



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

AUG 5 2008

To All Interested Government Agencies and Public Groups:

In accordance with the U.S. Environmental Protection Agency's (EPA) procedures for the preparation of environmental impact statements (EIS), an environmental review has been performed on the proposed agency action below:

- Project Name:** **Boriquen Aquaculture, Inc., NPDES Permit for New Source Discharge from an Offshore Concentrated Aquatic Animal Production Facility**
- Purpose of Project:** Boriquen Aquaculture, Inc., (Boriquen) proposed to establish a new for-profit business enterprise on the west coast of Puerto Rico capable of producing a total annual harvestable weight of approximately 30,000 to 240,000 pounds of Cobia (*Rachycentron candum*) to meet the increasing commercial demand for fish. Boriquen would be contributing to the achievement of the National Oceanic and Atmospheric Administration's (NOAA) efforts to promote offshore aquaculture in the exclusive economic zone (EEZ) to reduce pressure on natural fisheries.
- Project Originator:** Boriquen Aquaculture, Inc., Rincon, P.R. 00677
- Project Location:** The project is approximately 1.25 nautical miles offshore and northwest of the coastline of **Punta Higuero, Rincón**, Puerto Rico, coordinates: Latitude 18°22'48" N and Longitude 67°17'29" W.
- Project Description:** Boriquen proposes to construct and operate a commercial-scale, open-ocean aquaculture production facility consisting of eight cages over 50 acres of submerged land along the northwestern shoreline of Puerto Rico.

Based on our environmental review of information provided by Boriquen, plus other existing information, and with implementation of the measures identified below, we have determined that no significant adverse environmental impacts will result from EPA's issuance of the NPDES permit and implementation of the proposed project. However, given that large-scale aquaculture is a relatively new activity in Puerto Rico and that aquaculture practices and local conditions vary, EPA finds it necessary to gather additional site-specific data which will be used to inform future permit decisions. Therefore, additional measures are included.

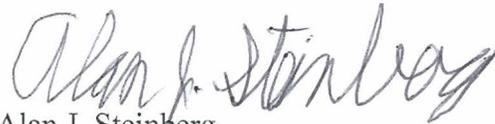
- 1) To ensure activities will remain within the scope of impacts considered, Boriquen will abide by the feed limits identified in the permit application, i.e., a maximum limit of 15,000 pounds of feed per day.
- 2) Whenever a different feed is tried; Boriquen will send a well documented report to EPA explaining results. Boriquen should use the least environmentally damaging feeds and keep abreast of latest advances. If not used, Boriquen must provide a legitimate reason for not doing so. It has been found that the human health risk associated with seafood consumption is linked to feeding habits of the fish. Since it has the capacity to control the diet of the caged fish; Boriquen may be able to offer a safer product for human health and consumption.
- 3) Boriquen will not add any other species prior to National Marine Fisheries Service (NMFS) and Puerto Rico Department of Natural and Environmental Resources approvals. EPA will receive a copy of any such approvals. If considering additional species in the future, Boriquen should consider lower trophic level species.
- 4) For compliance with the Endangered Species Act, Boriquen will implement the May 23,2005, Final Environmental Monitoring Plan which resulted from the federal consultation between and was approved by the NMFS and the U.S. Army Corps of Engineers (USACE) (see Environmental Assessment [EA] Appendix E). Additionally, Boriquen will send EPA a copy of the resulting monitoring data along with the appropriate report.
- 5) In order to monitor site-specific potential impacts and address the limited extent of data, Boriquen will provide dated photographs **and/or** video of the ocean floor following guidelines spelled out in the EA section 5.0. Mitigation Measures.
- 6) A higher than average mortality rate may indicate an environmental problem **and/or** pose a disposal concern. In light of this, if mortality events result in 0.10% or greater mortality for three consecutive days, Boriquen will provide EPA with water quality analyses and a disposal report within 14 calendar days of the occurrence.

The above stated measures will be implemented by Boriquen Aquaculture from project initiation until the initial permit expires. Using an adaptive management approach, measures may be extended or revised at the time of permit renewal if EPA data analysis demonstrates a need. In addition, it is our understanding that the USACE permit requirement to report endangered species and the standard NMFS guidelines (see EA Appendix G) will be followed to reduce the risk associated with vessel strikes or disturbance of protected species to discountable levels.

We have made a decision not to prepare an EIS on the project. This decision is based on a careful review of the project's environmental information document and other supporting information. All of these documents, along with the EA (copy enclosed) are on file at the offices of the EPA Region 2, where they are available for public scrutiny upon request. The EA is also available on EPA Region 2's website at <http://www.epa.gov/region02/sprmm/r2nepa.htm>.

Comments supporting or disagreeing with this decision may be submitted to EPA for consideration. All comments must be received within 30 calendar days of the date of this finding of no significant impact. Please address your comments to: Grace Musumeci, Chief, Environmental Review Section, at the above address. EPA will take no action on the project for at least 30 calendar days after the date of this finding.

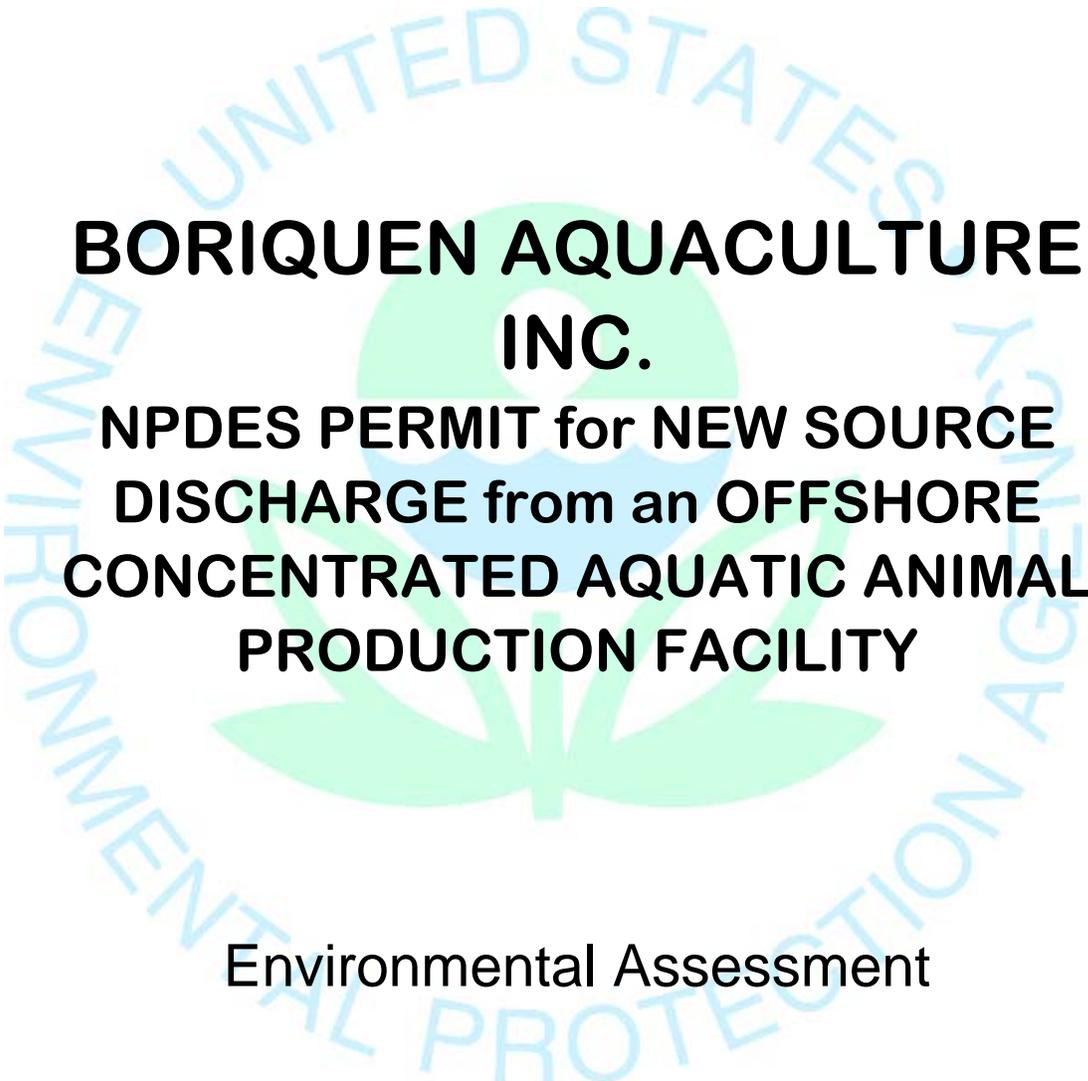
Sincerely,

A handwritten signature in black ink that reads "Alan J. Steinberg". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Alan J. Steinberg
Regional Administrator

Enclosure

USEPA Region 2
290 Broadway
New York, NY 10007-1866



**BORIQUEN AQUACULTURE
INC.**

**NPDES PERMIT for NEW SOURCE
DISCHARGE from an OFFSHORE
CONCENTRATED AQUATIC ANIMAL
PRODUCTION FACILITY**

Environmental Assessment

JULY 2008

Environmental Assessment

Boriquen Aquaculture Inc., Rincón, Puerto Rico

NPDES Permit for New Source Discharge from an Offshore Concentrated Aquatic Animal Production Facility

Prepared pursuant to

**National Environmental Policy Act, 42 USC 4322,
CEQ Regulations for Implementing NEPA, 40 CFR 1500, &
EPA Regulations for Implementing NEPA, 40 CFR 6**

U.S. Environmental Protection Agency, Region 2

JULY 2008

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Acronyms and Abbreviations

BMP	Best Management Practices
BPT	Best Practicable Control Technology
CAA	Clean Air Act
CAAP	Concentrated Aquatic Animal Production
CEQ	Council on Environmental Quality
CFMC	Caribbean Fishery Management Council
CFR	Code of Federal Regulations
COC	Community of Concern
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	Decibel
EA	Environmental Assessment
EFH	Essential Fish Habitat
EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FDA	Food and Drug Administration
FMP	Fishery Management Plan
ft	Foot
hp	Horse power

lb	Pound
m	Meter
MMPA	Marine Mammal Protection Act
NEPA	National Environmental Policy Act
nM	Nautical Mile
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuaries Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
PRDRNA	Puerto Rico Departamento de Recursos Naturales y Ambientales
PREQB	Puerto Rico Environmental Quality Board
PRPB	Puerto Rico Planning Board
PSU	Practical Salinity Unit
USACE	United States Army Corps of Engineers
USC	United States Code
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service

1.0. PURPOSE AND NEED OF THE PROPOSED ACTION

1.1. INTRODUCTION

This environmental assessment (EA) evaluates the environmental impacts of establishing a concentrated aquatic animal production (CAAP) facility in the waters off the coast of Punta Higuero, Rincón, Puerto Rico.

Boriquen Aquaculture, Inc. submitted a National Pollutant Discharge Elimination System (NPDES) permit application to the U.S. Environmental Protection Agency (EPA) for the establishment of an offshore CAAP facility. Boriquen Aquaculture plans to install eight 106,000 cubic feet (ft³) submerged finfish cages to produce a total annual maximum harvestable weight of 30,000 to 240,000 pounds (lbs) of cobia (*Rachycentron candum*). In the NPDES permit application, Boriquen Aquaculture was also proposing the collection and growth of lobster (*Panulirus argus*) in submerged cages. However, possession of undersize (less than 3.5 inch carapace length) common lobster (*P. argus*) is currently prohibited by the February 10, 2004 Puerto Rico Fishing Regulations (Regulation #6768 of 2004) established by the Puerto Rico Department of Natural and Environmental Resources (DNER 2007). Therefore, the collection and growth of juvenile lobster and their culture in submerged cages are not evaluated in this EA (Appendix B-IX). This EA supports NPDES new source discharge permit number PR0026522.

EPA has determined that the Boriquen Aquaculture facility is a new source under NPDES regulations. Boriquen Aquaculture obtained a Water Quality Certificate on January 16, 2007, from the Puerto Rico Environmental Quality Board (PREQB) (Appendix B-VII). Also, Boriquen Aquaculture on February 6, 2007, obtained a U.S. Army Corps of Engineers (USACE) Section 10 permit for the moorings of the offshore cages (Appendix B-VIII).

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321, as amended); the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations (CFR) Parts 1500-1508); EPA regulations implementing NEPA (40 CFR Part 6, as amended); and the Commonwealth of Puerto Rico Environmental Public Policy Act (Law 416, Article 4B-3). NEPA sets out procedures that Federal agencies must follow in analyzing environmental impacts of major Federal actions inside the U.S., its territories, and possessions. New source discharges for pollutants from CAAP facilities that produce 100,000 lbs or more of aquatic animals annually in a flow-through, recirculating net pen or submerged cage system are regulated by 40 CFR Part 451.

In addition, NEPA compliance responsibilities have been met by consideration of the following “cross-cutter” statutes, Executive Orders (EO) and other requirements listed:

- ✓ American Indian Religious Freedom Act of 1978, 42 U.S.C. 1996.
- ✓ Archeological and Historic Preservation Act, as amended 16 U.S.C., 469-469c
- ✓ Archaeological Resources Protection Act of 1979, 16 U.S.C.
- ✓ Bald and Golden Eagle Protection Acts, 16 U.S.C.
- ✓ Clean Water Act – Section 404, 33 U.S.C., 1251 et seq.
- ✓ Coastal Barrier Resources Act, 16 U.S.C., 3501 et seq.
- ✓ Coastal Zone Management Act, 16 U.S.C., 1451 et seq.
- ✓ Endangered Species Act, 16 U.S.C., 1531 et seq.
- ✓ Farmland Protection Policy Act, 7 U.S.C., 4201 et sea
- ✓ Fish and Wildlife Coordination Act, 16 U.S.C., 661 et seq.
- ✓ Land and Water Conservation Fund Act of 1965
- ✓ Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1801
- ✓ Marine Mammal Protection Act of 1972, 16 U.S.C. 1361
- ✓ Migratory Bird Treaty Act, 16 U.S.C. 703-711
- ✓ National Environmental Policy Act, 42 U.S.C.A., 4321
- ✓ National Historic Preservation Act, 16 U.S.C., 470 et seq.
- ✓ National Marine Sanctuaries Act
- ✓ Native American Graves Protection and Repatriation Act, 25 U.S.C.
- ✓ Resource Conservation and Recovery Act, 42 U.S.C., 6922
- ✓ Rivers and Harbors Act of 1899, 33 U.S.C. 403
- ✓ Wild and Scenic Rivers Act, 16 U.S.C., 271 et seq.
- ✓ Wilderness Act, 16 U.S.C., 1131 et seq.
- ✓ EO 11593 *Protection and Enhancement of the Cultural Environment*
- ✓ EO 11988, *Floodplain Management*
- ✓ EO 11990, *Protection of Wetlands*
- ✓ EO 12898, *Environmental Justice*
- ✓ EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*
- ✓ EO 13089, *Coral Reef Protection*
- ✓ EO 13112, *Invasive Species*
- ✓ EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*

1.2. PURPOSE AND NEED OF PROJECT

The purpose of the project is to establish a new for-profit aquaculture business on the west coast of Puerto Rico. The proposed project would help address two major needs of Puerto Rico and the U.S.; (1) creating employment opportunities in an area with chronic high unemployment; and (2) ameliorating the current reliance on over-exploited wild fisheries to satisfy the growing local and mainland demand for seafood products.

The Rincón area per capita income is less than a third of the U.S. per capita income, and the island has unemployment rate of approximately 12% which is significantly higher than the national average. In addition, it is expected that a portion of the work force that would be employed by Boriquen Aquaculture would be local part-time artisan fishermen with experience working at sea on small boats and handling seafood. The switch from part-time fishermen to full time aquaculture operators will likely reduce the pressure on local depleted fisheries resources. The expected sustainable production of cobia is aligned with the objective of the National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration (NOAA) for promoting sustainable use of the Nation's ocean resources. The United States imports more than 80% of the seafood it consumes, with a substantial portion of the imported seafood not obtained using sustainable practices, potentially resulting in diminished wild stocks and impacts to marine ecosystems. Offshore aquaculture, a major component of NOAA's Aquaculture Program, has among its goals to reduce the reliance on imported seafood products and ensure the sustainable production of seafood.

1.3. SCOPE OF PROJECT AND THE DOCUMENT

This EA describes the proposed activities and the environmental setting. It also evaluates potential pollutants and impacts that may result from the proposed action, and describes mitigation measures. The EA considered two additional alternative sites for the proposed action and a "no action" alternative.

Boriquen Aquaculture has gained knowledge through analyzing similar ongoing aquaculture projects conducted in other locations by other private enterprises (e.g., Snapperfarm in Culebra, Puerto Rico, and Kona Blue Water Farms in Kona, Hawaii). With this information, Boriquen Aquaculture hopes to successfully develop a commercial, open ocean CAAP facility in Rincón, Puerto Rico. The proposed project will be located at a 50-acre site in the Northern Mona Passage in the Caribbean Sea, at a water depth of about 100 ft, and approximately 1.25 nautical miles (nM) offshore and northwest of the coastline of Punta Higuero, Rincón, Puerto Rico (Figures 1 and 2). The coordinates for the proposed project site are Latitude 18°22'48" N and Longitude 67°17'29"W.



Figure 1: Map of Puerto Rico; Box on west coast denotes approximate location of the region of Punta Higuero, Rincón

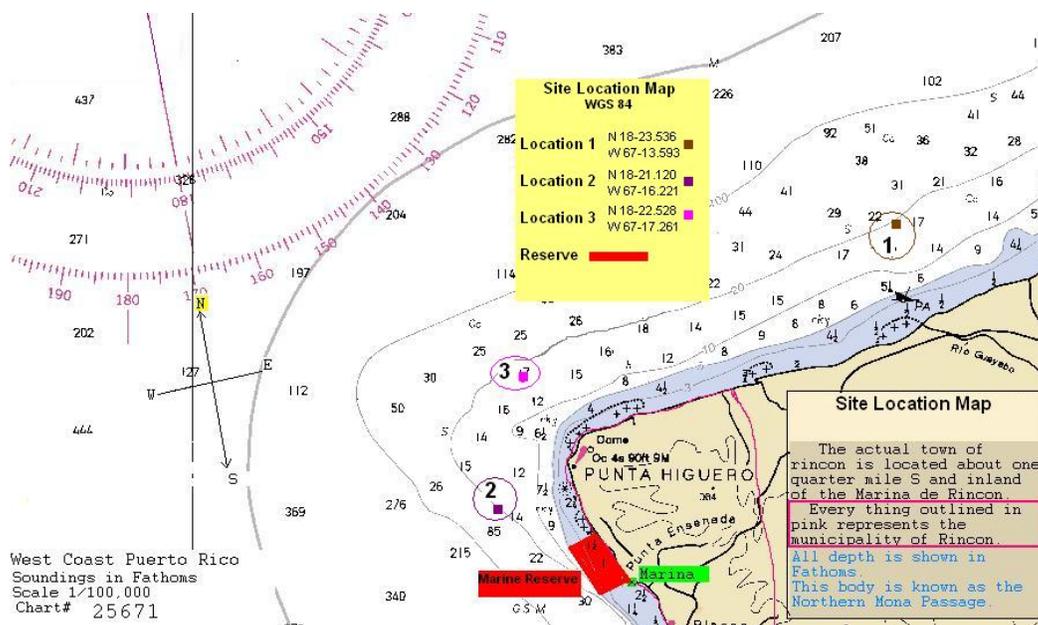


Figure 2: Location of three alternative sites considered for the Boriquen Aquaculture CAAP. Location 3 is the preferred alternative.

To support the offshore facilities, Boriquen Aquaculture will use existing marina facilities located in Rincón for its vessel operations. In addition, Boriquen Aquaculture is leasing existing land facilities to use as office space, and for storage of feed and equipment. Boriquen Aquaculture plans to offload cobia production pierside directly to seafood brokers for export and local sales through fish houses. No land-based fish processing facilities are currently included in

this project. This proposed project does not involve the construction or development of landside facilities. Major land activities are limited to the following:

- routine storage and transport of feed,
- storage, transport, and maintenance of support equipment (e.g., diving equipment), and
- land transportation of fingerlings from the Aguadilla Airport to the cages.

To help mitigate potential impacts from the project, the proposed Boriquen Aquaculture facility will be located away from sensitive ecosystems (e.g., coral reef) and essential fish habitats (EFH), and in open waters away from embayments and other locations with limited circulation and flushing or impaired waters. In addition, environmental procedures were established including an environmental monitoring plan developed in coordination with NMFS and submitted to the USACE, and a best management practices plan (BMP) will be developed and implemented. As required by 40 CFR 451 CAAP guidance the BMP will address feed management, waste collection and disposal, transport or harvest discharge, carcass removal, material storage, inspection and maintenance, record keeping and training (USEPA 1981, October 1993).

2.0. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The proposed action includes the establishment and operation of a commercial offshore CAAP facility consisting of submerged aquaculture cage systems, and onshore-based support activities at Rincón, Puerto Rico.

2.1. DESCRIPTION OF THE OFFSHORE FACILITIES AND ACTIVITIES

When fully operational, the offshore facilities would consist of eight 106,000 ft³ (3000 m³) Ocean Spar Sea Station™ finfish cages (OST, 2003). The cages will occupy a 50-acre site situated in waters with depths fluctuating between 95 and 116 ft, and approximately 1.25 nM off the northwest coastline of Punta Higuero, Rincón, Puerto Rico. Boriquen Aquaculture plans to deploy a total of four finfish cages during the first year of operation. During the initial year period, plans include deployment of one finfish cage every three months. A one-year environmental monitoring plan will follow this deployment. Based on the monitoring results, the USACE would authorize the deployment of the rest of the cages or may require modifications of procedures to mitigate impacts. The net result will be eight finfish cages operating.

Description of Finfish Cages

The finfish cages (Figure 3) will be arranged in three parallel rows; two rows with three cages, and one row with two cages (Figure 4). Each cage will be spaced on the sea floor at intervals of six acres to facilitate water circulation.

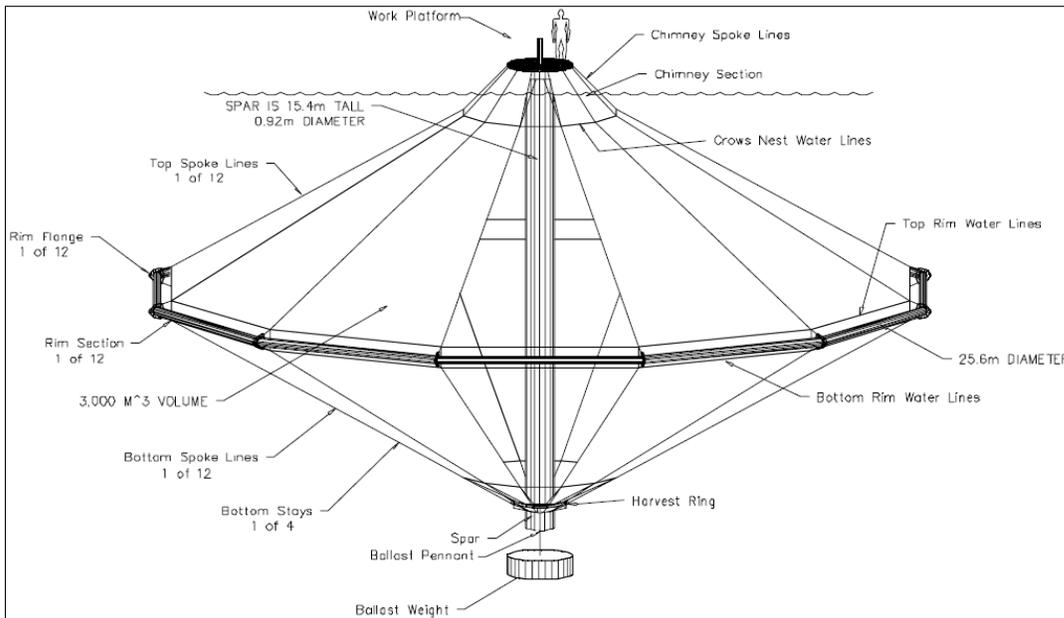


Figure 3: Ocean Spar Sea Station™ finfish cages with a volume of 106,000 ft³.

[Note: Figure 3 depicts a cage floating on the surface, which only occurs during maintenance or harvest. For scale purposes, note the drawing of person standing on top the cage.]

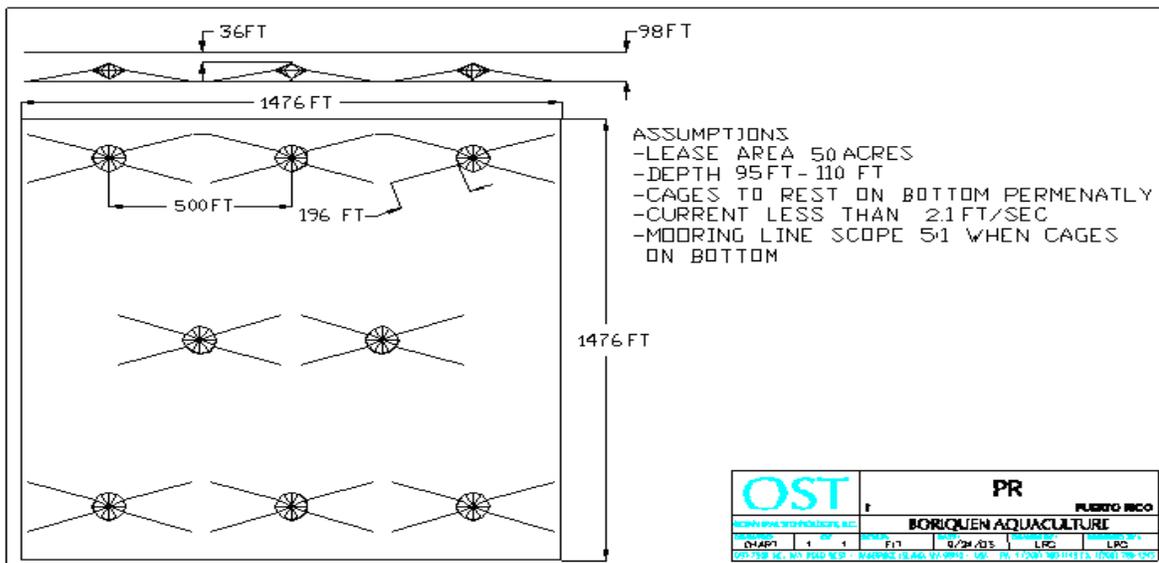


Figure 4: Diagram of distribution of finfish cages on proposed site.

The finfish cages will be assembled on shallow waters and towed to the proposed site where they will be submerged. The top of the cages will be located approximately 35 ft to 36 ft below the surface of the water, except during maintenance or harvest. Each cage will be moored on the

ocean floor (Figure 4) and will have a surface marker buoy (No. 7 Bullet Buoy), and submerged 18-inch floats to help maintain adequate tension for stability and provide access to the feeding tube (Figures 5 and 6).

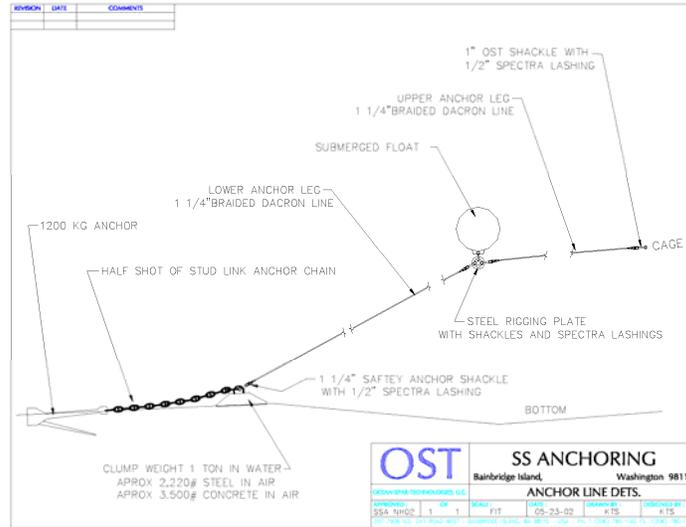


Figure 5: Typical mooring system for Ocean Spar Sea Station™.

Mooring lines will be at least 1 ¼-inch Bralden Dracon lines. The finfish cage main components include steel spars, steel rims, and Kevlar net. The netting of the cages consists of tight Spectra knotless net constructed of 3-inch stretch mesh. Divers can access the interior of the cages for maintenance purposes through zipper openings on the net. Buoyancy of the cages is controlled by releasing air from a hollow steel tube in the center of the cage.

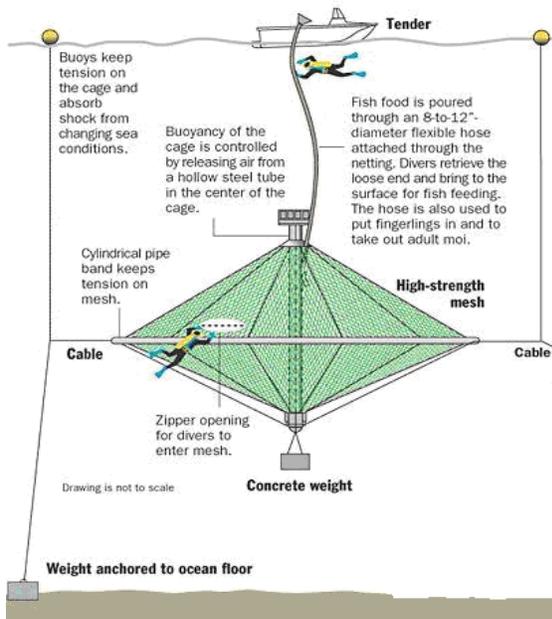


Figure 6: General diagram of a submerged finfish cage.

