looking line of aquaculture investigation (Sims, 2010).

### 3.2 Alternative 2: Proposed Permit and Activity

NMFS would issue a one-year Special Permit to carry out the proposed culture and harvest of a managed MUS fish using two small net pens to be towed in a controlled drift in federal waters off the leeward coast of the Island of Hawaii.

#### *3.2.1 Potential Impacts on Water and Seafloor Quality*

The proposed action would take place in deep ocean waters so there would be no effect on the seafloor environment. Local experience with commercial offshore net pen culture in State waters to date indicate that water and sea floor quality effects from this type of activity are anticipated to be negligible. Two commercial-scale farms, KBWF and Hukilau Foods (HF), have a combined experience of 15 years of operation. These two farms, with a total of 12 net pens, each 3,000 $m^3$ (105,930 $ft^3$), produced several million pounds of fish without experiencing any violations of environmental laws or permit conditions.

This test proposes to grow out approximately 6,000 fish over a ten month period to an average weight of four pounds. A specially formulated, compounded feed in pelletized form would be utilized and carefully distributed so as not to overfeed. Feeding would be observed by cameras and divers. The Feed Conversion Ratio (FCR), the ratio of how many pounds of feed to produce on pound of fish, is expected to be around 2:1, judging from KBWF's experience with its State lease (KBWF, 2009). Therefore, approximately 40,000 pounds of feed can be expected to be used during this ten month trial, based on a projected 80% survival rate for the stock and it is anticipated about 10,000 pounds of feces over that time period based on an assimilation efficiency of around 90% (i.e., 90% of the feed would be metabolized) (Sims, 2010).

Water and substrate quality concerns with net pen aquaculture in general focus on the resulting particulates (uneaten food and feces) and the dissolved metabolites (largely ammonia which converts to ammonium at the pH of sea water). For the current project, no reduction in water quality is expected to occur. The applicants have a combined experience totaling 15 years of monitoring two operating farms in open ocean conditions. Neither particulates nor dissolved metabolites are expected to accumulate due to the near constant flushing of the pens and the low stocking density. Other project characteristics that are expected to reduce the likelihood of particulates include: low stocking density and flushing that are likely to prevent diseases or pathogens from affecting the stock; and, the careful application of feed; the nutrient-poor (oligotrophic) nature of the deep ocean and its inherent assimilation capacity for nitrogen

byproducts of metabolism. Furthermore, the constant movement of the pens through the open ocean will ultimately result in very large volumes of water passing through the pens to "instantly" mix and dilute fish metabolites and particulates that would create a "perpetual following" environment for the mobile net pens (HF, 2009; KBWF, 2009). The open ocean flushing, water currents, and extreme water depth are features of the environment that would help dilute any wastes and prevent adverse impacts to the oceanic environment.

### *3.2.2 Potential Impacts on Fauna and Flora*

**Potential for Fish Escapes and Fish Health Issues**

The project has been designed to minimize fish escapes and any fish escapes are not anticipated to pose risks to wild stocks. Impacts of escaped farmed fish on wild stocks, mainly of the same species as being cultured, is a concern raised with offshore aquaculture. In this trial, the pen frame structure and brass wire netting material are very strong and would be submerged away from surface wave action most of the time. Moreover, the use of the Aquapod™ pen allows divers to enter and leave through a hatch in the top of the cage that would be above water while cages are at the surface, thus preventing accidental escapes of cultured stock into the wild.

In the event of a small or even a catastrophic failure of the pens/netting, the small number of cultured indigenous fish would be miles from the coast and exceedingly vulnerable to predation by ocean predators. It is anticipated that any escaped fish would likely behave in a similar manner to the escapees on the Kailua-Kona site: where it has been observed that escaped fish generally remain close to the pen as the structure offers protection against predation. Naturally, the net pens are expected to act like Fish Aggregating Devices (FADs) which in turn can attract blue water predators. Thus cage-cultured fish that wonder too far from the net pens are often naïve to predators and are expected to be subject to heavy predation before they ever get close to shore or to an otherwise suitable habitat (Appendix B; KBWF, 2009).

Cultured kahala have a higher fat content (a highly desirable market characteristic) than wild fish since they are confined, fed regularly, and utilize less energy in the daily search for food. Also, cultured kahala may be distinguishable to the experienced kahala fisher because they tend to have a thicker and rounder body than wild fish. However, should the cultured stock escape, fish are likely to quickly assume the body shape of wild fish due to the greater difficulty of finding food in the wild.

In addition, this trial uses fish that are genetically the same as local wild fish and are inspected for disease prior to stocking. Fingerlings are produced from locally sourced broodstock in a land-based, biosecure hatchery. While in the net pens, fish health would be monitored closely by divers and cameras. Given the nature of the culture method, far offshore in pristine ocean waters, issues related to skin flukes and bacterial infections seen at the inshore Kailua-Kona facility are expected to be avoided (KBWF, 2009).

In the event of a disease problem during this open ocean trial, KBWF would inform NMFS, PIRO and seek the advice of KBWF's qualified, licensed veterinarian to determine the appropriate course of action. If treatment is recommended and practical, approved therapeutants would be administered only under standard treatment protocols and with relevant oversight under an approved INAD (Investigational New Animal Drug) permit from the Food and Drug Administration (KBWF, 2009) (Appendix B).

**Feeds and Feeding Impacts**

As discussed above, fish feed would consist of a specially formulated, pelletized ration that would be fed to fish until near satiation while the feeding is being observed by divers and/or cameras. KBWF experience indicates optimum consumption and minimal wastage occurs with this strategy. Therefore, at a net pen level there should be little uneaten feed released to the environment.

At a more global level, the feed is especially formulated using lower than standard levels of fish meal (20%) and fish oil (10%) than usually found in carnivorous fish feed (usually around 40 to 50%). In this trial and at the KBWF Kailua-Kona facility, fish meal and oil have been reduced and replaced by agricultural meals and oils, thus directly addressing an often noted concern over global aquaculture's increasing use of industrial fish meals and oils. At a macro level, in addition to this favorable agricultural products substitution, Skretting, Inc., the feeds supplier to this trial, also notes that all the fisheries products in its feeds are from sustainable sources (Skretting, 2010).

**Potential Impacts of Sharks**

Nearshore aquaculture has caused public concerns over attraction of sharks to the vicinity of the net pens and closer to coastal areas. In nearshore net pen situations in Hawaii, that is with two existing operations, Hukilau Foods (HF) and KBWF, sharks (nearshore species) have been observed on occasion, but generally with no particular pattern of attraction or avoidance to the pens (HF, 2009). Standard management practice is to remove any dead fish from the pens on a regular and timely basis, and reduce that potential attractant. There has been one incident, reported by KBWF, where a diver was threatened by a tiger shark, which had to be killed due to diver safety concerns (KBWF, 2009).

This trial would take place in deep ocean waters, 3 to 150 nm offshore and far away from nearshore and coastal recreational areas. There are nine species of oceanic sharks that are found in the open ocean environment and all are rarely encountered by transiting vessels and generally don't frequent coastal waters (WPFMC, 2009b). Regardless, any dead fish would be removed from the pens regularly and a shark management plan that focuses on diver safety and non-lethal shark control, similar to the one used by the KBWF Kailua-Kona farm, would be followed for the duration of the trial (KBWF, 2009). This action and the constant movement of the array are expected to limit encounters with sharks and is expected to minimize potential adverse effects of the permit activity on sharks.

**Impact of a Disabled Ship and/or Broken or Breakaway Net Pens**

Operational protocols and practices and gear selection are designed to avoid mechanical mishaps. In the event of mechanical, weather, or equipment related issues, projected environmental effects are anticipated to be minor. The design and deployment practices for the gear incorporate mitigation and recovery methods and redundancy. Should the tender/towing vessel become disabled or the net pens become broken or break away from the array, operational protocols are in place to minimize or avoid anticipated potential impacts on the human and ocean environments. Basically, KBWF would rely on the experienced judgment of the captain of the *S/V Machias* to address the issue, with guidance from the Velella Project Emergency Reporting Plan (Appendix E). The failure risks considered in the design of the trial and risk mitigation measures are briefly described below.

