Farmed Shrimp
Purchasing Standards
October 2007

Goals and purposes

Wegmans has established a purchasing policy for farmed shrimp in order to provide environmentally-preferable products for our customers and to promote environmental progress in the shrimp aquaculture industry in the Americas. This policy requires suppliers to take important steps forward on key environmental issues, to set a specific timetable for implementing these changes, and to implement an auditing and reporting system to insure that real progress is made.

As new technological developments or research findings become available, we will modify the policy to continue to reflect the latest scientific information and to continue to push aggressively for environmental progress. The policy is intended to build upon and promote the Principles for Responsible Shrimp Farming developed by the Consortium on Shrimp Farming and the Environment. It is important to note that these purchasing standards focus on key environmental impacts. They do not directly address other issues such as labor and social justice issues associated with some sectors of the shrimp farming industry. The standards do, however, require suppliers to comply with all applicable laws, including labor laws, in operating and siting their facilities, and to not impede community access to public resources.

The purchasing policy consists of two interconnected parts – a set of performance-based purchasing standards based on best available techniques and environmental outcomes and an implementation plan covering auditing, reporting and timeline for making operational changes. Under the implementation section, suppliers are required to provide an annual public report demonstrating their performance on the standards below, and guidance is provided on the specific information that should be included in that report.

Purchasing standards

Wegmans will only purchase farmed shrimp that is high quality, healthful, and environmentally preferable, as demonstrated by the following purchasing standards. These standards apply to coastal operations growing shrimp in sea water. This purchasing policy is intended to reinforce local government requirements and compliance is consistent with or more restrictive than local or other applicable laws. Additional background and technical information about the standards is detailed in an appendix.

1. Purchased shrimp meets all U.S. and international health standards and advisories for regular consumption. To meet the most stringent health guidelines, concentrations of the following contaminants must be at or below the following levels:
    - Mercury - 0.22 ppm
    - PCBs - 0.011 ppm (11 ppb)
    - WHO-TEQs (dioxins, furans and dioxin-like PCBs) - 0.138 ppt (pg/g)

2. Farms must comply with all applicable local and national laws related to their siting and operations.

   a) Farms must have been sited in compliance with all applicable laws and regulations, including, but not limited to, environmental reviews, permitting processes, and requirements for local input, and must demonstrate clear legal rights or titles for the lands they occupy.
   b) Suppliers must comply with all applicable local and national labor laws, regulations, or other legal requirements at farms and processing facilities

3. Farms must be sited to minimize impacts on ecosystems and local communities.
   a) Farms will not be located below the high tide line
   b) Farms will not be located in areas that were formerly mangrove forests or other coastal wetlands
   c) Farms will not be located in habitats identified as supporting nationally or globally significant biodiversity
   d) Farms must not significantly impede local community access to public resources, such as shellfish collection areas or fishing grounds.

4. Minimize the impact of effluent from shrimp ponds on the quality of receiving waters. Suppliers will meet effluent criteria a <u>or</u> b below; all suppliers will also meet criteria c.
   a) Suppliers will demonstrate that effluent from production ponds is of equal or higher quality than intake; or,
   b) All effluent from growout ponds will be held in settling ponds for a minimum of 24 hours (or treated with a different system that has been demonstrated to be at least as effective in improving water quality).
   c) As baseline data are collected, a standard will be developed for tracking and reducing annual effluent loads of total suspended solids, five-day biochemical oxygen demand, soluble phosphorus, and total ammonia nitrogen. Toward this end, suppliers will calculate and report annually baseline loads of these variables per unit of shrimp produced.