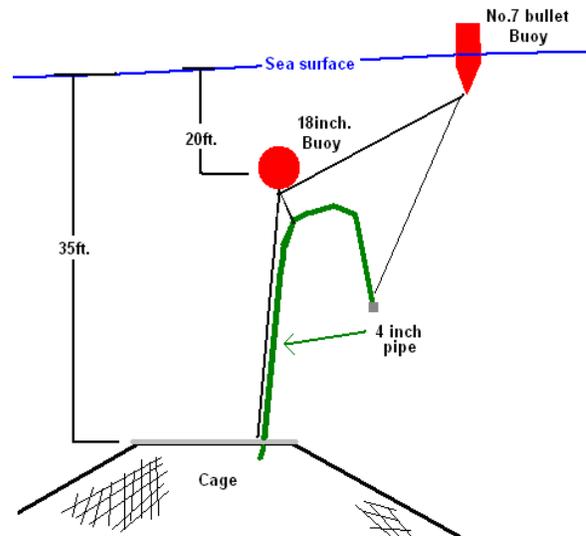


Figure 7: Diagram of float arrangement and feeding tube.

Stocking, Feeding, and Harvesting of Finfish Cages

Finfish cages will be stocked with cobia fingerlings acquired from established vendors. Aquaculture Center of the Florida Keys, located in Marathon, Florida, is a major producer of fingerlings and is currently supplying other similar offshore commercial aquaculture projects.

The cobia fingerlings used by Boriquen Aquaculture are produced in hatcheries under strict laboratory conditions and are shipped only after a veterinary certification of good health is obtained. This prevents the risk of transmitting diseases and importing invasive species. Fingerlings are typically shipped using specialized containers (46 inches high x 43 inches wide and 43 inches long) that maintain a controlled environment. These containers can hold approximately 80 gallons of seawater and between 1,000 and 1,500 fingerlings. Smaller plastic bags may be used to separate fingerlings in groups of about 100 inside the container. Cobia fingerlings are shipped at approximately a 35- to 45- day post-hatch, when they weigh between 0.03 and 0.05 oz. Because of fast growth rates, after a week, cobia fingerlings may reach 0.11 oz in weight (ACFK, 2005).

The fingerlings will be shipped by air to the Rafael Hernandez Airport in Aguadilla, approximately 15 miles north of Rincón. Once the fingerlings arrive at the airport, they will be transported by truck to the Rincón marina to be transferred to the Boriquen Aquaculture large tender vessel. This 36 ft vessel is a single-diesel engine converted shrimp boat with a 32,000 lb holding capacity, a saltwater icemaker, and head toiled with blackwater holding tank.

The nets are stocked by transferring the fingerlings from the vessel to nursery nets using the feeding pipe. The fingerlings are kept within nursery nets inside the submerged cages until they reach a size that prevents their escape through the net's 3-inch mesh openings. Once stocked with a cohort of fingerlings, the cages will be monitored daily by divers as required by the BMP to ensure proper health of the growing fish population and efficient use of feed. Incidental daily mortality of a few individual fishes is expected within the growing population. Boriquen Aquaculture will remove and dispose as solid waste any dead fish found in the cages. Boriquen Aquaculture has arranged with Meritech Industries in Florida to conduct bi-monthly fish sampling to verify that over feeding, as well as disease, is not occurring. If a mass mortality event occurs (i.e., 0.10% or greater mortality for three consecutive days), samples will be taken and sent for analysis, and EPA will be immediately notified of such events as required by the BMP. Necropsies will be conducted to determine the conditions that may have triggered the event. Waste Management of Puerto Rico, a local waste disposal company, will dispose of the rest of the removed fish carcasses as solid waste.

As part of the maintenance requirements set by the BMP to ensure proper flow-through of ocean water, the cages will be subjected to a routine cleaning regimen, removing biofouling materials (e.g., algae) that may colonize at the nets. Cleaning will be achieved using a system that relies on a pressure washer with a rotating disk that will release the growing algae. Cages will be

cleaned on a monthly or bi-monthly timetable depending on the severity of biofouling. A cage should take no longer than five dive hours to clean.

Daily feeds are planned, with the volume and tempo of feeding adjusted, as required by the BMP, based on fish size class, cage population, and observed feeding efficiency. The goal of Boriquen Aquaculture is to maximize population growth rates while minimizing loss of unconsumed feed material. This decreases operational cost and reduces environmental impact by minimizing potential nutrient loading to receiving waters.

Boriquen Aquaculture anticipates a maximum of monthly feeding levels of about 15,000 lbs once the facilities are in full operation (i.e., all cages installed, and each cage stocked with different size classes to ensure continuous stable production through the year). The feed is provided in 50 lb plastic lined and water resistant bags supplied by at least two vendors, Tender Mills Inc. in Moca, Puerto Rico, and Burriss Mill & Feed in Franklinton, Louisiana. On the tender boat, the feed is mixed with seawater that is pumped from the surface and delivered to the cages through the feeding tube (Figure 8).

The main composition of the feed consists of approximately 43% protein derived from sardine meal and soy, and 24% to 33% vegetable matter from algae. The feed will also contain Limpets¹ that will be used as a source of vitamins and minerals, and crab extract that will contribute flavor. The producer uses water as the feed bonding agent and the feed material is baked after being cut to the appropriate pellet size. No preservatives will be used in the production of the fish feed.

Based on results from other established projects (e.g., Snapperfarm), it is expected that cobia will reach a harvestable average size of 10 lbs approximately nine months after stocking the cages (Langan, 2006). During harvest, a cage will be brought to the surface and an aquaculture pump will be used to extract the fish from the cage onto a tender vessel. Once on board, the harvested fish will be sorted into holding bins according to orders received from customers, and placed whole into saltwater ice for a chill kill and pierside delivery to fish brokers and customers. Fish exported to the U.S. mainland will be packed in insulated containers with saltwater ice, and sent by air cargo. Brokers that order the fish will be responsible for the shipping, handling, and final disposition of exported fish.

¹ Limpets are benthic gastropod mollusks frequently found on intertidal and shallow subtidal hard surfaces like rocky shores.

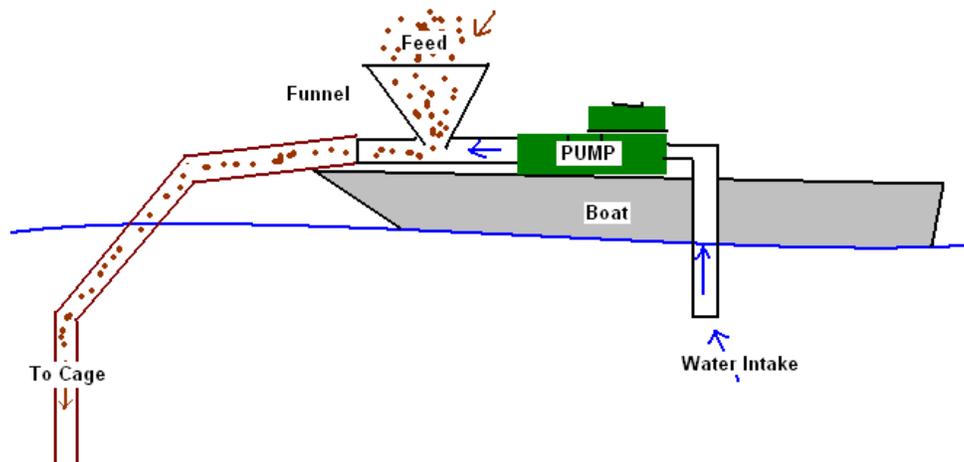


Figure 8: Diagram of Boriquen Aquaculture feeding system

A portion of the harvest, around 3,000 lbs per week may be sold to local distributors for consumption in area restaurants during tourist season (December to April). Boriquen Aquaculture will be removing the guts from these fish on board the vessel before placing them on saltwater ice and distributing them to the local market. The fish guts will be placed in 5-gallon buckets and given to local fishermen who have arranged to use the guts as bait for lobster traps. A fisherman uses approximately 70 lbs of bait on any given day. It is expected that leftover guts will fill about five to six 5-gallon buckets during a typical harvest day, and all of the gut remains will be used by the fishermen.

To ensure a fresh product, the cages will only be harvested based on orders placed by customers. Therefore, there is no need for shoreside fish processing or storage facilities regulated under the Food and Drug Administration (FDA) Hazard Analysis and Critical Control Point (HACCP) seafood requirements.

2.2. DESCRIPTION OF THE ONSHORE FACILITIES AND ACTIVITIES

To support its onshore activities, Boriquen Aquaculture is renting a one-acre property within the municipality of Rincón. This property is located approximately three miles driving distance from the marina (Figure 9). The main house on the property is planned to be used as a living and office facility. A 40 ft container, equipped with an air conditioner, will be installed on the property to store the feed. The air conditioner on the container will maintain a controlled environment, reduce humidity, and ensure the quality of the feed for longer periods.



Figure 9: NOAA image with approximate location of offshore and onshore facilities

Note: Size of highlighted areas does not correspond to actual acreage of sites.

Because as little as 3,000 lbs of feed can be ordered at a time, feed will be purchase daily. This will prevent the need to store excess quantities of feed for long periods and will ensure overall freshness and quality of feed. Any feed material that may spill from a bag will be collected with other generated solid waste (e.g., feed bags) for disposal by local waste management company (Waste Management, Inc.).

The rented facility will also include a storage and general maintenance facility for the Boriquen Aquaculture small transportable boat. The boat is a 20-ft skiff with a 115-horsepower (hp) outboard engine that will be used to support diving activities (e.g., daily monitoring of nets).

Daily transfer of feed from the onshore rental property to the marina will be done using a four passenger 4x4 King Cab diesel truck. This truck is also used to tow the boat and trailer to and from the marina. Transfer of feed to the marina will occur early in the morning at approximately 7:00 AM (prior to morning traffic). The return trip would occur around 1:00 PM (prior to afternoon traffic). Each trip would take approximately 10 minutes over the approximate three miles distance between the marina and rental property.

2.3. PROJECT ALTERNATIVES

This section describes and evaluates alternatives for meeting the project's purpose and need. This EA evaluates four alternatives, including the "no action" alternative. Other alternatives include the proposed preferred location and two alternative locations. Figure 10 identifies the three alternative sites selected for evaluation.

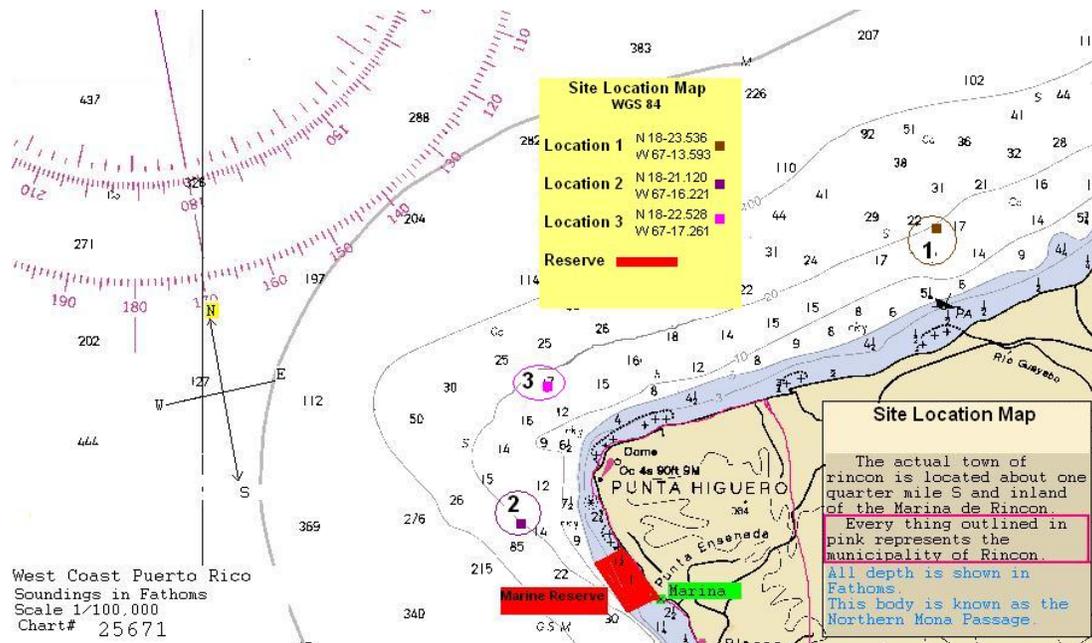


Figure 10: Location of three alternative sites considered for the Boriquen Aquaculture CAAP. Location 3 is the preferred alternative.

2.3.1. NO ACTION ALTERNATIVE

Under the "no action" alternative, a NPDES permit would not be issued and the project would not be constructed as proposed. Therefore, this alternative will prevent the establishment of this business enterprise, the creation of associated employment opportunities for the west coast of Puerto Rico, and the more sustainable production of fish to meet increasing demand. The island's high unemployment rate would not be diminished, nor would pressure on local fishery resources be reduced. Furthermore, by adopting the No Action Alternative, no relief would be provided to the current use of wild fish stocks to satisfy the demand for seafood products.

2.3.2. ALTERNATIVE LOCATIONS

A set of basic requirements guide the evaluation and selection of the proposed project locations. These requirements are:

- Open ocean environment with strong water circulation to help disperse and dilute animal waste and unconsumed feed material. Strong water circulation is also essential because it assists in maintaining adequate oxygen and salinity for the animal cages and surrounding waters.
- Sufficient area to locate and space eight cages;

- A location not in proximity to sensitive benthic ecosystems such as coral reefs or seagrass beds that could be affected by a chronic input of diluted animal waste and unconsumed feed.
- A level of isolation to avoid conflicts with other activities such as commercial and recreational fishing;
- Access to shoreside facilities to ensure effective operations and logistics, such as feed delivery, cage monitoring, and harvest transport for pierside distribution.

A two-step process was used to identify and finalize alternative offshore locations for consideration. First, the environmental characteristics of the proposed locations were evaluated to ensure they met the project requirements; then operational considerations were evaluated for feasibility.

2.3.2.1. Site 1: Aguada

Description

Site 1 is located northwest of Punta Higuero, in waters of the municipality of Aguada. The benthos substrate is composed of sand, gravel, and corals. Corals consist of patch reefs and small mounds of coral. Conch, Jacks, and stingrays were observed in the area during surveys conducted by Boriquen Aquaculture. Water flows in a general east to west direction.

Operational Considerations

This is a six-acre site located over 4 nM from the Rincón marina. The area is actively used by fishermen for lobster fishing.

2.3.2.2. Site 2: Tres Palmas

Description

Site 2 is located southwest of Punta Higuero, in waters of the municipality of Rincón. The benthos substrate is composed of sand and hard bottom. Conch, Jacks, and stingrays were also observed in the area. The Tres Palmas Marine Reserve is located approximately 0.5 nM southeast of the site. Water flows in a general south to north direction.

Operational Considerations

This site consists of one acre located about 0.75 nM from the Rincón marina. It is located close to the marinas, which reduces transit time and facilitates monitoring.

2.3.2.3. Site 3: Punta Higuero

Description

Site 3 is located northwest of Punta Higuero in waters of the municipality of Rincón (Figure 11). The benthos substrate is composed of sand and gravel. Stingrays and some pelagic fishes were observed in the area during surveys conducted by Boriquen Aquaculture. Humpback whales and sea turtles, both federally listed endangered marine mammals, may transit near the site.

Northerly and southerly flowing waters masses converge near, the site resulting in a general flow offshore in a westward direction.

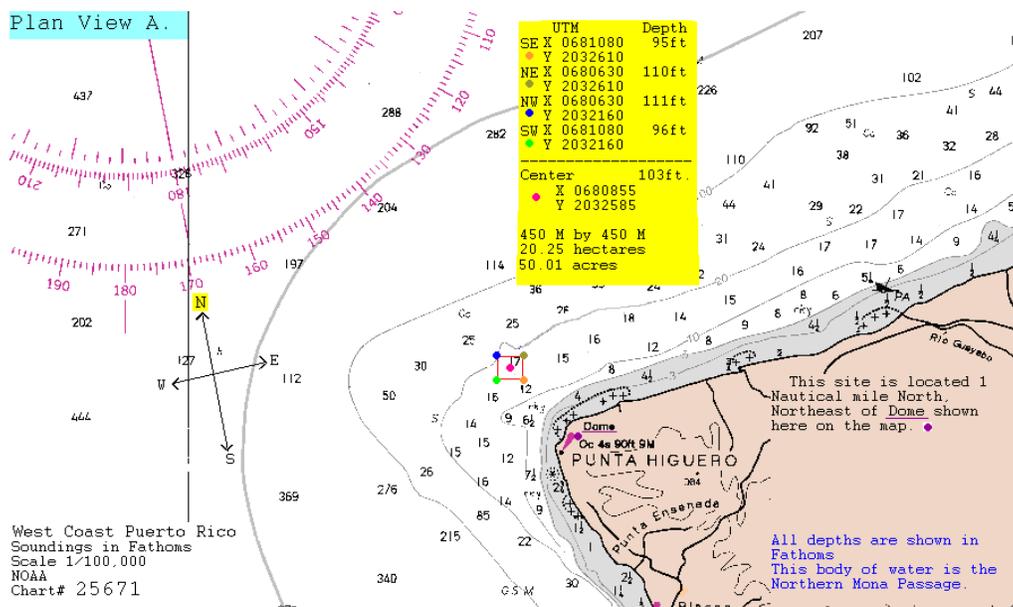


Figure 11: Map with location of proposed Boriquen Aquaculture CAAP facility in waters offshore of Punta Higuero, Rincón, Puerto Rico

Operational Considerations

This site consists of 50 acres located about 2 nM from the Rincón marina, allowing reasonable access to the site. Because the site is characterized by sand and gravel substrates, without coral reefs to sustain dense populations of finfish or invertebrates, the site is not actively used by local fishermen.

2.3.2.4. Preferred Alternative

Based on essential project requirements (Section 2.3.2), Site 3 meets the project purpose and need, satisfies operational requirements, and minimizes environmental impacts. Therefore, the other alternative locations were not analyzed in further detail. Table 1 provides a summary of the alternatives evaluation.

Site 1, located closer to the municipality of Aguada, and was excluded because of operational and environmental considerations. The greater distance from the marina facilities, would significantly increase vessel transit time, fuels consumed, and labor cost, while reducing Boriquen Aquaculture capabilities to monitor the offshore facilities. The presence of some corals, which provide EFH, imposed additional restrictions. Site 2 was excluded primarily to avoid potential environmental impacts to the Tres Palmas Marine Reserve. This reserve area encompasses an important coral reef system EFH. Moreover, the reef includes populations of staghorn and elkhorn corals (*A. palmata* and *A. cerviconis* respectively), which are federally

listed as threatened species under the ESA. In addition, size limitations of Site 2 would restrict the production capacity of the proposed project.

The preferred alternative is to locate the offshore aquaculture cages at Site 3 in Punta Higuero. The preferred site location provides the best environmental and operational alternative. The site provides an open ocean environment with good water circulation. The site is more distant from the Tres Palmas Marine Reserve, which will minimize impacts of detrimental nutrient enrichment or sedimentation stress on the reserve's coral reefs. The design of the cages, will prevent potential entanglement of whales and sea turtles. NMFS determined as part of an ESA Section 7 consultation associated with the USACE permit that the proposed action is not likely to adversely affect endangered species-listed whales or sea turtles (Appendix B-III, VIII). The site is also accessible to the Rincón marina, which facilitates operation, cage monitoring efforts, and logistical transport of feed and of harvest for pierside distribution. The site is close enough to provide easy access, while located remotely enough not to conflict with other uses of the Rincón coastline such as swimming, surfing and scuba diving.

Table 1: Comparison of Alternatives Evaluated

CONSIDERATIONS	ALTERNATIVES							
	NO ACTION		1 (Aguada)		2 (Tres Palmas)		3 (Punta Higuero)	
OPERATIONAL								
Distance from Marina	+	NA	-	4.3 nM	+	Less than 1 nM	+	1.7 nM
Site Size	+	NA	-	Small site (6 acres)	-	Very small site (1 acre)	+	Large site (50 acres)
Potential Conflict with other Activities	+	NA	-	Area used by lobster fishermen	+	No impact	+	No impact
Local Economy	-	No new direct and indirect jobs created	+	25 new direct jobs	+	25 new direct job	+	25 new direct job
ENVIRONMENTAL								
Water Circulation	+	NA	+	Good circulation	+	Good circulation	+	Good circulation
Presence of Coral Reef	+	NA	-	Small patch corals observed in the vicinity	-	Tres Palmas Reserve located 0.4 nM away	+	Tres Palmas Reserve located 2 nM away
Effects on ocean floor	+	NA	-	Impact	-	Impact	-	Impact
Endangered and Threatened Species	+	NA	+	None known in the area	-	Staghorn and Elkhorn corals at Tres Palmas Reserve	-	Staghorn and Elkhorn corals and transient humpback whales and sea trutles at Tres Palmas Reserve
Wild Fish Stocks	-	Continue depleting wild fish stocks	+	Reduce impact to wild fish stocks	+	Reduce impact to wild fish stocks	+	Reduce impact to wild fish stocks

+ The alternative is more favorable for the evaluated consideration.

- The alternative is less favorable for the evaluated consideration.

NA Not applicable.

3.0. AFFECTED ENVIRONMENT

NEPA implementing regulations at 40 CFR Part 1500 requires that an EA concisely describe the environmental areas affected by the alternatives under consideration. This section describes the existing environment that could be impacted by the proposed project.

3.1. SURFACE WATER RESOURCES

Surface water is defined as water present above the substrate or the soil surface. This encompasses lakes, reservoirs, streams, rivers, and coastal waters. Surface water usage ranges from drinking water to recreational enjoyment. In order to fulfill the requirements of the Clean Water Act (CWA) and Water Quality Standards regulation, the PREQB evaluates these types of water bodies.

3.1.1. FRESHWATER

Rio Culebrinas and Rio Grande de Añasco are the two major rivers in the vicinity of the proposed onshore and offshore facilities. The Water Quality Inventory and List of Impaired Waters Report (PREQB, 2003) categorized both rivers as priority watersheds. Priority ranking was determined by the population served by each watershed for drinking water, the water quality conditions, and the number of pollution sources that could impact the water body. Rio Culebrinas is located approximately 6 miles northeast from Punta Higuero. Based on categories established by the EPA 2002 Integrated Report Guidance, the river has 20.3 miles of Category 1 waters (i.e., waters attaining water quality standards), 222.3 miles of Category 3 waters (i.e., insufficient information for water quality determination), and 66.2 miles of Category 5 waters (i.e., water quality standards are not attained). Rio Grande de Añasco, located approximately 8 nM southeast from Punta Higuero, has 12.2 miles of Category 1 waters, 4.5 miles of Category 3 waters, and 71.9 miles of Category 5 waters.

When evaluating the total maximum daily loads for both rivers, causes of impairment due to pollution sources were similar and related to fecal coliform, arsenic, copper, lead, mercury, and manganese (PREQB, 2003). However, base on the severity of impairment and the percentage of water impaired, Rio Culebrinas received a low priority ranking for the scheduling of restoration activities by PREQB, while Rio Grande de Añasco received a high priority ranking.

The Report also lists Quebrada Ramos, a small creek located in Rincón. Quebrada Ramos has 2.3 miles of Category 2 waters (i.e., waters attaining some designated uses, but data are not available for full determination). Other minor rivers and creeks can be found in or near the municipality of Rincón; however none are listed in Puerto Rico's, Water Quality Inventory and List of Impaired Water Report. No freshwater surface reservoirs or lakes are found in the municipality of Rincón.

3.1.2. COASTAL WATERS

None of the coastal waters around the municipality of Rincón are listed as impaired (PREQB, 2003 and EPA, 2007). Rincón coastal waters also received a water quality classification of SB, which is applied to coastal and estuarine waters designated for primary (e.g., swimming) and secondary (e.g., boating) contact recreation, and propagation and preservation of desirable species (PREQB, 2003). Large wave systems from the North Atlantic frequently arrive during winter months, and have contributed to establishing Rincón as an internationally famous surfing destination. Water temperatures in the Caribbean Sea fluctuate between 78.8°F and 86°F, while salinities fluctuate between 34 and 36.3 Practical Salinity Units (PSU) (Morelock et al., 2001).

Despite the overall good quality of the coastal waters of Rincón, natural and human actions have the potential to affect the coastal waters near the proposed location. Actions within the area may result in pollution including nutrient loading from point and non point sources, erosion, and sedimentation (PREQB, 2003). For example, during heavy rains, large plumes of sediment from the Rio Grande de Añasco along the south approach the coastal waters of Rincón (Figure 12). The sediment plumes resulting from these events and the associated nutrients decrease water quality, including water transparency, and affect coastal sensitive communities like coral reefs (Acevedo et al., 1989 and Garcia-Sais et al., 2005).



Figure 12: NOAA image from 29 March 1999 showing a sediment plume from Rio Grande de Añasco moving north and approaching the coast of Rincón.

Rincón has some attributes that foster the development of the observed high energy and strong coastal system. Diurnal land and sea breezes and persistent 33 ft northeasterly trade wind flow characterize Puerto Rico's wind regime (Bennett et al., 2007). Surface water movements in the upper 300 ft of the water column are primarily driven by the drag of the wind over the surface of the ocean causing the water to move and form currents. These moving water masses are deflected 45° to the right of wind direction in the Northern Hemisphere by a combination of coriolis and water drag (Mann and Lazier 1991). Data collected by Boriquen Aquaculture indicate that near shore strong currents (~0.8 to 1.7 knots) flow in a north/northwest direction from the Tres Palmas Marine Reserve in the south, changing to an east to west direction at Punta Higuero where they move away from the coastline into deeper waters (Appendix A-II for data on currents). On a larger scale, currents in the area tend to have a net northwestward movement from the Caribbean to the Gulf of Mexico through the Mona Passage. These Mona Passage currents and other water passage currents (Windward passages, Trinidad Passage) combined with the Caribbean Current, the dominant current of the region, contribute to the origin of the Gulf Stream (NOAA, 2007).

Changes in bottom topography and coastal physiography can also affect surface water circulation by deflecting currents, causing eddies, and inducing coastal upwelling. Punta Higuero the most western point of the island of Puerto Rico, is at the tip of a triangular cape that extends into the water approximately 8 nM. Capes are known to cause strong deflection of coastal currents. The bathymetry around Rincón is noticeably different from the remainder of the west coast of the island. About 20 nM south of Rincón, near the town of Cabo Rojo, the shelf break is located more than 13 nM offshore. About 10 nM north, on the northwest coast of Aguadilla, the shelf break can be found at about 6 nM offshore. In contrast, there are locations near Punta Higuero where the shelf break is located less than 1 nM from the shoreline. Deep waters near the shore allow surface currents to move without losing energy because of bottom drag. In addition, the west coast of Puerto Rico is located on the Mona Passage, which is an area where the Atlantic Ocean waters mix with the waters of the Caribbean Sea.

3.2. GROUND WATER RESOURCES

Ground water is defined as water present below the substrate or soil surface. In Puerto Rico, the main uses of ground water are drinking water, irrigation, and manufacturing (PREQB, 2003). Because 37.8% of the water used in Puerto Rico is obtained from aquifers, ground water contamination is a serious concern. The PREQB monitors ground water for nitrates, volatile organic compounds (VOCs), pathogens, metals, and pesticides. Within the municipality of Rincón, two wells (Calvache II and Puerto II) are used for monitoring by PREQB. They serve as the baseline for the quality of the ground water in the surrounding area. Currently, there are no water quality issues with these wells and they remain open and functional.

3.3. AIR QUALITY, INCLUDING ODOR

The Clean Air Act (CAA) of 1970 requires the development, implementation, and enforcement of environmental regulations that will improve and maintain cleaner air. The EPA devised standards (primary and secondary) called National Ambient Air Quality Standards (NAAQS) under the CAA. Primary standards aim to protect public health and safety while secondary standards aim to protect public welfare. There are six criteria pollutants established under the NAAQS. They are carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), sulfur oxides, (SO_x, measured as SO₂ or sulfur dioxide), lead (Pb), and particulate matter (PM₁₀ and PM_{2.5}). Individual states are responsible for maintaining NAAQS and can adopt stricter standards than those established at the Federal level. Most states fulfill this responsibility through State Implementation Plans (SIPs) which identify implementation, maintenance, and enforcement actions for the NAAQS.

Based on these pollutants, the EPA designates all areas of the U.S. and territories as having air quality better than or worse than the NAAQS, attainment and non-attainment respectively. The criteria for non-attainment designation vary by pollutant. An area is in non-attainment for ozone if it exceeds the NAAQS more than three discontinuous times in three years and for any other pollutant if the NAAQS is exceeded more than once per year. The proposed water and land facility locations are in attainment for all six criteria pollutants.