The *SV Machias* is a Coast Guard inspected and registered vessel outfitted and approved for open ocean, blue water cruising, that includes space for 24 passengers. It has a highly experienced captain and crew and has sailed the Pacific Islands for over 30 years. Currently, the vessel is approved for service between Hawaii and Kiribati and is equipped with modern communications and navigation technology, e.g., two-way radio, GPS, radar, high frequency transceiversers, etc. It can use both sail power and diesel power and in the event of problems can communicate with the Coast Guard for assistance. In storm conditions, the tender vessel would lay an additional 600 ft of line out from the pens and use the pens as a sea anchor to control vessel orientation and limit drift (Figure 3).

In the event of a break in one or both of the pen structures, attempts would be made to repair the problem at sea. Assistance and materials to repair a problem can be brought by boat from the project base at Honokohau Harbor. Pens can be raised to the surface by using an air compressor on the tender vessel that is connected to ballast tanks (six per pen) in the pens via an air hose. Net pens are each marked with a light and a buoy float and have the residual buoyancy to remain at the surface indefinitely. If a break occurs, a stock assessment would be made and a decision as to whether or not to continue the trial would be made. Impacts of stock escape are discussed elsewhere in this report. Support for the overall operation and transport boats would be available 24/7 from the Honokohau Harbor support base.

Detachment of one or both cages from the tender vessel would require larger scale remedial or corrective actions. In order to minimize risks and avoid mechanical failures, the net pens towing bridle would be inspected frequently and the pens would be under 24/7 observation by vessel crew, staff, and cameras on each pen. Should pens become detached, the lighted surface buoys have enough residual buoyancy to keep the entire array afloat indefinitely. Moreover, if the floats malfunction, at 50 m (164 ft) depth there is a breakaway mechanism for the ballast (pendent) weights on each pen and the entire array would be positively buoyant. Also, each pen is equipped with GPS transmitter and radar reflector for tracking purposes and easy location.

**Effects on Target Species**

The sustainability of the target species, *Seriola rivoliana,* would not be affected by the proposed action because the affected resource is from hatchery stock which would be grown out in and harvested from a net pen at sea. Therefore, no wild stock of this or any Hawaii coral reef ecosystem species is allowed to be harvested under this permit.

The culture, harvesting, and transport of the fish would be done in a manner that prevents accidental release of the target species. If accidental escapes were to occur, there is a high probability of predation from wild fish that may be attracted to the floating pen. Additionally, while *Seriola rivoliana* is a species native to Hawaii, the location of the project would be located far away from reef habitat of this species and post escape settlement is unlikely.

The net pens would be stocked at a relatively low density and constantly flushed with ocean water. Therefore, disease is not expected to affect the target stock in the pens. Preventing and addressing diseases is a primary concern of the permitee. Therefore, diseases would be monitored and addressed by the permitee in coordination with aquatic veterinarians. This would help to reduce the potential of impacts on wild fish from the cultured fish. Low stocking densities, constant vigilance, and the appropriate

knowledge and ability to act swiftly in the case of an outbreak further aids in reducing the potential impacts of the proposed activity on both target and non-target species.

**Effects on Non-target Species**

No large adverse effects would occur to non-target species stocks or stock complexes. Other non-target species may be attracted to the net pen and remain in the area near the pen which could act as a floating fish aggregation device or FAD. The effects of the pens as a fish aggregating devices are not expected to be large and adverse to the migratory habits of pelagic fishes because the pens are relatively small. The project would collect information on the aggregations that form under the pens.

One concern about ocean aquaculture is the potential for diseases to transmit to other species. The movement of the pen is expected to flush the cage preventing buildup of pathogens. There is also not expected to be a need to treat the stock or the pens for biofouling. Due to the relatively low density and the constant moving and flushing of the pen, disease of the pen-reared stock and transmission to other fishes is not expected to occur.

### *3.2.3 Potential Impacts on Essential Fish Habitat (EFH), Habitat Areas of Particular Concern (HAPC) and Biodiversity*

The MSA identifies EFH as those waters and substrates necessary to fish spawning, breeding, feeding and growth to maturity. HAPC is defined as areas where ecological function of the habitat is important, habitat is sensitive to anthropogenic degradation, development activities are, or wouldstress the habitat, or the habitat type is rare. Marine organisms managed by the Act in Fisheries Management Plans involving the water column include highly migratory and pelagic fish species. Marine organisms managed by the Act on the ocean bottom include bottomfish and seamount groundfish, precious corals and coral reef ecosystems and crustaceans.

Important species related to the proposed action are Pelagic Management Unit Species (PMUS), which can be found in the Federal waters 3 to 150 nm off the leeward coast of Hawaiian Island. However, in the Council's recently published Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region, it adopted 1,000 m (3280 ft) as the lower bound of EFH for PMUS and 1,000 m in waters that lie above seamounts and banks within the EEZ shallower than 2,000 m (6560 ft) as HAPC. These broad designations are due to the recognized gaps in scientific information about the life histories and habitat utilization patterns of many PMUS (WPFMC, 2009d).

EFH and HAPC boundaries, as designated by the Council, for all life stages of the bottom fish, seamount groundfish, and coral reef ecosystem MUS are also varied and extensive, going in most cases from the shoreline to 200 nm and depths from the surface to as much as 400 m (1312 ft). These broad designations are also due to the gaps in scientific information about the life histories and habitat utilization patterns in those important fish species (WPFMC, 2009c).

Concerns regarding potential project impacts to EFH include the possible reduction of quality of water column or benthic substrate within the project footprint from fish waste or food accumulation, ecosystem

related impacts due to fish escapes or disease transmission, and disruption or displacement of habitat or migratory patterns from cage configuration.

The relatively small amounts of uneaten feed and the particulate and dissolved waste products of fish metabolism are not expected to accumulate in or near the array since the net pens would be in constant motion that would facilitate rapid nutrient dilution and assimilation by the deep ocean environment, similar to what is observed at the KBWF inshore site (KBWF, 2009). Potential ecosystem impacts due to fish escapes and disease transmission are discussed in detail in Section 3.2.2; however, briefly, it is noted that risks are substantially mitigated by using limited numbers of a native species that is checked for disease prior to and after stocking in the net pens. The chances for habitat disruption or displacement, or impacts on migratory patterns for any species of concern from the cage configuration, are minimal due to the transient nature and short duration of this test which will occur far offshore in a large expanse of the U.S. EEZ.

Although the proposed action would occur within these general EFH and HAPC boundaries, it is of such limited scope and duration that the proposed action is not expected to cause any negative impacts to designated EFHs and HAPCs of any managed finfish species. Likewise, due to these clear limitations, it is anticipated that any impacts on the biodiversity of the Hawaii Archipelagic ecosystem would be negligible.

### *3.2.4 Potential Impacts on Protected Species*

**Seabirds**

The proposed action is not expected to have any negative effect to seabirds in the region. Attraction of protected species of seabirds has not been an issue to date with either of the two existing nearshore aquaculture farms utilizing submerged cage technology according to proprietors with 15 years of operating experience, i.e., Hukilau Foods off of Ewa Beach, Oahu and Kona Blue Water Farms, Kailua-Kona, Island of Hawaii (HF, 2009; KBWF, 2009). Expectations are that a moving array of two net pens that spend the majority of time submerged at 25 ft below the sea surface would not attract oceanic seabirds of concern or pose an entanglement risk. When at the surface, staff would be working on the net pens, and would thus serve as deterrents for seabirds. Moreover, netting is made of small-sized (largest diameter of 50 mm or 2 in), slightly stiff, brass mesh material rendering the interior of the pen inaccessible to seabirds (Figure 2). Pursuant to 50 CFR §665.224, PIRO sent information pertaining to the application of this project to the U.S. Fish and Wildlife Service (USFWS) which has jurisdiction over listed seabirds. No comments were received from the USFWS.

