Introduction

These standards specify our minimum requirements and expectations for all producers supplying or seeking to supply farmed seafood to Whole Foods Market. These standards apply to individual producers or producer groups operating worldwide and cover all methods of production. Requirements related to particular species or production methods are specified in the standard. These standards are intended to be farm level. Please see Section 1, Standard 1.5, for a description of how farming areas are classified and where the third-party audit process begins.

While third-party audits are focused on farms, we still expect that producers will minimize stress to fish during harvesting, transport, and slaughter. For example, during transport, oxygen levels should be monitored and maintained at an adequate level and transport time should be limited. Fish should also be slaughtered in the most humane way possible. Mechanical or electrical stunning systems are preferred and should be monitored to ensure effectiveness. Furthermore, producers must maintain the highest standards for quality and food safety of seafood products. However, this will not be verified through the Quality Standards audit process. Suppliers should continue to obtain any relevant certifications such as HAACP and BRC to verify health and safety conditions at processing plants. We also expect that no preservatives will be applied to seafood products and that all local, state, and federal requirements for packing dates/shelf life, transport, and temperature controls will be followed.

Please note that these standards are designed for individual farms that sell fish and shrimp to Whole Foods Market and therefore are feasible for an individual producer to meet. Group certification may be an option for some suppliers. Producers interested in becoming certified as a group should inquire directly with Whole Foods Market to receive a more detailed guide and determine if they meet the necessary criteria for group certification.

While these standards are formal and require mandatory compliance from producers, this is a living document. As new information, farming techniques, and technology become available, we will update our standards to reflect opportunities for improvement. We fully recognize that not all producers will be able to meet these standards. Our expectation is that only the most innovative companies committed to maintaining healthy ecosystems and mitigating the potential environmental impacts will likely qualify.

While these standards require that producers take important environmental steps forward, we also acknowledge that further improvement in the industry’s environmental performance is necessary if we are to more fully protect our ecosystems. To promote such progress, Whole Foods Market is establishing a purchasing preference to source from suppliers that develop innovative technologies and practices such as closed containment systems that substantially reduce their environmental impacts, while at the same time meeting Whole Foods Market’s quality and cost criteria and other standards.

In 2019, these standards were expanded to include requirements for sturgeon and caviar. By July 1st 2019 only approved caviar products will be in Whole Foods Market stores.

A. Whole Foods Market "Responsibly Farmed" Logo

The Whole Foods Market® “Responsibly Farmed” logo helps customers recognize our commitment to offering farmed seafood that has been third-party verified to meet our Quality Standards for Farmed Seafood. Suppliers interested in using this logo must receive permission
from Whole Foods Market and follow our style guidelines. These logo guidelines are for both product packaging and for in-store use. Only products that meet the Quality Standards for Farmed Seafood and have been third-party verified by our approved Certification Body (CB) can display the logo. For information about the logo, including logo guidelines, please contact Jeremy St. Gelais: Jeremy.St.Gelais@wholefoods.com.

### B. Terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black caviar</td>
<td>Processed unfertilized eggs (roe) of Acipenseriformes. Roe from other species such as trout, salmon, flying fish, lake whitefish, bowfin can be referred to as caviar or roe, with the common name of that species preceding the word “caviar” (e.g., trout caviar).</td>
</tr>
<tr>
<td>CB</td>
<td>Certification Body</td>
</tr>
<tr>
<td>Farm</td>
<td>Facility, including ponds, raceways, tanks or net cages, used for the production of grow-out fish. Normally, this facility covers the major grow-out phase of fish prior to harvest.</td>
</tr>
<tr>
<td>Fish</td>
<td>All species of finfish and shrimp and products thereof (e.g., roe, caviar).</td>
</tr>
<tr>
<td>Production fish</td>
<td>All fish intended for human consumption, including post-larvae, fry, smolts and fingerlings.</td>
</tr>
<tr>
<td>Hatchery</td>
<td>Facility for hatching eggs and producing larval-stage animals under controlled conditions. In this document, the term hatchery includes facilities for holding broodstock used for egg production, egg hatching, and larval production. Larvae are defined as newly hatched animals that are transitioning to look like the adult version of itself. Yolk-sac stage in fish and metamorphosing newborn shrimp are examples of larvae.</td>
</tr>
<tr>
<td>Must</td>
<td>Required action on part of producer</td>
</tr>
<tr>
<td>Nursery</td>
<td>Facility for supporting post-larvae or fry development. Nurseries often are where animals are transitioned from starter feeds to grow-out feeds. They may also be used to produce advanced size fingerlings. Animals may spend a relatively minor amount of their time in nurseries and are eventually moved to grow-out facilities.</td>
</tr>
<tr>
<td>Producer</td>
<td>Operator of hatchery, nursery, or farm</td>
</tr>
<tr>
<td>Producer guidance</td>
<td>Defines a term in the standards, provides further clarification, or offers suggestions on methods that could be used to meet the standards.</td>
</tr>
<tr>
<td>Production Unit</td>
<td>Hatchery, nursery, farm, or processing plant</td>
</tr>
<tr>
<td>Should</td>
<td>A practice that is highly recommended</td>
</tr>
</tbody>
</table>
C. Definition of Aquaculture
For the purposes of the current standards, we define aquaculture as follows: The farming of aquatic organisms whereby growers enhance production by maintaining and managing cultured stocks in a defined area. To qualify as a farmed product (i.e., not wild-caught), ALL of the following conditions must be met:

- Producers regularly add seed/eggs/post-larvae/fry/smolts to the farm. For finfish (including salmon) and shrimp, they must originate from a hatchery. AND;
- Producers have control of—either through ownership or leases—the area where they are farming. Harvesting animals in areas open to the public does not qualify as aquaculture and will be considered a wild-capture fishery. AND;
- Animals do not have to receive any added feed to be considered “farmed.”

D. Scope of Standards
These standards apply to the following species, but may also cover other finfish and shrimp species as well. To find out if another species can be covered under these standards, please contact Whole Foods Market. Quality Standards for Farmed Bivalve Molluscs are covered in a separate document.

- Atlantic salmon (Salmo salar)
- Tilapia (including Oreochromis mossambicus and hybrid species)
- Channel catfish (Ictalurus punctatus)
- Rainbow trout/Steelhead (Oncorhynchus mykiss)
- Pacific white shrimp (Litopenaeus vannamei)
- Black tiger shrimp (Penaeus monodon)
- Arctic char (Salvelinus alpinus)
- Sea bream (Sparus auratus)
- Sea bass (Dicentrarchus labrax)
- Barramundi (Lates calcarifer)
- Pompano (Trachinotus blochii)
- Redfish/red drum (Sciaenops ocellatus)
- Yellowtail (Seriola rivoliana)
- Pirarucu / Paiche (Arapaima gigas)
- Tambaqui (Colossoma macropomum)
- Russian Sturgeon, Ossetra (Acipenser gueldenstaedtii) [GUE]
- Persian Sturgeon (Acipenser persicus) [PER]
- Siberian Sturgeon (Acipenser baerii) [BAE]
- Stellate Sturgeon or Sevruga (Acipenser stellatus) [STE]
- White Sturgeon, Pacific Sturgeon (Acipenser transmontanus) [TRA]
- Beluga Sturgeon (Huso huso) [HUS]
- Sterlet (Acipenser ruthenus) [RUT]

Hybrids: “Common name” plus the word “hybrid” (female species code x male species code), e.g., Beluga hybrid (Huso huso x Acipenser ruthenus) [HUSxRUT].
E. Quality Standards for Farmed Seafood: Salmon, Other Finfish, and Shrimp

Section 1: General Requirements

1.1: Compliance with Governmental Requirements

Producers must comply with all local, state, and national laws, codes, and regulations governing operations, including, but not limited to those categories listed below.

- Human health and safety
- Labor and employment
- Production siting and land use zoning
- License requirements
- Environmental assessments/reviews
- Water quality
- Movement and quarantine of animals to prevent introduction of exotic species or disease
- Effluent discharges and monitoring requirements
- Mangrove and wetland protection and restoration
- Escapes
- Predator control
- Disease treatment
- Local community involvement
- Payment of fees and taxes

The following documents must be available during onsite audits, as applicable:

- Official licenses, leases, titles, and other forms of government approvals and registrations
- Tax receipts
- Recent inspection reports from government authorities, public records
- Posted placards about labor rights; any government information regarding labor laws are disseminated to staff; evidence of any reports from inspections on labor laws, information on government contracts regarding worker’s health and safety
- Posted placards about safety, evidence of a safety training program, evidence of any reports from inspections on health and safety

1.2: Emergency Procedures

Each producer must have written emergency procedures to follow in case of an emergency. Anyone working at the farm or involved in farm management must be aware of the procedures in place and actions to take in the event of an emergency. Procedures must be posted in a prominent location so they are readily available in an emergency.