The proposed Boriquen Aquaculture CAAP sources of air emission are the engine wet exhaust of two support vessels, a 38-ft boat with a single engine diesel and a 20 ft skiff equipped with a single 115 hp outboard engine, and the air emission of a 4x4 King Cab truck. Direct emission measurements from the support vessels were not available; however, the contribution of emissions from these limited sources is minor in comparison to the large number of similar commercial and recreational small vessels in use around Puerto Rico's coastline. The truck will be used for general duties including, transport of feed between the onshore rental property and the marina. The feed will be kept in sealed, plastic lined bags and stored in a container equipped with an air conditioner that will prevent the free dispersion of odors. No other major sources of air emissions, such as incinerators, boilers, large power generators, furnaces, or ovens are part of the proposed project.

3.4. NOISE

Noise consists of extraneous or unwanted waveforms that can interfere with communication, and is most often associated with irritating unwanted sounds. Sound is typically measured in decibels (dB); a dB is defined as the ratio between a measured pressure and a reference pressure. Prolonged exposure to noise levels at or about 80 dB can cause deafness. Typical major sources of noise pollution are transportation vehicles, factory machinery, and heavy construction equipment, which tend to be associated with large industrial areas and urban centers. In ocean environments, sources of noise include ship traffic, underwater mining exploration, and military training activities. Elevated or prolonged levels of underwater noise can be particularly

detrimental to many marine mammal species. The proposed Boriquen Aquaculture CAAP major sources of noise are the engines of two support vessels, a 38-ft boat with a single engine diesel and a 20-ft skiff equipped with a single 115-hp outboard engine, and the engine of a 4x4 King Cab truck. No other major sources of noise (e.g., large power generators, heavy equipment), including underwater noise (e.g., underwater air blasts), are part of the proposed project.

3.5. LAND USE

Most of the land used by the proposed project consists of the 50 acres of submerged land owned by the Commonwealth of Puerto Rico where the submerged cages will be moored. The onshore activities will be limited to a one-acre rental property in the municipality of Rincón used to support offshore operations, and the use of an existing public marina. On August 15, 2006, Puerto Rico Departamento de Recursos Naturales y Ambientales (PRDRNA) granted to Boriquen Aquaculture a concession for the use of these submerged lands. Reference numbers of concession are O-BD-CZM01-SJ-00005-28102004 and ZMT-2003-013 (Appendix B-IV). Boriquen Aquaculture CAAP plans do not contemplate the construction or development of any new land facilities.

3.6. SOCIOECONOMICS

The municipality of Rincón is a small town located on a coastal valley in the most western portion of the island of Puerto Rico. Rincón is approximately 97 miles or about two and half hours driving time from the capital city of San Juan, the island's major urban center. In 2000, Rincón had a population density of 1,070 people per square mile, about 12% of the population density for urban San Juan. In addition, the Rincón per capita income of \$6,610 is only about 54% of the per capita income of San Juan (Table 2), or 80% of the \$8,185 per capita of Puerto Rico. The average income per family in Puerto Rico is \$27,017 while the island unemployment rate is approximately 12%. Family income and unemployment data were not available for Rincón; however, 51.52% of the population lives below the poverty level.

Table 2: Comparison of Rincón and San Juan Socioeconomic Data from the 2000 Census

PARAMETER	Rincón	San Juan
Population	14,301	442,447
Population Density	1,070/mile ²	9,145/mile ²
Per Capita Income	\$6,610	\$12,437
Land Area	13.8 mile ²	47.5 mile ²

During the last two decades, tourism has become an important contributor to the economy of Puerto Rico, representing 7% of the island's gross product recorded during 2000 (Pendelton, 2002). For the local economy of Rincón, tourism is a greater contributor. In 1997, the six major

accommodation establishments of Rincón had gross retail receipts in excess of \$4.5 million/year or 11% of the total earnings reported for Rincón. When combined with other expenditures (e.g., retail, food, and beverage), the visitors to the six establishments generated 40% of the income reported for Rincón (Pendelton, 2002). An Internet search identified at least 46 different guest accommodation establishments, the vast majority consisting of small inn-type facilities. During winter months, tourists from the U.S. mainland comprise the largest segment of the visitors. Summer months attract tourists from Puerto Rico's major urban centers. Tourists are drawn to the area because of the sparsely occupied and scenic beaches and year round opportunities for aquatic sports such as surfing, wind surfing, and scuba diving. The influx of tourists has increased the number of small, family-owned and operated restaurants, most that specialize in Puerto Rican seafood fare.

Rincón, like most of the coastal towns in Puerto Rico, has a traditionally important, but economically small commercial fishing industry (Table 3). In 2000, 120,509 lbs of fish were landed in Rincón with a value of \$302,084 (Pendelton, 2002). Commercial fisheries are not a major industry in Puerto Rico. Most of Puerto Rico's fisheries are considered artisan, and are conducted from small boats with outboard engines frequently using fish traps and fish lines. From 2001 to 2004, close to 80% of Puerto Rico's fish landings consisted of reef fishes (Matos-Caraballo, 2004).

The commercial fishing industry in Puerto Rico has declined by almost 40% during the last two decades (Matos-Caraballo et al., 2002). In contrast, Puerto Rico imports about \$185,000,000 in seafood products annually. From 2001 to 2004, the annual reported finfish landings in Puerto Rico fluctuated from around 2 to 2.9 million lbs. However, it is accepted that these values represent a general trend and are not absolute values, as part-time fishermen that do not report fishing statistics conduct a significant fraction of the commercial fishing in Puerto Rico.

Table 3: Number and Gross Annual Income for Fishermen from Rincón *

Fishing Technique	Number of Fishermen		Gross Annual Income	
	Full Time	Part-Time	Full Time	Part-Time
Diving	1	1	\$18K to \$22K	\$8K to \$10K
Fish Traps	—	6	N/A	N/A
Nets	—	15	N/A	N/A
Line	12	22	\$ 20K to 26 K	\$ 10K
Charter	2	—	\$ 60K	—

*Values provided by Boriquen Aquaculture

Line fishermen from Rincón frequently fish over 17 nM offshore using deep drop lines to catch red snapper. The last three years has recorded the highest snapper statistics, with an average

catch of 150,000 lbs annually. This increase has been attributed to government aid received in the form of new boats, gear, and electronics.

3.7. CULTURAL RESOURCES

Relevant cultural resources include archeological or historical sites that may be located in the vicinity of or may be affected by a proposed project. Neither of the proposed land-based facilities include known archeological or historical sites. In addition, no wrecks are known to be located in or near the proposed offshore site. On December 22, 2003, the Puerto Rico State Historical Preservation Office concurred with the finding that no historical properties will be affected by the proposed project (Appendix B-I).

3.8. FLOODPLAIN AND WETLAND

Floodplains are low-lying flat areas usually adjacent to a body of water that are expected to flood during determined conditions (OCZM and CPR 1978). Wetlands are defined as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Dominant wetlands in the Puerto Rico coastal zone are mangroves and mudflats. Neither of the two proposed onshore facilities is not located within or adjacent to floodplains or wetlands.

3.9. PRIME FARMLANDS

Prime farmlands are a special category of highly productive cropland that is recognized and described by the U.S. Department of Agriculture's Soil Conservation Service and receives special protection under the Surface Mining Law. Of the two onshore facilities is neither not located within nor adjacent to designated prime farmlands.

3.10. MARINE RESOURCES

For the purpose of the proposed project, relevant marine resources include the biological community found in the water column and benthos. Submerged coastal mineral resources such as oil or gas are not expected to occur near the proposed project and will not be further addressed in this EA. A variety of seabird species, including migratory species, may occur near the proposed project. The primary infrastructure of the proposed project is the series of offshore cages will be located underwater, well below diving and feeding depth of any bird species.

3.10.1. WATER COLUMN COMMUNITY

The composition of the water community within the proposed offshore site location ranges from microscopic phytoplankton and zooplankton species to humpback whales (*Megaptera*

novaeangliae). For the most part, large-scale horizontal plankton distributions are determined by ocean currents and the suitability of the physical, chemical, and biological components of the hydrographic regimes they encounter. The biomass of planktonic organisms is generally higher in nearshore, shallower waters. Phytoplankton use dissolved nutrients, primarily nitrates, ammonia, and phosphates, with their photosynthetic system to fix organic carbon and serve as the base of the ocean's food chain. Tropical species of phytoplankton have evolved fast nutrient uptake ratios to function in the relatively low nutrient concentration found in oligotrophic tropical waters. Major species groups include small dinoflagellates, diatoms, and cyanobacteria. Zooplankton expected to occur in the area range from single cell microscopic organisms, like radiolarians, to large gelatinous organisms such jellyfish that are several feet in length. Also included in this segment of the community are larval stages and juveniles of multiple benthic and pelagic species of fish and invertebrates (Parsons et al., 1984).

In the relatively deep waters, fish occurring around the proposed site would be a mix of coastal and pelagic species. A 14-month survey of fish found around the Culebra Snapperfarm cages identified 17 reef species, 9 oceanic species, and 10 species that typically live in both reef and oceanic waters (Cabarcas-Nuñez et al., 2004, Allston et al., 2005). The most abundant family of fish observed was the Carangidae, which represent Jacks species and accounted for eight species and 79% of all fish encounter. The most abundant finfish were the genus *Decapterus* and *Caranx*, which include both pelagic and reef species frequently found in schools. Based on the abundance of juvenile observed and aggregation behavior, Carbacas-Nuñez et al. (2004) suggest that the cages may act as nursery structures where juveniles could find the conditions required for existence and survival. Increases in juvenile fish survival may help replenish wild stocks.

Seventeen species of marine mammals have been sighted off the coast of Puerto Rico. The species most likely to be encountered at the proposed facility is the humpback whale. The area of Punta Higuero has an observation park where people gather during winter months to watch migrating humpback whales. In January 2004 the Reserva Marina Tres Palmas in Rincón was established (Salva Tres Palmas, 2004). The natural resources of the Reserve are the economic engine for the Rincón's community. NOAA is funding the Reserve's management conservation plan. The special area of planning covers well beyond Boriquen's site. This plan notes that the whale breeding area encloses the Boriquen Aquaculture site.

3.10.2. BENTHIC COMMUNITY

The benthic community is characterized as a diverse group of organisms that lives in or on the ocean floor. Benthic species consume organic detritus from the water column, graze on benthic algae and sea grasses, or actively predate on other benthic species. Benthic communities can be divided into infauna (animals that live within the sediment) and epifauna (animals that live on the seafloor, including demersal fish). Epifaunal studies have focused mostly on organisms

visible in photographs, often referred to as megafauna. For example, *Beggiatoa*² mats are considered indicator species of environmental degradation. This marine bacteria is known to colonize on top of sulfide-rich sediments and move around marine sediments forming mats or clusters of filamentous (NOAA, 2007).

Bathymetry affects currents and influences the types of marine organisms present, both in the water column and on the seafloor. Sediment type also strongly influences benthic communities. Soft bottom communities are typically composed of fish and invertebrate species, the latter of which live either as infauna and epifauna (Parsons et al., 1984).

The benthos of the preferred offshore site is characterized by sand gravel mix without prominent or marked vertical relief or structure that could provide refuge to high concentrations of large macroinvertebrates or fishes. The site is sparsely populated and not considered an important fishing ground.

A ecologically important coral reef is located about 2 nM south of the preferred offshore site. This reef is part of the Tres Palmas Marine Reserve. This system is a fringe coral reef that includes what is probably the largest remaining elkhorn coral (*A. cervicornis*) stand in Puerto Rico (Garcia-Sais et al., 2005). In August of 2003, Tres Palmas became the first marine reserve designated off the Puerto Rican mainland. It has an area of 0.316 square miles and an average depth of 50 ft. Common species found in the reserve are elkhorn coral, sea turtles, snapper, grouper, conch, and spiny lobster. Large swells, especially during the winter months, and large coral heads make fishing in the reserve virtually impossible. The main threats to the reserve come mostly from coastal development, point and non point source pollution, and contact from surfers and boaters. These threats have resulted in damage of about 45% of the elkhorn coral population of the site.

Coral reefs are one of the most biologically productive and diverse ecosystems on the planet. They protect inner waters, buffer against tropical weather systems, and provide habitat for juvenile fish as well as benthic species (OCZM and CPR 1978). Sea turtles are also closely associated with coral reefs. They use them as protection from predators while resting. However, despite their apparent hardiness, coral reefs are actually quite fragile and easily destroyed. Threats to coral reefs include sedimentation, pollution, poor water quality, and physical destruction from anchors and divers.

Because of their important ecological role, coral reefs are designated as EFH. The 1996 amendments to the Magnuson-Stevens Fisheries Conservation and Management Act (MSA) (16

² *Beggiatoa* is a [filamentous \(septate\) genus](#) of [proteobacteria](#), and are among the largest [prokaryotes](#), with cells about 200 micrometres in diameter. *Beggiatoa* can be considered an [indicator species](#) since they are present and flourish in [marine](#) environments which have been subject to [pollution](#), where the bacteria become visible as a whitish layer ([Wikimedia Foundation, Inc.](#), 2008)

United States Code (USC) 1801 et seq.) require the identification of EFH for federally managed fisheries species and the implementation of measures to conserve and enhance this habitat. In order to meet this requirement, the Caribbean Fishery Management Council (CFMC), which is responsible for the management of fishery resources in Puerto Rico, developed four fisheries management plans. In addition to coral reefs and reef-associated invertebrates, there are plans for spiny lobster, queen conch, and shallow water reef fish.

EFH as defined in the Magnuson-Stevens Act includes “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The final rules promulgated in 2002 (50 CFR Part 600) further clarify EFH with the following definitions:

- *Waters* – aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate;
- *Substrate* – sediment, hard bottom, structures underlying the waters, and associated biological communities;
- *Necessary* – habitat required to support a sustainable fishery and the managed species’ contribution to a healthy ecosystem; and
- *Spawning, breeding, feeding, or growth to maturity* – stages representing a species’ full life cycle.

3.10.3. THREATENED AND ENDANGERED SPECIES

A total of 12 federally-listed species are known to occur in the waters of Puerto Rico, and may occur in or near the proposed offshore site (Table 4).

The ESA of 1973, as amended, empowers the Secretary of the Interior and the Secretary of Commerce to establish a listing of endangered and threatened species and critical habitats designated for protection. The ESA prohibits jeopardizing endangered and threatened species or adversely modifying critical habitats essential to their survival. The ESA defines “take” as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (16 USC §1532(19)). Section 7 of the ESA requires Federal agency consultation with NMFS and/or the United States Fish and Wildlife Service (USFWS) if the agency has reason to believe that an endangered or threatened species may be present in the area affected by a project and that implementation of the proposed action would likely affect such species. NMFS is responsible for administering ESA as it applies to listed marine mammals and sea turtles.

Table 4: Threatened and Endangered Species that May Occur in the Vicinity of the Proposed Offshore Site

Common Name	Scientific Name	Status
Blue whale	<i>Balaenoptera musculus</i>	E
Finback whale	<i>Balaenoptera physalus</i>	E
Sei whale	<i>Balaenoptera borealis</i>	E
Sperm whale	<i>Physeter macrocephalus</i>	E
Humpback whale	<i>Magaptera novaeangliae</i>	E
Loggerhead turtle	<i>Caretta caretta</i>	T
Kemp's Ridley turtle	<i>Lepidochelys kempii</i>	E
Green turtle	<i>Chelonia mydas</i>	T
Hawksbill turtle	<i>Eretmochelys imbricata</i>	E
Leatherback turtle	<i>Dermochelys coriacea</i>	E
Staghorn coral	<i>Acropora palmata</i>	T
Elkhorn coral	<i>Acropora cervicornis</i>	T

Of the five listed whale species, only humpback whales are common to the area. In a study by Mignucci-Giannoni (1998), 80% of the marine mammal survey sightings were of humpback whales. Humpback whales migrate during the fall and winter months from feeding grounds in the North Atlantic to mating and calving in the Caribbean (NMFS, 1991). The other four whales are found mostly in pelagic waters. Major human-caused threats to this species include entanglement with fishing gear and ship collisions.

All five species of sea turtles can be found in Puerto Rico. However, only the green, leatherback, and hawksbill turtle are likely to be found at or near the proposed offshore facility. Leatherbacks are considered the most pelagic of the sea turtles (Marquez, 1990). Adults have a pelagic life, and are only found in coastal water during nesting. Leatherback, green, and hawksbill turtles are known to use sandy beaches for nesting (NMFS and U.S. FWS 1991, NMFS and U.S. FWS 1992, and NMFS and U.S. FWS 1993). Nesting activities for the three species have been reported for Rincón. Green and hawksbill turtles are typically associated with coral reefs and seagrass beds; however, they are expected to transit around the vicinity of the proposed project. Major causes of sea turtles' mortality by humans include incidental capture in trawling nets and entanglement in lost or discarded fishing gear (NRC, 1990). Another major threat is loss of secluded nesting beaches because of coastal development and installation of lights on the shoreline that disorient sea turtle hatchlings (Raymond, 1984).

On May 9, 2006, NMFS listed elkhorn and staghorn corals as threatened species (NMFS, 2006). These two species of coral are typically found in shallow warm water reefs within high-energy zones. As previously mentioned, the Tres Palmas Marine Reserve sustains a large population of elkhorn coral. The species are found throughout Florida and the Caribbean (Colin, 1988) and

were once one of the most important reef builders (NOAA, 2006). Their unique branching morphology creates enormous surface area and complex tri-dimensional structures that serve as habitat for multiple reef organisms (NOAA, 2006). No other hermatypic coral species can fulfill this ecological role (NOAA, 2006). Factors believed to be responsible for their decline include disease, elevated sea surface temperature, and hurricanes (NMFS, 2006).

4.0. ENVIRONMENTAL CONSEQUENCES

NEPA implementing regulations at 40 CFR Part 1500 requires the concise identification of environmental effects and values in adequate detail, so they can be compared to economic and technical analyses. This section describes the environmental consequences that could result from the implementation of the proposed project.

4.1. SURFACE WATER RESOURCES

4.1.1. FRESHWATER

The proposed onshore facilities are not located adjacent to or near any freshwater surface system. Management of the supplies and materials in the storage facility will prevent the accidental release into water systems. The storage facility will hold feed in 50-lb plastic lined and water resistant bags, which will be properly sealed. Additionally, the on-site septic system is operable and collects sewage generated on the rental property. Within the next two years, it is expected that municipal sewer lines will be installed in the location. Therefore, activities conducted at the onshore locations, including daily transit and transport of material between rental property and marina, will not affect any freshwater surface system.

4.1.2. COASTAL WATERS

No shoreside hatchery facilities or fish processing plants that would generate effluents with pharmaceutical or other biological waste products and that could impact coastal waters are contemplated as part of the project. Most of the proposed project activities with a potential environmental impact will occur within coastal waters. These activities include the placement and maintenance of cages, and the stocking, feeding, growing, and harvesting of the fishes. With the exception of the daily transits to the offshore site to feed the fishes and maintain the cages, and the offload of the harvested fish for distribution, the potential impacting activities will occur at the offshore site. A minor risk exists for small oil or fuel spills from the daily operation of the support vessels; however, this risk is similar to the risk of oil or fuel spills that may occur from the other small vessels that routinely operate within the coastal waters of Puerto Rico.

At the offshore site, the sources of potential pollutants that may affect water quality are unconsumed fishmeal and the excrement from the fish population. No pharmaceutical products or other chemical constituents will be discharged. The unconsumed fish meal/feed and excrement has the potential to increase the nutrient concentration, suspended solids, and

biological oxygen demand of receiving waters. Water quality data collected and monitoring observations made around the same model of cages at other offshore CAAP facilities located in similar tropical environments but at a much lower production (e.g., Snapperfarm in Culebra, Puerto Rico) indicate no measurable impacts on the water quality of receiving waters or nearby systems (Cabarcas-Nuñez et al., 2004, Allston et al., 2005, Langan, 2006). Because of the spacing between cages (e.g., every six acres to allow water circulation) and monitoring of the amounts of feed material provided to the growing cobia population, an adverse or significant impact on the quality of coastal waters is not anticipated during the establishment and operation of the Boriquen Aquaculture CAAP facilities. To ensure this however, water quality shall be monitored in accordance with a water quality plan developed in coordination with NMFS and a series of conditions listed in the Water Quality Certificate issued by the PREQB on January 16, 2007 (Appendix B-VII). The Water Quality Certificate determined that there are reasonable assurances that the proposed project will not cause violations to the applicable water quality standards of the receiving waters. The water quality plan was filed on May 23, 2005 with the USACE San Juan Area Regulatory Section as a condition for the Section 10 permit application for the installation of the offshore finfish cages. The plan specifies minimum parameters that shall be monitored and the methodology to be followed. Fish mortality has been shown to serve as a real-time indicator of water quality. Fishery experts have identified 0.03% to be the average incidental daily mortality for fish (Amos, 2008). A higher mortality rate may be indicative of an environmental problem and therefore will be reported. The disposal of diseased or dead fish may also present an impact. The BMP plan will ensure that proper methods have been identified and that events will be reported. Adherence to procedures will prevent any significant impact. In addition, the project shall comply with the 2004 *Effluent Limitation Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category* (40 CFR 451) (EPA, 2004), and the monitoring plan submitted with the USACE permit (Appendix E). Subpart B (40 CFR451.20-24) of the rule addresses BPTs for the net pen subcategory of CAAP that is applicable to this project.

4.2. GROUND WATER RESOURCES

The proposed project will not directly rely on groundwater for any aspect of its operations. All onshore facilities are supplied by potable water lines. The use of the rental property septic tank is considered routine use of an approved sewage collection device and will not affect groundwater. Within the next two years, it is expected that municipal sewer lines will be installed in the location. Therefore, activities conducted at the onshore locations, including daily transit and transport of material between rental property and marina, will not affect any ground water resources.

4.3. AIR QUALITY, INCLUDING ODOR

Potential sources of emissions affecting air quality, including odor, would be the storage of feed material and operation of transportation vehicles. The feed material will be stored in a climate controlled container facility. The facility will hold sealed bags of feed preventing odor from escaping. Therefore, the feed material is not likely to affect the air quality of the region directly.

Transportation by vehicle from the storage facility to the marina and back will be made daily (10 minutes each way). The vehicle is a diesel 4x4 with a KingCab. The vehicle annual inspection and registration required by the Puerto Rico Department of Motor Vehicles ensures compliance with pertinent emissions standards.

Transportation by boat from the marina to the proposed water facility location and back will occur daily (two hours each way). The boat used for routine activities is a 20-ft skiff with 115-hp outboard motor. When harvesting the fish, an additional 36-ft boat will be used. Both boats are registered with the Department of Environmental and Natural Resources as required by law. In addition, regular maintenance to ensure adequate performance would control the emissions from their engine wet exhaust.

Daily use of a truck and boats would be considered routine activities for the coast of Rincón, and are not anticipated to cause a significant detrimental effect on air quality.

Boriquen Aquaculture does not contemplate the construction or development of a fish processing or industrial facility that may generate additional air emissions. Puerto Rico is in attainment for all six criteria pollutants and the proposed action meets the corresponding NAAQS.

4.4. NOISE

None of the activities projected to occur at the onshore facilities are expected to create noise levels that will affect the surrounding environment. Sources of noise include routine use of a 4x4 King Cab truck and a small portable 3,000-kilowatt generator kept on rental property as backup system during power outages. No heavy machinery or processing plants are expected to be used by Boriquen Aquaculture. The offshore noise will originate from the 36 ft diesel boat and 20 ft skiff. The proposed action would not significantly affect noise or underwater noise levels.

4.5. LAND USE

Boriquen Aquaculture was granted a land use concession by PRDRNA for the installation of moored cages on 50 acres of submerged land. No other modification of land use is anticipated. The onshore activities will be limited to a one-acre rental property in the municipality of Rincón and the use of an existing public marina. Boriquen Aquaculture's current CAAP plans do not contemplate the construction or development of any new land facility. Therefore, the installation and operation of Boriquen Aquaculture CAAP are not likely to affect any land use.

4.6. SOCIOECONOMICS

The establishment and operation of Boriquen Aquaculture CAAP facilities is expected to have substantive positive direct and indirect impacts on the local economy. These employment

opportunities would be created under the proposed action. In addition, a sustainable use of natural resources would create a monetary influx into a low-income community.

Boriquen Aquaculture CAAP operations are not expected to create a conflict with local anglers because the areas where the cages will be installed are not considered prime fishing locations. In addition, Puerto Rico imports a significant amount of seafood products because the demand cannot be supplied by the local fishing industry. Due to the design, the proposed action would not have significant negative impacts on commercial or sport fishery stocks, fishing activities (including subsistence fishing), or the coastal fishing industry. Evidence suggests that offshore cages may act as structures that provide protected habitat for juveniles of coastal pelagic and reef fishes (Cabarcas-Nuñez et al, 2004). Therefore, the cages may act as refuges that could help replenish the wild fishing stock of adjacent areas.

Many local area anglers work part-time and search for jobs in other industries to supplement their income. The maritime and diving experience of these part-time anglers would make them ideal candidates for work at Boriquen Aquaculture.

The submerged cage designs would not interfere with routine navigation of the area (USCG, 2004). The cages will not obstruct the view or affect the high aesthetic value of the Rincón coastline. However, the unique design, size, and operation of the cages could serve as an additional diving attraction and destination for tourists that visit the area.

Existing shore facilities (i.e., Rincón public marina and leased storage shoreside facility) will provide all services in support of the proposed project. The shore-based operations and transit of vessels from the shore support facilities to the offshore cages will not involve any unusual or extraordinary activities. There are no anticipated impacts on coastal resources and activities are not expected to negatively affect the coastal economy.

4.7. ENVIRONMENTAL JUSTICE

Consistent with EO 12898 “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” EPA performs environmental justice assessments on areas potentially affected by proposed projects. Areas that meet EPA criteria classifying populations as an Environmental Justice (EJ) area undergo a full EJ analysis. The focus of this EJ analysis was the residential populations in direct proximity to the location of the project. The municipality of Rincón was chosen as the Community of Concern (COC) for this analysis. The goal of this analysis was to identify whether the proposed project would create any disproportionate negative impacts to the COC’s environmental and human health.

Step 1: Demographic composition of the COC was investigated using geographic information system (GIS) analysis. The GIS demographic analysis uses the COC and a significant reference community to compare demographics. Puerto Rico was used as the reference community. The

analysis identified 51.52% of the Rincón population as being low-income in comparison to 45.2% for Puerto Rico. Being above the reference community figures, the COC percentages of low-income population triggered EPA's criterion and moved the analysis to step 2 (full EJ analysis).

Step 2: Environmental burden of the COC was investigated using GIS analysis. Indicators were developed and used to compare the environmental burden of the COC to that of Puerto Rico. EPA Region 2 uses the concept of an Environmental Load Profile (ELP). The ELP helps to identify COCs that may bear a disproportionate environmental load in comparison to statewide derived thresholds. Currently the ELP consists of three indicators: Toxics Release Inventory (TRI), Air Emissions, Air Toxics and Facility Density. ELP results indicated that the emissions and the Air Toxics indicator for Rincón are above the thresholds.

Step 3: Next, the contribution of the proposed project to the ELP was considered. This project would fall into the category of small quantity generator (for this project emissions from boats and trucks only), and small quantity generators are not included in the calculation of the Facility Density Indicator. Therefore, the proposed project will not contribute to the Facility Density Indicator nor will it contribute to the other ELP indicators. In conclusion, based on the EJ analysis (Appendix F), and the fact that the proposed project is designed to operate such that it should not impose further negative environmental or health impacts to the COCs, the project does not appear to present any disproportionately high and adverse impacts to the COCs. For additional information regarding EJ, visit the EPA website at: <http://www.epa.gov/region02/ej/>. For additional information on the methodology and indicators used in the assessment, visit the EPA website: <http://www.epa.gov/region2/ej/poltoct.htm>. Additionally, the project would create new employment opportunities for the area.

4.8. CULTURAL RESOURCES

Neither of the two land-based facilities associated with the proposed action include known archeological or historical sites. In addition, no wrecks are known to be located in or near the proposed offshore site. The Puerto Rico State Historical Preservation Office in a December 22, 2003 letter to the USACE concurred with the finding that no historical properties will be affected by the proposed project; therefore, no impacts to cultural resources are anticipated as a result of the proposed project (Appendix B-I).

4.9. FLOODPLAIN, WETLAND, AND PRIME FARMLAND RESOURCES

Neither of the two land-based facilities includes or is adjacent to floodplains, wetlands, or prime farmlands. Therefore, floodplains, wetlands, and prime farmlands will not be affected by the proposed project.

4.10. MARINE RESOURCES

Marine resources including water column and benthic communities, and ESA listed species are not likely to be affected by the establishment and operation of the proposed Boriquen Aquaculture CAAP facility. Each of those communities is described in detail in the next three sections.

4.10.1. WATER COLUMN COMMUNITY

Data collected and monitoring observations made at the Snapperfarm pilot project, which used two offshore cages of the same model, showed no detrimental effects on the water community (Cabarcas-Nuñez et al., 2004, Allston et al., 2005, Rapp et al., 2007). Chlorophyll-*a* measurements done as a metric of phytoplankton biomass were no different with cages versus control sites, which indicates that any nutrient loading from unconsumed feed or fish excretion is not causing localized eutrophic conditions. Changes noted in the water column community were determined to be the result of cages acting as fish attraction devices, particularly for juvenile fishes, which increased the biomass and composition of wild species around the site. A high number of juvenile individuals suggest that the cages were providing refuge.