**Sea Turtles and Marine Mammals**

General concerns over open ocean aquaculture's potential impacts on rare, threatened, endangered, and protected species focus on the potential for the project to alter an animal's behavior or habitat, as well as the potential for harm by entanglement in netting and mooring lines (KBWF, 2009). While protected species of whales and dolphins are likely to be found in the study area, the presence of protected and highly migratory sea turtles should be rare due to the extreme depth of the water and distance from the shallow, coastal waters they normally frequent to feed and breed (more detail on protected resource distribution may be found in WPFMC 2009b).

Though a number of ESA and non-ESA listed species of marine mammals occur in State and Federal waters around the main Hawaiian Islands, the likelihood of the trial affecting their habitat or behavior or causing them harm through entanglement or a collision is considered highly unlikely. Humpback whales, Hawaii's premier whale species, when in Hawaiian waters usually stay in shallow, nearshore waters 100 fathoms or less except during migrations.

In moving between Kawaihae Harbor and the U.S. EEZ project site and the desired eddies, the tender vessel and net pen array would pass through under power the Hawaiian Islands Humpback Whale National Marine Sanctuary. The boundaries of the Sanctuary near Kawaihae Harbor extend to approximately two nm from shore. Whales are known to frequent the Hawaiian Islands in abundance from approximately November to March and years of observation data posted by the Sanctuary on its web site indicate the likely area of transit by the array is a low to moderate abundance area. None the less, while transiting this area during whale season, crew members would be posted and the tender vessel and array would actively avoid contact with whales.

Other ocean-going, migratory whale species, though observations are sparse, are relatively rare around the main islands. Likewise, the monk seal is also known to occur in the region and occasionally travel between the Northwestern Hawaiian Islands and the main Islands, but tends to inhabit shallow coastal waters.

Experience to date with fixed point, nearshore aquaculture in Hawaii is that net pens full of fish do not attract whale species, but occasional turtles and dolphins will hang around the pens for indefinite periods of time (HF, 2009; KBWF, 2009). Again, the constant motion of the aquaculture array would tend to dissuade such behavior, as would KBWF's consistent removal of any dead fish from the pens. As noted above, dead fish would be frozen and disposed of off-site. Maximum speed of the array at any time is estimated to be about two kts. By comparison, NOAA general guidance for vessels transiting when whales may be present states research shows that collisions occurring at vessel speeds above 10 kts cause more serious problems than those at lesser speeds (HIHWNMS, 2011b). Careful piloting of vessels will prevent harm to marine mammals.

A concern with protected species, particularly marine mammals, is entanglements in nets and lines used with aquaculture net pens. The basic configuration of the towed net pen array, including shape of the pens and location and length of all lines, support structures and counter weights can be found in Figure 3. The towline is a 1.25 in, 8-strand plaited nylon rope and all other lines are 1 in, 8-strand nylon rope. The umbilical line from the tender vessel to the net pen bundles the towline and the feeding hose, air compressor hose and electronic cable for the monitoring camera.

The trial would apply the widely accepted approach to mitigating entanglement risk by maintaining tight netting and mooring lines at all times. The tender vessel would always be either under wind drag that provides tension on the lines or would be towing the pens under power which also would provide line tension. This approach has worked well with HF, and particularly KBWF, which is located in the whale sanctuary, as there have been no incidents of protected species entanglements in a combined 15 years of operation (HF, 2009; KBWF, 2009). In addition, all staff and crew aboard the tender vessel would adhere to the same marine mammal management and reporting plan as used at KBWF's Kailua-Kona site and report any contacts to, and immediately discuss any problems with, appropriate Federal officials (Appendix E). Also, contributing to the significant reduction of entanglement risk with this project is the

structure of the pens and the slightly stiff mesh netting, with a diagonal gap no larger than 50 mm (2 in), made of 1.25 in long woven brass strands (Fig. 2).

Also of environmental concern, as discussed in the MMPA and the ESA, are potential impacts of project effluents and noise that might emanate from the project. The minimal release and anticipated rapid dilution and assimilation of particulate and dissolved uneaten feeds ad fish metabolites are discussed in detail in Section 3.2.1 and it is anticipated concentration would not be measurable and not impact protected species.

Noise from a drifting or sailing ship, or a sailing ship under power, is expected to be minimal, as would the occasional sound of feed being pumped to the fish in the net pens and the raising and lowering of the pens. Impacts of these issues on protected species are expected to be negligible. The main power of the sailing vessel, when not using sail, is a diesel engine rated at 190 horsepower that would push the array along at a maximum speed of two knots. This is expected to make less noise than the average powered vessel transiting the test area. Further, air entering and leaving pen ballast tanks makes a soft hissing sound that is barely audible.

Finally, KBWF is required to keep records on any interactions with protected species and would report such activity should it occur (Appendices D and E).

#### *3.2.5 Potential Impacts on Major Ocean Uses and Environmental Justice Issues*

The tender and submerged net pen array would be in a constant controlled drift – pushed along either by eddy currents, sail power, or diesel power – in ocean waters between 3 and 150 nm from the leeward coast of the Island of Hawaii for approximately 10 months. The array would be operated and lighted according to U.S. Coast Guard requirements for a vessel towing a barge (Miller, 2010). The tender vessel is equipped with modern telecommunications equipment and radar suitable for long distance trips over the open ocean and for communicating with other boat traffic. As such, other likely ocean users, e.g., commercial and recreational fishers and boaters, military vessels and cargo ships should view the array (vessel and submerged cages) as another vessel, albeit a sailing vessel, and be subject to normal maritime rules, "U.S. Coast Guard Rules of the Road" (Navigation Rules COMTINST M16672.2D), for transiting the ocean (Miller, 2010).

It is anticipated that curious boaters venturing very far from shore would know U.S. Coast Guard Navigation Rules and would use common sense and follow safe boating practices when approaching the array. The towing situation would be signaled by standard lights and flags and displaying dive flags when divers are in the water. KBWF does not intend to publicize or promote this potential fishing opportunity to local fishers due to concerns over staff safety, i.e., divers would be in the water every day. Doing so could also be counter-productive to the purpose of the test if large numbers of boats fish around the array.

If issues were to arise with boats coming too close to the array, crew members would communicate via radio or otherwise the nature of the tow situation to approaching vessel operator(s) and seek cooperation. KBWF recognizes that commercial and recreational fishers occasionally may want to troll near the array due to the likelihood it could attract pelagic species of game fish. The fishing permit does not grant any exclusive geographic ocean access to KBWF; however private property rights would remain for the net pen structures and the fish inside. KBWF does not object to boats trolling around the array, as long as the

boats operate according to safe boating practices, and stay far enough away from and do not transit over the net pens or between the net pens and the tender vessel to avoid entangling fishing lines.

Environmental Justice has been an important topic in recent years in considering Federal actions of all types. The concept includes the notion of fair treatment or implementation of policies and practices that ensure that no group of people, including racial, ethnic, or socioeconomic groups, bear disproportionately high and adverse human health or environmental effects resulting from Federal programs, policies, and activities.

In the case of this action, the granting a permit for a limited scope and duration trial of a new method of harvesting fish from the U.S. EEZ, there should be little or no impact on any member of the West Hawaii community. This conclusion is supported by the following: 1) the plan to conduct the proposed action 3 to 150 nm from shore; 2) the lack of any claim to exclusive access to the ocean; 3) the managed use of the harbor facilities by the State of Hawaii; and 4) the anticipated limited use by the West Hawaii community of the test area of 7,200 $nm^2$.

### *3.2.6 Potential Impacts on Cultural Resources and Practices*

Potential degradation of cultural resources or restrictions of cultural practices by Federal actions are a concern of both NOAA and the public. This project would by-and-large take place in the open ocean, 3 to 150 nm from the coast of West Hawaii and in waters 10,000 to 12,000 ft deep. KBWF is not aware of any Hawaiian cultural resources or practices that would be affected by carrying out this action in the open ocean waters of the U.S. EEZ. Study of this issue for a fixed point aquaculture project 2.6 nm off the Kohala Coast of West Hawaii concluded, after extensive oral history interviews and document searches that this particular site had no particular cultural significance. Culturally significant resources and practices normally occur within State waters or within 3 nm miles of shore (HOT, 2008).

