Environmental and Social Governance Report

for

The Kampachi Company

2018

A self-assessment as to how well we as a team are meeting our commitments to "soften humankind's footprint on the seas," and to be a good neighbor.

Dated December 31st, 2018

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1. INTRODUCTION

A. Statement of Purpose of the ESG Report

This Environmental and Social Governance (ESG) Report is prepared as part of our company's commitment to be exemplars in the offshore aquaculture field, and to constantly encourage ourselves, and our industry colleagues, to strive for continuous improvement in our operations, and in minimizing or mitigating our environmental footprint. Our commitment is to be a model for how aquaculture can "soften humankind's footprint on the seas." This report reflects on our progress towards meeting and keeping that commitment.

This is our first Annual ESG report, dated December 31st, 2018. It covers the company of families under the umbrella of The Kampachi Company holdings, including:

- Kampachi Mexico, S. de R.L. de C.V. (our La Paz-based production company);
- Centro de Investigacion en Maricultura Sustentable, S.C. (CIMAS, our La Paz-based research entity);
- Aquacultivos de Cortez S.A. de C.V. (which holds the title to the offshore concession); and
- Kampachi Worldwide Holdings, LP (our Texas-based holding entity).

B. Third-party validation of ESG goals

The Kampachi Company recognizes the value of third-party, objective certification schemes for assessing the environmental and social impacts of aquaculture operations, and for using free-market forces to drive innovation and change. We are committed to furthering the role of such certification schemes in our own operations, as well as in the wider industry.

The Kampachi Company will be pursuing both ASC and Global Aquaculture Alliance's (GAA's) Best Aquaculture Practices (BAP) certification. The audit for ASC certification is scheduled for January, 2019[1].

[1] The ASC Draft Audit Report is available at :
http://asc.force.com/Certificates/ASCCertDetails2?id=a011o00001k54qYAAQ

The Kampachi Company also anticipates evaluation by Monterey Bay Aquarium's Seafood Watch, who are planning an assessment of *Seriola* in Mexico. *Seriola rivoliana* that is farmed offshore in the U.S. is ranked as a "Good Alternative"[2], and we hope for a similar or better ranking for our King Kampachi.

In addition, we intend to measure our progress through metrics against the United Nations' Sustainable Development Goals (SDGs), primarily as described under SDG 14 ("Conserve and sustainably use the oceans, seas and marine resources for sustainable development."), but also including SDG s 2, 3, 5, 8, 11, 12, 13, 15 and 17. These SDGs are not assessed in this current ESG report, but company performance will be evaluated against them in future reports.

C. Global context for The Kampachi Company

The world's oceans are coming under increasing pressure. The global demand for seafood continually increases, driven by growing global population, increasing consciousness of the health benefits of seafood, and greater affluence – rendering seafood more relatively affordable. Capture fisheries around the world cannot meet this greater demand, as wild stock fisheries are declining, or static (Worm, et al., 2006; FAO, 2018). Only aquaculture can meet this shortfall.

Assessments of the global demand for animal protein underscore the need for a large proportion of aquaculture's growth to be in high-end marine fish. Full life-cycle assessment (LCA) of the range of animal protein production measures have demonstrated that there is insufficient land area or freshwater resources to expand beef or pork production (Hall, et al., 2011). Terrestrial livestock production is also responsible for a significant portion of greenhouse gas (GHG) emissions. Aquaculture has been shown to result in significantly less impact on land area, freshwater resources, and greenhouse gas emissions. Future aquaculture proteins therefore need to be able to compete with beef and pork in terms of palatability, so that they are preferred by consumers. We would posit that this implies a need for expanded marine fish production – fish that are highly desirable from a flavor profile, and that are high in heart-healthy and brain-healthy omega-3 fatty acids.

[2] https://www.seafoodwatch.org/seafood-recommendations/groups/amberjack?type=almaco-jack&q=Amberjack,%20Yellowtail&method=farmed

The Kampachi Company would also posit that offshore production has the potential to be the least impactful means of producing high-quality marine fish. We seek to work within the assimilative capacities of the ocean ecosystem, so that any local impacts are minimized or mitigated. Farms can reduce local ecosystem impacts by siting in deeper water, further offshore, in areas of brisker currents; by using more efficient diets; by maintaining lower stocking densities; and by using innovative engineering to better control pests, parasites, predators, and other challenges. Many of these approaches are implicit in the metrics that we report upon, below, and will be reported in greater detail as the farm operations scale over future years.

Figure 1 : King Kampachi served as nigiri – sliced raw, over a hand-molded ball of rice.