During USACE's consultation, NMFS expressed concern about the use of non-native species. Therefore, Boriquen Aquaculture agreed not to use Florida Pompano as one of the two finfish species to be cultured. In contrast, cobia is a species found in coastal pelagic waters around the Caribbean. Cobia is incidentally taken by sport fishermen, but is not the target of commercial or recreational fisheries. Therefore, any cobia that may escape the cages are not expected to result in detrimental impacts to the water column community or to recreational and commercial fisheries, as is a frequent concern with salmon and trout hatcheries.

Based on the project design and other operational procedures and controls, the incidental take of marine mammals by a net is not likely to occur during the establishment and operation of the Boriquen Aquaculture CAAP facilities. However, vessel collisions have been identified as a major human-caused threat to endangered species. Boriquen will be transporting feed and providing daily maintenance to the cages, and trips will occur during harvesting.

4.10.2. BENTHIC COMMUNITY

The Snapperfarm pilot project also did not demonstrate any detrimental effects on the benthic community (Cabarcas-Nuñez et al., 2004, Allston et al., 2005). An increase in macroinvertebrate abundance was observed directly below the Snapperfarm cages. However, at 131 ft from the center of each cage, the macroinvertebrate abundance was no different from the control site. The predominant groups observed were polychaete worms, mollusks, and crustaceans. A small localized increase in macroinvertebrate fauna like the one detected during the Snapperfarm survey is not likely to affect the ecological character of the region or cause detrimental ecological effects. However, considering that the Boriquen project is a larger facility than

Snapperfarm greater impacts may occur. While the site appears to be sparsely populated, accumulation of sediments may occur and this might trigger new species colonization.

Results from monitoring of the Kona Blue cages in Hawaii, which are located one nM upcurrent from a coral reef, indicate no measurable environmental impact at any level of significance (Kona Blue, 2003, Sims, 2006). The preferred location for the Boriquen Aquaculture cages would be approximately 2 nM northwest from the Tres Palmas Marine Reserve. Based on the Snapperfarm and Kona Blue results, the benthic community around the preferred location for Boriquen Aquaculture offshore site, including surrounding coral reefs, are not expected to be affected by the proposed action. However, as precaution, two mitigation actions were required by USACE. First, the USACE authorized a phased deployment of the cages. During the first year, four finfish cages would be deployed, followed by one year of environmental monitoring. The monitoring results will be evaluated by USACE. If no detrimental effects are detected, then the rest of the cages would be authorized for deployment. If detrimental effects are detected, modifications to the project, such as variations on feeding protocols, or number of fish per cage may be required before authorization of deployment of the remainder of the cages is granted. Second, water quality shall be monitored in accordance with the plan filed on May 23, 2005 (Appendix E). This environmental monitoring plan was developed in coordination with NMFS to comply with EFH requirements.

4.10.3. THREATENED AND ENDANGERED SPECIES

Because federally listed species including marine mammals and sea turtles may occur near the proposed action, consultation with NMFS in accordance with the ESA was required. On May 5, 2005, NMFS concluded the Section 7 consultation by concurring with the USACE determination that the proposed action is not likely to adversely affect ESA-listed whales and sea turtles or critical habitats. NMFS concluded that, for whales and sea turtles, the high tension of the cage mooring would make entanglement unlikely. Also because of the open design of the system, it is unlikely that the cages would impede the movement of sea turtles. However, as part of the USACE permit, Boriquen is required to report any whale or sea turtle found at the proposed project site. Furthermore, NMFS has general guidelines for sea turtle and marine mammal avoidance (Appendix G) and if an action results in harm to an endangered species (including critical habitat) then, NOAA Office of Law Enforcement would take action against the responsible party.

4.11. CUMULATIVE EFFECTS ANALYSIS

Under NEPA (40 CFR 1508.7), cumulative impacts are defined as “the impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.” Cumulative impacts can result from individually minor but collectively significant actions taking place over time. Cumulative impacts can result from both direct and indirect impacts. Direct effects are caused by the action and occur at the same time and place as the proposed action. Indirect effects are caused by the

proposed action, but are later in time or farther removed in distance, yet still reasonably foreseeable.

Based on this environmental assessment, possible cumulative impacts from the proposed Boriquen Aquaculture CAAP project are; degradation of water quality and increase in organic loading beneath the cages from the direct application of feed and excretion of caged fish; a possible increase of pelagic and reef fish around the site; impacts to lower trophic level species caused by the production of aquaculture feed; and changes on the ocean floor at the site caused by cage shadowing and sediment loading. Human health may be affected by the consumption of aquaculture products.

As previously discussed, findings from similar offshore CAAP projects indicated low risk for water quality degradation (e.g., Snapperfarm in Culebra, Puerto Rico, and Kona Blue Water Farms in Kona, Hawaii.) Conversely, other studies have shown that organic particulate matter, specifically feed, has a fast settling speed. The settling speed is so rapid that the descent has been shown to be almost vertical at near-shore cages (Rapp et al, 2007). However, in coastal open waters the settling speed rate and trajectory would reasonably be expected to vary. Moreover, plankton and other small marine life near the proposed cages might utilize any excess feed or waste produced by the growing fish population. An environmental monitoring plan will be implemented in conjunction with a scaled deployment of the cages as a requirement for the USACE permit to ensure that water quality is sustained and biological communities are not affected over time and with multiple cages.

The indirect effect of an increase in the numbers of wild juvenile pelagic and reef fish around the area of the cages has been observed around the Snapperfarm cages (Cabarcas-Nuñez et al., 2004, Allston et al., 2005). Consequently, this effect is also likely around Boriquen Aquaculture cages and this helps diversify the aquatic community. No other past, present or reasonable foreseeable future actions that could contribute to cumulative effects in the offshore study area were identified. Specifically, no other offshore aquaculture facility is located or currently planned for the west coast of Puerto Rico.

The impacts of changes in seafood activities (e.g., aquaculture) have important environmental consequences (Institute of Medicine of the National Academies, 2007). A latent future impact comes from preparation of the feed itself. The type of ingredients generally required for the production of feed for aquaculture operations utilizes, among other components, *target-feed* species caught from the wild. Some of these *target-feed* species are ground-up herring, menhaden, anchovy, sardines (AquaNIC, 2008) and krill (critical specie at bottom of the marine food chain.) Estimations have shown that in order to produce 2.2 pounds of feed, it takes 10 pounds (Time Magazine, 2007) of *target-feed* species. The increased demand for this feed will result in greater harvesting of the *target-feed* species with possible effects throughout marine food chains. Furthermore, food chain effectiveness (interdependencies) relies on the energy transfer from one level to another. Energy transfer occurs much more efficiently at lower levels

on the food chain (Duxbury A. 2000). By farming carnivorous fish specie, Boriquen is having to use greater amounts of target feed species to achieve its desired output. Farming a specie lower on the food chain (i.e., non carnivorous) would require less input.

Pharmaceutical products or other chemical constituents are sometimes included in aquaculture projects leaving residues in the product (USFDA, 2006). Boriquen Aquaculture will not use any of these products; consequently, residues in the cobia or aquaculture waste products are not an issue and were not analyzed here.

Studies showed a heavily shadowed area results the aquaculture cages (Rapp et al, 2007). Therefore, over time, the benthos at the ocean floor may be seriously depleted beneath all eight cages, which may also affect the bottom areas between cages. Further, sediment loading is expected to occur.

A potential benefit from aquaculture projects is that the feed is controlled. As such, aquaculture projects may have a positive effect on human health. Studies have indicated that most fish (ocean and freshwater) contain mercury. Mercury builds up in the bottom sediments where time and bacteria transforms it into a more noxious state called *methylmercury* and fish ingest it building it to very high levels (OEHHA 2008). Aquaculture fish are not expected to contain such levels.

5.0. MITIGATION MEASURES

Boriquen Aquaculture will phase-deploy the cages in order to monitor immediate impacts. During the first year, four cages will be deployed, one cage every three months. Further cage deployment will be preceded by a one-year monitoring program as required by the environmental monitoring plan developed in coordination with NMFS. Implementation of this plan is a condition for the USACE Section 10 permit for the mooring of the cages (Appendix E); and must comply with the monitoring conditions set by the PREQB Water Quality Certificate (Appendix C). These monitoring efforts will evaluate the biological variables and water quality of the offshore site and surrounding environment. A six-month summary report will be submitted to the USACE for evaluation. After one year of monitoring, the results will be presented for evaluation at an interagency meeting. If no detrimental effects are detected, then the rest of the cages would be authorized for deployment. If detrimental impacts are detected, modifications to the project (e.g., variations on feeding protocols, number of fish per cages) and/or scope of the monitoring plan may be required before authorization of deployment of the remainder of the cages is granted. Studies have demonstrated that deposition loading from these types of projects occurs; and that the ocean floor suffered greater impact after a longer period of time (Rapp et al, 2007). Consequently, the environmental monitoring plan will continue beyond the one-year requirement (USACE Section 10 permit) in order to capture a more complete data set that will render greater understanding for better decision-making.

Research companies are constantly creating new and more efficient products. Innovations in the techniques to produce feed will undoubtedly continue resulting in better management of marine resources. To continually minimize the impacts of feed, aquaculture operators should keep abreast of the most environmentally efficient feeding products.

Impacts resulting from the obstruction of light from the ocean floor and sediment loading will be documented with dated photographs. Recording should be done by transects of the project's site dated no more than seven days prior to each cage deployment and then continue providing dated photographs and/or video of the exact same location/coordinates throughout the operation. Recording should be performed every time a cage deployment occurs. Respectively, the first cage will have four reports and four sets of photographs/video and the fourth cage one report and one set of photographs/video. The beginning and ending points of transects shall be located by GPS and noted in the report. Table five describes transect information and necessary reports.

Table 5: Photographs/Video Monitoring Transects.

Monitoring Elements	Photograph and/or Video Monitoring Transects of Ocean floor			
	<i>Transect Beneath Pens</i>	<i>Transect 30 m Up-current From Edge of Pens</i>	<i>Transect 30 m Down-current From Edge of Pens</i>	<i>Frequency</i>
<i>Photographs and/or Video Tapes of ocean floor</i>	Report	Report	Report	Every three months every cage (cage 1=4 reports, cage 4=1 report)

Boriquen should install two-foot measurement markers (made of PVC material and showing feet [thicker lines] and inches) prior to project initiation directly below each cage to be shown in each photograph/video. Boriquen should train staff in charge of recording to identify species indicators such as *Beggiatoa* bacteria (report should describe: species, growth, color, form, abundance), document the flora and fauna observed and any feed or other man-made debris. Reports should include; color sediments, gassing and the presence of bumps shall be recorded and described. Boriquen should provide these series of photographs and/or videos and reports taken every three months for each cage from the time of their deployment in an organized way simultaneously with the environmental monitoring plan report. Recordings must be taken with the same camera or video equipment and same film and develop techniques should be use to assure data consistency.

Species can act as real time indicators of different circumstances. The average incidental daily mortality level of fish has been identified as 0.03% (Amos, 2008). A higher mortality rate

occurring over a few days might be an indicator of exposure to pollution (University of Missouri Extension, 2005). Therefore, water quality must be considered. The presence of *Beggiatoa* mats has also been used as an environmental indicator near aquaculture projects and Boriquen should identify and record its presence.

Aquaculture activities could become even more sustainable by farming fish that are non-carnivorous and lower on the food chain (Duxbury A. 2000). The production of herbivorous and omnivorous species (Time Magazine, 2007) requires less fish ingredients for the feed.

Collisions with vessels is recognized as a major threat to endangered and threatened species. As a result, USACE permit required Boriquen to report any whale or sea turtle found at the proposed project site. NMFS developed measures (Appendix G) to mitigate some of these impacts. USACE and NMFS measures would assure the protection of endangered species when implemented as appropriate.

6.0. PUBLIC INVOLVEMENT

Public notices regarding the project were published: December 18, 2003, by the USACE, on September 21, 2004, by PRDRNA and on November 14, 2006, by the PREQB. The Puerto Rico Planning Board (PRPB), as part of the application for Certification of Consistency with the Puerto Rico Coastal Zone Management Program notified 57 different individuals and organizations about the proposed Boriquen Aquaculture project. In addition to Federal, state, and local government representatives, 43 recipients of the notified group included private citizens, non-governmental organizations, and community groups (e.g., fishermen associations). The Certification of Consistency with the Puerto Rico Coastal Zone Management Program (Appendix B-V) included a summary of comments received from the local Sea Grant office and Surfrider Foundations. On March 6, 2006, Boriquen Aquaculture received the endorsement of the office of the Mayor of Rincón (Appendix B-II).

7.0. COORDINATION AND CONSULTATION

The following sections summarize coordination and consultation actions related to the NPDES permit application submitted by Boriquen Aquaculture (Appendix B). Most of the consultation and coordination for this project was done as part of the Section 10 permit application submitted with the USACE, which was submitted prior to the EPA NPDES permit application.

7.1. NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act of 1969 (NEPA), as amended, contains policy and guidance to ensure that potential impacts from proposed Federal actions are assessed using a systematic and interdisciplinary approach. This EA has been prepared in accordance with Section 102(2)(C) of NEPA, CEQ regulations on implementing NEPA procedures (40 CFR 1500-1508), and the Commonwealth of Puerto Rico Environmental Public Policy Act (Law 416,

Article 4B-3).

7.2. PUERTO RICO WATER QUALITY STANDARD REGULATIONS

Section 6.11 of the Puerto Rico Water Quality Standard Regulations (PRWQSR) regulates the issuance of Water Quality Certifications (WQC) by the PREQB. On October 28, 2004, EPA submitted a request for a WQC. On April 19, 2006, Boriquen submitted a request for a WQC. PREQB informed Boriquen of the intent to issue a WQC for the project pursuant to the PRWQSR that there is reasonable assurances that the proposed project will not cause violations to the applicable water quality standards of the receiving waters. The WQC is subject to a series of conditions listed (Appendix B-VII). A public notice about the project was published in a Puerto Rico newspaper on November 24, 2006. On January 16, 2007, PREQB issued a final Water Quality Certificate for the project.

7.3. SECTION 10 OF RIVERS AND HARBORS ACT OF 1899, 33 U.S.C. 403

The Rivers and Harbors Act established that constructions of structures, dredging, and depositing material in waters of the U.S. can only commence once authorized by the USACE. The installation of finfish cages in offshore waters requires a River and Harbor Act Section 10 permit issued by the USACE. The USACE issued a finding of no significant impact for the proposed project, but informed the applicant that Federal Law prohibits the issue of a permit until (1) a Coastal Zone Management (CZM) Consistency Determination is issued by the PRPB, and (2) a NPDES permit is obtained from EPA. On July 19, 2006, the PRPB issued a determination that the proposed project is consistent with the Puerto Rico Coastal Management Program. The number of the determination is CZ-2004-1113-044.

7.4. COASTAL ZONE MANAGEMENT ACT

The Coastal Zone Management Act of 1972 (CZMA), as amended, provides for the effective management, beneficial use, protection, and development of the U.S. coastal zone. The CZMA enables individual states to develop and implement regulatory guidelines to ensure appropriate protection and compatibility of uses within their coastal zones. In the case of the proposed action, shore-based operations and transit of vessels from shore support facilities to offshore cages will have no effect on coastal resources. Shore facility operations (e.g., storage of feed material) and small vessel transits are of the same type routinely conducted in the area for other projects and will not involve any unusual or extraordinary activities.

On July 19, 2006, the PRPB issued a determination that the proposed project is consistent with the Puerto Rico Coastal Management Program. The number of the determination is CZ-2004-1113-044.

7.5. EXECUTIVE ORDER 13089

The purpose of EO 13089, “Coral Reef Protection,” is to preserve and protect the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems and the marine environment. In addition to establishing a Coral Reef Task Force, EO 13089 requires Federal agencies to: (a) identify their actions that may affect U.S. coral reef ecosystems; (b) utilize their programs and authorities to protect and enhance the conditions of such ecosystems, and (c) to the extent permitted by law, ensure that any actions they authorize, fund, or carry out would not degrade the conditions of such ecosystems. Protective measures to reduce impacts from pollution, sedimentation, and fishing should be taken for Federal actions that may affect coral areas.

Potential impacts resulting from establishment and operation of the offshore CAAP facility were determined unlikely to affect coral reef areas. Therefore, the proposed action is consistent with EO 13089.

7.6. ENDANGERED SPECIES ACT

The Endangered Species Act of 1973 (ESA), as amended, empowers the Secretary of the Interior and the Secretary of Commerce to establish a listing of endangered and threatened species and critical habitats designated for protection. The ESA prohibits jeopardizing endangered and threatened species or adversely modifying critical habitats essential to their survival. The ESA defines “take” as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (16 USC §1532(19)). Section 7 of the ESA requires consultation with NMFS and/or USFWS if it has reason to believe that an endangered or threatened species may be present in the area affected by the project and if implementation of the proposed action would likely affect such species.

NMFS is responsible for administering ESA as it applies to listed marine species. Section 7 consultation with NMFS was initiated by the USACE as part of the requirements for Section 10 of the Rivers and Harbor Act permit application submitted by Boriquen Aquaculture. On May 5, 2005, NMFS completed the Section 7 consultation by concurring with the USACE determination that the proposed action is not likely to adversely affect ESA listed species.

7.7. MARINE MAMMAL PROTECTION ACT

NMFS has a regulatory role under the Marine Mammal Protection Act (MMPA) of 1972 (16 USC §1361 et seq.). The act, as amended, establishes a national policy designed to protect and conserve marine mammals and their habitats. This policy was established to prevent the reduction of population stocks beyond the point at which they cease to be a functioning element in the ecosystem, or the reduction of species below their optimum sustainable population.

Under the MMPA, two categories of harassment are defined: (a) the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment), and (b) disturbance to a marine mammal or marine mammal stock by causing disruption of natural behavioral patterns, (e.g., migration, breathing, nursing, breeding, or feeding) (Level B harassment).

NMFS concurred with the USACE determination that the proposed action is not likely to adversely affect marine mammals.

7.8. MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT

The Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA), as amended, (also referred to as the “Ocean Dumping Act”) prohibits the transportation of toxic material from the U.S. for the purpose of dumping it into ocean waters (33 USC §1402(f)). The term “dumping,” as defined under the MPRSA, does not include the intentional placement of any device in ocean waters for a purpose other than disposal. In the case of the proposed action, the feed will be transported for the purposes of feeding the fish. Thus, the proposed action will not involve transporting material for the purpose of dumping into ocean waters, and the proposed action will not require an ocean dumping permit.

7.9. NATIONAL MARINE SANCTUARIES ACT

The National Marine Sanctuaries Act (NMSA) (also known as Title III of the Marine Protection, Research, and Sanctuaries Act of 1972) authorizes the Secretary of Commerce to designate and manage areas of the marine environment with nationally significant aesthetic, ecological, historic, or recreational value as sanctuaries. The NMSA works to protect marine resources, such as sunken historical vessels or unique habitats, while facilitating compatible management for public and private use. There are no existing or proposed marine sanctuaries within or near any of the proposed locations.

7.10. MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT AND SUSTAINABLE FISHERIES ACT OF 1996

Under Section 303(a)(7) of the Magnuson-Stevens Act, as amended, EFH must be properly described and identified for those species considered under Federal Fishery Management Plans (FMP). EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The EFH final rule, published January 17, 2002 (NOAA, 2002c) summarizing EFH regulations, outlines additional interpretation of the EFH definition. These regulatory requirements are intended to minimize, to the extent practicable, any adverse effects on habitat caused by fishing or other non-fishing activities, and to identify other actions to encourage the conservation and enhancement of EFH. Federal agencies must consult with NMFS for any actions or proposed actions authorized, funded, or undertaken that may adversely affect EFH. Per 50 CFR 600.810(a), an adverse effect “may include direct or indirect physical, chemical, or biological alterations of the waters or substrate or loss of, or injury to, benthic

organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.” NMFS provided EFH conservation recommendations to the USACE permit application to install the finfish cages. Based on these recommendations, EFH are not likely to be affected by the proposed action.

7.11. EXECUTIVE ORDER 13158 MARINE PROTECTED AREAS

EO 13158, “Marine Protected Areas” (May 26, 2000), establishes a national system of marine protected areas (MPAs) that are defined as “any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.” The Order strengthens governmental interagency cooperation in marine environmental protection.

The only marine reserve near the proposed project is the Tres Palmas Marine Reserve. A unique attribute of this reserve (designated in August 2003), is that it includes what is probably the largest remaining elkhorn coral (*A. cervicornis*) stand in Puerto Rico (Garcia-Sais et al., 2005). To ensure adequate protection to the reserve, a water quality program, developed in coordination with NMFS, was filed with the USACE as one of the requirements for the Section 10 permit. Based on the project design, data and observation from other locations with similar CAAP facilities, and the developed water quality program, the proposed project is not likely to affect the Tres Palmas Marine Reserve.

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APPENDIX A-

Documentation of Environmental Impacts and Conditions

Appendix A-I: Benthic Survey Submitted by Boriquen Aquaculture

Boriquen Aquaculture Site Description

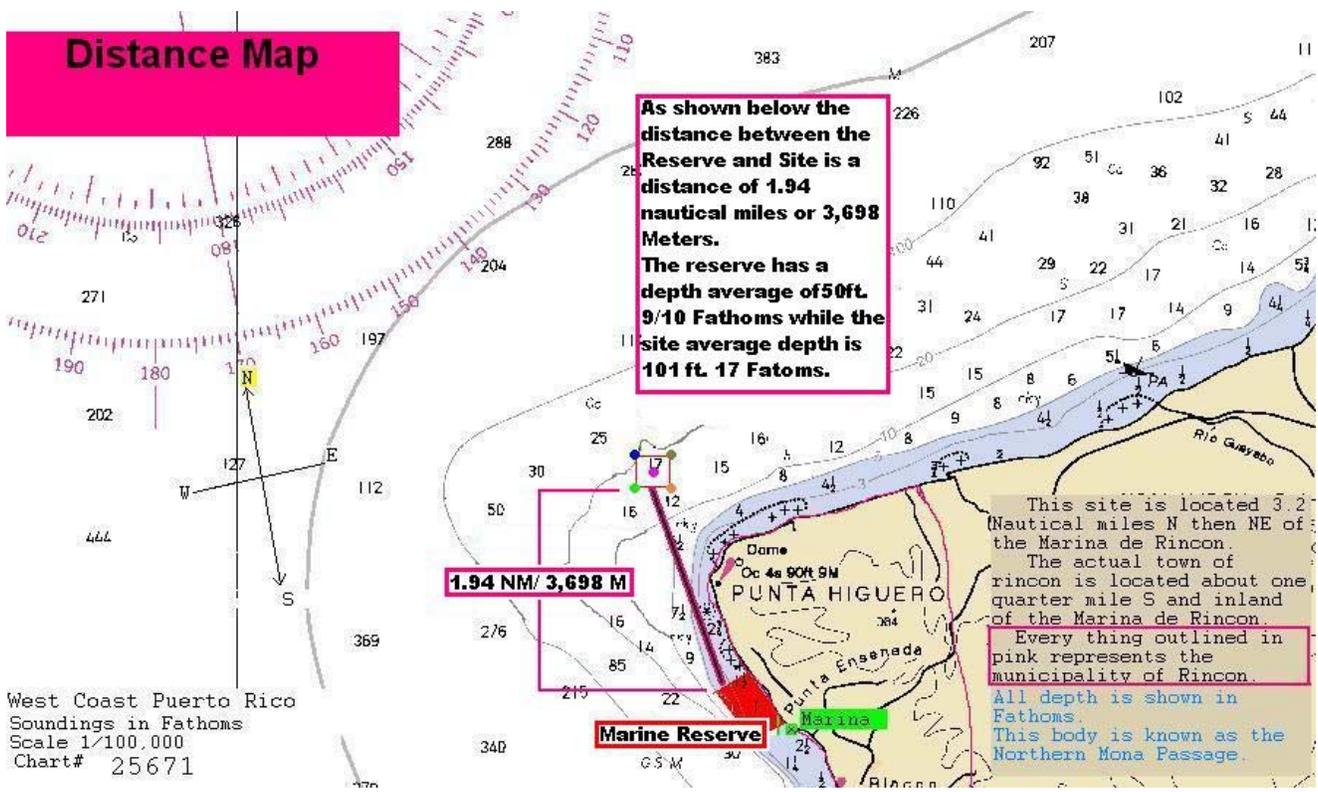
General depth: 95ft. - 116ft.

Bottom description; Sand gravel mix through out the site. Current use; the bottom has no structure to date to report and is as of now considered dead to the fishing community.

Benthic Communities: There is no sign of sea life in any form other then pelagic species that occasionally frequent the continental shelf more than 600 meters from the site.

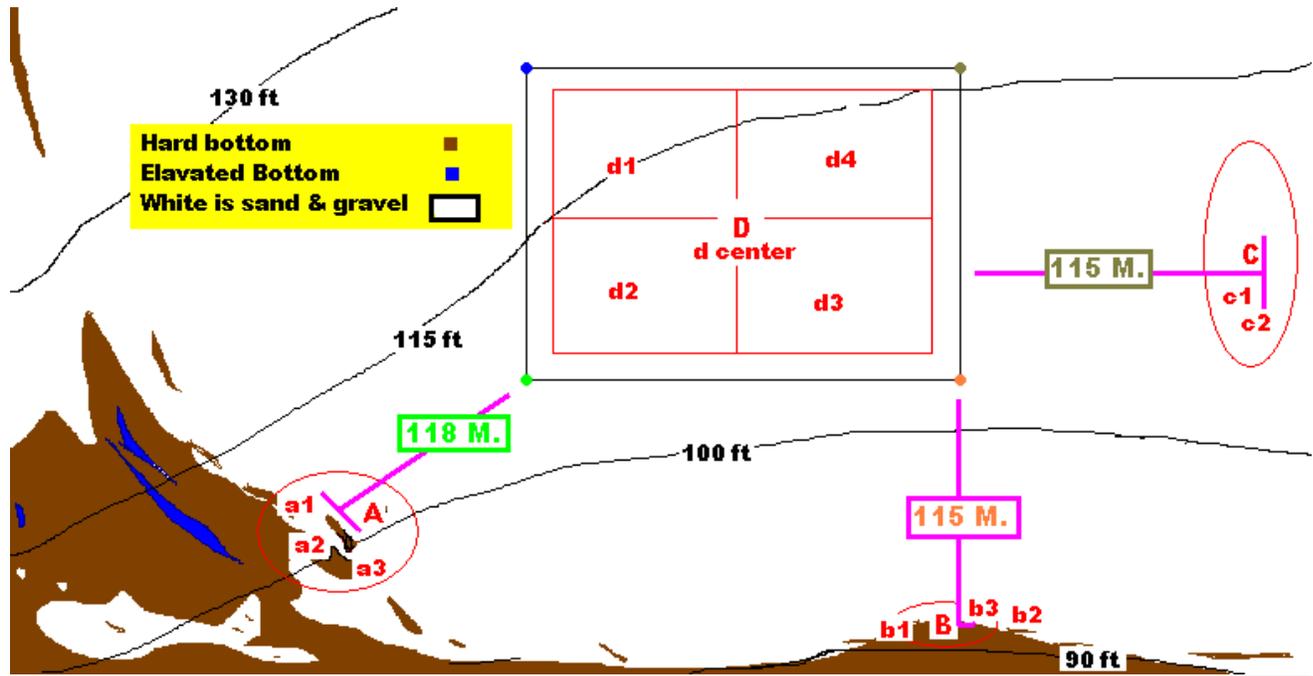
Current Patterns: Attachment B, will show the prevailing current pattern across the site flowing from East to West and South to North out onto the continental shelf away from the shorelines of Punta Higuero.

Endangered Species: None



This Chart indicates the location of our proposed site in relation to the Marine Reserve located between Punta Higuero and Rincon, Puerto Rico. The site is 1.69 nm from the Marine Reserve and 1.04 nm form Punta Higuero.

Site Map and Survey Areas

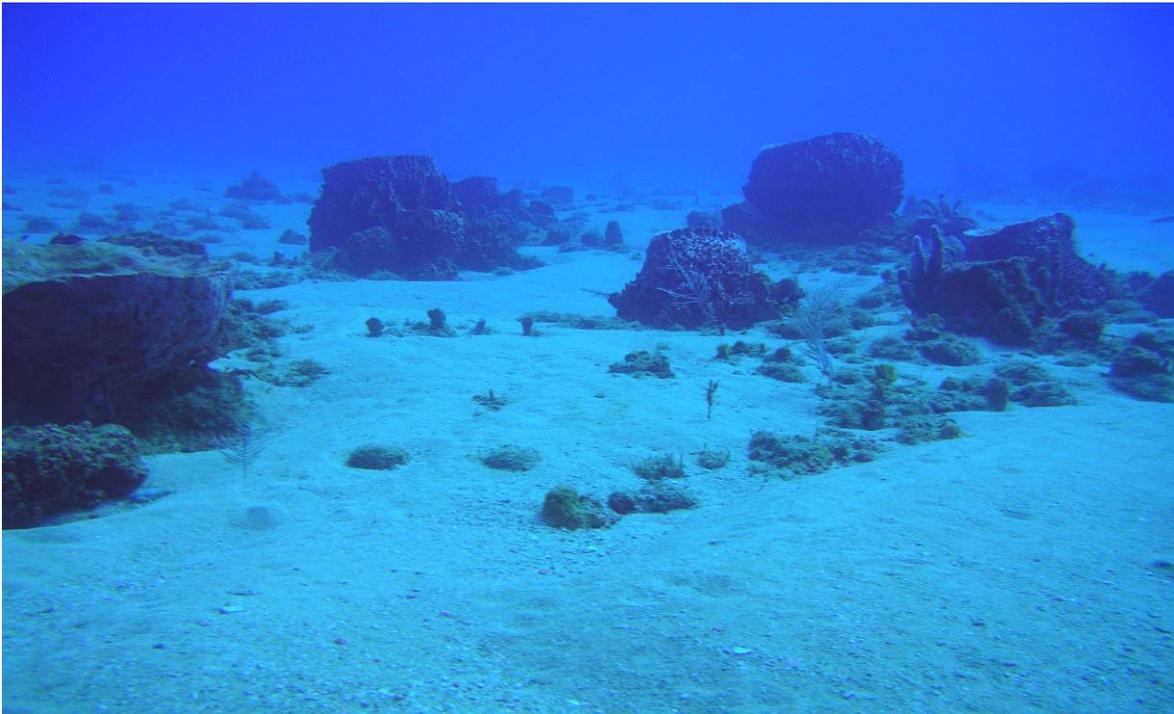


This chart illustrates the areas surveyed with Area D as the proposed site. The bottom is primarily sand and gravel with no structures. The site is over 115 meters from any hard bottom. The shoreline at Punta Higuero is another 1500 meters south of area B. The following photos correlate to areas (A, B, C, D) Example ; Photo (D) is located at the center of the proposed site. We included photos for every form of life observed during this survey.