Support facilities for the project are located at a well-developed, well-used State harbors at Kawaihae and Honokohau, Island of Hawaii. As such, the action of the tender vessel/net pen array and use of the support facilities would have no effect on any historical or archeological resources or cultural practices.

### *3.2.7 Cumulative Impacts*

No cumulative impacts are expected given the limited scope and short duration of this project. The "footprint" for the proposed test project is small, and would have fewer environmental impacts than existing and long-term, fixed point mariculture projects already occurring in State waters that do not themselves, have known adverse impacts. The proposed permit would not result in extraction of biological resources from the environment and inputs, in terms of particulates and metabolites, are expected to be insignificant and quickly diluted.

NOAA encourages the research, development, and demonstration of emerging technologies, including offshore and open ocean aquaculture, to increase domestic supplies of seafood and has issued a Draft Aquaculture Policy to guide development (NOAA, 2011). Issuance of a permit for the conduct of the proposed gear test to culture and harvest a MUS does not, however, obligate NMFS, PIRO, WPFMC, or any other Federal agency to approve another trial of the Velella Concept at any scale in the proposed region or any other site in Hawaii. If another gear trial is proposed in the future, an application for a permit would begin a new approval process with appropriate environmental review based on results from the proposed test deployment and in compliance with associated legal requirements at the time.

#### *3.2.8 Potential Impacts Related to Global Climate Change*

This trial would take place in an open ocean environment that is dynamic and subject to the long-term impacts of global climate change. In a 2007 report, the Intergovernmental Panel on Climate Change (IPCC) came to the firm conclusion that global climate change is occurring. This megachange in the warming of the earth's climate is beginning to show impacts on marine ecosystems through such evidence as changes in ice coverage, salinity, oxygen levels, circulation and ranges of some species (Solomon et al., 2007). While global climate change is clearly a priority issue for all the world's nations, this small-scale test would have very little impact on the environment and a very small carbon footprint. For example, the trial would use ocean currents and wind energy to supplement and reduce the use of diesel power and the feed being used would have about half the usual amount of fish meal, making up the balance of these nutrients with more abundant plant-based proteins and oils. No impacts to the net pen and tender vessel array are associated with global climate change.

#### *3.2.9 Effects on Administration and Enforcement*

The applicant would be required to adhere to the permit conditions listed in Section 2.2.4. These conditions are considered enforceable, and the proposed trial is small in scale and not expected to require additional law enforcement or administrative burden. Also, the proposed trial would be of limited duration and the processing of submitted logbooks would have no substantial effect on administration.

## 4.0 Coordination with Others

### 4.1 Coordination with Agencies

- NOAA, National Marine Fisheries Service, Pacific Islands Regional Office
  - NMFS, PIRO, Sustainable Fisheries Division
  - NMFS, PIRO, Protected Resources Division
  - NMFS, PIRO, Habitat Conservation Division
- Western Pacific Regional Fishery Management Council
- Hawaii Department of Land and Natural Resources
- United States Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office
- United States Coast Guard, Fourteenth Coast Guard District

### 4.2 Public Review

The draft EA is being posted on the NMFS PIR website at: http://www.fpir.noaa.gov/.

Members of the public will be able to obtain a copy of the EA online or through the mail. The EA was posted on the NMFS website on March 17, 2011.

The website and cover page contains information on how to obtain a copy of the document and how to comment. Members of the public may provide comments on the draft EA. Comments should be received by mail or email at the agency by 11:59pm (midnight) March 27, 2011. Comments received will be considered by the Regional Administrator in determining whether or not the issuance of the permit would result in significant environmental impacts. Comments may be published so commenters should not send

proprietary or private information. People wishing to comment anonymously are requested to provide postal zip code information so that any location-sensitive concerns can be noted by the agency.

The initial results of an environmental analysis contained in the draft EA indicate that NMFS' proposal to issue a permit authorizing the culture and eventual harvest of up to 20,000 lb of *Seriola rivoliana*, a native fish using floating untethered net pens in the U.S. EEZ around Hawaii, is a relatively small scale test of the technology and has little risk of adverse impacts. The document shows the proposed activities under the permit would not have a large and adverse environmental effect on the environment.

## 5.0 List of Preparers

**NOAA Contactor**
John S. Corbin, MS, CFP, AICP
Coral Reef Management Specialist
Joint Institute of Marine and Atmospheric Research
University of Hawaii at Manoa
1000 Pope Road, Marine Science Building 312
Honolulu, Hawaii 96822

Mr. Corbin has over 30 years experience in aquaculture research, planning and development. He researched and co-authored *Aquaculture Development for Hawaii*, the first comprehensive state aquaculture plan in the nation. In 1978, he became manager of the State Hawaii Development Program, which carried out planning and policy development, provision of industry support services and funding of research and development projects. While manager, a position he held until 2006, he and his staff assisted hundreds of businesses, from small family farms to large corporate commercial enterprises, in selection of species and technologies, siting, permits, operations improvement, health management, and product marketing. In 1999, he led an effort to amend Hawaii's ocean leasing law to allow commercial cage culture, co-authoring the amendments. From 2000 to 2003, Mr. Corbin worked with a team from the Center for Marine Policy, University of Delaware, on two studies for Congress, addressing: 1) development of a policy framework for the U.S. Exclusive Economic Zone (USEEZ); and, 2) operational guidelines for aquaculture in the USEEZ. He received his B.S. in Zoology and Chemistry from the University of Miami and M.S. in Biological Oceanography from the University of Hawaii. He is certified as a Fisheries Professional by the American Fisheries Society; Planner by the American Institute of Certified Planners; and, State Manager by the State Department of Human Resource Development and the U.S. Office of Personnel Management. Since leaving state government at the end of 2006, he established a company to offer expertise in aquaculture planning, permitting and business development, particularly for island settings.

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## Appendix A: Agencies Consulted

- NOAA, Hawaii
  - National Marine Fisheries Service, Pacific Islands Regional Office
    - NMFS, PIRO, Sustainable Fisheries Division
    - NMFS, PIRO, Protected Resources Division
    - NMFS, PIRO, Habitat Conservation Division
- Western Pacific Regional Fishery Management Council
- Hawaii Department of Land and Natural Resources
- United States Fish and Wildlife Service, Pacific Islands Office
- United States Coast Guard, Waterways Management Division

## Appendix B: Applicant Correspondence

1. Letter from Mr. Tosatto to Mr. Sims dated November 4, 2010 acknowledging request for authorization.
2. Special Cora Reef Ecosystem Fishing Permit Application Form submitted by Mr. Sims on November 5, 2010.
3. Letter from Mr. Tosatto to Mr. Sims dated November 24, 2010 requesting more information for the permit application.
4. Letter from Mr. Sims to Mr. Tosatto dated November 29, 2010 providing additional application information.
5. Letter from Mr. Tosatto to Mr. Sims dated December 21, 2010 acknowledging application is complete for review.

**U.S. DEPARTMENT OF COMMERCE**
**National Oceanic and Atmospheric Administration**
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1601 Kapiolani Blvd., Suite 1110
Honolulu, Hawaii 96814-4700
(808) 944-2200 • Fax: (808) 973-2941

NOV - 4 2010

Mr. Neil Anthony Sims
Kona Blue Water Farms
P.O. Box 4239
Kailua-Kona, HI 96745-4239

Dear Mr. Sims:

Thank you for your letter of September 17, 2010, requesting authorization to conduct a beta test of the "velella" concept for open-ocean aquaculture of the native carangid (jack), *Seriola rivoliana* in the Exclusive Economic Zone (EEZ) off of the Big Island of Hawaii.