2. COMPANY OPERATIONS

A. The lease area

Site selection is a critical component for any mariculture operation. The offshore site in La Paz, Baja California Sur, was selected using the following criteria :

a. Deep water: the site ranges from around 68 – 82 m deep (223 – 276 ft).

b. Limited activity: there was little or no public use of this area. The bare sand bottom meant that there are no distinguishing features on the seafloor. There is no recreational diving in the area, and fishing is mostly trolling for pelagic species; which is unimpeded around the farm site.

c. La Paz Bay affords some protection from winter storms and from hurricanes. There is an exposed fetch of around 200 miles in the N - NE sector, to the Mexican mainland, but all other sectors are less than 20 miles fetch.

d. There is potential for ready access from the existing wharf (as part of the RofoMex mine facility) and shoreline at San Juan de La Costa, four miles (6 km) to the West of the farm site. Support facilities such as docks for fueling and land for staging of equipment and feed are located at Pichilingue, which is about 20 nM away from the site.

e. The site was directly offshore from the RofoMex phosphate mine. Its use was therefore consistent with the adjacent land uses, and it represented no significant impact on the viewplane.

The net pens are currently concentrated towards the western end of the lease area, within a single mooring array, containing four net pens (as of 12/31/18). The net pens deployed to date are all submersible Polar-Cirkel-style pens, each of around 10,000 cubic meters capacity. The outermost area of the lease is used almost solely for mooring lines, which require a 3:1 scope. The net pens are tied into a submerged grid that is anchored into the soft substrate using steel embedment anchors and chains. A series of buoys and weights ensure that the anchor lines are perpetually taut, to eliminate any risk of entanglement by marine mammals. Bridles from the mooring grid corners attach to the net pen rims, to hold the net pens in place in each grid square.

The company's complete Manejo de Impacto Ambiental (the Mexican equivalent of an Environmental Impact Assessment) for the offshore farm site is available from our website. (https://kingkampachi.mx/monitoring-and-reporting/performance-metrics/).

B. Farm operations

The daily activities on the farm primarily consist of feeding the fish in the pens, and removing mortalities. Underwater video cameras inside the net pens are frequently used to relay visual images to the operators on the feed boats. This enables the operators to regulate feed to ensure that feed is not wasted, and that excess feed does not fall below the net pen. Any fish carcasses are regularly removed by divers (on all days when sea conditions allow net pens to be raised to the surface and for safe diver operations inside the pens). Carcasses from routine daily mortality collection are disposed of as solid wastes at a municipal government-operated land-fill.

Harvests usually occur weekly, with fish harvested into an ice-brine slurry, to quickly and humanely kill them, with a minimum of damage. Fish are transported whole, in ice-brine, to land-based processing facilities, for packing and shipping. No fish processing occurs at sea. Disposal of processing wastes is the responsibility of the processing facilities and of the wholesalers or other purchasers of the fish.

Support activities for the existing operation are based out of Pichilingue Harbor, where a warehouse area is rented from the harbor agency. This accommodates containers for feed storage, gear storage areas, and office. The farm is also serviced by a feed / security platform vessel, which remains on-site as conditions allow (and which occasionally traverses the bay to uplift feed and other supplies from Pichilingue). Several other smaller work boats are also used to support net pen and grid maintenance and cleaning, and other tasks.

C. Localized Environmental Concerns

Aquaculture – or indeed, development of any food production system – brings with it attendant environmental concerns. In the past, fish farms have had impacts in the following areas:

- water quality;
- nutrient enrichment of the substrate beneath the farm;
- antifoulant paints from net pens to contaminate the substrate;
- therapeutant or antibiotic misuse, or prophylactic use;
- escapes to outcompete wild fish for spawning grounds or feed;
- escapes to dilute the wild fish gene pool;
- proliferation of pests, parasites and diseases inside the net pens, which can then be transferred to wild fish;
- entanglement of whales, dolphins and other marine mammals;
- disruption of marine mammal or other species' migratory paths;
- harmful deterrents or fatal control measures against predators;
- excessive use of fishmeal and fish oil, leading to overharvesting of the smaller pelagic species targeted by industrial reduction fisheries;
- exclusion of other user groups from traditional, cultural or recreational uses of the farm area; and
- visual impact on the viewplane from the net pens.

After around 8 months' experience at The Kampachi Company farm site, some preliminary assessment of these potential impacts can be made. Each of these issues is examined in detail, below, beginning with an evaluation of the *de novo* environmental status of the farm site, and then detailing the impacts that have occurred, their context, and their significance.

Figure 2 : Wild-caught King Kampachi broodstock at the CIBNOR facility in Comitan, La Paz

3. ENVIRONMENTAL AND SOCIAL METRICS OF PRODUCTION SYSTEMS

A. Fish produced

Kampachi Mexico began offshore growout in June, 2018, and so the metrics below simply report on the first seven months of net pen operations.

Three cohorts of fish were stocked offshore from June, onwards. Total biomass as of December 31st, 2018, was **216 metric tons**.

As of year-end, the operation had only begun small trial harvests to present product samples. Total tonnage harvested from Cohort 1 was **608 kg**.

All fish that were stocked at the offshore farm site were produced at the company's hatchery facility, located at Universitad Autonoma de Baja California Sur (UABCS), in Pichilingue. All fingerlings stocked offshore came from eggs provided by the company's own wild-caught or F1 (first generation) broodstock, held at Centro de Investigaciones de Biológicas de Noroeste (CIBNOR), in Comitan, La Paz. In addition, Kampachi Mexico occasionally stocked eggs into the hatchery from an additional broodstock facility (Rancheros del Mar, with whom Kampachi Mexico has a fish-egg sharing agreement), but very few of these resulting fingerlings were stocked to the company's offshore site.