Area (D) –Center of Project Site facing shoreline of Punta Higuero – Domes Beach



Area (a1) – 387 ft Up Current from Project Site near hard bottom - depth 110 ft. (low Light)



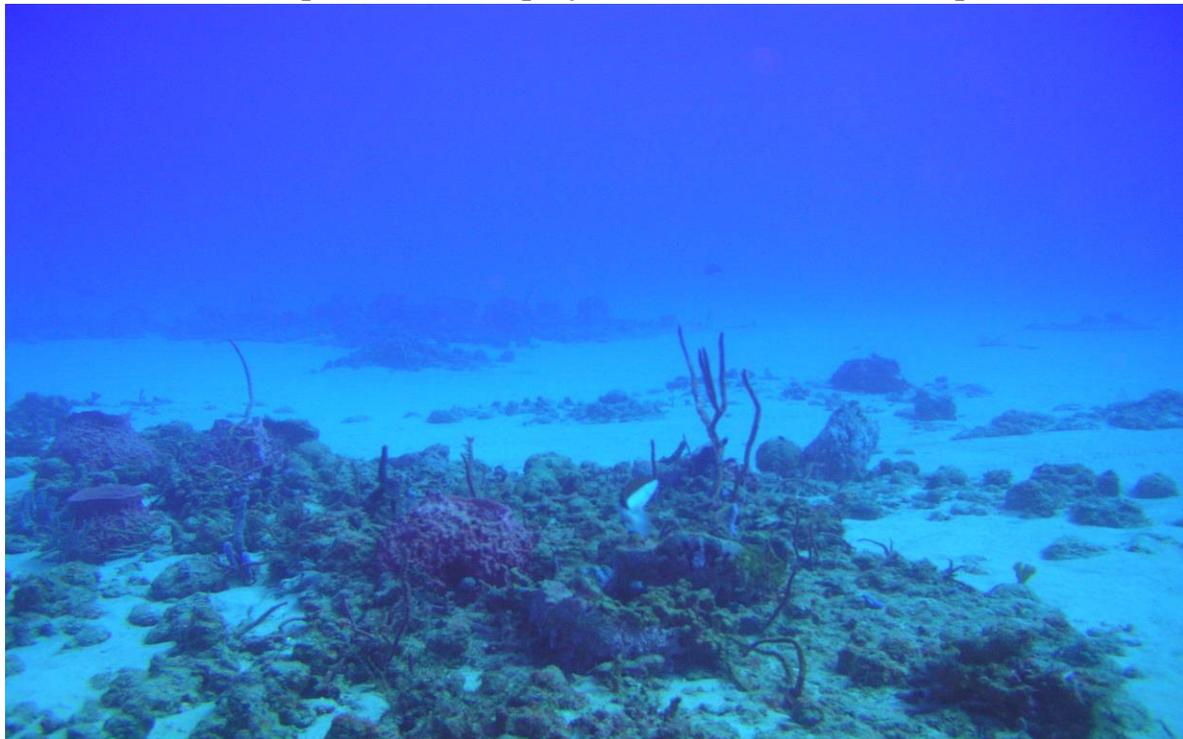
Area (a2) – Spotty patches of reef – low light level prevents growth – depth 110ft



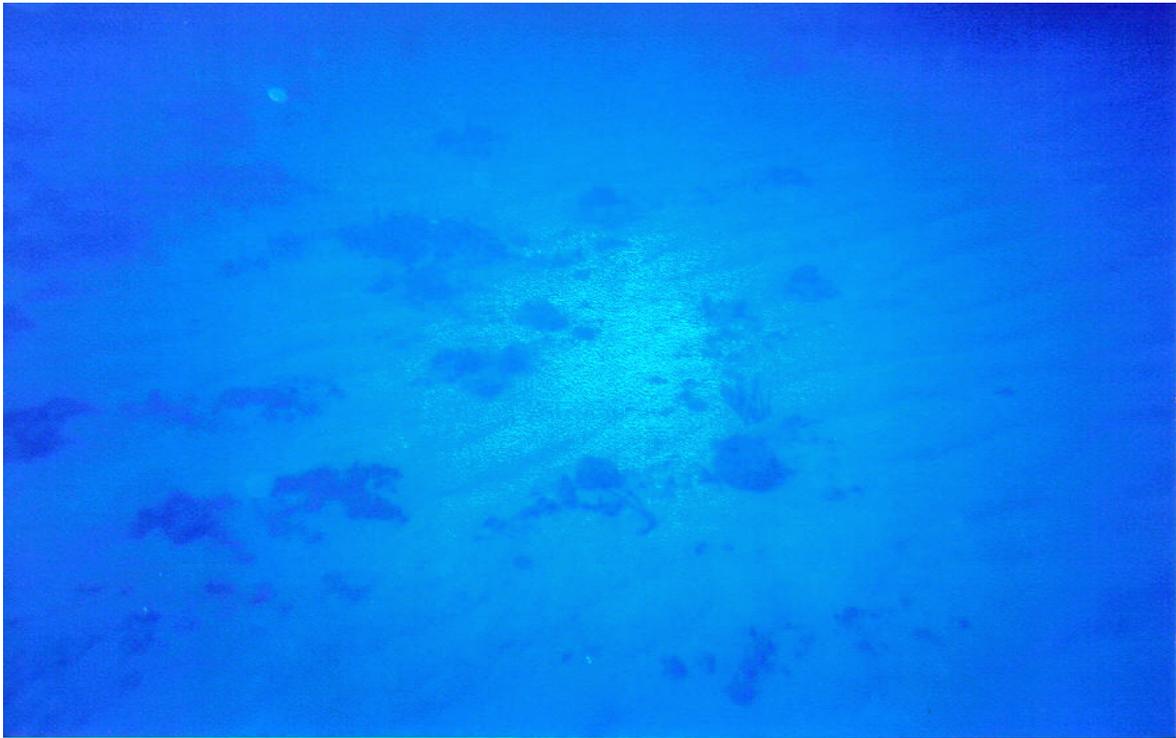
Area (a3) – Top down view illustrating scarcity and patchiness – depth 95 ft



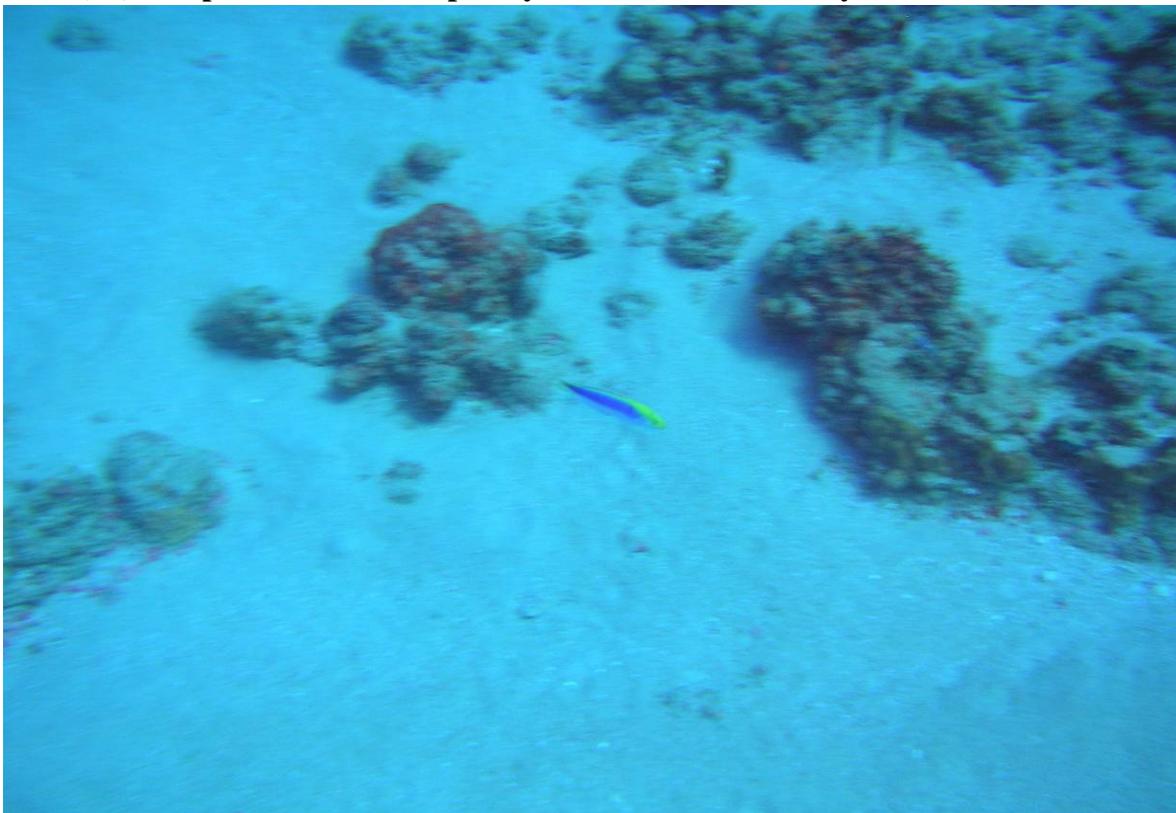
Area (b1) - 377 ft – Up Current from project – near hard bottom – depth 90ft



Area (b2) – 377 ft from project – depth 90 ft - still very patchy



Area (b3) – Top down view onto patchy hard bottom – scarcity of marine life



Area (c1) – 377 ft East and Up Current of project - at 110 ft / Sandy bottom



Area (c2) – Typical view around the site-shifting gravel and sand bottom-note ripples



Area (d1)- Project Site – Typical view-rippled shifting sand and gravel – no life



Area (d2) – Project Site – Top down view sand bottom - low light depth 110 ft



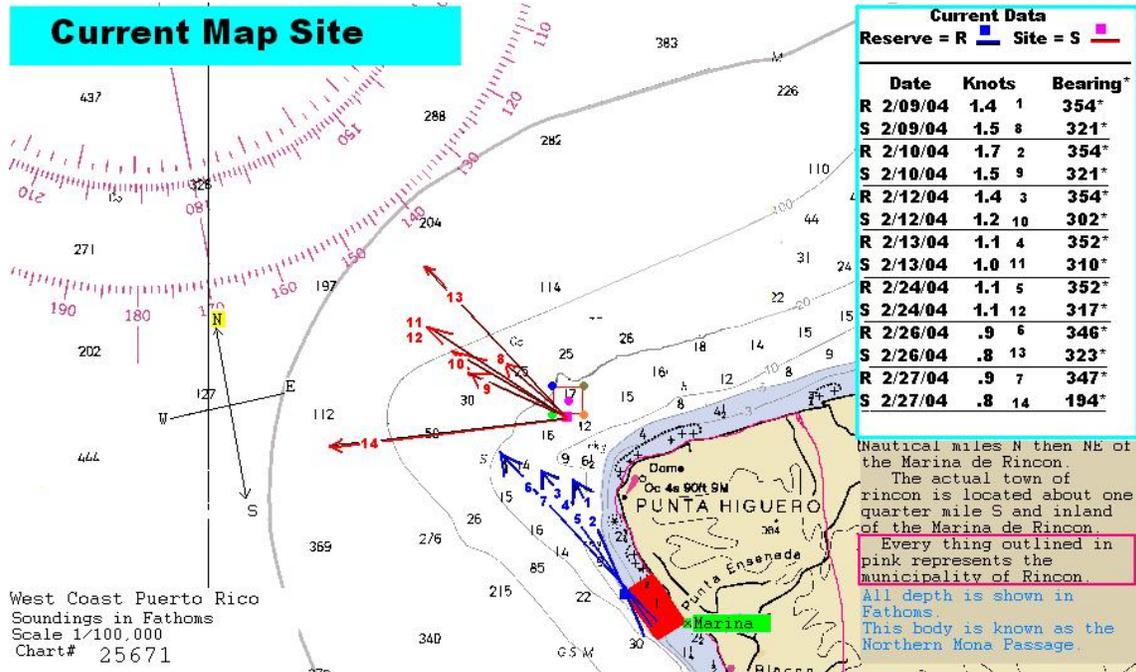
Area (d3) – Project Site – Shifting sand and gravel – current ripped sand -110ft



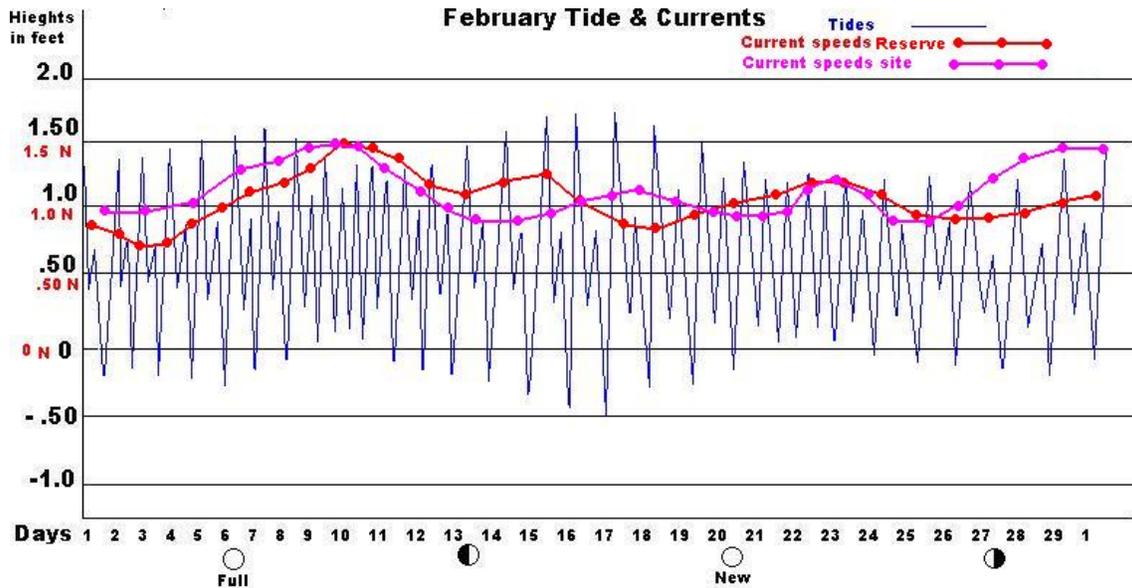
Area (d4) – Project Site – Northeast quadrant showing typical view of area 110ft



Appendix A-II: Currents Tides Survey Submitted by Boriquen Aquaculture



This Map illustrates the typical current flow along the West Coast at Punta Higuero from the Marine Reserve at Rincon moving in a North by Northwest direction across the proposed site. Note the currents converging from an East to West direction with those coming from the South sweeping out away from the coastlines of Punta Higuero and onto the deeper waters of the continental shelf.



The chart above illustrates as a graph the typical Tide and Currents as observed during the month of February 2004. The most westerly current bearing 194 deg. occurs on 2/27/04 with the moon going full. Note also that the current speed across the site increases as currents across the Reserve decrease at this time.

Current Data 2/9/04 – 2/27/04

Reserve 10:04 am 2/09/04 Starting point N 18- 20.552 W 67 -16.248.
Drift rate 38 sec to cover 30 M. Direction moving: Bearing 354 degrees Depth 55 ft.
After calculations = 1.5 N
Site 9:15 am 2/09/04 Starting point N 18- 22.674 W 67- 17.174
Drift rate 29 sec to cover 30 M Direction Moving: Bearing 321 degrees Depth 116 ft.
After calculations = 1.8 N

Reserve 9:13 am 2/ 10 / 04 Starting point N 18-20.552 W 67-16.248
Drift rate 34 sec to cover 30 M. Direction moving: Bearing 354 degrees Depth 46 ft.
After calculations = 1.7 N
Site 9:45 am 2 / 10 / 04 starting point N 18-22.674 W 67-17.174
Drift rate 33 sec to cover 30 M Direction moving: Bearing 321 degrees Depth 110 ft.
After calculations = 1.7 N

Reserve 8:03 am 2/ 12 / 04 Starting point N 18-20.552 W 67-16.248
Drift rate 39 sec to cover 30 M. Direction moving: Bearing 354 degrees Depth 54 ft.
After calculations = 1.4 N
Site 9:25 am 2 / 12 / 04 starting point N 18-22.674 W 67-17.174
Drift rate 46 sec to cover 30 M Direction moving: Bearing 302 degrees Depth 100 ft.
After calculations = 1.2 N

Reserve 7:15 am 2/ 13 / 04 Starting point N 18-20.552 W 67-16.248
Drift rate 49 sec to cover 30 M. Direction moving: Bearing 352 degrees Depth 54 ft.
After calculations = 1.1 N
Site 9:15 am 2 / 13 / 04 starting point N 18-22.674 W 67-17.174
Drift rate 53 sec to cover 30 M Direction moving: Bearing 310 degrees Depth 100 ft.
After calculations = 1 N

Reserve 7:15 am 2/ 24 / 04 Starting point N 18-20.552 W 67-16.248
Drift rate 51 sec to cover 30 M. Direction moving: Bearing 352 degrees Depth 52 ft.
After calculations = 1.1 N
Site 9:15 am 2 / 24 / 04 starting point N 18-22.674 W 67-17.174
Drift rate 46 sec to cover 30 M Direction moving: Bearing 317 degrees Depth 114 ft.
After calculations = 1.1 N

Reserve 7:35 am 2/ 26 / 04 Starting point N 18-20.552 W 67-16.248
Drift rate 59 sec to cover 30 M. Direction moving: Bearing 346 degrees Depth 52 ft.
After calculations = .9 N
Site 9:00 am 2 / 26 / 04 starting point N 18-22.674 W 67-17.174
Drift rate 69 sec to cover 30 M Direction moving: Bearing 323 degrees Depth 114 ft
After calculations = .8 N

Reserve 7:45 am 2/ 27 / 04 Starting point N 18-20.552 W 67-16.248
Drift rate 62 sec to cover 30 M. Direction moving: Bearing 347 degrees Depth 52 ft.
After calculations = .9 N
Site 9:00 am 2 / 27 / 04 starting point N 18-22.674 W 67-17.174
Drift rate 71 sec to cover 30 M Direction moving: **Bearing 194 degrees** Depth 114 ft
After calculations = .8 N

APPENDIX B-
Coordination and Consultation Communications

Appendix B-I: Finding of no historical properties by Puerto Rico State Historic Preservation Office

STATE HISTORIC PRESERVATION OFFICE
Office of the Governor

December 22, 2003

Mr. Edwin Muñiz
Chief, Regulatory Section
U.S. Army Corps of Engineers
400 Fernández Juncos Ave.
San Juan, P.R. 00901-3299

**SHPO: 12-17-03-04 LOBSTER AND FISH AQUACULTURE,
RINCÓN, PUERTO RICO/SAJ-2003-12392(IP-ML)**

Dear Mr. Muñiz:

Our Office has received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 102-575) as amended in 1992 and *36 CFR Part 800: Protection of Historic Properties* from the Advisory Council on Historic Preservation. The State Historic Preservation Officer (SHPO) is to advise and assist federal agencies when identifying historic properties, assessing effects upon them, and considering alternatives to avoid or reduce the project's effects on them.

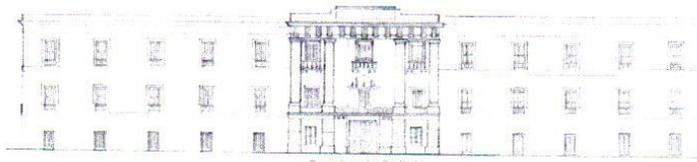
Our records support your finding that **no historic properties** are located within the project's area of potential effects.

If you have any questions concerning our comments, please do not hesitate to contact us. Please note that should the Agency discover other historic properties at any point during project implementation, you should notify the SHPO immediately. We appreciate your interest in the rescue and preservation of our national historical heritage and we reiterate our commitment to assist you in this endeavor.

Sincerely,


Enid Torregrosa de la Rosa, MSHP
State Historic Preservation Officer

ETD/MB/img



Cuartel de Ballojo

PO Box 9066581 San Juan PR 00906-6581 • Phone (787) 721-3737 Fax (787) 722-3622

Appendix B-II: No Objection letter from Municipality of Rincón



Estado Libre Asociado de Puerto Rico

Gobierno Municipal
Apartado 97
Rincón, P. R. 00677
~
Oficina del Alcalde

Tel. (787) 823-2180
Fax (787) 823-3240

6 de marzo de 2006

Sr. Fred R. Lentz
Servicios Técnicos de VP
Boriquen Aquaculture
P.O. Box 1077
Rincón, PR 00677

**RE: BORINQUEN AQUACULTURE FISH AND LOBSTER;
OFFSHORE CAGE PROYECT
Rincón, PR**

Estimado señor Lentz:

La Administración Municipal de Rincón no presenta objeción a que se desarrolle el proyecto de acuicultura, propuesto por Borinquen Aquaculture.

No obstante, se le exhorta a cumplir rigurosamente con las normas y regulaciones que le impongan las agencias reguladoras que intervienen con proyectos de esa naturaleza; tales como: Fish & Wild Life, Cuerpo de Ingenieros del Ejército de los E.E.U.U., Recursos Naturales y cualesquiera otras.

Deseándole éxito en sus empresas, nos reiteramos a sus órdenes.

Cordialmente,


Pedro Rodríguez Bass
Ayudante Especial del Alcalde

mmv 
Vo. Bo. Francisco Mercado Silva
Administrador Municipal

"No descansaremos hasta que Rincón sea el orgullo de Puerto Rico"

Appendix B-III: NMFS Endangered Species Section 7 Consultation



UNITED STATES DEPARTMENT OF COMMERCE
 National Oceanic and Atmospheric Administration % £
 NATIONAL MARINE FISHERIES SERVICE /
 Southeast Regional Office V/t
 9721 Executive Center Drive North
 St. Petersburg, FL 33702
 (727) 824-5312; FAX 824-5309
<http://sero.nmfs.noaa.gov>

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MAY -5 2005

F/SER32: JCL

Mr. Sindulfo Castillo Chief, Antilles
 Regulatory Section Jacksonville
 District-Antilles Office U.S. Army
 Corps of Engineers 400 Fernandez
 Juncos Avenue San Juan, PR 00901-
 3299

MIC

Dear Mr. Castillo:

This correspondence is in reference to the U.S. Army Corps of Engineers' (COE), Jacksonville District, Antilles Office, letter received on January 31, 2005, requesting section 7 consultation with NOAA's National Marine Fisheries Service (NMFS), pursuant to the Endangered Species Act of 1973 (ESA). The NMFS' Protected Resources Division has reviewed the materials submitted by the COE with respect to potential effects on ES A-listed species and designated critical habitat under the purview of NMFS.

The proposed action consists of the deployment and mooring of up to eight 3,000-m³ submerged open-ocean cages (Sea Station 3000™) for the grow-out of cobia, *Rachycentron canadum*, and Florida pompano, *Trachinotus falcatus*, to a commercial scale. The cages will be located approximately 1 mile west of Punta Higuero, off the coast of Rincon, Puerto Rico. The cages will be 25 m diameter, diamond shaped, and approximately 47 ft high and 76 ft wide at the middle. A strong synthetic mesh, with a net depth of 15 m in which divers can enter, will connect the steel pipe framework. The synthetic net material, Spectra, has the strength of steel and was developed by NASA. The total cage volume will be approximately 3,000 m³. Each cage will be placed at a depth of approximately 108 ft (35 m) and will utilize a four-point mooring system, using four 3,000-lb (105 inch wide) Danforth anchors and an 8 ft diameter main central ballast which would rest on the sea floor in 110 ft of water. Every cage will be submerged 33 ft from the surface, out of the high-energy zone, to reduce the risk of harm to the cage or to the fish in the event of very large ocean swells generated from stormy conditions, hi addition, the action consists of the installation of up to 5 containment reef lobster cages, which would be 16 ft long, 8 ft wide, and 8 ft high for the grow-out of spiny lobster, *Panulirus argus*.

Of the ESA-listed species under the purview of NMFS, five sea turtle species including the loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys conacea*), hawksbill (*Eretmochelys imbricata*), and Kemp's ridley (*Lepidochelys kempii*) are known to occur off the waters of Puerto Rico and may occur in or near the action area. Two areas of concern regarding marine aquaculture operations and the threats to both marine mammals and ^



sea turtles are entanglement and water quality. Interactions between marine aquaculture facilities and sea turtles and marine mammals can have significant negative impacts to protected species. There are documented cases of interaction between nearshore aquaculture operations and pinnipeds on both the U.S east and west coasts. In New Zealand, documented marine mammal entanglements have occurred with offshore aquaculture facilities (NMFS 1999) . NMFS has also documented evidence showing that nets and netting material are threats to sea turtles (NMFS 2001)². Therefore, entanglements of sea turtles may occur with the netting used for the construction of the cages. The proposed netting to be used for this project consists of tight Spectra knotless netting constructed of 3.0-inch (76-mm) stretch mesh. The netting would be kept tightly stretched to avoid any risk of entanglement. In currents commonly found in the open ocean, conventional aquaculture net systems lose more than 80 percent of their volume. It has been shown that the netting used in the Sea Station 3000™; however, maintains its volume in these currents (Alston et al., 2004)³. There have never been any documented entanglements with this type of cage and sea turtles in previous studies including a similar aquaculture project (Snapperfarm, Inc.) that has been operating for nearly two years at Culebra, Puerto Rico. Based on the information, NMFS believes it is unlikely the netting of these cages poses a threat to sea turtles, hi addition, NMFS believes it is unlikely the cages will impede turtle movement since turtles are mobile and excellent swimmers.

Besides to entanglement threats to sea turtles by the cages, the degradation of water quality by aquaculture operations may also pose a risk to sea turtles. Inshore aquaculture operations have been shown to have many problems with poor water quality conditions, which often result in disease; high ammonia, nitrite, nitrate, phosphate levels; and the poor quality of the grow-out finfish. However, based on the information submitted by the COE as well as the final report (Alston et al., 2004) of the environmental study at the Culebra, Puerto Rico cage culture project, results of the water quality analysis, as a result of cage culture operations, show that there were no statistical differences in ammonia, nitrate, nitrite, and phosphate concentrations in the water and/or any differences in the organic matter and organic nitrogen in the sediments between the cage site and the control site, hi the final report the authors point out that open-ocean cage systems have lower environmental impacts than traditional aquaculture methods. The researchers go on to affirm that degraded water quality conditions are significantly diminished in open-ocean cage sites, where strong currents flowing into deeper waters quickly dilute wastes. Further, Alston et al. (2004) indicate that aquaculture operations may impact the environment as a result of the type and amount of finfish feed utilized, but that this impact is almost always eliminated in the offshore environments, again due to the strong currents and the high water exchange volume. Thus, based on existing currents in the action area and all the information reviewed, NMFS concurs with the COE's findings and believes that adverse effects to sea turtles are unlikely from the proposed action to install open-water cages off Puerto Rico.

¹ Moore, K. and D.Wieting. Marine Aquaculture, Marine Mammals, and Marine Turtles Interaction Workshop 12-13 January 1999, Silver Spring, Maryland. U.S. Dep. Commerl, NOAA Tech. Memo. NMFS-OPR-16, 60 p. NMFS SEFSC. 2001. Stock assessments of loggerhead and leatherback sea turtles and an assessment of the impact of the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North Atlantic. U.S. Department of Commerce, National Marine Fisheries Service, Miami, Florida, SEFSC Contribution PRD-00/01-08; Parts I-III and Appendices I-VI.

³ Alston, D.E., Cabarcas, A, Capella, J., Benetti, D.D., and Cortes, R. 2004. Final Report of the Environmental Study at the Culebra Cage Culture Project. NOAA-National Sea Grant.

For the waters of Puerto Rico, critical habitat has been designated for green and hawksbill sea turtles. Designated critical habitat for green sea turtles is defined as the waters extending seaward 3 nautical miles (5.6 km) from the mean high water line of Culebra Island, Puerto Rico. Designated critical habitat for hawksbill sea turtles is defined as the waters extending seaward 3 nautical miles (5.6 km) from the mean high water line of Mona and Monito Islands, Puerto Rico. The action area is located approximately 1 mile off the coast of Rincon and thus is approximately 120 miles west of Culebra Island, and over 35 miles east of Mona Island. There is no evidence to suggest that the action will negatively influence water quality, nesting, breeding, or have any harmful effects to the Primary Constituent Elements (PCEs) that define green and hawksbill sea turtle critical habitat. In addition, since the cages are submerged below the surface and are not located near any reefs, which are feeding areas for sea turtles, NMFS believes the proposed action is not likely to adversely affect designated critical habitat.