Commercial aquaculture of a species managed under a federal fishery management plan in the EEZ is considered to be fishing under the Magnuson-Stevens Fishery Conservation and Management Act. *Seriola rivoliana* is listed as a Potentially Harvested Coral Reef Taxa (PHCRT) under the Fishery Ecosystem Plan for the Hawaii Archipelago. Because federal regulations require that coral reef species be taken only with allowable gears and the "velella" is currently not identified as such an allowable gear, a Hawaii Coral Reef Ecosystem Special Permit is required to beta test this gear.

I must note that since the proposed gear has never been evaluated for potential environmental impacts, an analysis under the National Environmental Policy Act would be required as part of the federal permit application process.

I have enclosed copy of the coral reef special permit application and an excerpt of the relevant regulations outlining the requirements of the application process. Please contact Alan Everson at 944-2212 with any questions. I look forward to working with you to undertake this project.

Sincerely,

Michael D. Tosatto
Acting Regional Administrator

cc: Frederick Tucher, Regional Counsel Pacific Islands
Alvin Katekaru, Assistant Regional Administrator,
Sustainable Fisheries Division

NOAA National Marine Fisheries Service
Pacific Islands Regional Office ATTN: SFD Permits
1601 Kapiolani Blvd. Suite 1110
Honolulu, HI 96814-4700
Ph: (808) 944-2200; FAX: (808) 973-2940

OMB Control No. 0648-0463
Expires: 8/31/2012

## Special Coral Reef Ecosystem Fishing Permit Application Form

**Applicant Information** (Please print legibly) Date: 11/5/2010

Full Name or Business Name: KONA BLUE WATER FARMS, INC.

Taxpayer Identification Number (TIN): [redacted] Date of Birth/Incorporation: [redacted]

Business Mailing Address: [redacted] KAILUA-KONA, HI 96745
Street Apt.# City State ZIP

Phone: [redacted] Cell: [redacted] Fax: [redacted] Email: [redacted]

Vessel Name: S.S. MACHIAS Home Port: HONOLULU

Length (ft): LOA 82 FT Net Tonnage: 18 NRT Gross Tonnage: 35 GRT

Vessel: (check one) USCG Documentation (●); State License ( ); Vessel Registration Number: [redacted]

**Vessel Operator:**

Name: OCEAN CHARTER SERVICE, INC. Phone: [redacted] Fax: [redacted]

Address: [redacted] HONOLULU, HI, 96817
Street Apt.# City State ZIP

**Privacy Act Statement:** Federal Regulations (at 50 CFR Part 665) authorize collection of this information. This information is used to verify the identity of the applicant(s) and to accurately retrieve confidential records related to federal commercial fishery permits. The primary purpose for requesting the TIN is for the collection and reporting on any delinquent amounts arising of such person's relationship with the government pursuant to the Debt Collection Improvement Act of 1996 (Public Law 104-134). Personal information is confidential and protected under the Privacy Act (5 U.S.C. 552a). Business information may be disclosed to the public.

Is this permit solely to transship coral reef ecosystem taxa received from another vessel around the EEZ of the Northwest Hawaiian Islands, the Pacific Remote Island Areas, or any other MPA? NO

Do you agree to accommodate an observer on board while fishing, if required? YES

Does vessel have an individual Vessel Monitoring System? NO

Does vessel have insurance covering removal/clean-up in event of a grounding? YES Name of Insurer: THOMPSON BUDAR AGENCY, HNL

Do you agree to submit daily log data within 30 days of returning to port? YES or transshipment log data within 7 days of returning to port? N/A

**Check any special exemption for which you qualify and would like to be eligible for under this permit application** (attach description of conditions under which you apply):

Other FMP ( ) Scientific Bioprospecting ( ) General Indigenous ( ) Indigenous use of live rock/coral ( )
Aquaculture seed stock of coral ( )

**In which EEZ Management Subarea will fishing be conducted?** (check only one)

Main Hawaiian Islands (●) American Samoa ( ) Guam ( )
Guam's Southern Banks ( ) CNMI ( ) PRIA (specify) ( )

**Describe your intended fishing effort, general fishing grounds, gear to be used and methods of collection**

| Target Species or Taxa | | | | Expected Incidental Species or Taxa | | |
|---|---|---|---|---|---|---|
| Species Name | Expected Catch (lb) (#, wt.) | How will it be processed?[1] | Why harvested? [2] | Species Name | Expected Catch (lb) (#, wt.) | Keep? |
| Seriola rivoliana | 20,000 lbs | Fresh | Food | None | | |
| | | | | | | |
| | | | | | | |

[1] Live, fresh, frozen, preserved, other
[2] Food, ornamental, research, other

**Use back, if necessary; total expected catch during permit period for target species required for permit approval**
**Attach statement regarding objectives of fishing operation, estimated ecosystem, habitat and protected species impacts, and any additional information to help support approval of this application. Attach copy of USCG vessel documentation or state/territory vessel registration.**
**It is prohibited to file false information on any application for a fishing permit** (50 CFR § 665.15(b)).

Signature: [signature] Date: 11/10/2010

Please return completed and signed application to: NMFS Pacific Islands Regional Office, ATTN: Permits
1601 Kapiolani Blvd., Suite 1110, Honolulu, HI 96814-4700

**U.S. DEPARTMENT OF COMMERCE**
**National Oceanic and Atmospheric Administration**
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1601 Kapiolani Blvd., Suite 1110
Honolulu, Hawaii 96814-4700
(808) 944-2200 · Fax: (808) 973-2941

NOV 2 4 2010

Mr. Neil Anthony Sims
Kona Blue Water Farms
P.O. Box 4239
Kailua-Kona, HI 96745-4239

Dear Mr. Sims:

Thank you for applying for a Special Coral Reef Ecosystem Fishing Permit to test the feasibility of deploying and operating two unmoored submersible, brass-meshed pens stocked with *Seriola rivoliana* in Federal waters off the Kona coast of the Island of Hawaii. We have reviewed your application and determined that it is not yet complete. The consideration or your proposal requires a comprehensive assessment of the potential environmental impacts (direct, indirect and cumulative) of the proposed activity. To complete this assessment, information including, but not limited to, the content of feed pellets (i.e., percent of fishmeal/oils, antibiotics/medication), the frequency of feeding and tender vessel provisioning, monitoring of water quality, marine mammal interaction monitoring and mitigation, contingency planning (storm events/gear loss), and the anticipated amount of escaped fish is required.

Fortunately, much of this information may be contained in the April 2009 Final Supplemental Environmental Assessment (FSEA) document for Kona Blue Water's existing offshore fish farm. We would like to meet with you to discuss the additional information needed to complete your application and conduct the necessary analyses. Please contact Toby Wood, Fishery Policy Analyst, at (808) 944-2234 to arrange this meeting.

Sincerely,

Michael D. Tosatto
Acting Regional Administrator

KONA BLUE
KONA BLUE WATER FARMS

NMFS/PIRO
DEC - 6 2010

November 29, 2010

Michael Tossato
Acting Regional Administrator
NOAA, PIRO
1601 Kapiolani Blvd, Suite 1110
Honolulu, HI 96814-4700

Dear Michael,

Thank you for your letter of 11/24/2010, requesting additional information on our Special Coral Reef Ecosystem Fishing Permit application.

I will respond point-wise to the specific questions you raise:

1. The content of feed pellets (i.e. percent of fishmeal/oils, antibiotics/medication),

The feed that we will use in the Velella trial will be precisely the same feed formulation as that which is currently used on the Keahole Point grow-out site. This is produced by Skretting in Canada, and meets the highest standards for feedstuff quality and QA/QC in production.

One of the key tenets of Kona Blue's aspirations towards greater sustainability has been a relentless drive to reduce the amount of fishmeal and fish oil from reduction fisheries in our Kona Kampachi® diets. The feed as presently formulated contains 20% fishmeal (of which 10% is fishmeal from trimmings from processing in the B.C. hake fishery) and 10% fish oil. The reduction fishery products are derived from the Peruvian anchovetta fishery – the largest such fishery, and one of the most responsibly managed reduction fisheries in the world.