B. Feed sourcing, and feed ratios

In the offshore net pens, the fish are fed an extruded pellet diet, sourced from British Columbia, in Canada. It is comprised of a balanced ratio of amino acids, fatty acids, vitamins, and minerals that has been formulated by professional fish nutritionists for the *Seriola* genus. The feed plant is fully certified for producing diets to be imported into Mexico, and meets the requirements for ASC and BAP certification. The current King Kampachi diet is comprised of:

- Around 50% proteins and oils from microalgae and agricultural grains such as corn, wheat, peas, and beans;
- Around 25% fishmeal and fish oil from trimmings (off-cuts or processing by-products from food-grade fisheries);
- Around 25% fishmeal and fish oil from well-managed, certified forage fish fisheries (such as Peruvian anchovies);

- additional supplemented with vitamins, minerals, and amino acids.

As of compilation of this report, the Forage Fish Dependency Ratio (i.e. the conversion efficiency of wild-caught, targeted forage fish fisheries, calculated as per the ASC Standards for Seriola-Cobia) was:

1.53 for fishmeal (FM), and

1.49 for fish oil (FO)

This FFDR is based on the weighted average of FM and FO from targeted reduction fisheries used in King Kampachi diets of

FM: **28.1%**
FO : **5.7%**

plus an economic Feed Conversion Ratio (i.e. the conversion of fish feed to harvestable fish) of **1.31**

None of the fishmeal or fish oil is derived from other species in the *Seriola* genus (a critical factor in maintaining good farm biosecurity). The fishmeal and fish oil used in King Kampachi diets that is derived from forage fish fisheries all comes from fish stocks that are reasonably-well managed, or well-managed (i.e. a FishSource Score of 6, or higher; Table 1).

Table 1: Certification and FishSource assessment of those forage fish fisheries used in production of fishmeal and fish oil in King Kampachi diets.

Marine Ingredient Sourcing	MSC Certified	FishSource Score
Fish Meal		
Anchoveta (*Engraulis ringens*)	No	≥ 6
Gulf Menhaden (*Brevoortia patronus*)	Yes	10
Thread Herring (*Opisthonema* spp.)	Yes	≥ 6
Fish Oil		
Gulf Menhaden (*Brevoortia patronus*)	Yes	10

We will continue to track our FFDR for both FM and FO, and will report on it routinely as part of both our ASC certification process, and this annual ESG Report. We will also track the changes in time with these indices, with the aspiration of being able to document continuous improvements.

Our company also recognizes that humanity must scale aquaculture to be able to feed a planet of 9 billion people. For us to be able to achieve this, while at the same time fulfilling our goal of "softening our footprint on the seas," requires us to reduce our reliance on all wild-caught sources of fishmeal and fish oil (Taylor, et al., 2000). These fisheries may be sustainably-managed, but they are not scalable. We therefore continue to explore protein and fish oil alternatives through research and collaboration with feed nutritionists, feedstuff producers, eNGOs and other partners. Our goal is to maintain both optimal fish health and welfare, and to sustain the "Wow!" factor – the delicious taste and health benefits our King Kampachi offers consumers.

In the last year, we have undertaken research on alternative feedstuffs for our King Kampachi through partnerships with the following entities:

EWOS
Nebraska Soybean Board
Prairie Aquatech
KnipBio
Anthropocene Institute

The question of feedstuff scalability is of critical concern to the scalability of aquaculture. In the last year, the company's CSO partnered with academic experts, and representatives from Conservation International, to undertake a study on scalability, sustainability and life-cycle analysis of the global impacts of a range of protein sources (Pelletier, et al., 2018). In addition, the company's affiliated Hawaii-based research entity has pursued the development of culture methods for a group of high-value herbivorous reef fish (the kyphosids, also known as rudderfish or chubs), which in the wild are sustained on a diet of seaweed. The company's Hawaii-based research division has also been pursuing research into commercial culture techniques for macroalgae (seaweed), and for use of biodigesters to render seaweeds into single-cell proteins, or other readily digestible material for use in the diets of so-called 'carnivorous' marine fish, such as the Seriolas.

Results of these research efforts have been presented at aquaculture conferences and other venues (through blogs).

C. Fish escapement

On our offshore farm site, we ensure that we have robust net pen construction, copper-alloy metal mesh netting, and constant vigilance for net maintenance. However, in spite of our best efforts, there is always a possibility of some fish escaping. This is a problem for us as fish farmers, because it directly impacts our bottom line. Lost fish are lost revenues. It is also something to be avoided because of the potential genetic impacts, or the impacts on wild fish stocks.