5. Eliminate use of antibiotics, other antimicrobials, and pesticides in shrimp production.
   a) Disinfectants may be used provided they are allowed by the U.S. Environmental Protection Agency (EPA) or Food and Drug Administration (FDA), or recommended for use in shrimp farming by the World Organization for Animal Health (OIE), provided that any recommended procedures for treating disinfectants before their release are implemented.
   b) In accordance with Wegmans policy of purchasing chemical-free shrimp, sodium bisulfite shall not be used on shrimp sold under this policy

6. Reduce the ratio of wild fish consumed to shrimp produced to or below one-to-one; do not source fish meal and oil from depleted fisheries; when cost-competitive, source fish meal and oil from byproducts of fish processing.
   a) The ratio of wild fish consumed for fish meal to shrimp produced and the ratio of wild fish consumed for fish oil to shrimp produced will each be equal to or less than 1:1. Only wild fish captured for meal and oil production are included in calculating this ratio; fish meal and oil made from fish-processing byproducts are not included in calculating wild fish inputs.

   b) If the current ratio of wild fish consumed to shrimp produced is above 1.25:1, suppliers will provide a plan demonstrating how this ratio will be reduced to or below 1:1 within two years.
   c) Fishmeal or oil will not be sourced from any fishery classified by relevant provincial, national or international fisheries authorities as follows: 'at risk of reduced reproductive capacity'; 'suffering reduced reproductive capacity'; 'harvested outside precautionary limits'; 'overexploited'; 'depleted'; 'overfished'; 'overfishing is occurring' (or any other comparable classification).
   d) Fish-processing byproducts used in feed will preferably be sourced from fisheries certified by the Marine Stewardship Council, or from fisheries not listed in the "avoid" category of the seafood ranking programs of leading marine conservation organizations.

7. Stock shrimp farms from hatcheries that do not depend on regular capture of wild shrimp.
   a) Wild-caught shrimp may be used to maintain genetic diversity of hatchery broodstock.

8. In shrimp production, do not use fresh ground water or otherwise impact the ground water supply; do not salinize or otherwise contaminate ground water or soils.
   a) Freshwater wells on or near the farm will be monitored at least annually for chloride concentrations.
   b) This standard applies to any actions that salinize or otherwise contaminate soils or groundwater, including discharges or leakages of pond water and disposal or storage of pond sediments.

9. Adopt best practices to prevent diseases and the spread of diseases.
   a) International better or best practices to prevent diseases have been identified by the Consortium on Shrimp Farming and the Environment and include the stocking specific pathogen-resistant postlarvae, screening intake water, routine monitoring for diseases, and drying out and treating ponds between crops.
   b) Disease outbreaks will be immediately reported to Wegmans, any neighboring shrimp farms, and appropriate aquaculture authorities and comprehensive records on disease incidence will be maintained. World Organization for Animal Health (OIE) recommended methods on the disinfection of crustacean farms will be followed to reduce the risk of disease spread to other farms or wildlife.

10. Adopt best practices to prevent the spread of exotic and genetically engineered species.
   a) Do not farm non-indigenous shrimp species unless those species are already widely used in commercial production locally, or have been approved for aquaculture use by a process based on the ICES Code of Practice on the Introductions and Transfers of Marine Organisms or a comparable protocol.
   b) No genetically-engineered shrimp will be stocked.

11. Escape prevention systems are designed and implemented to eliminate escapes of farmed shrimp into the environment and to document any exceptions.
   a) All effluent from ponds and hatcheries will be screened to eliminate escapes.

12. Minimize or eliminate killing of shrimp predators.

a) Suppliers will comply with all local laws concerning the control of birds and other predators.
b) If local law allows the killing of wildlife predators, suppliers will: 1) document and report any avian, reptilian, and mammalian predators killed; and 2) not kill any birds, mammals, or reptiles listed as a declining species 3) not use lead shot.
c) Declining species include those listed as nationally or globally vulnerable, imperiled or critically imperiled by NatureServe; vulnerable, endangered or critically endangered by IUCN; or in Belize identified as declining in the Conservation Assessment of the Waterbirds of Belize

<u>Implementation and Compliance</u>

Suppliers will provide an annual report demonstrating compliance with this policy, and make this report available for public review. An independent third party will conduct an operational audit to verify the accuracy and completeness of the supplier report. Given that many suppliers will need time to implement the changes needed to fully achieve all the performance standards, shrimp will be considered to have been produced in compliance with this purchasing policy provided that: (1) suppliers are presently meeting at least nine of the standards, including the first two standards on contaminants and complying with applicable local and national laws and (2) suppliers demonstrate full compliance with these standards within one year within one year of the start of shrimp sales under this policy, unless a longer period is specifically noted above.