Five federally-protected whale species including the blue (*Balaenoptera musculus*), finback (*Balaenoptera physalus*), humpback (*Magaptera novaeangliae*), sei (*Balaenoptera borealis*), and sperm (*Physeter macrocephalus*) are known to occur off the waters of Puerto Rico and may occur in or near the action area. The blue, finback, and sperm are usually found in deeper waters off the continental shelf; therefore, NMFS believes the proposed activity is not likely to adversely affect these whales since the project is located approximately 1 mile from the beach and in waters 110 feet deep. Nonetheless, NMFS has conducted whale abundance and distribution studies off Puerto Rico that show that humpback whales migrate through and temporarily reside off the Rincon area throughout the fall and winter period (Swartz et al., 2001). The two greatest threats to whales are ship strikes and entanglements with commercial fishing operations. The proposed action does not directly or indirectly influence ship traffic, the cage mooring lines will be highly tensioned with 1 1/2 -in diameter black rope, and humpback whale migration is not likely to be negatively influenced. Entanglement is unlikely because both ends of the tension lines are fixed, and constant high tension is maintained on them, in addition, the COE has conditioned the permit so that the applicant is responsible for strict and constant monitoring of the cages to assure the integrity of the cages and the mooring lines. Further, the applicant is responsible for reporting any events in which sea turtles or whales are found at the project site. For these reasons, NMFS concurs with the COE and believes the proposed action is not likely to adversely affect ESA-listed whales.

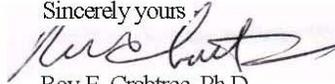
- * This concludes the COE's consultation responsibilities under section 7 of the ESA for the proposed project. Be advised that a new consultation must be initiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action.

⁴ Swartz, S.L., A. Martinez, J. Stamates, C. Burks, and A.A. Mignucci-Giannoni. 2001. Acoustic and visual survey of cetaceans in the waters of Puerto Rico and Virgin Islands: February-March 2001. NO AA Tech Memo. NMFS-SEFSC-463, 62 p.

You are also reminded that, in addition to your protected species/critical habitat consultation requirements with NMFS' Protected Resources Division pursuant to section 7 of the ESA, prior to proceeding with the proposed action you must also consult with NMFS' Habitat Conservation Division pursuant to the Magnuson-Stevens Fishery Conservation and Management Act's requirements for essential fish habitat (EFH) consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-930, subpart K).

We look forward to continued cooperation with COE in conserving our endangered and threatened resources. If you have any questions about EFH consultation for this project, please contact Dr. Lisamarie Carrubba, HCD, at (787) 851-3700. If you have any questions regarding this ESA consultation, please contact Mr. Juan Levesque, fishery biologist, at (727) 551-5779, or by e-mail at Juan.Levesque@noaa.gov.

Sincerely yours



Roy E. Crabtree, Ph.D.
Regional Administrator

cc: F/SER4 - L. Carrubba; F/PR3

Ref: I/SER/2004/01085 File: 1514-

22.f.l PR

Appendix B-IV: PRDRNA Concession of use for submerged lands, 15 August 2006

Estado Libre Asociado de Puerto Rico

Departamento de Recursos Naturales y Ambientales**CONCESION PARA EL USO DE LAS AGUAS TERRITORIALES
LOS TERRENOS SUMERGIDOS Y LA ZONA MARITIMO TERRESTRE**

Concesionario: Borinquen Aquaculture
P.O. Box 1077
Rincón, PR 00677

O-BD-CZM01-SJ-00005-28102004
ZMT-2003-013

La Compañía Borinquen Aquaculture solicita al Departamento de Recursos Naturales y Ambientales una concesión para el desarrollo de un proyecto de acuicultura de Cobia (*Rachycentron canadum*) y Pompano (*Trachinotus carolinus*), con la ubicación de un sistema de jaulas submarinas en las costas de Rincón, una milla náutica de Punta Higüero. Dichas estructuras ocuparán 200,000 metros cuadrados de terrenos del dominio público denominados aguas navegables y terrenos sumergidos en el Municipio de Rincón.

El Departamento de Recursos Naturales y Ambientales, en lo sucesivo denominado "El Departamento" representado por su Secretario, Hon. Javier Vélez Arocho, bajo la autoridad conferida por la Ley Núm. 23, Ley Orgánica del Departamento de Recursos Naturales y Ambientales del 20 de junio de 1972, según enmendada, concede a Borinquen Aquaculture, en lo sucesivo denominado "El Concesionario", la concesión para el uso de las aguas navegables y terrenos sumergidos.

Como custodio y administrador de las aguas territoriales, los terrenos sumergidos bajo ellas y la zona marítimo terrestre y a tenor con el Reglamento para el Aprovechamiento, Vigilancia, Conservación y Administración de las Aguas Territoriales, los Terrenos Sumergidos Bajo Estas y la Zona Marítimo Terrestre, "El Departamento" otorga la concesión para el uso y aprovechamiento para la instalación de dos (2) jaulas submarinas, sujeto a las cláusulas y condiciones que se presentan a continuación:

1. "El Concesionario" utilizará 200,000 metros cuadrados (51 cuerdas) de aguas navegables propiedad del Pueblo de Puerto Rico y bajo la jurisdicción del Departamento de Recursos Naturales y Ambientales en las costas de Rincón, según se describe a continuación:
 - Instalación de ocho (8) jaulas submarinas de 3,000 m³ (Sea Station TM 3000) para la crianza de Cobia y Pompano, además de un sistema de estaciones para monitoreo. Estas estructuras estarán ubicadas a una milla náutica de Punta Higüero, Rincón, según han sido descritas en la Solicitud Conjunta #518.
2. "El Concesionario" pagará la cantidad de \$200.00 como pago inicial y \$50.00 por cuerda, para un total de \$2,750 por los derechos y privilegios aquí concedidos, según descritos en el inciso 1. El pago deberá efectuarse al momento de aceptar esta concesión por el uso y aprovechamiento de las estructuras en bienes de dominio público por el período de agosto de 2006 a julio de 2007.

Dicho pago se efectuará mediante giro postal o cheque certificado expedido a nombre del Secretario de Hacienda, ante la Oficina de Pagaduría de este Departamento. Al momento de la renovación de esta concesión, el canon anual estará sujeto a las enmiendas que este Departamento realice al Reglamento Núm. 4860, Reglamento para el Aprovechamiento, Vigilancia, Conservación y Administración de las Aguas Territoriales, los Terrenos Sumergidos Bajo Estas y la Zona Marítimo Terrestre.

Boriquen Aquaculture
O-BD-CZM01-SJ-00005-28102004
Página 2

3. El término de esta concesión será por un período de un (1) año.
4. Formarán parte de esta concesión todas aquellas resoluciones que alteren, amplíen, modifiquen, cambien, o condicionen la concesión aquí otorgada.
5. Durante la vigencia de esta concesión no se podrá efectuar ampliaciones, alteración o reconstrucción que impliquen una mayor área de ocupación en los terrenos de dominio público marítimo terrestre sin que medie una autorización previa por escrito de "El Departamento".
6. Esta concesión no transfiere derecho alguno de propiedad. "El Concesionario" no podrá ceder, traspasar, permutar, transferir, arrendar, ni en forma alguna enajenar o gravar la concesión que por la presente se le concede, ni los terrenos objeto del mismo, ni ningún derecho, título o privilegio que del mismo emane sin la aprobación expresa por escrito del oficial que lo extiende a su sucesor.
7. Esta concesión es intransferible. La misma se cancelará si "El Concesionario" cediera o transfiriera las facilidades.
8. El incumplimiento del "El Concesionario" con cualesquiera de los requisitos o condiciones impuestas por el Secretario, así como, su incumplimiento con cualesquiera disposiciones reglamentarias o legislativas aplicables al uso o aprovechamiento permitido por medio de la misma, será causa suficiente para la imposición de una multa administrativa y la suspensión o revocación de la concesión. En caso de que el aprovechamiento produjera efectos perjudiciales para los bienes del dominio público marítimo terrestre, "El Departamento" podrá modificar la concesión, imponer condiciones adicionales o incluso revocar la concesión, sin derecho a indemnización alguna para su titular.
9. "El Concesionario" deberá mantener una precaución razonable para prevenir la contaminación o deterioro de las tierras o aguas que pueda resultar como consecuencia del uso autorizado por esta concesión y dará fiel cumplimiento a las leyes de protección ambiental vigentes.
10. "El Concesionario" mantendrá las facilidades y sus alrededores en buen estado y será responsable de la limpieza, mantenimiento y seguridad del área durante el tiempo autorizado para la operación de esta agencia.
11. "El Concesionario" permitirá el libre e ilimitado acceso al área y a las facilidades objeto de esta concesión al personal del "Departamento" debidamente identificado.



12. "El Concesionario" conviene en relevar y exime a "El Departamento" de toda responsabilidad y asume "El Concesionario" toda obligación legal por concepto de reclamación por daños a la propiedad o por lesiones personales o de cualquier otra naturaleza o por muerte ocasionada a cualquier persona como consecuencia de las operaciones de "El Concesionario" en los terrenos objeto de esta concesión. "El Concesionario" asumirá la defensa en cualquier reclamación judicial o administrativa que surja contra "El Departamento" por tales daños, lesiones o muerte y pagará cualquier compensación o sentencia que se conceda.
13. "El Concesionario" mantendrá en vigor, durante la vigencia de esta concesión una póliza de responsabilidad pública por \$1,000,000.00 a ser expedida por una compañía de seguros autorizada a hacer negocios en Puerto Rico que aseguren al Departamento de Recursos Naturales y Ambientales y al Estado Libre Asociado de Puerto Rico contra toda responsabilidad por daños a la propiedad y por lesiones personales, incluyendo lesiones corporales o muerte ocasionada de toda actividad de "El Concesionario" en los terrenos objeto de esta concesión.
14. "El Concesionario" deberá obtener todos los permisos y licencias requeridas por cualquier agencia, federal o estatal, para la operación de esta actividad.
15. El incumplimiento de cualesquiera de las cláusulas y condiciones de esta concesión, conllevará la revocación de la misma.
16. El hecho de que "El Departamento" no tome acción alguna contra "El Concesionario" al momento de ocurrir cualquier incumplimiento o infracción a lo dispuesto en esta concesión, no se considerará como que consiente ni que renuncia al derecho de dar por terminado esta concesión, pudiendo en cualquier momento hacer uso de todos o cualesquiera de los derechos y acciones que la ley o esta concesión le conceda.
17. "El Concesionario" deberá coordinar con el Departamento de Recursos Naturales y Ambientales para que personal de este Departamento participe en el monitoreo de los trabajos propuestos para la instalación de la jaulas, durante los mismos y luego de finalizados estos.
18. "El Concesionario" radicará un informe trimestral relacionado al progreso del proyecto, a partir de la instalación de las jaulas. El informe incluirá información sobre el tipo de uso, accidentes ocurridos, efectos sobre las estructuras ocasionados por los fenómenos atmosféricos y cualquier otra situación que "El Concesionario" estime que deba informar a "El Departamento". Además, este informe deberá incluir los resultados de las estaciones de monitoreo a ser instaladas según las especificaciones del National Marine Fisheries Service (NMFS) del National Oceanic and Atmospheric Administration (NOAA). En cualquier momento, "El Departamento" podrá solicitar a "El Concesionario" la información que estime necesaria relacionada con la concesión aquí autorizada.
19. El hecho de que "El Departamento" no tome acción alguna contra "El Concesionario" al momento de ocurrir cualquier incumplimiento o infracción a lo dispuesto en esta concesión, no se considerará como que consiente ni que renuncia al derecho de dar por terminado esta concesión, pudiendo en cualquier momento hacer uso de todos o cualesquiera de los derechos y acciones que la ley o esta concesión le conceda.

Dada en San Juan, Puerto Rico, a 15 de agosto de 2006.



Javier Vélez Arocho
Secretario

JVA/JERF/ARB/JLP/GA/nm

Appendix B-V: PRPB Coastal Zone Management Consistency Certificate 16 July 2006



COMMONWEALTH OF PUERTO RICO
OFFICE OF THE GOVERNOR
PLANNING BOARD

MINILLAS GOVERNMENT CENTER
DE DIEGO AVE., STOP 22, SANTURCE
P. O. BOX 41119, SAN JUAN, PUERTO RICO 00940-1119

July 19, 2006

Mr. Fred Lentz & Mr. Tim Cates
PO Box 1077
Rincón, Puerto Rico 00677

**Application for Federal Consistency Certificate
CZ-2004-1113-044
Joint Permit Application Number 518
USACE: SAJ-2003-12392(IP-ML)
Offshore Aquaculture Project
Rincón, Puerto Rico**

Dear Sirs:

This is in response to your application for Certification of Consistency with the Puerto Rico Coastal Management Program (PRCMP) in order to obtain a permit from the U.S. Army Corps of Engineers (USACE). The project consists in the installation of eight (8) finfish cages, five (5) Containment Reef Lobster Cages and larvae collectors that were previously authorized by the Nationwide Permit Number 4. The finfish cages are 25.6 meters in diameter and the lobster cages are 16 feet long, eight feet wide and eight feet high.

The proposed project will occupy an area of 50 acres of submerged lands located one (1) nautical mile offshore of Punta Higüero, Rincón, Puerto Rico.

The review period of this Certification began on January 18, 2006. The application and accompanying documents were sent to the Fish & Wildlife Service (FWS), the Environmental Quality Board (EQB), the State Historic Preservation Office (SHPO), Underwater Archaeology Council and the Department of Natural and Environmental Resources (DNER). A summary of the received comments follows:

- **NMFS:** concluded consultation with the U.S. Army Corps of Engineers pursuant to the requirements of the Endangered Species Act for this project on May 5, 2005, and concluded that the project was unlikely to adversely affect sea turtles, whales, and critical habitat. Notwithstanding, this consultation was concluded with the condition to implement the detailed environmental monitoring plan that was developed in coordination with NMFS and that the applicant shall only being permitted to culture spiny lobster and cobia.
- **DNER:** expressed that the proposed project is consistent with the objectives of the P.R. Coastal Zone Management Program. Therefore, they do not object to the emission of the Federal Consistency Certificate for this project.

Federal Consistency Certificate
CZ-2004-1113-044
Page 2

- **EQB:** emitted the required endorsement about compliance with Article 4B(3) of Law Number 416 of September 22, 2004 (P.R. Environmental Policy Law).
- **FWS:** expressed that they do not object the project providing that it do not directly impact any hard ground area and that an appropriate monitoring program is developed and implemented.
- **SHPO:** expressed that according to their records and submitted information they support the USACE finding that there are no historic properties within the project's area of potential effects.
- **Sea Grant Program and Surfrider Foundation:** expressed concerns regarding possible impacts of the project on water quality and natural resources present within "Tres Palmas" Submarine Natural Reserve. Copy of the applicant's answer and the Biological Assessment was sent to these organizations as a response to their concerns.

After the evaluation of the received comments and submitted documents and pursuant to the Federal Consistency Procedures the Puerto Rico Planning Board determined that the proposed project **is consistent with the Puerto Rico Coastal Management Program.**

This final determination does not exempt the project to comply with any other procedures or permits of other State and Federal agencies. If you have any questions concerning this matter do not hesitate to contact Miss Rose A. Ortiz at 726-0289 or 723-6200, ext. 2020.

Cordially,


Angel D. Rodríguez
Chairman

c: Mr. Eldon Hout, OCRM, Maryland
Mr. Sindulfo Castillo, CoE, San Juan
Mr. Ernesto Díaz, PRCMO, DNER, San Juan
Mrs. Wanda García, EQB, San Juan
Mr. José L. Padilla, DNER

NAR/MML/RAO

Appendix B-VI: USFWS Letter Endangered Species 16 July 2006



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Boqueron Field Office
P.O. Box 491
Boqueron, Puerto Rico 00622



January 15, 2004

Mr. Edwin Muñiz
Chief, Antilles Regulatory Section
Department of the Army
Jacksonville District Corps of Engineers, Antilles Office
400 Fernandez Juncos Avenue
San Juan, Puerto Rico 00901-3299

Re: SAJ-2003-12392 (IP-ML), Fred Lentz
mariculture cages, Rincon

Dear Mr. Muñiz:

The interested agencies of the Department of the Interior have reviewed the above referenced public notice. Our comments are issued in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*)

The applicant is proposing the modification of a Nationwide permit 4 (NW4) to increase the scope of the aquaculture cage project originally approved under the NW4. The purpose of the project is to cage-culture spiny lobsters (*Panulirus argus*) and various tropical finfish species. The originally approved project was for the placement of two cages and 50 larval collectors. The modified project is to add up to eight "Ocean Spar" finfish cages with a diameter of 25.6 meters each, five additional lobster containment cages 16 feet by 8 feet by 8 feet, and to install the lobster collectors along the perimeter of the cages. According to the information provided, the project is located over sandy bottom, and the currents are strong, preventing a build up of waste and excess feed.

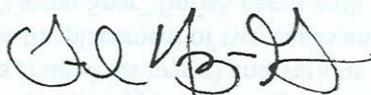
According to the NOAA benthic habitat maps for that area (enclosed), groove and buttress coral reef lies relatively close to and inshore of the project site. The area is a high energy site subject to heavy swells from the North Atlantic, and the nearby Punta Higuero beaches are considered to be among the best surfing beaches on the island. Currents in the area tend to have a net northward movement from the Caribbean to the Gulf of Mexico through the Mona Channel.

Although the project site is likely to have strong current movement and wave energy may preclude very well developed shallow coral reefs, it is likely that deeper coral reefs occur very close to the project site. Since the intention is to increase the density of culture at the site, we recommend that the applicants include a water quality and benthic habitat monitoring program as

part of the project requirements. This should include regular water quality sampling between the project site and nearby reefs, characterization of the soft substrate biota in the vicinity of the cages, and some permanent sampling stations on the nearby reef. The latter should focus on an evaluation of the proportion of hard corals and sponges to fleshy algal growth at the sampling stations over time (if eutrophication becomes a problem, the proportion of fleshy algae to corals and sponges should increase).

Providing that the project would not directly impact any hard ground area, and an appropriate monitoring program is developed and implemented, we would not object to this project. However, we wish to review the monitoring program, permit conditions and any other relevant project details before a permit is issued. Thank you for the opportunity to comment on this action. For any questions regarding these comments please contact Beverly Yoshioka at (787-851-7297 ext. 227).

Sincerely yours,



Fernando Núñez-García
Acting Field Supervisor

Enclosure (1)

bby/mtr

cc:

CFMC, San Juan

DNER, San Juan

EPA, San Juan

EQB, San Juan

NMFS, Boqueron

Appendix B-VII: USFWS Water Quality Letter Species 6 June 2007



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Boqueron Field Office
Carr. 301, KM 5.1, Bo. Corozo
P.O. Box 491
Boqueron, PR 00622

JUN 06 2007

Ms. Grace Musumeci
Chief, Environmental Review Section
USEPA Region 2
290 Broadway
New York, NY 10007-1866

Re: NPDES PR 0026522, Borinquen
Aquaculture

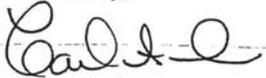
Dear Ms. Musumeci:

The applicant is requesting a NPDES permit for an aquaculture project consisting of 8 oceanic cages off the coast of Rincon, Puerto Rico. Our comments are provided in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and the Endangered Species Act (16 U.S.C. 1531 et seq. as amended).

Our office has been involved with this project for some time, given the information provided; the project would not impact any federally listed threatened or endangered species within our jurisdiction. Given the currents and location of this project, we believe that the proposed effluent will meet PR Water Quality Standards. However, in order to track possible long term impacts of this project we recommend that copies of the project's water quality monitoring reports be forwarded to our office for review.

Thank you for the opportunity to comment on this project, if you have any questions please contact Felix Lopez of my staff at 787 851 7297 x226.

Sincerely,


for Edwin Muñiz
Field Supervisor

fhl

c:
DNER, San Juan
EPA, San Juan
EQB, San Juan
COE, San Juan

Appendix B-VIII: E-mail from Lisamarie Carrubba (NOAA) to Maria Clark (USEPA) regarding NPDES Permit 9 July 2007

From lisamarie carrubba <Lisamarie.Carrubba@noaa.gov> To Maria Clark/R2/USEPA/US@EPA
07/09/2007 11:12 AM cc Teletha Mincey <Teletha.Mincey@noaa.gov>, Robert Hoffman
<Robert.Hoffman@noaa.gov>
Subject NPDES Permit for the Borinquen Aquaculture project, Rincon

The National Marine Fisheries Service (NMFS) has reviewed the information that accompanied your letter of April 26, 2007, regarding the issuance of a National Pollutant Discharge Elimination System (NPDES) permit by the U.S. Environmental Protection Agency (EPA) for the installation and operation of an eight finfish cage and eight lobster cage mariculture project by Borinquen Aquaculture off the coast of Punta Higüero, Rincón, Puerto Rico. EPA completed a section 7 consultation under the Endangered Species Act (ESA) with NMFS for the project on May 5, 2005, prior to the listing of elkhorn corals (*Acropora palmata*) or staghorn corals (*A. cervicornis*) as threatened.

The benthic survey conducted for the project indicates that elkhorn and staghorn corals are not present in the project area, including where the cages will be installed and the environmental monitoring site that will be used to determine whether the operation of the cage culture is affecting water quality in the project area. Thus, NMFS believes that the project will have no effect on threatened coral species. However, should additional information on listed or proposed species become available or the project be modified, this determination may be reconsidered.

Thank you for your efforts to ensure the conservation of listed species and their habitat. If you have any questions regarding ESA consultation requirements or our position on the Borinquen Aquaculture project, please contact me at (787) 851-3700, or by e-mail at lisamarie.carrubba@noaa.gov.

Thank you,
Dr. Lisamarie Carrubba
NOAA Fisheries Service
Caribbean Field Office

Appendix B-IX: Letter from Puerto Rico Department of Natural and Environmental Resources regarding capture and growing lobsters in submerged cages

Estado Libre Asociado de Puerto Rico

Departamento de Recursos Naturales y Ambientales

PO Box 366147

San Juan, PR 00936

Tel. (787) 999-2200

Fax: (787) 999-2303

25 de mayo de 2007

Grace Musumeci, Chief
Environmental Review Section
290 Broadway, 25th floor
New York, NY 10007-1866
Tel. 212-637-3738

Dear Ms. Musumeci:

You may be aware that the captive rearing of spiny lobsters (*Panulirus argus*) in Puerto Rico is being considered or requested by more than one applicant for offshore aquaculture permits. Whereas the Puerto Rico Department of Natural and Environmental Resources sees offshore aquaculture as an activity deserving of every opportunity to prove that it can be performed in manner consistent with applicable laws and regulations for protection of the environment, the commercial captive rearing of spiny lobsters in particular is incompatible with our current Fisheries Regulations (Regulation #6768 of 2004).

Specifically, Article 8 – General Fishing Limitations, section o, states that it is illegal to fish, possess, sell or offer for sale spiny lobsters which are less than 3.5” in carapace length. Lobsters captured less than this size must be released live in the water. It also specifically states that lobsters captured by divers less than the legal size must be immediately released alive at the capture site.

Captive rearing of spiny lobsters usually involves the capture of puerulus stage lobsters, considerably less than legal size, which are then fed in cages and reared to legal size. Under our current regulations, as you can see, this is not permitted.

We would request that this state regulation be considered during the evaluation of any permit application for offshore aquaculture that is referred to your office.

Cordially,

Craig Lilyestrom, Ph.D

CL/ddr

**APPENDIX C -
Water Quality Certificate**

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Appendix C: Water Quality Certificate issued on 16 January 2007



COMMONWEALTH OF PUERTO RICO
Office of the Governor
Environmental Quality Board

35 Years of Environmental Management

Water Quality Area

RETURN RECEIPT REQUESTED

January 16, 2007

Mr. Fred Lentz
Vice President
Borinquen Aquaculture
P.O. Box 1077
Rincón, Puerto Rico 00677

Dear Mr. Lentz:

RE: WATER QUALITY CERTIFICATE
BORINQUEN AQUACULTURE
1.25 NAUTICAL MILES OFFSHORE FROM PUNTA HIGÜERO
RINCÓN, PUERTO RICO
NPDES NO. PR0026522

We have received and reviewed the application for a permit under Section 402, National Pollutant Discharge Elimination System (NPDES), of the Federal Clean Water Act, as amended (33 U.S.C. 466 et. seq.) (the Act) for the referenced facility.

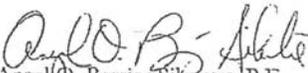
Pursuant to Section 401 (a) (1) of the Act, after due consideration of the applicable provisions established in the Puerto Rico Water Quality Standards Regulation (PRWQSR), as amended and in Sections 208(e), 301, 302, 303, 304(e), 306 and 307 of the Act, it is certified that there is reasonable assurance as determined by the Environmental Quality Board (EQB) that the allowed discharge will not cause violations to the applicable water quality standards at the receiving water body if the limitations and monitoring requirements on Tables A-1 and A-2 are met. The conditions specified in the aforementioned tables shall be incorporated into the NPDES permit in order to satisfy the provisions of Section 301 (b) (1) (C) of the Act.

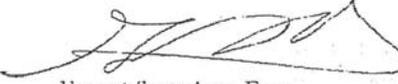
Environmental Agencies Bldg., 1308 Ponce de León Ave., State Road 8838, Río Piedras, PR-00918
PO Box 11488, San Juan, PR 00910
Tel. 787-767-8181 • Fax 787-767-1962

Mr. Fred Lentz
WQC Borinquen Aquaculture
NPDES No. PR0026522
Page 2

If you have any objection to the Water Quality Certificate (WQC), you have the right to request reconsideration to the EQB within the statutory period (twenty (20) calendar days from the date that the WQC is received).

The Agency reserves the right to comment at a later date concerning other environmental aspects of the discharge.


Angel O. Berrios Silvestre, P.E.
Associate Member


Eugene Scott Amy, Esq.
Vice Chairman


Carlos W. López Freytes, Esq.
Chairman

HJC/dcc

c: Mr. Walter F. Andrews, EPA-Region II
Eng. Carl-Axel P. Soderberg, EPA-CEPD

C:\D:\win\Permits\Permits\WP\RD\Hwy\Jof\11\WQC_Borinquen Aquaculture_PR0026522.doc

SPECIAL CONDITIONS

NPDES NO. PR0026522

These special conditions are an integral part of the Water Quality Certificate (WQC) and shall be incorporated into the NPDES permit in order to satisfy the provisions of Section 301(b)(1)(C) of the Federal Clean Water Act (CWA) as amended (33 U.S.C. 466 et. seq):

1. The discharge will only consist of fish (Cobia and Florida Pompano) and lobster excrement and unconsumed food coming from the production system. ^{2,4}
2. The permittee shall install, maintain and operate all water pollution control equipment in such a manner as to be in compliance with the applicable Rules and Regulations. ³
3. No toxic substances shall be discharged, in toxic concentrations, other than those allowed as specified in the NPDES permit. Those toxic substances included in the permit application, but not regulated by the NPDES permit, shall not exceed the concentrations specified in the applicable regulatory limitations. ^{2,3}
4. The waters of Puerto Rico shall not contain any substance attributable to discharge, at such concentration which, either alone or as result of synergistic effects with other substances, is toxic or produces undesirable physiological responses in human, fish or other fauna or flora. ²
5. All sample collection, preservation, and analysis shall be carried out in accordance with the Code of Federal Regulation (CFR) Number 40, Part 136. All chemical analyses shall be certified by a chemist licensed to practice the profession in Puerto Rico. All bacteriological tests shall be certified by a microbiologist or a medical technician licensed to practice the profession in Puerto Rico. ^{1,3}
6. No change in the design and configuration of the cages inside of the production area will be permitted without the previous authorization of the Environmental Quality Board (EQB). ⁴
7. The production system consists of sixteen (16) cages located within an area of 450 meters length by 450 meters width. Eight (8) of the cages are Sea Sparl model and will be used for the breeding of fishes, they are 25 meters of diameter per 15 meters of height and are located at 11 meters of depth. The others eight (8) cages will be used for the breeding of lobsters and has dimensions of 16 feet of length per 8 feet of width per 8 feet of height. Each lobster's cage will be placed alongside the Sea Sparl cages.

Special Conditions
 NPDES No. PR0026522
 Page 2

- a. The production area is delineated by the following points:

<u>Points</u>	<u>Geographic Coordinates (NAD 83)</u>
Point 1	18°22'29.5" N, 67°17'23.7" W
Point 2	18°22'29.4" N, 67°17'8.3" W
Point 3	18°22'14.7" N, 67°17'8.5" W
Point 4	18°22'14.9" N, 67°17'23.8" W

- b. The production area sampling points shall be situated at points 5, 6, 7, 8, 9, 10, 11 and 12, which are located at the following coordinates:

<u>Points</u>	<u>Geographic Coordinates (NAD 83)</u>
Point 5	18°22'29.5" N, 67°17'18.6" W
Point 6	18°22'29.4" N, 67°17'13.4" W
Point 7	18°22'24.5" N, 67°17'8.4" W
Point 8	18°22'19.6" N, 67°17'8.4" W
Point 9	18°22'14.8" N, 67°17'13.6" W
Point 10	18°22'14.8" N, 67°17'18.7" W
Point 11	18°22'19.8" N, 67°17'23.8" W
Point 12	18°22'24.6" N, 67°17'23.7" W

- c. A background sampling point shall be located one hundred (100) meters from point 1 of the production area, in the following point: 18°22'12.5" N, 67°17'10.9" O.
- d. The permittee shall perform current velocity measures (speed and direction) in the background sampling station during each sampling event.