Producer Guidance:
Emergency procedures could include plans for responding to storms or natural disasters, fire, disease outbreak, emergency water shut off, or power failure.

1.3: Biosecurity Procedures

Each producer must implement and maintain a written biosecurity program. The program must include measures taken to avoid the introduction of pathogens from outside sources such as incoming stock, visitors, and trucks or equipment.
The following documents must be available during onsite audits, as applicable:

- Methods/protocols taken to prevent spread of disease
- Dates of health checks conducted on grow-out stock
- Data on incidences of disease or parasite outbreaks

1.4: Employee Training

Initial and ongoing training on the present standards must be provided by the producers to all farm employees. It is the responsibility of the producers to ensure that the requirements of these standards are understood by all individuals handling products sold to Whole Foods Market.

**Producer Guidance:**
- Training can be experience-based or through a formal program.
- Written confirmation of attendance at training or achieving expectations of training should be available.
- Training should provide information on the specific requirements of the Whole Foods Market standards for all responsible staff.

1.5: Audits

These standards are intended to be farm level. Because we recognize that producers have varying definitions for the different stages of production (e.g., hatcheries, nurseries, and grow-out), we define the location where on-site third-party audits begin as indicated below. Using the approach described below, ~75% or more of the animals’ life will be audited.

Third-party audits begin at the facilities indicated below.

- **Shrimp:** Facilities where shrimp are raised when they reach 30 days old (1 month) post-hatching.
- **Finfish, except salmon and char:** Facilities where fish are raised when they reach 90 days old (3 months) post-hatching.
- **Salmon and char:** Facilities where fish are raised when they reach 180 days old (6 months old) post-hatching.
- **Acipenseriform species:** Facilities where Acipenseriform species are raised after time of sexing, which is typically age 2-3 years.

Premises, documentation, records, and production units are subject to annual inspection by an independent CB, selected by Whole Foods Market. Auditors must have access to all facilities that are used for Whole Foods Market production and which are covered under the scope of the on-site inspection. This can include, but is not limited to, hatcheries, nurseries, grow-out farms, management offices and storage areas. These third-party audits must be paid for by suppliers.

**Producer Guidance:**
Producers are reminded that it’s their responsibility to learn and understand the standards and comply with all components of the program. Producers should proactively reach out to Whole Foods Market with any questions about the standards and work continuously to implement the standards on their farms, including any necessary corrective actions. The role of the CB is to verify compliance and issue certifications to qualified producers, rather than to serve as a trainer of the standards.
1.6: Records
Producers must maintain, and provide, the CB full access to records sufficient to document compliance with all applicable Whole Foods Market Quality Standards for Farmed Seafood.
- Inaccurate reporting could lead to suspension of business.
- Records must be kept for three years after harvest.
- Records may be held in a range of formats, including computer programs, and hard copy files, but must be accessible during audits.

**Producer Guidance:**
- *Farm documentation typically includes information on all inputs such as feed, nets, stock, treatments.*
- *In addition, farm documentation shall include information on the following, as applicable: All vaccinations applied, including product and date of administration. Include records confirming approval for use from veterinarian or animal health professional. All treatments used, including antibiotics and parasiticides. Specify frequency of use.*
- *In addition, independent inspections, environmental surveys and impact assessments may also be audited in order to verify compliance with a particular requirement in the standards.*
Section 2: Transparency and Reporting Requirements

2.1: Notice of Violations or Critical Issues
Producers must inform the CB within 48 hours, in the form of a written letter that is also included in the Operator Profile (OP), about any of the following:

- Major violations to government laws and regulations and specify corrective actions that will be taken
- Deaths of protected or endangered species
- Escapes involving over 50 fish

2.2: Whole Foods Market Operator Profile
Each producer must complete an Operator Profile (OP), which identifies practices implemented to ensure compliance with all applicable sections of Whole Foods Market Quality standards for Farmed Salmon, Other Finfish and Shrimp. The OP must reflect actual practices for all production fish and be current at all times. If there are any changes in production practices, producers must update the document and re-submit to the CB within one month.