Appendix I:
Technical Notes and References

Standard 1

Background
Relative to other farmed fish and many wild fish, farmed shrimp have relatively low levels of persistent organic pollutants (including PCBs and dioxin-like compounds).[1,2,3] To reassure customers that farmed shrimp produced under the purchasing policy is safe for regular consumption, this standard sets maximum levels for mercury, PCBs, and dioxin-like compounds based largely on guidelines developed by the U.S. EPA.[4] The EPA guidelines, among the most stringent in the world, are substantially stricter than U.S. FDA legal limits on seafood contaminants.

Technical notes
For the purposes of this policy, regular consumption is defined as eight ounces (227 g) of seafood per week (the amount recommended by the U.S. federal Dietary Guidelines Advisory Committee to reduce the risk of heart disease[5]).

EPA is reassessing its methodology for dioxin-like compounds. In the interim, the limit of 0.138 ppt (pg/g) WHO-TEQs is based on its existing guidance.

If recent contaminants monitoring data for sites producing shrimp under this policy show compliance with this standard, one new composite sample will be tested every six months. If no such monitoring data exist, or the data do not clearly show compliance, two composite samples will be tested every six months for the first year, followed by one composite sample every six months in subsequent years. Each composite sample will include at least ten shrimp in the form that they will be sold (e.g. de-shelled and de-veined with heads removed), and will be taken within one month of harvest. All samples will be submitted to an independently-accredited lab, and the testing described here will be conducted for each group of shrimp receiving a different feed formulation (i.e. varying fishmeal/oil content). Each composite sample should be analyzed for the following:

- Total mercury - with a minimum detection limit of 0.1 parts per million (ppm).
- Total PCBs***** - as the sum of all 209 congeners according to EPA Method 1668A.[6]
- WHO-TEQs***** - as the sum of dioxin/furan congeners and the 12 dioxin-like PCB congeners, according to EPA Method 1613[7] (Revision B).

*****Non-detected PCB, dioxin, and furan congeners will be considered as one-half the detection limit for the purposes of PCB and TEQ totals.

Reporting Guidance

- Using the methodology described above, demonstrate that contaminant levels in shrimp currently produced under this policy are at or below the target levels listed in Standard 1. .
- Suppliers not initially at or below the target contaminant levels should provide at least one year of monitoring data demonstrating consistent compliance.
- Provide any previous contaminants monitoring data, for up to three years, for sites producing shrimp under this policy.

Standard 2

Background

Reports suggest that some shrimp farms have been sited illegally or violate applicable labor laws. This standard requires suppliers to site farms in compliance with all applicable laws, regulations, and requirements for local input, and requires suppliers to comply with all applicable labor laws at farms and processing facilities.

Reporting Guidance

- Demonstrate that farms are sited and constructed in compliance with all applicable laws and regulations and possess clear legal rights or titles to farm sites.
- Demonstrate that farms and processing plants comply with all applicable labor laws and regulations

Standard 3

Background

Mangroves provide critical habitat for a number of species, including wild shrimp larvae. Research also suggests that mangrove forests help to improve water quality both in and around farms and reduce disease problems on farms.[8,13] According to the FAO, most countries no longer allow the conversion of mangroves for aquaculture purposes, and global mangrove loss slowed from 1.9% annually between 1980 and 1990 to 1.1 % annually between 1990 and 2000.[11] Nevertheless, world-wide mangrove cover decreased by 25% between 1980 and 2000, partly due to shrimp aquaculture and removal for resort development[9]. Based on estimates from a number of shrimp-farming countries, 14-43% of the land used in shrimp farming is on former mangrove forests[10].

Farms meeting this standard will not be located in mangrove forests or other coastal wetlands, and must be situated above the high tide line. The standard also requires that farms are sited so as not to prevent community access to public resources.

Technical Notes

The high tide line is defined as the highest high tide level of the year, excluding storm surges.