Special Conditions
NPDES No. PR0026522
Page 3

- e. The permittee shall maintain records of the equipment used to be situated at the production area and background sampling points. Such records shall include the date when the equipment was obtained or leased, calibration date, serial number, model, etc.

To identify the location of the production area and background sampling points, the permittee shall use the procedure established in the EPA-QA/QC for 301 (h) Document (Table D-1 Example ZID Boundary station locations).

If the permittee determines to use another method to identify the sampling points of the production area and background, the permittee shall, prior to the utilization of such method, obtain the written approval from EQB.

- f. The samples of the eight (8) stations of the production area and the background monitoring station shall be taken at three (3) depths in each station: 10%, 50%, 90% of the depth.
- g. Fifteen (15) months after the Effective Date of the Permit (EDP), the permittee shall submit a report of the first year of the monitoring program. Based on the review of the monitoring results the EQB will determine if its is necessary to reopen the WQC to modify (increase or decrease) the monitoring requirements or the location and/or number of ambient monitoring stations.
8. Solids from the production system shall not cause deposition in the bottom of the receiving water body in such amount that be deleterious to the existing or designated uses of the receiving water body.
9. The permittee shall implement a monthly monitoring program to determine if the solids generated due to this activity cause deposition in the bottom of the receiving water body in such amount that be deleterious to the existing or designated uses of the receiving water body. The monitoring program shall commence no later than thirty (30) days after the EQB's written approval of the Quality Assurance Project Plan (QAPP). The QAPP must be submitted for evaluation and approval of EQB no later than thirty (30) days after the Effective Date of the NPDES Permit (EDP). The results of the monitoring program shall be submitted to EQB no later than sixty (60) days of completion of the monitoring program. Based on the evaluation of the results obtained, EQB will determine if it is necessary to revoke the Water Quality Certificate.

Special Conditions
NPDES No. PR0026522
Page 4.

10. The referenced activity shall not cause the growth or propagation of organisms that negatively disturb the ecological equilibrium in the areas adjacent to the production system.
11. The production area shall be free of debris, scum, floating oil and any other substances that produce objectionable odors.
12. The permittee shall maintain the production system in good operating conditions. At least quarterly, the production system shall be inspected to determine if some repairs, replacing, etc., are required. A report of such inspections shall be submitted to EPA and EQB no later than sixty (60) days after the performance of the inspection.
13. The permittee shall employ efficient feed management and feeding strategies that limit feed input to the minimum amount reasonably necessary to achieve production goals and sustain targeted rates of animal growth.
14. The permittee shall dispose of accumulated solids and attached marine growth contained within or on the net-pen in a manner, which prevents to the maximum extent practical these materials from entering or reentering the receiving water body.
15. The permittee shall recover floating debris and trash, which enters the receiving water incidental to the operation of the facility.
16. The permittee shall remove and dispose of animal mortalities properly on a regular basis to prevent discharge to a water body.
17. The permittee shall ensure proper storage of medications, pesticides and feed in a manner that prevent spills that may result in the discharge of such substances to a water body. Also, the permittee shall implement procedures for properly containing, cleaning and disposing of any spilled material.
18. The EQB, can require that the permittee conduct bioaccumulation studies, dye studies, water quality studies or any other pertinent studies. If the EQB require one or more of the aforementioned studies, the permittee will be notified to conduct such study(ies). Sixty (60) days after the notification of the EQB, the permittee shall submit, for evaluation and approval of the EQB, a protocol to conduct such study(ies). Thirty (30) days after the EQB approval, the permittee shall conduct such study(ies). Sixty (60) days after conducting such study(ies), the permittee shall submit a report that includes the results of such study(ies).

Special Conditions
NPDES No. PR0026522
Page 5

19. The authorization for the production system will not be transferable and does not convey any property rights of any sort or any exclusive privileges, nor it authorizes any injury to persons or property or invasion of other private rights, or any infringement of Federal or State law or regulations.
20. Each condition of this WQC is considered as separate. Therefore, if the applicability of any condition of this WQC is stayed due to any circumstance, the remaining conditions of this WQC will not be affected.
21. The EQB, by the issuance of the WQC, does not relieve the applicant from its responsibility to obtain additional permits or authorizations from the EQB as required by law. The issuance of the WQC shall not be construed as an authorization to conduct activities not specifically covered in the WQC, which will cause water pollution as defined by the Puerto Rico Water Quality Standards Regulation (PRWQSR), as amended. ⁴

1, 2, 3 and 4 see next page

Special Conditions
NPDES No. PR0026522
Page 6

1. According to Article 1, Puerto Rico Water Quality Standards Regulation and Amendments.
2. According to Article 3, Puerto Rico Water Quality Standards Regulation and Amendments.
3. According to Article 6, Puerto Rico Water Quality Standards Regulation and Amendments.
4. According to the Environmental Public Policy Act of September 22, 2004, as amended, Act No. 416, effective since March 22, 2005.

TABLE A-1 EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS AT THE EDGE OF THE PRODUCTION AREA NPDES NO. PR0026522

During the period beginning on the EDP and lasting through the EDP +5 years, the permittee is authorized to discharge fish and lobster excrement and unconsumed fish food. Such discharge shall be limited and monitored by the permittee at the production area monitoring points (5, 6, 7, 9, 10, 11 and 12) by the permittee as specified below:

Receiving Water Name and Classification: Pasaje de La Mona, SC

Effluent Characteristics	Gross Discharge Limitations		Monitoring Requirements	
	Monthly Average	Daily Maximum	Measurements Frequency	Sample Type
BOD ₅ (mg/l) ^{1,2,3}		30.0	Monthly	Grab
Color (Pt-Co Units) ^{2,3}	Shall not be altered except by other than natural phenomena, except when it can be proven that such charge in color is harmless to biota and aesthetically acceptable.		Monthly	Grab
Copper (Cu) (µg/l) ^{2,3}		3.1	Monthly	Grab
Dissolved Oxygen (mg/l) ^{1,2,3}	Shall not contain less than 4.0 mg/l except when natural conditions cause this value to be depressed.		Monthly	Grab
Nitrogen (NO ₃ , NO ₂ , NH ₃) (µg/l) ^{2,3}		5,000	Monthly	Grab

TABLE A-1 EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS AT THE EDGE OF THE PRODUCTION AREA NPDES NO. PR0026522

Receiving Water Name and Classification: Pasaje de La Mona, SC

Effluent Characteristics	Gross Discharge Limitations		Monitoring Requirements	
	Monthly Average	Daily Maximum	Measurements Frequency	Sample Type
Oil and Grease (mg/l) ^{2,3}	The waters of Puerto Rico shall be substantially free from floating non-petroleum oils and greases as well as petroleum derived oils and greases.		Monthly	Grab
pH (SU) ^{2,3}	Shall always lie between 7.3 and 8.5 except when caused by natural phenomena.		Monthly	Grab
Solids and Other Matter ^{2,3}	The waters of Puerto Rico shall not contain floating debris, scum or other floating materials attributable to discharges in amounts sufficient to be unsightly or deleterious to the existing or designated uses of the water body.		---	---
Selenium (Se) (µg/l) ^{2,3}		71.0	Monthly	Grab
Suspended, Colloidal or Settleable Solids (ml/l) ^{1,2,3}	Solids from wastewater source shall not cause deposition in or be deleterious to the existing or designated uses of the waters.		Monthly	Grab
Taste and Odor Producing Substances ^{2,3}	Shall contain none in amounts that will render any undesirable taste or odor to edible aquatic life.		---	---

TABLE A-2 MONITORING REQUIREMENTS AT THE BACKGROUND MONITORING STATION NPDES NO. PR0026522

During the period beginning on the EDP and lasting through the EDP +5 years, the permittee shall perform monitoring at the background monitoring station, as specified below:

Receiving Water Name and Classification: Pasaje de La Mona, SC

Parameter	Monitoring Requirements	
	Measurements Frequency	Sample Type
BOD ₅ (mg/l) ^{1,2,3}	Monthly	Grab
Color (Pt-Co Units) ^{2,3}	Monthly	Grab
Copper (Cu) (µg/l) ^{2,3}	Monthly	Grab
Current Velocity (m/s) ³	Monthly	Instantaneous
Dissolved Oxygen (mg/l) ^{2,3}	Monthly	Grab
Nitrogen (NO ₃ , NO ₂ , NH ₃) (µg/l) ^{2,3}	Monthly	Grab
Oil and Grease (mg/l) ^{2,3}	Monthly	Grab
pH (SU) ^{2,3}	Monthly	Grab
Selenium (Se) (µg/l) ^{2,3}	Monthly	Grab
Temperature °F (°C) ^{2,3}	Monthly	Grab

TABLE A-2 MONITORING REQUIREMENTS AT THE BACKGROUND MONITORING STATION NPDES NO. PR0026522

Receiving Water Name and Classification: Pasaje de La Mona, SC

Parameter	Monitoring Requirements	
	Measurements Frequency	Sample Type
Turbidity (NTU) ^{2,3}	Monthly	Grab
Zinc (Zn) (µg/l) ^{2,3}	Monthly	Grab

Notes:

1, 2, 3 and 4 see page 6 of the Special Conditions.

APPENDIX D -

US ARMY Corps of Engineers Permit

Appendix D: US Army Corps of Engineers Permit issued on 9 March 2007



REPLY TO
ATTENTION OF
Antilles Regulatory Section
SAJ-2003-12392 (IP-MIL)

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
ANTILLES OFFICE
400 FERNANDEZ JUNCOS AVENUE
SAN JUAN, PUERTO RICO 00901-3299

Mr. Fred Lentz
Borinquen Aquaculture
P.O. Box 1077
Rincón, Puerto Rico 00940-2007

Dear Mr. Lentz:

We are pleased to enclose the Department of the Army permit and a Notice of Authorization, which should be displayed at the construction site. Work may begin immediately, in accordance with the terms and conditions of the permit, but the Chief, Antilles Regulatory Section, as representative of the District Engineer, must be notified of:

- a. The date of commencement of the work,
- b. The dates of work suspensions and resumption of work if suspended over a week, and
- c. The date of final completion.

The Section Chief is responsible for inspections to determine that permit conditions are strictly adhered to. A copy of the permit and drawings must be available at the site of work.

IT IS NOT LAWFUL TO DEVIATE FROM
THE APPROVED PLANS ENCLOSED.

Sincerely,


David S. Hobbie
Chief, Regulatory Division

Enclosure



This notice of authorization must be conspicuously displayed at the site of work.

United States Army Corps of Engineers

EXPIRES 5 January 2011

install mariculture cages to culture Cobia (*Rachycentron canadum*) and Spiny
A permit to lobster (*Panulirus argus*).

at 1 nautical mile offshore Punta Higuero, Mona Passage, Rincón, Puerto Rico.

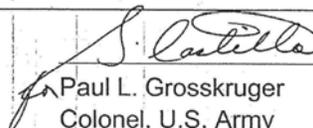
has been issued to Mr. Fred Lentz, Borinquen Aquaculture on 5 January 2006

Address of Permittee P.O. Box 1077

Rincón, Puerto Rico 00940-2007

Permit Number

SAJ-2003-12392 (IP-ML)


Paul L. Grosskruger
Colonel, U.S. Army
District Engineer

**DEPARTMENT OF THE ARMY PERMIT
ORIGINAL**

Permittee: Mr. Fred Lentz, Borinquen Aquaculture

Permit No: SAJ-2003-12392(IP-ML)

Issuing Office: U.S. Army Engineer District, Jacksonville

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: To install different-size cages in 50 acres of sandy bottom within navigable waters of the United States to cage-culture Spiny lobster (*Panulirus argus*) and Cobia (*Rachycentron canadum*). The "Ocean Spar" cages have 25.6 meters in diameter each. They also would install additional five "Containment Reef Lobster Cages", 16 feet long, 8 feet wide, and 8 feet high.

The work described above is to be completed in accordance with the drawings and attachments affixed at the end of this permit instrument.

Project Location: The project is located 1 nautical mile offshore Punta Higuero, Mona Passage, Rincón, Puerto Rico. Lat., Lon.

Latitude & Longitude at the center of the project site:

Latitude: 18°22'48"N

Longitude: 67°17'29"W

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on January 5, 2011. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

Permittee: Mr. Fred Lentz, Borinquen Aquaculture

Permit No: SAJ-2003-12392(IP-ML)

Page 2

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
4. If you sell the property associated with this permit, you must obtain the signature and the mailing address of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. The use of Pompano (*Trachinotus carolinus*) in the cages is hereby prohibited until the permittee can demonstrate that escapes of Pompano would not result in significant impacts to local fish populations, specifically, managed species, and their habitat. Once information to address this issue is provided, the permittee may come back to the Corps for the evaluation of a permit modification.
2. The Corps authorizes a scaled deployment of the cages, specifically 4 cages during the first year, followed by a 1-year of water quality monitoring. The results of the water quality monitoring would be filed with the Corps for evaluation. Depending on the monitoring results the Corps would authorize the deployment of the rest of the cages. If monitoring reveals relevant impacts to water quality, the permittee would modify the

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operations, including, but not limited to feed the fish when currents move offshore, or reduce the amount of fish per cage.

3. Water quality shall be monitored in accordance with the enclosed Water Quality Monitoring Plan, filed on 23 May 2005. The Plan specifies the minimum parameters that shall be monitored, and the methodology to be followed.

4. The permittee shall implement the Water Quality Monitoring Plan to record the pre-deployment conditions as baseline for subsequent monitoring. Water quality shall be monitored at least on a monthly basis, with specific monitoring events following cage clean-up activities.

5. Cleaning of the cages would be conducted at least monthly, or as necessary, to prevent the accumulation of biofouling and potential outbreaks of viruses or parasites.

6. The cages must have at least 20 feet of water clearance between the top of the cages and water surface. The surface buoys are considered "Special Aid Marks", and must be yellow in color. These buoys should also have "Radar Reflecting Tape", color yellow. The owner and/or organizations name, address and a telephone number must be placed on the buoys. All letters should be in black.

7. Upon completion of the cages and buoys installation the permittee shall provide the Coast Guard, Aids to Navigation Office in writing the latitude and longitude of each cage/buoy. A copy of said written communication shall be provided to the Corps.

8. The netting of the cages shall consist of tight Spectra knotless net, constructed of 3.0-inch stretch mesh. The net would be kept tightly stretched to avoid risk of entanglement by endangered species.

9. The mooring lines shall be at least 1 ¼ Braided Dracon lines. The permittee shall monitor the site such to assure the integrity of the cages and the appropriate tension of the cages net and mooring lines. In the case of hurricane or storm swales, the lines shall be monitored immediately after the event.

10. The permittee shall use distinctive coloration to make the cages mooring lines as clearly visible as possible. This is to avoid entanglement by endangered species. The cages mooring lines will be highly tensioned with 1 ½ diameter black rope. Both ends of the tension lines shall be fixed and constant high tension maintained.

11. As part of the cages monitoring, the permittee will record any interaction of sea turtles and whales with the cages.

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12. Bi-annual reporting requirements will include:

- 1) water quality results for monthly monitoring events
- 2) water quality results for post-cage cleaning events
- 3) integrity of the cages net and mooring lines on a monthly basis
- 4) integrity of the cages net and mooring lines after hurricane or storm swales
- 5) interaction of sea turtles, whales or other endangered species with the cages
- 6) function of the cages as fish attracting device

13. If future operations demand the establishment of a local hatchery, the permittee shall consult with the Corps for proper evaluation of potential direct, indirect and cumulative impacts of the hatchery.

14. The permittee shall provide as-built drawings of the authorized work, and a completed As-Built Certification Form herewith provided. The drawings are to be submitted within 60 days after completion of the authorized work or at the expiration of the construction window of the permit, whichever comes first. The drawings and Certification Form must be signed and sealed by a Professional Engineer in Puerto Rico. In the event that the completed work deviates from the approved permit drawings and special conditions, the permittee shall describe, on the Certification Form, the deviations between the authorized by the permit and the work as constructed. A blank form is provided in attachment 4(a). Please note that the depiction and description of the deviations on the drawings and Certification Form does not necessarily mean the Corps of Engineers will approve them.

a. The As-Built drawings shall include the following:

- 1) Plan view and cross-sections of the project as built.
- 2) Location of the authorized work footprint (as shown on the permit drawings) with an overlay of the work as constructed.
- 3) List any deviations between the work authorized by the permit and the work as constructed. Clearly indicate on the as-built drawings any deviations that have been listed.
- 4) The Department of the Army Permit number.
- 5) Include pre- and post-construction aerial photographs of the project site, if available.

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b. As-built drawings shall be submitted to:

Chief, Antilles Regulatory Section, U.S. Army Corps of Engineers
400 Fernández Juncos Avenue, San Juan, PR 00901-3299

15. Within 60 days of completion of the work authorized, the attached "Self-Certification Statement of Compliance" must be completed and submitted to the U.S. Army Corps of Engineers. Mail the completed form to the Chief, Antilles Regulatory Section U.S. Army Corps of Engineers, 400 Fernandez Juncos Avenue, San Juan, Puerto Rico 00901.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 10 of the Rivers and Harbors Act of 1899
(33 U.S.C. 403).

() Section 404 of the Clean Water Act (33 U.S.C. 1344).

() Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972
(33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

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- b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
 - d. Design or construction deficiencies associated with the permitted work.
 - e. Damage claims associated with any future modification, suspension, or revocation of this permit.
4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.
5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:
- a. You fail to comply with the terms and conditions of this permit.
 - b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).
 - c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

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When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE-SIGNATURE)

(DATE)

(NAME-PRINTED)

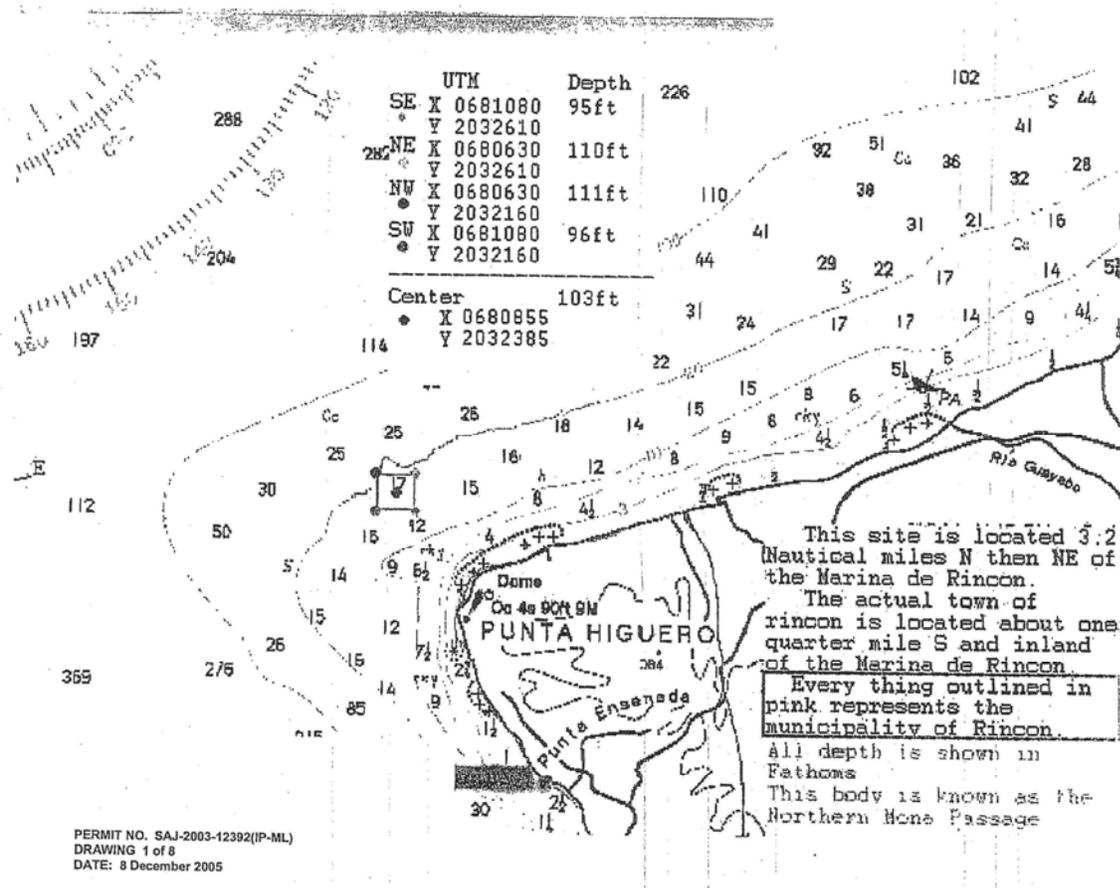
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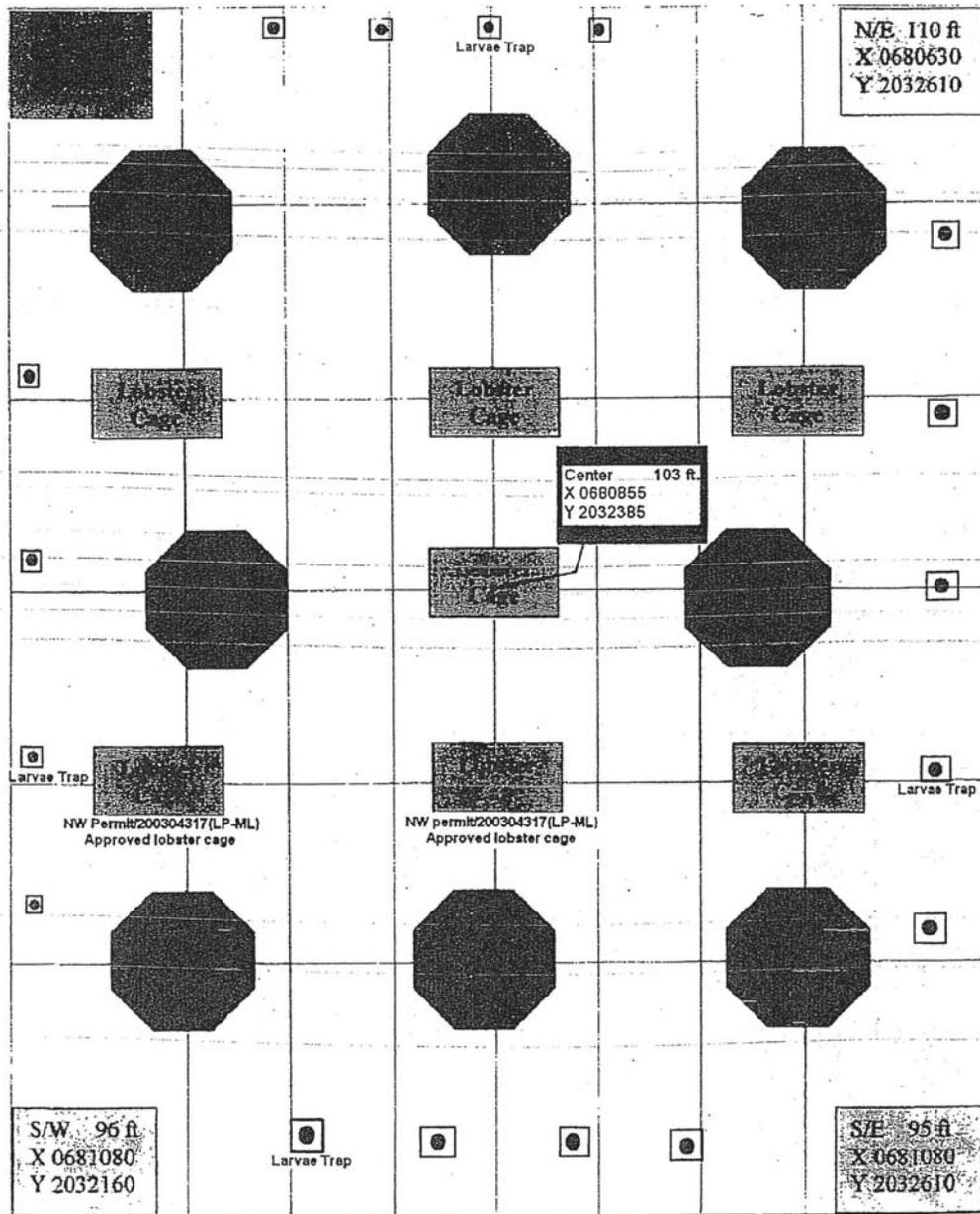
(CITY, STATE, AND ZIP CODE)

DEPARTMENT OF THE ARMY PERMIT

**Attachments to Department of the Army
Permit Number SAJ-2003-12392(IP-ML)**

1. PERMIT DRAWINGS: 8 pages, dated 8 December 2005
2. As-built certificate
3. Self Certification Statement of Compliance
4. National Pollutant Discharge Elimination System permit No. PR0026522 dated 16 January 2007



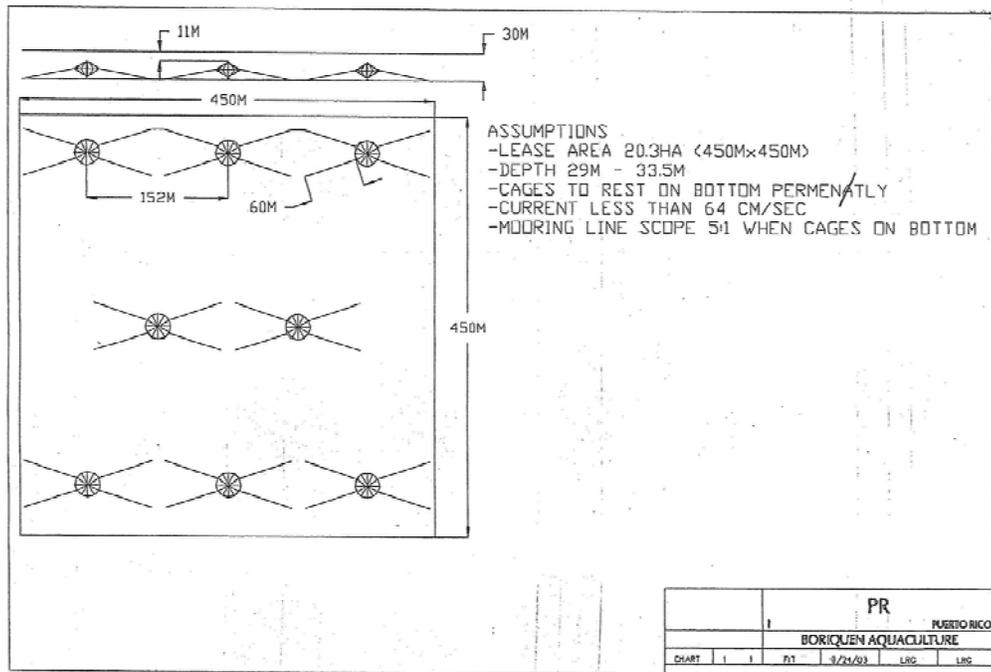


Upgrade Proposal for – NW Permit / 200304317 (LP-ML)

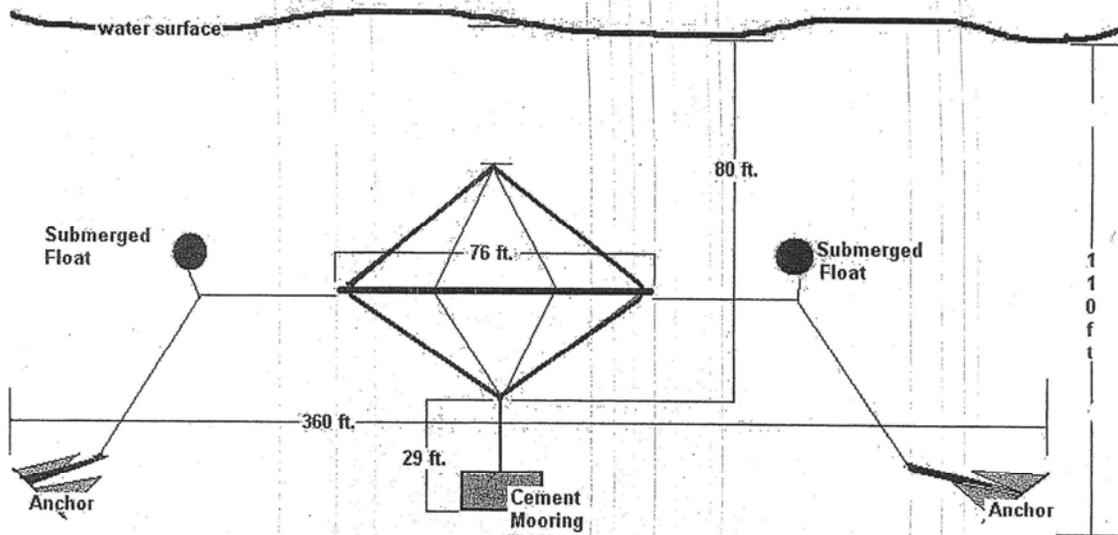
- * Each Grid Space is equal to Approximately one (1) Acre
- * Objects shown are drawn larger than actual scale size to facilitate layout viewing
- * Locations of objects are approximate