Producers that have written Standard Operating Procedures (SOPs) or a Quality Manual can provide a copy with their OP and refer to the relevant section within the OP.

An updated version must be submitted annually to the CB, at least 1 month prior to the audit.

2.3: Verification Statement for Early Life Stages
Producers must fill out, sign, and submit a Whole Foods Market Verification Statement for all Finfish and Shrimp during Early Stages of Production (e.g., a hatchery or nursery) indicating that prohibited substances are not used. The statement must be sent to the CB.

An updated version must be submitted annually to the CB, at least 1 month prior to the audit.

2.4: Feed Manufacturer Compliance Statement
Whole Foods Market requires that producers report on ingredients used in feed. A Feed Manufacturer Compliance Statement for each feed type used for all stages of production fish, must be submitted to the CB. Feed labels for each feed type must be included.

The supplier must inform the CB of any planned changes to feed by re-submitting the updated Feed Manufacturer Compliance Statement and labels. The supplier must receive approval for the new feed by the CB prior to use.

Non-manufactured live feeds, such as Artemia, do not require a Compliance Statement.

Producer Guidance:
- Any feed for which ingredients, or amounts of certain ingredients, vary are considered different feed types. If only pellet size varies, this does not need to be considered as different feed type.
- Feeds used for life stages outside the scope of the on-site audit must still comply with the standards.
An updated version must be submitted annually to the CB, at least 1 month prior to the audit.

2.5: Calculations Spreadsheet
Fish In: Fish Out ratios as well as nitrogen and phosphorus inputs must be calculated using the spreadsheet “Calculations for Whole Foods Market.” Contact the CB for the spreadsheet “Calculations for Whole Foods Market”.

An updated version must be submitted annually to the CB, at least 1 month prior to the audit.

2.6: Contamination Testing
Whole Foods Market requires that producers report on test results for Polychlorinated Biphenyls (PCBs), TEQs (dioxins, furans, and dioxin-like PCBs), and mercury:
  o The sampling plan for environmental contaminants must be approved by the CB prior to first sampling and by March 31 of each year thereafter.
  o Tests for environmental contaminants must be completed and results must be made available to the CB prior to first certification and by October 31 of each year thereafter.
  o The sampling plan and testing for environmental contaminants is not applicable for caviar at this time.

2.7: EPA and DHA Testing, additional for salmon
Whole Foods Market requires that producers report on test results for combined EPA and DHA:
  o Tests for EPA and DHA are required annually.
  o Test results of harvest size fish must be included in the operator profile and made available to the CB.
Section 3: Source of Grow-Out Stock

3.1: Use of Genetically Modified or Cloned Animals
Use of genetically modified or cloned animals is prohibited.

Producer Guidance:
• Selective breeding is not considered genetic modification.
• Genetically engineered (GE) crops or animals are also known as genetically modified organisms, or GMOs.

3.2: Methyl Testosterone, additional for trout:
Producers must source eggs raised from broodstock without the use of methyl testosterone.

Producer Guidance:
This standard has been in effect since September 1, 2015.

3.3: Preventing Pathogens, additional for shrimp (Pacific white shrimp (Litopenaeus vannamei) and black tiger shrimp (Penaeus monodon):
To avoid introducing and spreading pathogens to shrimp farms, producers should stock post-larvae from Specific Pathogen Free (SPF) and/or Specific Pathogen Resistant (SPR) shrimp broodstock. If certified SPF or SPR shrimp are not suitable to local conditions, producers must use shrimp bred for pathogen resistance. The Whole Foods Market Verification Statement for Early Stages of Production for Finfish and Shrimp must indicate which method of pathogen prevention is used.