Reporting Guidance

- Report the distance from the farm to the high tide line, as defined above
- Document boundaries of mangroves and other coastal wetlands prior to farm construction and current farm boundaries, including canals and channels

- Demonstrate that the farm is not located in habitats identified as supporting nationally or globally significant biodiversity
- Provide documentation demonstrating that the farm was sited in compliance with all applicable laws and regulations, including, but not limited to, environmental reviews, permitting processes, and requirements for local input
- Demonstrate that the farm does not prevent local community access to public resources

Standard 4

Background
Effluents from shrimp farms frequently have substantially lower water quality than the receiving waters.[8,10] Water pollution from shrimp farms can cause environmental harm, especially when the effluents are released in areas with sensitive ecosystems such as coral reefs. Intensive shrimp ponds can also form a thick sludge layer at pond bottom which must be disposed of properly.[13] While hatchery production of shrimp larvae is an important element of more environmentally friendly shrimp aquaculture, unmanaged hatchery effluent can also contribute to water quality problems. Hatchery discharge amounts vary widely, and most do not monitor their discharges.[23]

Technical notes
To calculate annual loads of total suspended solids, five-day biochemical oxygen demand, soluble phosphorous, and total ammonia nitrogen, suppliers should monitor concentrations of these variables quarterly using the methodology described below, and multiply average annual concentrations by total annual effluent volume.

Suppliers seeking to demonstrate compliance with standard 3(a) should monitor the following water quality criteria: pH, dissolved oxygen, total suspended solids, 5-day BOD, salinity, total ammonia nitrogen, and soluble phosphorus. Sampling stations should be at the point of intake for incoming water (or, if this is not feasible, at the end of the pump discharge pipe) and at the final farm effluent outfall. Inflow samples should be collected from the discharge stream before it falls into the canal. Effluent should be sampled at low tide when it is not mixing with incoming tidal waters (or behind a structure with a flap gate that prevents tidal inflow.) Inflow and effluent should be sampled on a monthly basis, and for each criterion there will be no more than 10% difference between annual average levels in inflow and effluent.

To meet the requirements of 3(c), suppliers will calculate and report annually baseline loads of these variables per unit of shrimp produced. The baseline load per unit of shrimp produced shall be calculated as follows:

$$\text{Load index (kg variable/metric ton shrimp)} = \text{Annual load of variable (kg/yr)} \div \text{Annual shrimp production (metric ton/yr)}.$$

Where the annual effluent loads for total suspended solids, soluble phosphorus, total ammonia nitrogen and five-day biochemical oxygen demand is:

Load of variable (kg/yr) = Farm discharge in m^3/yr x
Average annual concentration of variable (mg/L, same as g/m^3) x
10^{-3} kg/g.

And where

Farm discharge in m^3/yr = Pump discharge in m^3/min x
Average time of pump operation in hr/day x 60 min/hr x
365 days/yr

Or

Farm discharge in m^3/yr = [Volume of ponds in m^3 x
Number of crops/yr] + [Volume of ponds in m^3 x
Average daily water exchange rate as fraction of pond volume x
Crop in days x Number of crops/yr].

Reporting Guidance

- Suppliers seeking to demonstrate compliance with standard 4(a) should provide monthly sampling data for inflow and effluent as described above.
- Suppliers seeking to demonstrate compliance with standard 4(b) should verify that all effluent was held in settling ponds for at least 24 hours or treated with another system shown to be similarly effective.
- Provide calculations for annual effluent loads of total suspended solids, five-day biochemical oxygen demand, soluble phosphorus, and total ammonia nitrogen as described above.

Standard 5

Background

A wide variety of antibiotics (antibacterials) are used in shrimp ponds for routine disease prevention (prophylaxis) and disease treatment – including treatment of viruses, which are of course unresponsive to antibiotics.[11, 12] Bacteria from shrimp farms where antibiotics are used frequently can have high rates of antibiotic resistance. These resistant bacteria include human pathogens, such as *Vibrio vulnificus*.[12] Non-pathogenic bacteria in ponds may also transfer their resistance genes to pathogenic bacteria, reducing the efficacy of antibiotic treatment for human and animal diseases.[12]

Improper use of antibiotics can also leave potentially harmful antibiotic residues in shrimp. Use chloramphenicol and nitrofurans in shrimp is banned worldwide, because these drugs are harmful to human health[13],[14] Moreover, the US Food and Drug Administration has not established any tolerances for antibiotic residues in shrimp.