The potential negative impacts of escaped fish are often voiced as an objection to fish farming. However, this issue is most pressing only where non-native fish are cultured in areas where escapes might become established or compete with local species, such as Atlantic Salmon in the Pacific Coast of Canada. King Kampachi, by contrast, is native to the waters of the Sea of Cortez. Concerns of the potential effects of fish farm escapees on wild fish genetics are not as pressing in the farming of marine fish in the open ocean as in other anadromous farmed fish, such as salmon. As marine fish are broadcast spawners, there is only a coarse zoogeographic genetic granularity. *Seriola* and other carangids appear to undertake seasonal migrations throughout the waters of north-western Mexico. Fishermen recognize a distinct seasonality to their presence around Los Cabos and La Paz (primarily from March to July). The potential genetic impacts of King Kampachi escapees on the wild stocks of *S. rivoliana* are therefore minimal.

Kampachi Mexico uses only wild-caught or F1 (first generation) broodstock to ensure that there is no significant difference between the King Kampachi inside the net pen and the wild fish outside in the Sea of Cortez.

Around 1,500 King Kampachi escaped from the company net pens on a single instance of a breach in the nursery netting. Most of these escapees were recovered using dip-nets and feed as attractant over the succeeding few days. Root cause analysis identified the abrasive ends of the copper-alloy wire as the cause, and the problem was rectified. Individual escapees outside of the net pens might be presumed to be subjected to heavy predation pressure, as they are completely unaccustomed to predators, and have no learned avoidance strategies, and no learned feeding beyond eating pellets. However, the copper alloy

mesh appears to provide sufficient shelter to prevent heavy predation on the escapees[3]. It is difficult to predict the long-term prospects for survival and reproductive success of any escapees. Although there is little likelihood of escapees competing in any significant manner with the wild stocks of snapper or other high-value species targeted by local fishermen, wild catches by fishermen will be monitored in future years.

We report all of our escape events through our website (https://kingkampachi.mx/monitoring-and-reporting/performance-metrics/#1553817550412-3271092d-4b29), and undergo rigorous analysis of the root cause, so that we can prevent future escapes. We share our escape reports publicly because we are required to do so under the Aquaculture Stewardship Council certification standards (see Certifications page), and because we strongly believe that a transparent approach is important both for our customers and our community. We will continue to track and report on our escape event frequency and impact through these ESG Reports. As we track these changes over time, we expect to be able to document continuous improvements, and reduced risk of impact, even as our biomass increases, and our selective breeding program advances.

D. Water quality and benthic impacts

There have been no spills, leaks, or other chemical containment issues in 2018 on Kampachi Mexico's land-based facilities or offshore farm site.

i. Water quality and effluent impacts

The water quality at the farm site is close to oceanic, with moderate currents and variable turbidity. Underwater visibility is usually of the order of 5 - 7 meters.

Water quality and benthic monitoring reports are compiled by independent researchers, at a government-supported research institute (CIBNOR), and are made publicly available on our website (under the section https://kingkampachi.mx/monitoring-and-reporting/performance-metrics/). These reports show that there has been **no significant impact** on water quality around the net pen array.

[3] Those escapees that could not be recaptured remained around the copper alloy mesh netting, and around 50 still survive. They do not appear to be preyed upon by sea lions or fishes, and most have now reached a size where they are retained by the 40 mm square mesh of the copper alloy wire.

General water movement patterns at the farm site are governed by the tidal movements in the bay, with an overall pattern of circular inflow at the north end of the bay, and outflow through the southern opening to the Sea of Cortez. Current data analysis is included in the EIS/MIA available on the website. Ongoing current studies have been undertaken through 2018 on a quarterly basis by CICIMAR scientist Dr Trasviña. A current meter deployed at the farm site during these studies showed regular peak current speeds of around 35 cm/sec (about 0.7 kts).

ii. Benthic impacts

The water beneath the farm is around 70 m deep (beyond the limits of normal safe SCUBA diving). Prior to stocking of fish on the farm site, a baseline survey of the substrate was undertaken by grab samples. The substrate below the net pens appears to be exclusively comprised of bare silt.

CIBNOR has conducted regular benthic monitoring around the farm site, examining substrate chemistry and infaunal community structure, in accordance with SEMARNAT/SAGARPA monitoring requirements. These reports are made publicly available on our website (under the section https://kingkampachi.mx/monitoring-and-reporting/performance-metrics/). These reports show that there has been **no significant impact** on the benthic community around the net pen array.

The use of copper alloy mesh material significantly reduces the biomass of biofouling on the farm structures. However, there is still profuse growth of macroalgae and invertebrate biofouling on the grid-lines and buoys of the mooring array, as well as on the bridle lines that attach the cages to the grid, and the rims of the cages themselves. This fouling includes diverse macroalgae, bivalves (several species of mussels, and pearl oysters: *Pinctada margaritifera mazatlanica*), bryozoans, sea urchins and encrusting sponges. These all settle out of the plankton onto the farm structures, and their presence does not represent any significant or even measureable reduction in the available recruits to the nearby reef areas. The growth of the pearl oysters, particularly, is compelling evidence that the presence of the fish farm operation is not deleterious, as these organisms are usually associated with healthy benthic reef communities.