There are no prophylactic antibiotics or other medications included in the feed. We do not expect to have to use any therapeutants during the course of the Velella trial. This is because of the key characteristic of the Velella concept: the cultured fish are separated from any potential pathogen or parasite reservoir on wild reef fish by many miles, and are only exposed to open ocean seawater and pelagic fish species. There is therefore very little likelihood of transmittal of any parasite or pathogen from wild fish to the cultured fish (which is the usual vector for pathogen/parasites in the cultured animals). The Velella is essentially a pristine farm site for each new stocking. We therefore do not expect to see skin flukes or bacterial infections on these cultured fish.

The 2009 Final Supplemental EA details the use of therapeutants to treat the skin fluke and bacterial infections that have been found on fish at the Keahole Point farm site. In the unlikely event of any skin fluke infestation or bacterial infection in the Velella project, Kona Blue would seek the advice and guidance of an authorized veterinarian to direct us on the best course of action. If the veterinarian were to recommend use of any approved therapeutants, these would only be administered under the standard treatment protocols, and with the oversight of USFWS, under an approved INAD (Investigational New Animal Drug permit from FDA), as detailed in the 2009 Final Supplemental EA.

2. The frequency of feeding and tender vessel provisioning

As with the fish that are cultured on the Keahole Point grow-out site, the fish in the Velella trial will initially be fed 5 times per day. As the fish grow larger, then the frequency of feeding is reduced. By the time the fish are around 2 lbs (1 kg), they are only fed once per day. Fish are fed each time to a level just below satiation, to ensure that no excess feed is wasted, and to maximize the assimilation of the feed by optimizing digestive efficiency.

The tender vessel will be provisioned about once each week (when the Velella is within ready range of Kona); and less frequently if the Velella is carried further offshore by the eddies. These provisioning trips on a smaller vessel (25 – 35 ft Radon, or similar) will also provide opportunity for Kona Blue to change crews, and conduct other research at the Velella array. We would make every effort to accommodate NOAA scientists if they wished to accompany us on some of these trips.

The tender vessel should be able to carry sufficient feed to sustain operations for around 6 months. At this point, a smaller vessel will assume the role of the tender, allowing the larger tender to return to Kawaihae Harbor and re-load the feed for the final four months of grow-out. The entire grow-out will therefore be accomplished by just a single round trip of the tender vessel from the array to the harbor.

3. Monitoring of water quality

Kona Blue has been monitoring the water quality around the Keahole Point grow-out site over the past five years. We have made the data from this available on our web site, at www.kona-blue.com. These data demonstrate overwhelmingly that there is no detectable impact on water quality from the Keahole Point operation, even when production volumes peaked at around 500 tons per year (in 2008).

The Velella project will only harbor around 6,000 fish, versus the almost 500,000 fish that were stocked to the Keahole Point site over the course of 2008; i.e. Velella will involve only 1.2% of the fish at Keahole Point during peak production. In addition, the Velella project will be located between 3 and 150 miles offshore, in waters over 12,000 ft deep, and constantly moving over the substrate. By contrast, the Keahole Point site is a mere ½ mile offshore from a pristine coral reef, located in waters around 200 ft deep, and is in a fixed position over the substrate. This all indicates that the Velella will have no measureable impact on water quality.

Under EPA regulations, an NPDES water quality monitoring plan is only required if a production facility exceeds 100,000 lbs production in one year. With only 6,000 fish grown to 4 lbs in size, the Velella will not even attain one quarter of the EPA threshold. It is therefore neither required, nor reasonable, to consider conducting any water quality monitoring around the Velella.

4. Marine mammal interaction monitoring and mitigation

The Kona Blue employees that will be staffing the Velella will record any sightings of marine mammals either from the surface, during dives to tend to the net pens, or while monitoring the underwater cameras on the array. Number, size, behavior and duration of residence around the array will be recorded. The staff will also note any other fish or birds around the tender vessel or the pens. The results from this monitoring will be made available to NOAA on request.

We expect no negative interaction with marine mammals, and therefore no mitigation is planned. The only negative marine mammal interaction at the Keahole Point farm site has been one bottle-nose dolphin that is regularly attracted to the pens – and several others that are rarely present – by the occasional provisioning by incidental escapes from the pens (as divers entered or left the cages through the submerged zippers). To reduce this provisioning, the offshore operation has installed net pen entry points on the newly-deployed Sea Station pen that are accessible by divers from above the surface, when the pen is raised. This has eliminated incidental escapes, and significantly reduced the provisioning of the dolphin. The Aquapod net pens that will be used in the Velella will similarly be equipped with hatches that allow entry by divers from above the water, when the pen is raised.

5. Contingency planning (storm events/gear loss)

As the Velella net pen array is usually submerged, storm events present no problem for the cages. The net pens will be submerged to around 25 ft deep – around the same depth as the net pens on the Keahole Point farm site. Storm conditions over the past 5 years at Keahole have not resulted in any significant damage to the pens. We therefore do not expect any damage to the Velella pen array.

The plan during storm conditions is for the tender vessel to lay an additional 600 ft of line out from the pens, and to use the pens as a sea anchor to control the vessel orientation and limit drift. Each of the pens will have attached sufficient residual buoyancy in the buoy float-lines to remain at the surface, even if the pens break free from the vessel, or become detached from each other. For a pen to be lost, then it would need to become detached from both its own surface float-line and from the rest of the array. The buoy float-line at the top of each pen will also include a GPS transmitter and radar reflector, so that if the pens do become detached from the vessel, they can be readily located as the storm abates, and reattached to the array.

6. Anticipated amount of escaped fish

We do not anticipate any escaped fish from the brass-mesh Aquapod net pens that will be used in the Velella trial. This mesh material is very robust (2.5 mm diameter UR30 alloy wire), and the cages will be submerged – isolated from wave action – for most of the time. The incidental

"leakage" escapes that have previously occurred at the Keahole Point site will be avoided in the Velella project by divers accessing the pen through the hatch at the top of the cage, which is emergent when the pen is raised.

If there is a catastrophic engineering failure, and the pen is breached, then the fish will likely behave in a similar manner to the escapees on the Keahole Point site: the escaped fish will remain close to the net pen, as this structure offers the only protection against predation. Blue water is a very dangerous environment for these relatively slow-swimming, deep water fish. The cage-cultured fish are also naïve to predators ("fat, slow, and stupid", as we call them), and will be subjected to very heavy predation by the larger pelagic fish that may aggregate around the cages. As the Velella will be located in very deep water, some 3 – 150 miles offshore, the probability of any of these escapees surviving to reach an island is negligible.

Even if the escapees did survive, and reach their natural habitat in the reef drop-off around the islands, these fish are progeny from locally-collected broodstock. There is no active selective program in the hatchery, and so there is little likelihood of any genetically significant difference between the escapees and the rest of the wild population.

The overall goal of this research.

We feel that it is perhaps valuable to note again the scale of this Velella project. The proposed project is a mere 6,000 fish: it is around 5% of the biomass of fish that is presently stocked into a single net pen at the Keahole Point farm site. This biomass is therefore insignificant, the feed amounts are relatively miniscule, and the potential ecological impacts are immeasurably small. We have deliberately designed this experiment and established this scale for the trial to be able to provide assurances to regulatory agencies and the public (once we publicize the project) that there are no possible negative impacts from this operation.

Certainly, if this project is successful and Velella moves forward towards commercial reality, some more detailed analysis of the cumulative and other impacts is fully warranted. At this stage, however, this is a very, very small scale experiment.

We are happy to assist you in the further review of this project. I am willing to travel to Honolulu to meet with Toby Wood or others to work through any additional questions, as you desire. Please let us know how else we might be of further assistance.

Thank you in anticipation.

Aloha, sincerely,

Neil Anthony Sims
Co-Founder; President; Co-CEO

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1601 Kapiolani Blvd., Suite 1110
Honolulu, Hawaii 96814-4700
(808) 944-2200 • Fax (808) 973-2941

DEC 2 1 2010

Mr. Neil A. Sims
Kona Blue Water Farms
P.O. Box 4239
Kailua-Kona, HI 96745-4239

Dear Mr. Sims:

NOAA Fisheries Service has received your application for a Special Coral Reef Ecosystem Fishing Permit to test the feasibility of deploying and operating two unmoored submersible, brass-meshed pens stocked with *Seriola rivoliana* in Federal waters off the Kona coast of the Island of Hawaii. We have determined that the application, which includes the additional information you provided, contains the required information needed for further review.