Besides antibiotics, chemicals are commonly used in shrimp ponds to control nematodes, fungi and protozoa. EDTA is also sometimes used in ponds to bind metals[15]. Fish or invertebrate predators and pests are sometimes controlled with pesticides. Saponin and Rotenone kill only fish; tobacco dust, KCN (Potassium cyanide), PCP-Na (Sodium pentachloropenate), Thiodan and several others kill shrimp and invertebrates; Sevin, calcium carbide, Brestan and Aquatin are used to control crabs; Brestan and bayluscide kill snails[15].

This standard, which prohibits most chemical use in shrimp production, is intended to address the concern of antibiotic resistance in pathogens that infect shrimp and humans, and to prevent the use of chemicals that may cause ecological harm, accumulate in shrimp, or pose risks to farm workers. Dumping of sodium bisulfite, commonly used to improve the appearance of shrimp after harvest, can deoxygenate receiving water, leading to die-offs of fish or invertebrates,[16] This standard permits the use of sodium bisulfite in shrimp, but requires proper disposal. The standard also allows the use of chemical disinfectants in shrimp hatcheries, provided these chemicals are approved as disinfectants by U.S. government agencies.

Technical Notes
Disinfectants or "sterilants" approved by the US Environmental Protection Agency (http://www.epa.gov/oppad001/chemregindex.htm) include:

Ethylene oxide
Hydrogen peroxide
Peroxyacetic acid
Sodium chlorite
Sodium hypochlorite
Alkyl dimethyl benzyl ammonium chloride
Octanoic acid

Suppliers may also use substances classified by the US Food and Drug Administration (FDA) as "New Animal Drugs of Low Regulatory Priority," if their use as shrimp hatchery disinfectants is consistent with FDA's specified conditions. See:
http://www.fda.gov/cvm/Documents/LRPDrugs.pdf

World Organization for Animal Health (OIE) recommended methods for disinfecting shrimp farms are available at http://www.oie.int/eng/normes/fmanual/A_00014.htm.

No antibiotics, other antimicrobials or pesticides are to be used in shrimp production under these standards. If treatment is necessary, shrimp will not be sold under this purchase policy**.**

Deactivation of sodium bisulfite with calcium hypochloride or other chlorine compounds is not recommended because of the creation of dangerous chlorine gasses. A number of methods to neutralize sodium bisulfite are available, ranging from treatment in a wastewater treatment plant, to oxidization in a stagnant holding pond. When the concentration of dissolved oxygen in the holding tank, whether aerated or not, stabilizes above 4-5 mg/l, the sodium bisulfite has been fully oxidized and can then be neutralized. Each kg of sodium bisulfite will require 0.36 kg of calcium hydroxide or 0.38 kg of sodium hydroxide to neutralize the sodium bisulfite. After neutralization, the wastes can be discarded in natural waterways.[16]

Reporting Guidance

- Demonstrate that no antibiotics, other antimicrobials, or pesticides were used in the production of shrimp under these standards. Feed purchase orders will be submitted on request to confirm that medicated feed was not used.

- Document that any chemical disinfectants used are approved for use as disinfectants by the U.S. government.
- Demonstrate that any sodium bisulfite used on the farm was fully treated before being released into the environment.

Standard 6

Background
Shrimp feed incorporates fish meal and fish oil made from wild-caught fish, potentially adding to the pressures on wild fish stocks.[17,18] This standard requires suppliers to be more efficient than the global average[19, 20] in terms of the amount of wild fish they consume in feed per pound of shrimp produced, and to achieve a 1:1 ratio of wild fish consumed to farmed shrimp produced. (Note that the FCR or feed conversion ratio is not the same as the FI:FO or wild fish in: farmed out ratio.) The standard also requires that the fish meal and oil used to make shrimp feed not be sourced from fisheries that authorities classify as over-exploited. Finally, the standard promotes the use of fish processing by-products in the production of shrimp feed.