Producer Guidance:
• Domesticated SPF broodstock are defined as those animals that originate from stocks which have a documented history of being free of specific pathogens for at least two years.
• Domesticated SPR broodstock are defined as those animals that are resistant to a specific pathogen.
• Use the World Organization for Animal Health’s (OIE)’s current list of shrimp pathogens for monitoring broodstock in SPF surveillance programs. Targeted SPF surveillance programs should keep current on possible changes to the OIE list. The current list (http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2019/) includes the following pathogens: Taura syndrome virus (TSV), White spot syndrome virus (WSSV), Yellow head virus (YHV), Infectious hypodermal and haematopoietic necrosis virus (IHHNV), Infectious myonecrosis virus (IMNV), Hepatobacter penaei (necrotising hepatopancreatitis), and Acute hepatopancreatic necrosis disease (AHPND).
• Broodstock producers may also breed shrimp for specific pathogen resistance (SPR), yielding SPF/SPR shrimp.

3.4: Species Selection
Raising native species is preferred. Exotic species can only be cultured if a substantial commercial industry for farming that species already exists or if scientific risk assessments demonstrate negligible risk to the surrounding ecosystem. To raise exotic species producers must demonstrate they have followed ICES Code of Practice on the Introductions and Transfers of Marine Organisms 2004. Farms in the United States must also meet all state requirements for the introduction of new species.
3.5: **Grow-Out Stock**
Grow-out stock must be raised in a hatchery. Wild-caught grow-out stock is prohibited.

*Producer Guidance:*
- Grow-out stock includes shrimp post-larvae and fish fingerlings/fry/smolts.
- Wild-caught grow-out stock includes both targeted catch and bycatch, both of which are prohibited.

3.6: **Inducing Spawning, additional for Acipenseriformes:**
The use of hormone on broodstock to induce spawning is allowed. The meat or roe from hormone treated broodstock cannot be sold to Whole Foods Market.

*Producer Guidance:*
Examples of acceptable types of hormones: Buserelin, LHRH, GnRH

3.7: **CITES, additional for Acipenseriformes/black caviar:**
Broodstock must be hatchery-raised according to CITES guidelines.
Section 4: Drug and Synthetic Chemical Use

4.1: The Following Drugs and Synthetic Chemicals are prohibited:

<table>
<thead>
<tr>
<th>Prohibited Drugs and Chemicals for ALL Production Fish, Including Larvae, Post-larvae, Fry, Smolts, Fingerlings and Grow-out Stock:</th>
<th>Producer Guidance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preservatives</td>
<td></td>
</tr>
<tr>
<td>Antibiotics</td>
<td><em>Fish exhibiting symptoms associated with disease must receive veterinary attention, and if diagnosed with disease, must be treated as appropriate. However, the pen/tank/pond/raceway must be marked for identification and fish from that system cannot be sold to Whole Foods Market.</em></td>
</tr>
<tr>
<td>Growth hormones</td>
<td></td>
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<tr>
<td>Methyl testosterone</td>
<td><em>For sex reversal</em></td>
</tr>
<tr>
<td>Hormone to induce spawning</td>
<td></td>
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<tr>
<td>Use of malachite green, crystal violet, and Tributyltin compounds (TBT)</td>
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</tr>
<tr>
<td>In-feed veterinary medicines, including parasiticide treatments such as emamectin benzoate</td>
<td></td>
</tr>
<tr>
<td>Organophosphates</td>
<td><em>Organophosphates are highly toxic chemicals used in some pesticides</em></td>
</tr>
</tbody>
</table>
| Synthetic parasitcides for sea lice treatments or other purposes. Limited amounts of hydrogen peroxide are permitted. | *In 2007 (for farmed salmon) and 2008 (other finfish and shrimp), Whole Foods Market implemented a five-year phase out period for use of synthetic parasitcides on fish destined for Whole Foods Market stores. The phase out period has ended.*  
  - *Alternatives to synthetic chemical treatments could include using vaccines, cleaner fish, mechanical solutions, sea lice traps, or other innovative solutions.*  
  - *Wrasse/lumpsucker (cleaner fish) may be used to prevent infestations of sea lice. Cleaner fish should be hatchery raised. If wild-caught wrasse are used, catch levels must not cause wrasse populations to become overfished. If wrasse are non-native to the region where the farms are located, producers must demonstrate they have followed ICES Code of Practice on the Introductions and Transfers.* |
of Marine Organisms 2004. Farms in the United States must also meet all state requirements for the introduction of new species.