Sincerely,

Michael D. Tosatto
Regional Administrator

# Appendix C:

## Title 50: Wildlife and Fisheries PART 665—FISHERIES IN THE WESTERN PACIFIC Subpart C—Hawaii Fisheries § 665.224 Permits and fees.

(a) *Applicability.* Unless otherwise specified in this subpart, §665.13 applies to Hawaii coral reef ecosystem permits.

(1) *Special permit.* Any person of the United States fishing for, taking or retaining Hawaii coral reef ecosystem MUS must have a special permit if they, or a vessel which they operate, is used to fish for any:

(i) Hawaii coral reef ecosystem MUS in low-use MPAs as defined in §665.199;

(ii) Hawaii Potentially Harvested Coral Reef Taxa in the coral reef ecosystem management area; or

(iii) Hawaii coral reef ecosystem MUS in the coral reef ecosystem management area with any gear not specifically allowed in this subpart.

(2) *Transshipment permit.* A receiving vessel must be registered for use with a transshipment permit if that vessel is used in the Hawaii coral reef ecosystem management area to land or transship PHCRT, or any Hawaii coral reef ecosystem MUS harvested within low-use MPAs.

(3) *Exceptions.* The following persons are not required to have a permit under this section:

(i) Any person issued a permit to fish under any FEP who incidentally catches Hawaii coral reef ecosystem MUS while fishing for bottomfish MUS, crustacean MUS, western Pacific pelagic MUS, precious coral, or seamount groundfish.

(ii) Any person fishing for Hawaii CHCRT outside of an MPA, who does not retain any incidentally caught Hawaii PHCRT; and

(iii) Any person collecting marine organisms for scientific research as described in §665.17, or §600.745 of this chapter.

(b) *Validity.* Each permit will be valid for fishing only in the fishery management area specified on the permit.

(c) *General requirements.* General requirements governing application information, issuance, fees, expiration, replacement, transfer, alteration, display, sanctions, and appeals for permits are contained in §665.13.

(d) *Special permit.* The Regional Administrator shall issue a special permit in accordance with the criteria and procedures specified in this section.

(1) *Application.* An applicant for a special or transshipment permit issued under this section must complete and submit to the Regional Administrator a Special Coral Reef Ecosystem Fishing Permit Application Form issued by NMFS. Information in the application form must include, but is not limited to a statement describing the objectives of the fishing activity for which a special permit is needed, including a general description of the expected disposition of the resources harvested under the permit ( *i.e.*, stored live, fresh, frozen, preserved, sold for food, ornamental, research, or other use, and a description of the planned fishing operation, including location of fishing and gear operation, amount and species (directed and incidental) expected to be harvested and estimated habitat and protected species impacts).

(2) *Incomplete applications.* The Regional Administrator may request from an applicant additional information necessary to make the determinations required under this section. An applicant will be notified of an incomplete application within 10 working days of receipt of the application. An incomplete application will not be considered until corrected in writing.

(3) *Issuance.* (i) If an application contains all of the required information, the Regional Administrator will forward copies of the application within 30 days to the Council, the USCG, the fishery management agency of the affected state, and other interested parties who have identified themselves to the Council, and the USFWS.

(ii) Within 60 days following receipt of a complete application, the Regional Administrator will consult with the Council through its Executive Director, USFWS, and the Director of the affected state fishery management agency concerning the permit application and will receive their recommendations for approval or disapproval of the application based on:

(A) Information provided by the applicant;

(B) The current domestic annual harvesting and processing capacity of the directed and incidental species for which a special permit is being requested;

(C) The current status of resources to be harvested in relation to the overfishing definition in the FEP;

(D) Estimated ecosystem, habitat, and protected species impacts of the proposed activity; and

(E) Other biological and ecological information relevant to the proposal. The applicant will be provided with an opportunity to appear in support of the application.

(iii) Following a review of the Council's recommendation and supporting rationale, the Regional Administrator may:

(A) Concur with the Council's recommendation and, after finding that it is consistent with the goals and objectives of the FEP, the national standards, the Endangered Species Act, and other applicable laws, approve or deny a special permit; or

(B) Reject the Council's recommendation, in which case, written reasons will be provided by the Regional Administrator to the Council for the rejection.

(iv) If the Regional Administrator does not receive a recommendation from the Council within 60 days of Council receipt of the permit application, the Regional Administrator can make a determination of approval or denial independently.

(v) Within 30 working days after the consultation in paragraph (d)(3)(ii) of this section, or as soon as practicable thereafter, NMFS will notify the applicant in writing of the decision to grant or deny the special permit and, if denied, the reasons for the denial. Grounds for denial of a special permit include the following:

(A) The applicant has failed to disclose material information required, or has made false statements as to any material fact, in connection with his or her application.

(B) According to the best scientific information available, the directed or incidental catch in the season or location specified under the permit would detrimentally affect any coral reef resource or coral reef ecosystem in a significant way, including, but not limited to, issues related to spawning grounds or seasons, protected species interactions, EFH, and habitat areas of particular concern (HAPC).

(C) Issuance of the special permit would inequitably allocate fishing privileges among domestic fishermen or would have economic allocation as its sole purpose.

(D) The method or amount of harvest in the season and/or location stated on the permit is considered inappropriate based on previous human or natural impacts in the given area.

(E) NMFS has determined that the maximum number of permits for a given area in a given season has been reached and allocating additional permits in the same area would be detrimental to the resource.

(F) The activity proposed under the special permit would create a significant enforcement problem.

(vi) The Regional Administrator may attach conditions to the special permit, if it is granted, consistent with the management objectives of the FEP, including, but not limited to:

(A) The maximum amount of each resource that can be harvested and landed during the term of the special permit, including trip limits, where appropriate.

(B) The times and places where fishing may be conducted.

(C) The type, size, and amount of gear which may be used by each vessel operated under the special permit.

(D) Data reporting requirements. (E) Such other conditions as may be necessary to ensure compliance with the purposes of the special permit consistent with the objectives of the FEP.

(4) *Appeals of permit actions.* (i) Except as provided in subpart D of 15 CFR part 904, any applicant for a permit or a permit holder may appeal the granting, denial, conditioning, or suspension of their permit or a permit affecting their interests to the Regional Administrator. In order to be considered by the Regional Administrator, such appeal must be in writing, must state the action(s) appealed, and the reasons therefore, and must be submitted within 30 days of the original action(s) by the Regional Administrator. The appellant may request an informal hearing on the appeal.

(ii) Upon receipt of an appeal authorized by this section, the Regional Administrator will notify the permit applicant, or permit holder as appropriate, and will request such additional information in such form as will allow action upon the appeal. Upon receipt of sufficient information, the Regional Administrator will rule on the appeal in accordance with the permit eligibility criteria set forth in this section and the FEP, as appropriate, based on information relative to the application on file at NMFS and the Council and any additional information, the summary record kept of any hearing and the hearing officer's recommended decision, if any, and such other considerations as deemed appropriate. The Regional Administrator will notify all interested persons of the decision, and the reasons therefore, in writing, normally within 30 days of the receipt of sufficient information, unless additional time is needed for a hearing.

(iii) If a hearing is requested, or if the Regional Administrator determines that one is appropriate, the Regional Administrator may grant an informal hearing before a hearing officer designated for that purpose after first giving notice of the time, place, and subject matter of the hearing in the Federal Register. Such a hearing shall normally be held no later than 30 days following publication of the notice in the Federal Register, unless the hearing officer extends the time for reasons deemed equitable. The appellant, the applicant (if different), and, at the discretion of the hearing officer, other interested parties, may appear personally and/or be represented by counsel at the hearing and submit information and present arguments as determined appropriate by the hearing officer. Within 30 days of the last day of the hearing, the hearing officer shall recommend in writing a decision to the Regional Administrator.