Technical notes
Section (a): To calculate the ratio of wild fish consumed to farm fish produced, or "fish in:fish out" (FI:FO):

- Information needed: percentage of feed that is fish meal; percentage of feed that is fish oil; eFCR*; percentage of fish meal that comes from reduction fisheries vs. seafood processing byproducts; percentage of fish oil that comes from reduction fisheries vs. seafood processing byproducts; the reduction fisheries from which fish meal and oil originate.

- FI:FO for fish meal = number of units of wild fish required to produce the fish meal for one unit of farmed fish. Calculate FI as eFCR ∗ (percentage feed that is fish meal/100) ∗ (percentage of fish meal from reduction fisheries/100) ∗ 4.8 (4.8 can be used as a typical conversion rate of whole fish to fishmeal, meaning it takes 4.8 units of sardines, menhaden or the like to make a unit of fish meal; use a more exact number if available).

  FI:FO for fish oil = number of units of wild fish required to produce the fish oil for one unit of farmed fish. Calculate FI as eFCR ∗ (percentage feed that is fish oil/100) ∗ (percentage of fish oil from reduction fisheries/100) ∗ 8.3 (8.3 is the conversion rate of menhaden to fish oil, meaning it takes 8.3 units of menhaden to make a unit of fish oil; check conversion rates for other fish species, since conversion rates to fish oil vary considerably.)

- Example: if eFCR = 2.0, percent fishmeal in feed = 25, and percent of fish meal from reduction fisheries = 93.75, then FI:FO for fish meal = 2 ∗ 25/100 ∗ 4.8 ∗ 93.75/100 = 2.25

*****Economic FCR, or eFCR, is the best approximation of feed input to whole fish output. This figure should include mortalities, as well as shells, viscera, and heads of harvested shrimp.

Fish processing by-products are typically scraps that might otherwise be wasted from the processing of fish for human consumption. Fish processing by-products does not include fisheries bycatch. Producers should give preference to "feed-grade" by-products, rather than by-products that could be used as human food.

Section (c): Models used by fisheries management agencies do not currently assess whether catch of one species has significant impacts on populations of other species, for example by depriving predatory fish and birds of their prey. As models assessing ecological impacts become available, this standard will be updated to give preference to reduction fisheries managed in a manner that reduces the fisheries' ecological impacts.

Reporting Guidance

- Calculate the FI:FO ratio for the previous production year using the formula provided above. The calculation should clarify assumptions about the eFCR, the inclusion rate of fish meal and oil in feed, the percentage of fish meal and oil that is derived from fish processing byproducts, and the conversion rates of fish to meal and oil.
- Confirm that no reduction fishery used for feed has been classified by national or international fisheries authorities as depleted or in other categories listed in section (c).
- Confirm whether source fisheries for any fish processing byproducts are certified by the Marine Stewardship Council or listed in the "avoid" category of leading marine conservation organizations. Key ranking programs to consult are the Monterey Bay Aquarium's Seafood Watch (USA, www.seafoodwatch.org), SeaChoice (Canada, http://www.seachoice.org/), and the Marine Conservation Society's Good Fish Guide (UK, http://www.fishonline.org/).

Standard 7

Background

In 2004, an estimated 65-75% of shrimp larvae used in shrimp farming world-wide were produced in hatcheries. For those larvae caught in the wild, bycatch of other larval shrimp, finfish and macrozooplankton is sizeable, as high as 2000 larvae lost for each shrimp larvae that survives during the collection of tiger shrimp and losses as high as seven larvae for each collected Pacific white shrimp[21]. The transport of wild-caught shrimp larvae and adults has also contributed to the spread of diseases, including the introduction of novel diseases in shrimp producing countries[8].

Technical notes

Any wild-caught broodstock collected to maintain genetic diversity should be quarantined to ensure that they are disease free.

Reporting Guidance

- Provide records of postlarvae sources and purchases.
- Confirm source of broodstock

Standard 8

Background

Improperly managed shrimp ponds can contribute significantly to the depletion, salinization, or contamination of fresh groundwater, and to the contamination of soils. According to one study in Thailand, shrimp pond-seepage contained 38% of salt lost from the pond. [22] Agricultural fields nearest to the shrimp ponds had higher salinity than fields further away. In Thailand alone, more than 2.4 million tons of salt are estimated to be lost from shrimp farms annually[23]. Pumping freshwater into shrimp ponds can exacerbate seepage and ground water contamination.[10] Pumping groundwater into ponds can also cause salt water intrusion into underwater aquifers and lower the water table[13].