The use of copper metal in the netting does not represent any measureable heavy metal loading to the environment. Copper-based antifouling paint on nylon nets ablates and flakes, with fragments falling to the substrate below. The accumulation of heavy metals under some net pen operations has resulted in

impacts on benthic communities, and bioaccumulation in the benthic marine community. No such toxicity umbra or bioaccumulation has been associated with the use of copper-alloy metal nets, as the metal only dissolves very slowly, over a number of years, rather than ablating or flaking. The resultant copper ions are in solution, and do not accumulate over time.

iii. Effluent water quality from land-based facilities

Kampachi Mexico is subject to monitoring of the effluent water from broodstock and hatchery land-sites. The samples are collected and analyzed by Asesoria y Servicios Analiticos S.A. de C.V. (ASA, an independent laboratory, certified by NOM – Norma Oficial Mexicana, the Mexican government oversight agency), under the NOM-001-SEMARNAT-1996 standard.

The most current wastewater analysis of effluent from the Pichilingue hatchery (November) is reported below. Additional reports are available on the company website (at https://kingkampachi.mx/monitoring-and-reporting/). These parameters have been within the World Bank / IFC International Environmental and Health Safety (EHS) guideline levels for all samples (Table 2). These sampling reports are also available on our company website.

TABLE 2 : Water Quality Parameters for effluent water from Kampachi Mexico's Pichilingue hatchery (November, 2018)

	Units	EHS guideline	Pichilingue
pH	pH	6 - 9	7.9
BOD	mg/l	50	< 15
COD	mg/l	250	ND
Total N	mg/l	10	1.068
Total P	mg/l	2	0.3
Oil and grease	mg/l	10	< 9.9
Suspended solids	mg/l	50	12
Temperature increase	°C	<3	ND
Total coliform	MPN/ 100 ml	400	21
Active ingredients			ND

E. Fish condition and health indicators

The Kampachi Company employs an integrated pest management strategy to optimize fish health, reduce interactions, or minimize impacts on wild fish stocks, and reduce any potential environmental impacts from therapeutant use. Under Mexican law, any therapeutant use must be applied under the oversight of a veterinarian. Kampachi Mexico has a veterinarian on staff to oversee all fish health and welfare concerns.

i. Skin flukes

As with almost all farmed animals, *S. rivoliana* is subjected to small external pests. The most prevalent is the skin fluke, *Neobenedenia girellae*, that attaches itself to the fish's skin. These flukes do not pose any risk to human health, and do not themselves detract from the quality of the harvested product, but may cause irritation to the fish. This represents the primary fish health challenge for offshore mariculture of *Seriola.* The closely-related *Benedenia seriolae* skin fluke is similarly the major challenge in in Japanese hamachi production (Japanese yellowtail; *S. quinqueradiata*), where it has been reportedly responsible for up to 20% of the costs of production. Similarly, *B. seriolae* is problematic in yellowtail kingfish (hamachi; *S. lalandi*) production in Australia. *Seriola* are particularly vulnerable to skin flukes because they have extensive areas of skin without scales, and even where there are scales, these are small, and rounded.

Neobenedenia proliferate at water temperatures between 23^{o}C and 28^{o}C, and so are common on our fish in net pens in Mexico during spring and fall. The temperature variation in La Paz allows for a periodic natural respite from infestations; in the peak of summer and in winter, the skin fluke infestation will naturally abate.

Skin flukes are more of an irritant to fish, than a direct health problem. The significance of any infestation rate is also dependent on fish size; smaller fish are more vulnerable. Fish may show no signs of distress at skin fluke counts well over 50 per fish (for fish over 1 kg). Usually, fish will "flash" (rub up against) on the netting, the HDPE pipe or on divers in the water, in an attempt to 'scratch' the flukes. The rate of flashing indicates the level of irritation of the fish. Weekly fresh water dip-sampling of the fish is used to provide counts of skin fluke abundance, to determine when a therapeutic treatment is needed.

We report publicly the skin fluke prevalence on our farm site, updated every week, through our website (https://kingkampachi.mx/monitoring-and-reporting/performance-metrics/). We do this both because we are required to do so under the Aquaculture Stewardship Council certification standards (see Certifications page), and because we believe that a transparent approach is important both for our customers and our community.

Neobenedenia are also common in kampachi production in Hawaii. In prior studies in Kona, Hawaii, the proliferation of skin flukes in fish in the offshore net pens had no impact on the abundance of skin flukes in the wild fish populations. We are working with the local scientific community to try to obtain any prior records of skin fluke abundance on wild fish in the Bay of La Paz. We will also institute a sampling program for monitoring skin fluke abundance in wild stocks, over future years.

ii. Skin fluke therapeutants

The Kampachi Company strives to minimize all use of medications and therapeutants, and to use farm siting and farm management strategies as the primary means of managing pests, parasites and pathogens. These considerations are the primary driver behind location of the farm offshore, in deep water, and the alignment of the net pens across the prevailing current directions. Fish health management is also the underpinning rationale for the use of copper alloy nets, to reduce the biofouling that acts as a reservoir for skin fluke eggs.