(iv) The Regional Administrator may adopt the hearing officer's recommended decision, in whole or in part, or may reject or modify it. In any event, the Regional Administrator will notify interested persons of the decision, and the reason(s) therefore, in writing, within 30 days of receipt of the hearing officer's recommended decision. The Regional Administrator's action constitutes final action for the agency for the purposes of the Administrative Procedure Act.

(5) Any time limit prescribed in this section may be extended for good cause, for a period not to exceed 30 days, by the Regional Administrator, either upon his or her own motion or upon written request from the Council, appellant or applicant stating the reason(s) therefore.

# Appendix D: NOAA Fisheries Service, PIRO Official Information Collection Forms

1. Special Permit/Low-use Marine Protected Areas Coral Reef Taxa Daily Catch Report Form
2. NMFS Transshipment Log for Coral Reef Ecosystem Management Unit Species Form

NOAA Fisheries Service
Pacific Islands Fisheries Science Center

OMB Control No. 0648-0462
Expires: xx-xx-xxxx

## Special Permit/Low-use Marine Protected Areas
## Coral Reef Taxa Daily Catch Report

Name of Licensee:_____Coral Reef Ecosystem Permit No._____
Vessel Name:_____ Radio Call Sign:_____Vessel Number:_____
Area Fished:_____ (follow regional fishing area designations)
Type of Gear Used (one report form for each haul with each gear type per day):_____
Date Gear Set: ____/____/____ Time at Start:_____ Units of Gear Set: _____
Date Gear Hauled: ____/____/____ Time at End: _____ Units of Gear Lost:_____
Wind Speed:_____ Wind Direction:_____ Sea Surface Temperature:_____ Average Depth:_____
Target Species (list all):_____
Observer on board?_____
If gear was lost, give explanation as to reason why (no penalty for lost gear)._____
_____
Describe any observed damage to the coral reef and how it occurred._____
_____

| Species | No. Caught | Lbs. Caught | No. Kept | Lbs. Kept | If discarded, why ? | How processed? |
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| Protected Species Observation | | | |
|---|---|---|---|
| Enter Seal & Turtle numbers: identify other in appropriate box | Monk Seal | Turtle | Other |
| Observed in area | | | |
| Observed in vicinity of gear | | | |
| Interfering with fishing operations | | | |
| Preying on catch | | | |
| Entangled released alive | | | |
| Entangled released dead | | | |

Print Name:_____Signature:_____ Date: ____/____/____

All information must be logged within 24 hours after the completion of the fishing day.
Submit this form to NMFS at the following address within 30 days of each landing of coral reef harvest:
NMFS Pacific Islands Fisheries Science Center, Fishery Monitoring and Socioeconomics Division
2570 Dole St., Honolulu, HI 96822; FAX: (808) 983-2902

NOAA Fisheries Service
Pacific Islands Fisheries Science Center

OMB Control No. 0648-0462
Expires: xx-xx-xxxx

**NMFS Transshipment Log for Coral Reef Ecosystem Management Unit Species**

Vessel:_____Permit No.:_____Date: ____/____/____
(Vessel receiving fish)

Broker or Shipping Agent:_____

Vessel:_____ Radio Call Sign:_____
(Vessel offloading fish) Permit Number:_____
Total number of days fished:_____ Type of Gear Used: _____
Average units of gear set per day:_____ Area of Catch:_____

| Species | Number Received | Total Weight Received (Lbs.) |
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Print Name:_____ Signature:_____ Date:____/____/____
(Vessel captain / operator)

All required information must be recorded on the form within 24 hours after the day of transshipment. Submit report to National Marine Fisheries Service at the address below within 7 days following the date the vessel arrived in port to land transshipped fish.
NMFS Pacific Islands Fisheries Science Center, Fishery Monitoring and Socioeconomics Division
2570 Dole St., Honolulu, HI 96822; Fax: (808) 983-2902

# Appendix E: Project Contingency Plans

1. Velella Project Emergency Reporting Plan
2. Marine Protected Species Monitoring and Reporting Plan

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E1)

## VELELLA PROJECT EMERGENCY REPORTING PLAN

1. The NOAA designated contact point shall be notified immediately if any of the following occur:

a. Failure of any major component of the tow or tether system
b. Damage (either willful or unintentional) to array materials or equipment by any third party, or any physical contact between the array and any third party
c. Escape of any fish from the net pen
d. Mass mortality of fish in the net pen

Any interaction with marine mammals will be reported in accordance with the Marine Mammal Monitoring Plan (State Mitigation) and/or the Marine Mammal Protection Act (Federal Requirement).

2. The array shall be monitored on a continual basis. When weather or surf conditions do not permit the tender to remain tethered to the array, the tender shall stand off and maintain contact by visual or remote telemetry methods. The tender shall ensure that the array does not come in contact with any corals or other sensitive habitats, and remains outside of State waters, and clear of any reefs. In effect, the tender vessel will exercise the same responsibility for due care as if the array were a vessel under tow by the tender.

3. The USCG shall be notified immediately if any maritime incident occurs that may represent a risk to life or property.

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E2)

In addition to reporting requirements of the Marine Mammal Protection Act as discussed in section 2.2.4 of the draft EA, the following was provided by the applicant to demonstrate compliance with existing aquaculture operations and marine mammal mitigation procedures within State waters:

**KONA BLUE WATER FARM'S STATE OF HAWAII**
**MARINE PROTECTED SPECIES MONITORING AND REPORTING PLAN**

The goal of the Marine Protected Species Monitoring and Reporting Plan is to ensure that there is no significant negative interaction between marine protected species and the farm operations.

**Reporting**

A designated representative of the permittee shall:

Report immediately to NOAA Fisheries (1-888-256-9840) and DAR (808-587-0106):

1. Any observed or reported direct physical contact by any marine mammal or sea turtle with any part of the pen, cage or moorings.

2. Any observed or reported injured or entangled marine mammal or sea turtle within 100 meters of any part of the pen, cage or moorings.

Report within one week to DAR (808-587-0106) any observed approach less than 10 meters by any marine protected species to any part of the cage or moorings.

All reports should include the following information:

1. Name of observer (and reporter, if not reported by observer)
2. Date and time of report
3. Date and time of incident
4. Contact number of observer (and reporter, if not reported by observer)
5. Marine protected species identification if possible
6. Brief incident description

### Monitoring

A shore-based humpback whale monitoring program will be developed and initially implemented by DAR-HIHWNMS staff using equipment and field support provided by the permitee. The project will compare whale behaviors and abundances observed at the project site to those observed at a nearby control site having similar biophysical characteristics. The project will be designed to detect gross changes in abundance and/or behavior over time at the project site relative to those observed at the control site. The monitoring methodology will be tested, finalized and implemented by DAR-HIHWNMS staff during the winter-spring 2005 humpback whale season. The permitee will provide staff and/or funds to continue the project during subsequent humpback whale seasons, unless otherwise notified by DAR-HIHWNMS. The total level of effort required to implement the monitoring program in subsequent humpback whale seasons is expected to be approximately 20 hrs per month for a five-month period (December through April).

### Activity Modification

Pursuant to CDUP HA-3118 (August 19, 2003), condition no. 24, in the event any instance of significant adverse impact on marine protected species, e.g., collision, entanglement, injury, etc., is observed to be associated with the project, DAR will coordinate a consultation as soon as possible between the permitee and marine protected species experts to determine the most appropriate course of action. After the consultation, DAR staff will coordinate with OCCL to make recommendations as necessary to the BLNR for consideration and approval. As stated in the CDUP condition no. 24, activity modifications may range from increased monitoring to immediate project shutdown and removal of the entire structure, depending on the severity of the impact and its likelihood of reoccurrence.

PROJECT ACTIVITY MODIFICATION PROTOCOL

These provisions, originally Section 24 of CDUP HA-3118, are now incorporated in full into the Marine Protected Species Reporting and Monitoring Plan.

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