Reporting Guidance

- Provide monitoring results from freshwater wells near shrimp ponds.
- Demonstrate that groundwater is not used.
- Demonstrate that pond water and sediments are contained or treated in a way that prevents contamination of soils or groundwater

Standard 9

Background

Disease outbreaks have resulted in the loss of billions of dollars of shrimp production worldwide.[24, 25] Top producing countries like Thailand, China and Ecuador have all seen their shrimp farming industries severely impacted by diseases such as Taura Syndrome Virus (TSV), Whitespot Syndrome Virus (WSSV), and many of these diseases have spread among shrimp-producing regions through the importation of post larvae and broodstock.[24] In addition to transfers between farms, increased disease on the farm can amplify disease in the wild, or introduce novel diseases in wild shrimp.

Along with adopting best practices and reporting disease incidents, suppliers must make raw data concerning disease available to interested researchers, so that they can better understand disease biology and develop new disease prevention measures.

Technical Notes

Section (a): For more information on best practices to prevent disease see the reports “A Consortium Program To Analyse and Share Experiences on the Better Management of Shrimp Aquaculture in Coastal Areas,” (http://www.enaca.org/modules/wfdownloads/singlefile.php?cid=44&lid=599) and, “Thematic Review on Management Strategies for Major Diseases in Shrimp Aquaculture” (http://www.enaca.org/modules/wfdownloads/singlefile.php?cid=43&lid=144)

Reporting Guidance

- Demonstrate that international best practices are used to prevent disease, including stocking specific pathogen-resistant or specific pathogen-free postlarvae, screening intake water, routine monitoring for diseases, and drying out and treating ponds between crops.
- Demonstrate that any OIE Reportable Disease outbreaks are immediately reported to any neighboring shrimp farms and appropriate aquaculture authorities and that World Organization for Animal Health (OIE) methods (available at

http://www.oie.int/eng/normes/fmanual/A_00014.htm) were used to reduce the risk of disease transfer to other farms or wild stocks.[26]

- Provide a summary of all diagnosed disease or parasite events involving more than 5% of shrimp stock at a site.

Standard 10

Background

Tiger shrimp (*P. monodon*), fleshy prawn (*P. chinesis*) and Pacific white shrimp (*Litopenaeus vannamei* or *P. vannamei*) are the top three species of farmed shrimp, constituting about 75% of total shrimp farming world-wide, with production of *P. chinesis* and *P. vannamei* growing the most rapidly.[27] Both tiger shrimp and Pacific white shrimp are farmed outside of their native distribution.[27] This standard is intended to reduce the risk of spread non-native species and to help prevent the translocation of novel diseases with new shrimp species.

Non-native farmed shrimp that escape from aquaculture ponds and hatchery facilities have the potential to establish new populations and compete with native shrimp. Although there is no scientific evidence that escaped non-native farmed shrimp have established wild populations, individual non-native farmed shrimp have been captured far from the location of escape.[27] Introduced species of shrimp may also spread new disease to native shrimp. Taura syndrome virus appears to have jumped in Thailand from non-native *P. vannamei* to native *P. monodon*, although *P. monodon* currently show no clinical signs of the disease.[27] The standard requires that non-indigenous shrimp species that are not currently widely used locally in commercial production be approved for aquaculture use by a process based on the ICES Code of Practice on the Introductions and Transfers of Marine Organisms. In addition, this policy reduces the risks associated with the farming of any non-native species by requiring precautionary measures to avoid escapes, as outlined in Standard 11.

Genetically engineered shrimp are not known to be sold commercially, and their ecological and genetic impacts in the marine environment remain hypothetical.[30] However, scientists are concerned that genetically engineered fish, when introduced to the wild, could out-compete wild fish for food, spread to new regions like an invasive species if their modification makes them more tolerant to warmer or colder temperature, and interbreed with and threaten wild fish stocks.[28,29] As a precaution to protect marine ecosystems, this standard precludes the farming of genetically engineered shrimp.