The standard treatment for *Neobenedenia* infestations is either a freshwater bath (if individual fish are being treated), or a bath of hydrogen peroxide (H_2O_2), if an entire net pen is being treated. Hydrogen peroxide breaks down rapidly in sunlight to form oxygen and water. Hydrogen peroxide is also considered an acceptable Organic aquaculture treatment under the draft USDA Organic aquaculture guidelines, and USDA Organic agriculture standards. For smaller fish, or for smaller cohorts of fish, it may be preferable to use praziquantel (PZQ) as an oral therapeutant, to treat skin fluke infestations. The use of PZQ is controlled under Mexican regulations, and Kampachi Mexico's integrated Fish Health Management Plan. PZQ use is usually confined to only smaller fish (under 100 g), and for conditions where peroxide bath treatments are impractical. PZQ is considered a "benign" treatment, under the audit evaluation for Aquaculture Stewardship Council certification (Appendix 1).

The Kampachi Company is also undertaking research in both Kona and La Paz on a range of feed additives that could assist in controlling skin fluke abundance, or in reducing the impacts of skin flukes on fish health. These include Coppens' Aquate™, EWOS's nucleotides and immunostimulants, and novel feed additives from other innovative companies.

The frequency use of peroxide, PZQ and other therapeutants will be tracked, and reported on in future ESG Report, with the goal of documenting continuous improvements.

iii. Antibiotic use and vaccinations

The Kampachi Company does not use prophylactic antibiotics, and only uses drugs that are approved by the United States Food and Drug Administration (FDA) for use in aquaculture.[4] The company has occasionally, under veterinary supervision, used Florfenicol® to treat *Streptococcus iniae* infections that afflict juvenile fish after the stresses of transfer offshore. These treatments last for 10 days; in other offshore fish farm operations, use of Florfenicol has repeatedly demonstrated no impact on marine biota. *S. iniae* infections are not an issue with larger fish, once they have overcome the initial stress of transfer from the nursery to offshore.

To minimize future use of antibiotics, the company is working with marine fish veterinary experts to prepare vaccines that could be used to reduce the frequency and severity of bacterial infections.

F. Wildlife interactions

i. Marine mammals and birds

The primary wildlife interactions on the offshore farm site are with seabirds and sea lions. A variety of seabirds frequent the net pen array, including petrels, boobies, and frigate birds. Seabirds will often rest on the net pen frames. Occasionally, some of these birds will attempt to catch air-blown feed pellets when

[4] A complete listing of US FDA-approved aquaculture drugs is available at:

https://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/Seafood/ucm518782.htm

the pens are being fed. There are no other interactions with birds, and no bird mortalities have occurred as a result of farm activities.

A small colony of sea lions has recently taken up residence at the farm site, and they have been observed by divers to be chewing on the carcasses of dead kampachi, through the net pen mesh. For each of the three cohorts of fish so far, when fish have been initially released from the nursery nets, there has been a period of zero reported mortality, lasting for a couple of months. This is most certainly due to sea lions sucking the fish carcasses out through the mesh. Larger dead fish are frequently found with neither head nor tail. This is problematic in several ways:

1. This is unnatural behavior for the sea lions, and is both problematic for their health (an abundant diet of oil-rich fish that can be gleaned for very little effort) and for their long-term patterns of behavior (if new-born sea lions are not being trained to hunt; Wursig and Gailey, 2002).

2. Without an accurate tracking of mortality, farm management can have lessened confidence in the inferred number of fish remaining in the pen, and thus the fish biomass or FCRs.

3. Although the copper-alloy mesh (CAM) has demonstrated to date that it is indeed predator-proof, sea lions are highly intelligent, and any potential breach could be catastrophic.

Turtles, dolphins, and sharks are also occasionally reported from the waters around the net pen site, but there have been no interactions between these animals and the farm.

ii. Wild fish interactions

The existing operation does not appear to have a significant aggregative impact on other fish. This is in contrast to other offshore farm sites (e.g. in Hawaii), which supported resident populations of wild fish; both large fish (ulua or giant trevally, *Caranx ignobilis*; wild *Seriola rivoliana* and *S. dumerili*; and barracuda (*Sphyraena barracuda*) and small fish (pelagic baitfish such as mackerel scad, *Decapterus macarellus*), and any number of smaller reef fish species, such as Sargeant-majors (*Abudefduf* spp), dascyllids (*Dascyllus* spp), chromids (*Chromis* spp) wrasses (primarily *Coris* spp and *Thalassoma* spp), and kyphosids (*Kyphosus* spp).). This lack of aggregative impact from the La Paz farm site may change over time, and occurrence of large fish around the net pens will be recorded by divers, and documented in future ESG Reports.