- Beyond the phase-out period, if preventative methods fail and fish must be treated with synthetic parasiticides, those fish cannot be sold to Whole Foods Market.

| Synthetic fungicides for finfish/shrimp after 30 days post-hatch for shrimp, 90 days post-hatch for finfish, or 180 days post-hatch for salmon and char. |
Section 5: Feed

NOTE: Some producers may raise species in systems where cultured fish feed on organisms living in the ecosystem (e.g., shrimp in extensive pond systems) and therefore do not require formulated feeds. The following standards apply only to those producers using added feeds.

5.1: Regulatory Compliance
All feed must comply with regulations of the U.S. Food and Drug Administration (FDA), the EU, or equivalent.

5.2: Nutrition
Whole Foods Market’s aim is to maintain animal health throughout the life-cycle. Feed systems must deliver diets that are nutritionally complete for the species cultured. The use of probiotics to support animal health is permitted.

5.3: Non-Adulteration
Feed must not be adulterated.

5.4: Prohibited Ingredients
Antibiotics, parasiticides and hormones are prohibited in feed.

5.5: Slaughterhouse Products
Slaughterhouse products from avian or mammalian species are prohibited in feed.

If the CB suspects that feed contains slaughterhouse products, they will collect a feed sample from the farm and submit it for laboratory testing. Suppliers are required to permit the CB to collect the sample. Sampling will be done at the producer’s expense.

The threshold for the level of slaughterhouse products in feed is 3% or 30,000 ppm. Producers whose feed tests at or above 3% or 30,000 ppm will be suspended or denied approved status as suppliers. This value represents a reasonable limit for distinguishing intentional use from accidental cross-contamination.

Feed manufacturing equipment must be cleaned or purged prior to running feed batches for Whole Foods Market compliant feed. Flush batches cannot be sold to Whole Foods Market’s suppliers. Below 30,000 ppm, but above the detection limit of 100 ppm (0.01%), indicates likely cross contamination of equipment from previous conventional batches. While results in this range would not lead to immediate suspension, results within this range will require suppliers to provide SOPs from feed companies indicating how equipment is cleaned/purged. Guidance for Standard Operating Procedures (SOPs) for clean-out/purge are included in the Producer Guidance section below.
Producer Guidance:

- Testing is conducted using PCR Analysis which is a qualitative test for animal DNA, and at a detection limit of 100 ppm (0.01%).
- The laboratory conducting the testing must be ISO 17025 accredited.
- Whole Foods Market recommends that testing is conducted by FoodChain ID Testing (formerly Genetic ID). Results must indicate the percentage of animal DNA detected.
- The estimated cost of testing is $275.00 per sample.
- Whole Foods Market recommends that producers conduct their own periodic testing of feed to verify that feed received on the farm is compliant and present results of testing to the CB during third-party audits.

Please note the following for submitting samples:
- For consistency, feed should be tested using PCR Analysis with the detection limit of 100 ppm.
- Sample size is 200 grams.
- Samples need to be sealed and double bagged to avoid cross-contamination.
- Prior to sending samples, contact FoodChain ID to set up an account and receive further instructions on how to send a sample. Contact information is as follows: Alex Moreno amoreno@foodchainid.com
- If another laboratory is selected, it is the supplier’s responsibility to ensure that the same method and detection levels are used.

The Cleanout/Purge SOPs should identify the following. Note that FDA provisions on cleaning and sanitation SOPs are outlined in 7 CFR 120.6

- Purpose: To prevent or minimize contamination of compliant feed from avian or mammalian slaughterhouse products/ingredients
- Scope: Identify the areas or facilities to which this procedure applies
- Responsible Parties: Identify the individuals or departments responsible for execution of the cleanout/purge.
- Frequency: Identify how often the cleanout/purge procedure is executed.
- Recordkeeping: Identify how the execution of this procedure is documented or logged.
- Procedure: Clearly outline the steps used to execute the cleanout/purge. Clearly identify equipment affected and materials used.
- Address contamination prevention measures for applicable critical control points on shared equipment.

If a purge is used as an intervening event, the SOP should identify the amount of product purged and why this is a sufficient amount.