☐ Larvae Trap

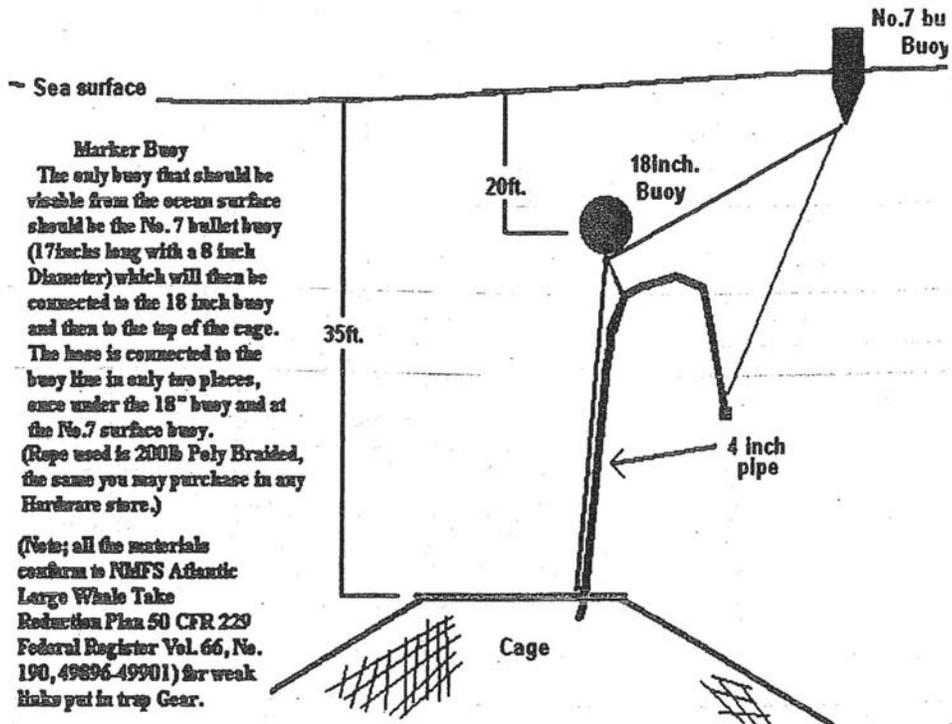
PERMIT NO. SAJ-2003-12392(IP-ML)
 DRAWING 2 of 8
 DATE: 8 December 2005



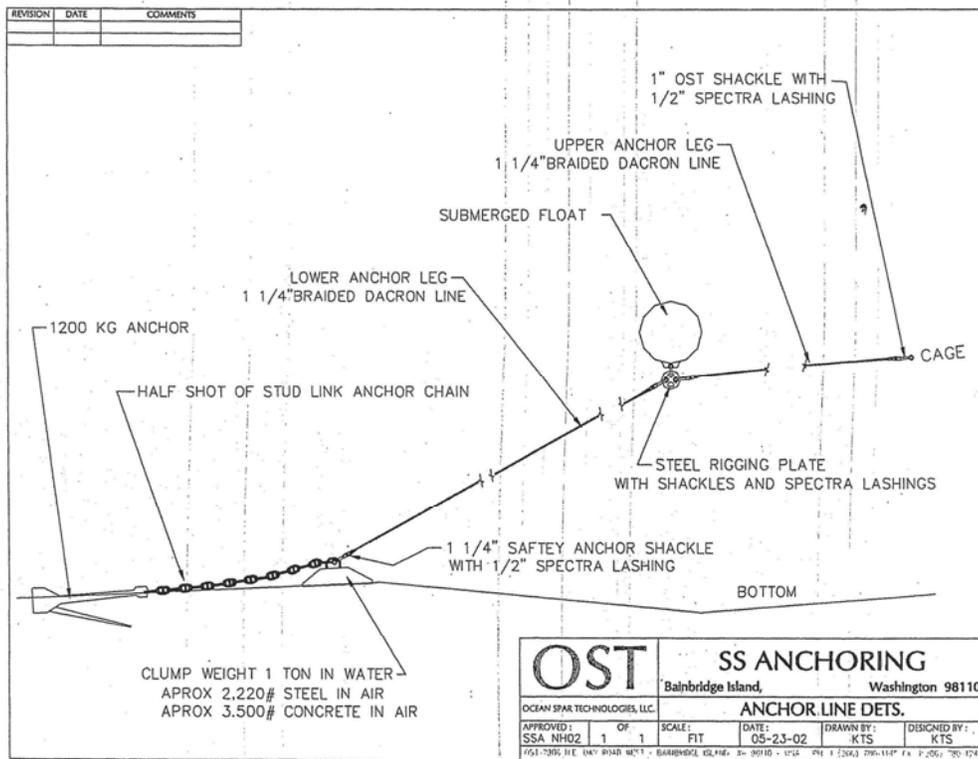
PERMIT NO. SAJ-2003-12392(IP-ML)
DRAWING 3 of 8
DATE: 8 December 2005



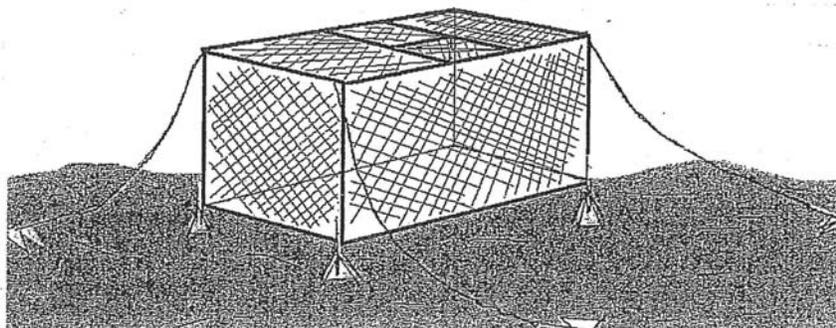
PERMIT NO. SAJ-2003-12392(IP-ML)
DRAWING 4 of 8
DATE: 8 December 2005



PERMIT NO. SAJ-2003-12392(IP-ML)
DRAWING 5 of 8
DATE: 8 December 2005



PERMIT NO. SAJ-2003-12392(IP-ML)
DRAWING 6 of 8
DATE: 8 December 2005



Containment Reef

Containment Reef Lobster Cage

- Constructed of Galvanized, angle and expanded metal.
- Allows normal flow of current through cage.
- Algae growth on cage collects lobster larvae.
- Internal habitats provide added security.
- Sits 24" off the ocean floor for current flow.
- Stable footers prevent movement or sinking.
- Acts as a reef promoting propagation of other species.
- Four point anchor prevents movement from large swell.
- Flow thru design prevents swell impact.
- Larvae collectors within cage are protected from predators.
- Secure design discourages and prevents poaching.
- Transportable and environmentally friendly.
- Length 16' x Width 8' x Height 8'

PERMIT NO. SAJ-2003-12392(IP-ML)
DRAWING 7 of 8
DATE: 8 December 2005

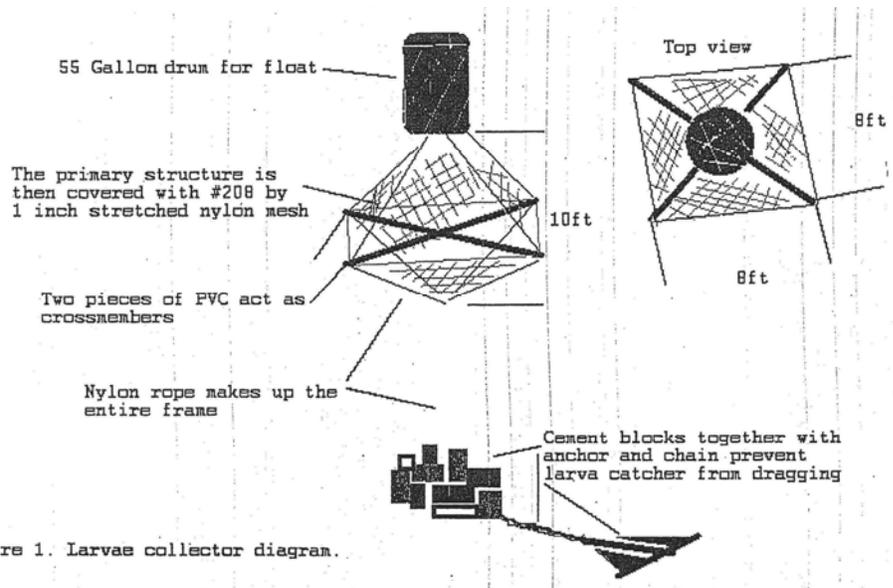


Figure 1. Larvae collector diagram.

PERMIT NO. SAJ-2003-12392(IP-ML)
DRAWING 8 of 8
DATE: 8 December 2005

AS-BUILT CERTIFICATION BY PROFESSIONAL ENGINEER

Submit this form and one set of as-built engineered drawings to the Chief, Antilles Regulatory Section, U.S. Army Corps of Engineers, 400 Fernandez Juncos Avenue, San Juan, Puerto Rico 00901-3299. If you have questions regarding this requirement, please contact the Antilles Regulatory Section at (787) 729-6905/6944.

1. Department of the Army Permit Number: SAJ-2003-12392 (IP-ML)

2. Permittee Information: _____

Name _____

Address _____

3. Project Site Identification:

Physical location/address _____

4. As-Built Certification:

I hereby certify that the authorized work, including any mitigation required by Special Conditions to the permit, has been accomplished in accordance with the Department of the Army permit with any deviations noted below. This determination is based upon on-site observation, scheduled and conducted by me or by a project representative under my direct supervision. I have enclosed one set of as-built engineering drawings.

Signature of Engineer _____ Name (Please type) _____

(FL, PR or VI) Reg. Number _____ Company Name _____

Address _____

(Affix Seal) _____ City _____ State _____ ZIP _____

Date _____ Telephone Number _____

SELF-CERTIFICATION STATEMENT OF COMPLIANCE

Permit Number: SAJ-2003-12392(IP-ML)

Permittee's Name & Address (please print or type): _____

Telephone Number: _____

Location of the Work: _____

Date Work Started: _____ Date Work Completed: _____

Description of the Work (e.g. bank stabilization, residential or commercial filling, docks, dredging, etc.): _____

Acreage or Square Feet of Impacts to Waters of the United States: _____

Describe Mitigation completed (if applicable): _____

Describe any Deviations from Permit (attach drawing(s) depicting the deviations): _____

I certify that all work, and mitigation (if applicable) was done in accordance with the limitations and conditions as described in the permit. Any deviations as described above are depicted on the attached drawing(s).

Signature of Permittee

Date

APPENDIX E -
Environmental Monitoring Plan

Appendix E: Environmental Monitoring Plan¹

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FYA.
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05 MAY 23 PM 1:47
U.S. ENVIRONMENTAL PROTECTION AGENCY
WATER POLLUTION CONTROL DIVISION

Final
Water Quality Monitoring Plan

FOR
**BORIQUEN AQUACULTURE
FISH AND LOBSTER,**
OFFSHORE CAGE PROJECT, RINCON PUERTO RICO
No. SAJ-2003-12392 (IP-ML) JPA#518

Prepared for:
Boriquen Aquaculture
PO Box 1077
Rincon, PR 00677

By:
Pace Analytical, Inc.
Puerto Rico Laboratory
El Retiro Industrial Zone
San German, PR 00683
Phone (787) 892-2680

¹ Inserted environmental monitoring plan does not include sections with standard operating procedures (SOP) for chemical analysis used by Pace Analytical. Those sections were submitted with documentation for USACE permit.

Water Quality and Benthic Monitoring Methodology for Offshore Aquaculture Project Punta Higuero Rincon

Summery

After several meetings with Dr. Lisa Marie Carruba of the Essential fish Habitat (EFH) Division, NOAA. It has been noted by both parties that there may need to be changes made to the below listed monitoring plan in the future as information becomes available, so we please ask all the agencies involved, to stay in communication with us through out the first cycle. A summary report will be issued after six months of sampling and a year review will be given at an interagency meeting, to allow for comments and questions by the agencies. Boriquen Aquaculture has contracted *Pace Analytical Laboratories* in San German Puerto Rico to help us with our monitoring plan; *Pace Analytical* is a full services laboratory that follows EPA standards. *Pace Analytical* will be training Mr. Lentz and one other diver to collect the samples using their standard SOP, basically *Pace Analytical* is controlling the testing parameters and Boriquen Aquaculture is providing personnel. Some of the features to this monitoring plan will be;

- Pace Analytical Standard Operating Procedures (SOP)
- Pace Analytical custom chain of custody log
- Pace Analytical custom sampling work sheets
- EPA standardized sampling and parameter methodology

1. Quality Assurance Measures

Boriquen Aquaculture has contracted *Pace Analytical* to design our monitoring strategy as well as analyze the water and benthic samples in accordance with EPA assurance measures. *Pace Analytical* has taken the time provide some of the methodologies and Quality Assurances (QA) that will be used to quantify the samples that will be taken.

Pace Analytical is EPA approved and inspected Resources Analytical Company owning up to fifteen different Labs in the US and Puerto Rico, for more information on some of the other functions Pace Analytical can provide, you may go online to www.pacelabs.com or Write /Call;

Pace Analytical, Inc.
Puerto Rico Laboratory
El Retiro Industrial Zone
Calle B & C, P.O. Box 325
San German, PR 00683
Phone (787) 892-2680

2. Cage installation

Boriquen Aquaculture plans to install four cages in its first year of operation. As the first cage is installed, both the perimeter and cage samples are taken simultaneously along with one Macro invertebrate and the grain size. Since the cages will be installed one at a time every three months, the cage sampling parameters will be affected. The monthly benthic cage samples are a perfect example of how the installation affects information gathered, cage one will only require one monthly benthic cage sample for the first three months till the second cage is installed, once cage two is installed, we can sample either cage one as usual or between cage one and two, by the time all four cages are installed it may be simple to just collect the center sample from center around the lobster cages.

(View the sampling chart below)

Month	Cage Installation and Sampling				
	Water Quality	Benthic Monitoring	Hard Bottom	Macro Invert.	Grain Size
Cage 1 Baseline					
1	3 stations	3 stations	0	1	1
2	3 stations	3 stations	0	0	0
3	3 stations	3stations	0	0	0
Cage 2					
4	3 stations	3stations	0	0	0
5	3 stations	3stations	0	0	0
6	3stations	3stations	0	1	0
Cage 3					
7	3stations	3stations	0	0	0
8	3stations	3stations	0	0	0
9	3stations	3stations	0	0	0
Cage 4					
10	3stations	3 stations	0	0	0
11	3stations	3stations	0	1	0
12	3 stations	3stations	0	0	0

3. Water Quality Monitoring

Water quality is probably the most important monitoring tasks to be undertaken. Pace Analytical has recommended an Up-stream to Down-stream testing methodology. This methodology entails identifying the currents direction or bearing (Example North to South or in bearings) In reference to the illustration below there is one water sample taken at sixty five feet on the site perimeter Up-stream, one sample taken at sixty five feet of depth at the cage rim and one sample taken at sixty five feet Down-stream at the other side of the site perimeter by an Alpha water sampler.

Below are some of the parameters that will be sampled, note; EQB may require additional parameters not listed below.

- **Turbidity**; Reference Methods – EPA 180.1
- **Chlorophyll-a+Pheophytins**; Trichromatic Method EPA- N/A
- **NO3-N**; Reference Methods – EPA 352.1
- **Total Suspended Solids**; Reference Methods – EPA 160.2 (SM2540B) / SM 2540F
- **NH3-N**; Reference Methods – EPA 350.1
- **PO4-P**; Reference Methods – EPA 365.2

4. Benthic Core Sampling

The monthly benthic monitoring will require one diver to collect samples. As mentioned above, Pace Analytical has recommended an Up-stream to Down-stream testing methodology. This methodology entails identifying the currents direction or bearing (Example North to South or in bearings) In reference to the illustration below there is one *Core* sample taken at the site perimeter Up-stream, one *Core* sample taken under the #1 fish cage and one *Core* sample taken Down-stream at the other side of the site perimeter. The sediment cores collected at all three locations are to be analyzed as stratified samples, the top 5cm will be analyzed for the moment but if conditions on the seafloor seem unsettled the tests may need to focus on a 10cm core sample. Boriquen Aquaculture will be in stalling a pin to help monitor the depravation of the sea floor during this first cycle. Since there are no specific underwater benthic sampling parameters, Pace Analytical has chosen a series of test methodologies used to test topsoil on land. Below is a listing of the tests to be conducted;

- **Total Nitrogen**; Kjeldahl method EPA 351.2
- **Total Organic Carbon (TOC)**; Walkley-Black chromic acid wet oxidation method.
- **Phosphorus**; Reference Methods EPA 365.2

(Most Methodologies have been provided as Appendix 7)

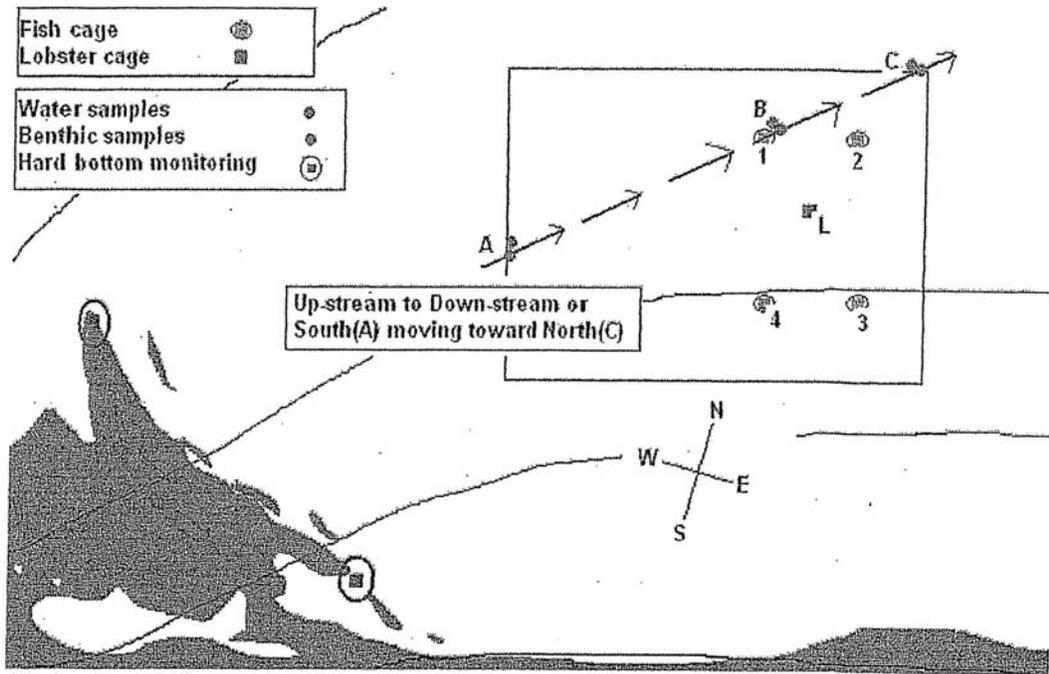


Illustration "A"

Example: What we are going to show with this picture is a description of the sampling SOP Pace Analytical has produced for Boriquen Aquaculture, using the Up-stream to Down-stream sampling strategy.

1. Identify the current direction; using a drone that is placed for a half hour in the ocean close to the site may do this.
2. Sample area "A"; a diver will dive down on to the seafloor and collect a sediment sample, and on his way up collect a water sample at 65ft. using a Alpha water sampler.
3. Sample area "B"; a diver will dive down on to the seafloor under cage 1. and collect a sediment sample, and on his way up collect a water sample at 65ft. next to the rim of the cage, using an Alpha water sampler.
4. Sample area "C"; a diver will dive down on to the seafloor and collect a sediment sample, and on his way up collect a water sample at 65ft. using an Alpha water sampler.

5. Hard Bottom Monitoring

Point Transect Quadrant Sampling will be conducted every three months, starting with the installation of the first cage.

List of materials:

- 10 small pieces of red brick
- 10m tape measure
- Video camera (Optional)
- Enough ½ inch PVC pipe to make a quadrant 5m square

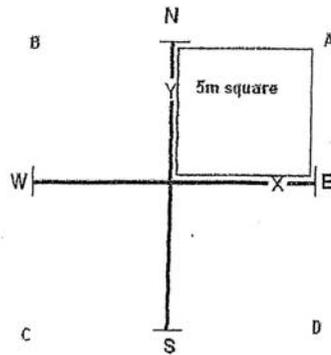
5.1. Transect methodology

Using a compass establish a Northern point on the hard bottom and using a 10m tape measure and mark with a piece of brick the north, south and 5m center, this will be your "Y" axis. By using the center point move that distance in meters on a line perpendicular to the baseline and mark, this will be your "X" axis. (View illustration "B")

Use the quadrant frame (made of PVC pipes) to identify each quadrant. Place the frame on the ground and put the compass on the central joint. Orient the middle arm of the frame so it points north. Score the northeast ("A") and northwest ("B") quadrants as described in the next paragraph. Without moving the central joint, flip the frame over so the middle arm points south and score the southeast ("C") and southwest ("D") quadrants.

In each of the four quadrants identify and list each of the species witnessed the Repeat the entire procedure four times so you have a total of four point-quarters with four data sheets with the identified species in each. Make one list of identified species combining all the species and individuals from the four point quarters. Calculate the relative density of each species based on the pooled data.

Illustration "B"



6. Macro Invertebrates and Substrate Size Sampling

This is the addition of one core sample taken under the cage to determine the quantity of Macro Invertebrates. This will be done three times a year, March / August / December, during the first testing cycle.

There will also be one Grain size sample of the sand gravel bottom done in this first year.

7. Fish Aggregation Survey.

Boriquen Aquaculture intends to conduct fish identification and count around one fish cage every month; the methodology chosen was the *Point-count Fish Census*. This methodology came recommended by the EFH as being the most complete methodology for use with the open ocean cages. Boriquen Aquaculture plans to incorporate an underwater camera in the methodology below, as this will allow for more accurate counts.

7.1 *Point-count Fish Census: Bohnsack-Bannerot (1986)*

The point-count diver records all fish species seen within a vertical cylinder of radius 7.5m that extends from the substrate to the surface of the water. Using a random number of fin kicks and a randomly chosen compass heading the center of the cylinder is positioned to the side or behind the tape rolled out by the belt-transect diver such that there is no overlap between the two surveys. The point-count diver also makes no attempt to avoid features within a habitat. While staying at the center point of the cylinder the point-count diver slowly rotates in a circle. All species seen within the cylinder during a 5-minute period are recorded. After the 5 minutes are up, the diver records the number and size of individuals seen for each species identified. This is done during one full rotation per species in order from the bottom of the list to the top. Only schools of fishes unlikely to remain in the cylinder past the first 5 minutes are enumerated and measured during the initial time period. In the instance where species observed in the initial period are no longer seen in the area the count and measurement are done by memory.

APPENDIX F -
Environmental Justice Analysis

Appendix F: Environmental Justice Analysis

EPA Region 2 Environmental Justice Analysis

Case Study: Municipality of Rincón, Puerto Rico

The Region 2 Environmental Justice (EJ) Analysis supports EPA Region 2's Interim Policy for Environmental Justice (IP). The specific community that is under evaluation for inclusion in the Region's EJ program is referred to as the Community of Concern (COC) in the IP. The analysis process hinges on the comparison of the respective levels of minority representation, low-income representation and the environmental burden of the COC relative to its statistical reference area. If the demographic analysis (first step) identifies the COC as an EJ area, then a full EJ analysis is conducted.

Demographic Analysis

The first step of EJ analysis evaluates demographic data. The analysis is conducted by comparing the demographic characteristics of a discrete, geographically defined community to its respective statistical reference area. Due to the special situation in Puerto Rico and the U.S. Virgin Island, only the “percent below poverty” is applied for evaluation of a potential EJ community. The percent poverty for the COC was compared to an appropriate statistical reference, in this case Puerto Rico. The location of the COC determines which statistical reference area is used.

Demographic Analysis for Rincón

Indicator	Puerto Rico Threshold	COC Indicator	Urban/Rural
Percent Minority	NA	NA	Urban
Percent Poverty	45.2	51.52	Urban

Environmental Load Profile (ELP)

A full EJ analysis entails an environmental burden analysis. Region 2 uses the concept of an Environmental Load Profile (ELP). The profile would provide a representation of the environmental load (i.e., relative environmental burden) within a community. The ELP serves to identify communities that may bear a disproportionate environmental load in comparison to statewide-derived thresholds. Currently, the ELP consists of the following three indicators: Toxics Release Inventory (TRI) Air Emissions, Air Toxics, and Facility Density. The ELP generates a summary report that provides a numeric value for the state threshold, an indicator of the community of concern (COC Indicator), and the ranking of the community in the state. These calculated values not only identify whether the particular community meets an ELP threshold, but upon exceedance, the indicator value is ranked to provide a measure of magnitude.

Ranking

In addition to quantifying the facility density indicator, a ranking system is used to provide a measure of the magnitude of the potential risk in these communities in comparison to the rest of

the state. Ranking is established on a scale of 1 to 10 (i.e., one being the lowest potential risk and ten having the highest potential risk.) Communities with indicator values lower than the benchmark are ranked zero.

Establishing the Benchmark Value

The median, instead of the arithmetic mean, is used to establish a benchmark value for the facility density indicator. Data of environmental indicators typically include a small number of extremely high or extremely low values such that outlying data points skew the distribution of the environmental indicator and can greatly influence the mean value. Conversely, the median of a skewed distribution is not as heavily influenced by the outlying data points and is therefore a better representative of the entire dataset for the purposes of establishing a benchmark value.

Historically, industrial facilities were located in areas where a high percentage of minority and low income (i.e., potential EJ) populations exist. Conversely, non-potential EJ areas have less industrial facilities. A statistical analysis on the facility indicator confirms the above assumption.

Benchmark Values for Facility Density Indicator

	NY	NJ	PR	VI
State	60	83	61	65
Potential EJ Areas	224	338	54	49
Non EJ Areas	57	78	119	70

The median indicator value of Non-Potential EJ areas is lower than the median indicator value of Potential EJ areas in New York and New Jersey. Puerto Rico and the Virgin Islands, however, portray a different picture because only low income data are evaluated for potential EJ areas in the Caribbean. Further, it has been found overall that industries are concentrated in a number of cities where people have higher income than those in the rural sections. Nonetheless, in terms of public health, a more conservative approach was adopted to better gauge a community's health condition. For NY and NJ, the median of Non-Potential EJ areas is used as the benchmark value, while for PR and VI the median of the state is used as the benchmark.

Environmental Load Analysis for Rincón

Indicator	Puerto Rico	Threshold COC	Indicator Ranking
TRI Indicator	10.48	0.17	0
Facility Density Indicator	61	78.11	1
Air Toxics Cancer Indicator	41	31.41	0
Air Toxics Non-cancer Indicator	3.2	2.23	0

The analysis shows that only the Facility Density Indicator value for the COCs is slightly greater than the Puerto Rico thresholds. However, this proposed project does not contribute specifically to the ELP indicators.

**APPENDIX G -
Vessel Strike Avoidance and Injured/Dead Protected
Species Reporting**

Appendix G: Vessel Strike Avoidance and Injured/Dead Protected Species Reporting

Vessel Strike Avoidance and Injured/Dead Protected Species Reporting

BACKGROUND

The National Marine Fisheries Service (NMFS) has determined that collisions with vessels can injure or kill protected species (e.g., endangered and threatened species, and marine mammals). The following measures must be implemented to reduce the risk associated with vessel strikes or disturbance of protected species to discountable levels.

Protected Species Identification Training

Vessel crews should use an Atlantic and Gulf of Mexico reference guide that includes and helps identify the 28 species of whales and dolphins, 5 species of sea turtles and the single species of manatee that might be encountered in the Atlantic Ocean and Gulf of Mexico.

Vessel Strike Avoidance

The following measures must be taken in order to avoid causing injury or death to marine mammals and sea turtles:

1. Vessel operators and crews must maintain a vigilant watch for marine mammals and sea turtles and slow down or stop their vessels to avoid striking sighted protected species.
2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel. If the whale is believed to be a North Atlantic right whale, federal regulation requires a minimum distance of 500 yards be maintained from the animal (50 CFR 224.103 (c)).
3. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.
4. When cetaceans are sighted while a vessel is underway, attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
5. Reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity of the vessel; therefore, prudent precautionary measures should always be exercised.

6. Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.

Injured/Dead Protected Species Reporting

Vessel crews must report sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by your vessel.

Report marine mammals to the Southeast U.S. Stranding Hotline: 305-862-2850

Report sea turtles to the NMFS Southeast Regional Office: 727-824-5312

In addition, if the injury or death was caused by a collision with your vessel, you must notify the Federal Energy Regulatory Commission immediately of the strike by email (email and/or phone number contact information provided by the Federal Energy Regulatory Commission). The report should include the following information:

- a. the time, date, and location (latitude/longitude) of the incident;
- b. the name and type of the vessel involved;
- c. the vessel's speed during the incident;
- d. a description of the incident;
- e. water depth;
- f. environmental conditions (e.g., wind speed and direction, sea state, cloud cover, and visibility);
- g. the species identification or description of the animal, if possible; and
- h. the fate of the animal.

If a [ACTION AGENCY NAME]-related industry activity is responsible for the injury or death, the responsible parties should remain available to assist the respective salvage and stranding network as needed.