G. Energy use, and GHG emissions monitoring

No assessment has been conducted of energy use or GHG emissions from operations, as of the date of this report. All shore-based operations (offices, broodstock facility, hatchery, and nursery) are dependent on the electrical grid, which is powered almost exclusively by oil. The offshore operations are reliant on diesel power for larger vessels and for heavy equipment (generators on the larger boats, hydraulic cranes, fish harvest pump, etc), and gasoline (petroleum) for four-stroke outboard engines for run-abouts. Consumption of these fuels will be documented in future sustainability reports.

H. Number of employees, training and advancement

As of December 31st, 2018, Kampachi Mexico and The Kampachi Company together had a headcount total of 47 full-time and part-time employees, of whom 40 were male, and 7 were female.

Basic health and safety training for all employees had been initiated in 2018, but records are incomplete. A training program for 2019 has been developed by the new company Health and Safety Officer, and will be reported in the next ESG Report.

Figure 3 : Net pens 1 and 2 raised to the surface, looking to the northwest, back towards the San Juan de la Costa coast, 4 miles (6 km) in the distance.

4. REPORTING OF ENVIRONMENTAL INCIDENTS OR EVENTS

A. Escapement

There was a single escape event reported in 2018, of an estimated 1,500 juvenile fish, when a nylon nursery net was abraded. A large proportion of these fish were captured within the succeeding few days. Documentation of this escape, and root cause analysis, is provided on the company website.

B. Marine mammal or other megafauna interaction

There were no negative incidents or interactions with marine mammals or other megafauna reported in 2018.

C. Spills, leaks

There were no spill or leak accidents reported in 2018.

D. Work accidents – proactive safety policies

There were no work accidents reported in 2018.

Figure 4 : King Kampachi's vigorous surface feeding activity allows the ration to be carefully monitored, ensuring that no excess feed is wasted.

5. COMMUNITY ENGAGEMENT AND SOCIAL RESPONSIBILITY

Kampachi Mexico works actively to provide opportunity for engagement with the local communities in which we work, including active outreach to environmental non-governmental organizations (NGOs) and community recreational and artisanal fishing interests.

Kampachi Mexico strives to be a good neighbor, and works collaboratively with RofoMex - the phosphate mine facility located in San Juan de la Costa, which provides company access to a boat-ramp and loading dock; and Earth Ocean Farms - another aquaculture company raising totoaba (*Totoaba macdonaldi*) and huachinango (*Lutjanus peru*) at a site inshore from the Kampachi Mexico location. The company also engages in collaborative aquaculture research activities with scientists from CIBNOR and CICIMAR (Centro Interdicsiplinario de Ciencas Marinas) in La Paz, and maintains offices at the BioHELIS facilities (Parque de Innovacion Tecnologica de CIBNOR) in Comitan, La Paz.

At the State level, the company's Research Director in La Paz serves as the Secretario del Comité Estatal de Sanidad Acuícola de Baja California Sur; a coordinating body for food safety for aquaculture products in B.C.S.

At the international level, the company provides voluntary support for Aquaculture Stewardship Council (the company CSO serves on the ASC's Technical Advisory Group), and the Ocean Stewards Institute (the offshore aquaculture trade association – www.oceanstewards.org). In addition, the company's CEO occasionally lectures at the Universidad Iberoamericana in México City.

A detailed description of all community and eNGO engagement in 2018 is attached as Appendix 2.

The company also engages with the wider aquaculture community through individual membership by employees in the World Aquaculture Society, and presentations at WAS and Aquaculture America conferences, as well as Seafood Summit, and other forums for diverse stakeholder consideration of questions of environmental and social importance around aquaculture, and seafood in general.

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APPENDIX 1: CONTROLLED USE OF PRAZIQUANTEL (PZQ) UNDER KAMPACHI MEXICO'S FISH HEALTH MANAGEMENT PLAN

Kampachi Mexico's integrated fish health management plan states that any PZQ treatments by Kampachi Mexico must be:

i. in compliance with the Mexican laws for administration of veterinary therapeutants;

ii. in compliance with import regulations of any countries to which King Kampachi are exported;

iii. conducted only with the approval of, and under the supervision of, the company fish health management specialist;

iv. specifically to address skin fluke (*N. girellae*) infestations (i.e. PZQ shall not be administered prophylactically);

v. only for short periods, conforming to veterinary guidelines, and not continuous, to reduce the chance of the development of drug resistance; and

vi. combined with other treatments and control strategies, such as fresh water, peroxide, copper mesh alloy netting, and net pen cleaning to remove biofouling, to reduce the chance of the development of drug resistance.