5.6: Feed Processing

Feed must be fully processed to kill microorganisms, reduce the risk of disease transmission, and maintain its integrity in the water for optimal efficiency.

Producer Guidance:

Cooking ingredients is required to avoid disease and the deterioration of water quality from the high oxygen demand of raw food or organisms.
5.7: **Feed Conversion Ratio**
The Feed Conversion Ratio (FCR) must be calculated annually.

Producer Guidance:
- The feed conversion ratio (FCR) indicates the amount of feed used to grow one kilogram of fish: 
  \[ \text{FCR} = \frac{\text{kg feed}}{\text{kg fish}} \]
- FCR values shall be calculated for each generation or batch, rather than averaging for the entire facility. Exceptions include production systems in which juvenile fish are stocked continuously and there are no distinguishable age batches, and sturgeon (see 5.9). These systems can be calculated over the entire facility.
- If preferred, Early Stages can be left out of the FCR calculation due to insignificant biomass increase.
- For Acipenseriformes, the FCR can be calculated for the entire grow-out facility as a whole rather than as feed consumed by fish over their entire lifecycle. The total annual feed used (“in”) is calculated against the total annual fish harvested (“out”).

5.8: **Fish In, Fish Out Ratio**
Whole Foods Market’s goal is to reduce pressure on populations of wild fish and to decrease reliance on reduction fisheries for feed by moving toward the target Fish In, Fish Out Ratio, as indicated below. To evaluate progress towards meeting this goal, producers must report their ratios yearly. Ratios must be calculated using the spreadsheet “Calculations for Whole Foods Market.” Whole Foods Market will review these reports to evaluate progress.

To calculate the ratio, use data from the farm diary, not from theoretical production and FCR values.

Target Level for Fish In, Fish Out Ratio:
- Shrimp (Litopenaeus vannamei): 1:1
- Black tiger shrimp (Penaeus monodon): 1.5:1
- Cod: 1:1
- Salmon 1:1
- Steelhead/Rainbow Trout 1:1
- Tilapia: 0.25: 1
- Channel Catfish: 0.35:1
- Other finfish and crustaceans: 1:1
Producer Guidance:

• Whole Foods Market’s aim is to reduce pressure on populations of wild fish and to decrease reliance on reduction fisheries.

• The Fish In, Fish Out Ratio (Feed Fish Equivalence Ratio or FFER) is the ratio of wild-caught fish consumed as fishmeal and/or oil to fish produced.

• Innovative technologies in support of this aim such as the use of algae and insect protein in feed is permitted. The use of insect meal must follow the COMMISSION REGULATION (EU) 2017/893 on processed animal protein, which limits the insect species currently approved as well as limits the type of substrate with which the insects can be fed.

• Contact the CB for the spreadsheet, “Calculations for Whole Foods Market,” to use in calculating this ratio.

• FFER values shall be calculated for each generation or batch, rather than averaging for the entire facility. Exceptions include production systems in which juvenile fish are stocked continuously and there are no distinguishable age batches, and sturgeon (see 5.9). These systems can be calculated over the entire facility.

• If preferred, Early Stages can be left out of the FFER calculation due to insignificant biomass increase.

• Explore the feasibility of using by-products from fish processing (i.e. trimmings from processing wild or farmed fish and crustaceans). By-products of fish processing do not need to be counted in the Fish In portion of the ratio.

• Explore other innovative methods for lowering the overall amount of fishmeal and fish oil in feed ingredients. For example, consider using marine worms or algae-based products as a source of essential fatty acids to reduce the amount of fish oil used.

5.9: FFER, additional for Acipenseriformes:

For Acipenseriformes, the FFER shall be calculated for meat and reported annually. FFER calculation for caviar is not a requirement. For Acipenseriformes, the FFER will be calculated for the entire grow-out facility as a whole rather than as feed consumed by fish over their entire lifecycle. The total annual feed used (“in”) is calculated against the total annual fish harvested (“out”).

Producer Guidance:

• This approach to calculating FFER is different for sturgeon than for other species of finfish. However, a different approach is needed for sturgeon due to the practice of continuously selecting and moving individual fish based on sex, state of maturation, stage of egg development, etc. As a result, fish are continuously re-selected and one batch of fish cannot be kept separate and traced for the entire grow-out.