Technical Notes

Section (a) The ICES Code of Practice on the Introductions and Transfers of Marine Organisms[30] is available at:
http://www.ices.dk/reports/general/2004/ICES%20Code%20of%20Practice%202005.pdf

Section (b): Selective breeding is not considered to be genetic engineering.

Reporting Guidance

- Report species being farmed and sub-species if applicable.

- If a non-indigenous species is being farmed that is not already widely used in commercial production locally, demonstrate that the species was introduced in accordance with the ICES code of practice on the introductions and transfers of marine organisms or a comparable protocol.
- Confirm that no genetically-engineered fish were stocked, including the offspring of genetically-engineered fish.

Standard 11

Background

Escapes of shrimp from farms, especially those that are located in coastal areas exposed to tides and storms, are believed to be commonplace. They can occur on a small scale during harvest, for example, or as mass escapes during flooding events where millions of shrimp can escape into the coastal environment[27]. Hatcheries can also release shrimp. Studies concerning the impacts of wild shrimp are few, but farmed shrimp appear to have spread disease to wild. [27] White spot syndrome virus, a disease not identified in the Gulf of Mexico before farming of *P. vannamei,* was found in wild stocks of shrimp in the Gulf of Mexico and Southeast Atlantic after being eradicated from US farms[27]. This policy requires farms to take management measures, including screens on intake and outflow pipes and locating farms above the tidal zone, to minimize the potential for escapes.

Reporting Guidance

- Demonstrate that all effluent from ponds and hatcheries is effectively screened to eliminate escapes.
- Demonstrate that all know escape incident are recorded.
- Describe BMPs used to prevent escapes during water exchange, harvest, and extreme weather events.

Standard 12

Background

Little research is available on how significant an impact birds and other wildlife predators have on shrimp production, or on the potential for predators to spread disease to farms. Deterrents such as wires on the pond, sound deterrents, and nets on the levee banks, as well as lethal means, such as shooting the birds, are all used to control predators. In-pond predators such as fish, crabs, or snails, can compete with shrimp for food or eat the shrimp; these pests can often be prevented through properly sized screens or manually removed.

Many producer countries have laws restricting the killing of birds and wildlife predators, but predator control typically goes unreported and predator control laws may not be consistently enforced in many countries. This standard requires suppliers to comply with all local laws on predator control, to publicly report kills of bird, mammal, or reptile predator by species, and to not kill any listed declining species. Some producers also use poisons and pesticides to remove in-pond predators[15]; the use of these chemicals in ponds is prevented under Standard 4.

Reporting Guidance

- Demonstrate compliance with all local laws concerning predator control
- Demonstrate that no listed declining species were killed, or provide detailed information on any incidents causing death or injury to listed species, including a plan to avoid such incidents in the future
- Report to [Company] any predators killed by species and date
- Confirm that no lead shot was used

Implementation and Compliance

Technical notes

The annual supplier report will demonstrate performance on each purchasing standard and compliance with the purchasing policy, following the reporting guidance above. The supplier will provide the annual report to the purchaser(s) and make it publicly available by either posting the report on the web or by posting on the web information about how to receive a free copy of the report.

An external audit, conducted by an independent third party, is also required for the compliance process:

- The auditor will conduct an operational audit and verify that the supplier report accurately and completely reflects the supplier's performance on these purchasing standards.
- The auditor will also solicit input from key community leaders in assessing the supplier's compliance with local laws and whether the access of local communities to public resources has been impeded.
- The auditor will be provided a copy of the supplier report prior to visiting a farm. Suppliers will cooperate fully with the auditor, provide full access to all operations and personnel, and make available all information requested by the auditor.
- The auditor will be approved by [Company] and have no financial relationships to the supplier through consulting or other arrangement.

The auditing and reporting requirements can alternatively be met through integration of these purchasing standards into an ISO 14001-based environmental management system (EMS), provided that approach produces an annual public report demonstrating compliance with these purchasing standards and meets the above requirements concerning selection of a third party auditor and soliciting community input.

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