PZQ is considered as a "benign treatment" (using the terminology under the ASC standards), for the following reasons:

a. PZQ is used in both human medicine, and in other veterinary treatments, and has shown to have no residual by-products that may impact the environment;

b. PZQ is widely used to control monogenean worm infections in aquariums, dogs and cats, and farm animals, in both the US and the UK;

c. Although PZQ is listed on the World Health Organization's List of Essential Medicines, its use for treating ectoparasites of marine fish in no way represents any risk to human health. There is no possibility that if *Neobenedenia* became resistant to PZQ, that these parasites could infest humans, as they are only found in the marine environment;

d. Development of *Neobenedenia* strains that were resistant to PZQ would represent no significant risk to wild fish populations;

e. Development of Neobenedenia strains that were resistant to PZQ would represent a significant impact to commercial operations that were culturing Seriola, and other marine fish. This impact would be primarily in the reduced effectiveness of PZQ treatments. However, this possibility should not preclude its judicious, periodic use in responsible aquaculture operations;

f. PZQ is only one tool of several that Kampachi Mexico is committed to using for skin fluke management. Other strategies include deep water siting, cross-current orientation of net pens, copper-alloy mesh material for pen netting, use of alternative therapeutants such as peroxide treatment and freshwater baths (for small numbers of fish); and use of other non-therapeutic in-feed additives to improve fish health, resistance to ectoparasites and immunity to secondary infections (which are the primary cause of mortalities associated with skin fluke infestations);

g. PZQ is expensive. Regular use of PZQ is therefore not commercially advantageous, and is usually only recommended for smaller fish (during the nursery stage), where the quantities required are minimal;

h. PZQ is almost always administered as a feed additive (and would only ever be administered by this means by Kampachi Mexico), so there is no direct impact on effluent water, other than by-products or excess PZQ excreted by the fish;

i. There is evidence that PZQ degrades naturally in a matter of a few days, and so it does not persist in effluent ocean water or the sediment; and

j. PZQ is only effective at dosages at or above 2 ppm (which would be rapidly diluted in the ocean environment – see Thomas, et al., 2016), and so it would not continue to have lethal effects on other parasites in the wild.

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APPENDIX 2: ENGAGEMENT WITH COMMUNITY, GOVERNMENT AND NON-GOVERNMENTAL ORGANIZATIONS DURING 2018

Evento: Red Nacional de Información e Investigación en Pesca y Acuacultura

Lugar y fecha: La Paz Baja California Sur, 24 de agosto de 2018

Participantes:

NGO´s:

-Comunidad y Biodiversidad A.C. (COBI)

-Sociedad de Historia Natural Niparaja, A.C.

-Pronatura Noroeste A.C.

-Grupo Tortuguero de las California A.C.

-World Wildlife Fund (WWF)

Instituciones Académicas y de Investigación

-Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California (CICESE).

-Centro de Investigación en Alimentación y Desarrollo (CIAD), Unidad Mazatlán.

-Centro de Investigación y Desarrollo Costero (CIDECO).

-Centro de Investigaciones Biológicas del Noroeste S.C. (CIBNOR).

-Universidad de Sonora (UNISON)

-Universidad Autónoma de Baja California Sur (UABCS).

-Universidad Autónoma de Sinaloa (UAS).

-Centro Interdisciplinario de Ciencias Marinas (CICIMAR).

-Universidad Tecnológica de la Costa.

-Centro de Investigación en Maricultura Sustentable S.C. (CIMAS).

Agencia de Gobierno:

-Centro Regional de Investigación Acuícola y Pesquera (CRIAP), La Paz

-Instituto Nacional de Pesca y Acuacultura (INAPESCA).

Evento: Foro Nacional para el Aumento de la Productividad del Cultivo de Macroalgas en México

Lugar y fecha: La Paz Baja California Sur, 10 de agosto de 2018

Participantes:

Instituciones Académicas y de Investigación

- Centro de Investigaciones Biológicas del Noroeste S.C. (CIBNOR).

-Centro Interdisciplinario de Ciencias Marinas (CICIMAR).

-Universidad Autónoma de Tamaulipas

-Centro de Investigación y Estudio Avanzados (CINVESTAV)

-Instituto de Investigaciones Oceanológica, UABC.

Agencia de Gobierno

- Sistema Nacional de Investigación y Transferencia de Tecnología (SNIIT)

-Instituto Nacional de Pesca y Acuacultura (INAPESCA).

-Secretaria de Pesca y Acuacultura de Baja California (SEPESCA, BC)

-Secretaria de Pesca, Acuacultura y Desarrollo Agropecuario de Baja California Sur (SEPADA, BCS)

- Centro Regional de Investigación Acuícola y Pesquera (CRIAP), Puerto Morelos

Empresas Privadas

-Algas y extractos del Pacífico Norte, S.A. de C.V.

-Algamar S.A. de C.V.

-Algas y Bioderivados Marinos, S.A. de C.V.

-Baja Kelp S.A. de C.V.

-Kampachi Farms México S. de R.L. de C.V.

Relaciones directas de colaboración

-Se forma parte de la mesa directiva como Secretario del Comité Estatal de Sanidad Acuícola de Baja California Sur, en donde se encuentran afiliadas empresas dedicadas a la acuacultura en todo el estado de las cuales 4 al cultivo de peces, 16 de crustáceos y 31 de moluscos.

-Convenio de colaboración con el Centro de Investigaciones Biológicas del Noroeste

-Convenio de colaboración con la Universidad Autónoma de Baja California Sur

-Convenio de colaboración con el Centro Interdisciplinario de Ciencias Marinas

Reuniones con Stakeholder

Federación de Cooperativas Zona Centro

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