• The production of caviar requires that fish are grown and fed for many years prior to harvest. Some of these fish may never produce caviar. In addition, for caviar production energy is going into sexual maturation and egg development, rather than into growth, as is the typical approach with other species of farmed finfish. The current FFER calculation does not credit the more protein rich egg development and only uses the parameter of overall fish weight at harvest (“out”) versus feed used (“in”). For these reasons, Whole Foods Market acknowledges that FFER targets will be difficult to reach for sturgeon. However, Acipenseriformes are included in the goal of 1:1 for all finfish as a target for producers to work toward.

5.10: Marine Ingredients

Whole Foods Market’s ultimate goal is for all marine ingredients in feed to be sustainably sourced. To monitor progress toward meeting this goal, feed suppliers must report on the current status of each source fishery in the feed manufacturer compliance statement by indicating if the source fishery is certified or rated and if so, under which certification or rating program.
in, Fish out ratio, fish products used for feed should be sourced from by-products of fish and fish oil in feed should be Marine Stewardship Council (MSC)-certified.

5.11: Trash Fish
Producers must not use “trash fish” in feed.

Producer Guidance:
- Trash fish is a term used to define fish that have low commercial value and may or may not be used for human consumption. These are typically small fish that are processed into fish meal and oil for animal feeds, including for aquaculture.
- Removing exotic species (e.g., carp from freshwater systems) for the purpose of restoring native fish and utilizing these fish for feed ingredients is permitted. These fish are not considered “trash fish” for the purposes of these standards.

5.12: Krill
If krill is used as a component of feed, it must be sourced from a Marine Stewardship Council (MSC) certified fishery.

The feed manufacturer must demonstrate that krill in feed comes from an MSC certified fishery and MSC Chain of Custody (CoC) certified supplier.

Producer Guidance:
Krill is a valuable food source for marine life. While our standards for farmed fish (aquaculture) allow krill from fisheries certified by the MSC to be used as a rich nutrient-rich component of feed, it should be used in limited amounts.

5.13: Comingling
Under certain circumstances producers may decide to grow fish for Whole Foods Market as well as fish for other customers within a given farming site. It is permitted for producers to raise fish for customers other than Whole Foods Market, whereby a portion of the site is fed on compliant feed and another portion is fed on feed which does not meet Whole Foods Market’s standards, provided that the following requirements are met:
- Feed used within a given farming site and shared water body must not contain any drugs or chemicals listed in standard 4.1.
- Physical separation of enclosures ensures low risk of fish for Whole Foods Market feeding on non-compliant feed.
- Physical and visual separation of enclosures clearly identifies compliant and non-compliant fish stocks.
- Mechanisms are in place to prevent co-mingling of products, including feed.

5.14: Non-GMO Verification
Producers claiming to use non-GMO feed ingredients must have acceptable verification through organic certification or a certification program using accredited testing technology and scientific documentation of quality assurance. For suppliers selling to North America, verification of non-GMO status for a product can be achieved through the “Non GMO Project,” “NSF Non-GMO True North,” “USDA Organic” certification, including “Made with Organic . . .” certification, and equivalent Organic certifications in Canada, the European Union, Japan, Republic of Korea and Switzerland.
Producers choosing to make a non-GMO claim must ensure that products are third-party verified by a Whole Foods Market-approved verifier before they are on shelf. In addition, producers must provide the Whole Foods Market CB with a valid non-GMO certificate from one of the acceptable organizations listed above.

Producer Guidance:
- Genetically engineered (GE) crops, also known as genetically modified organisms (GMOs), are organisms whose genetic makeup (DNA) has been altered in a way that does not occur naturally.
- The Non-GMO Project and NSF Non-GMO True North standards may vary slightly. Producers should consult these organizations directly for details on program standards and requirements.
- This policy does not apply to our stores in the United Kingdom, as the EU already requires mandatory labeling of GMO ingredients in food products.

5.15: Astaxanthin/canthaxanthin
The intention of this standard is to use non-synthetic sources of astaxanthin/canthaxanthin whenever possible, but to allow for small amounts of synthetic astaxanthin/canthaxanthin where other options are not available. The use of synthetic astaxanthin/canthaxanthin in feed to support fish health, including growth and survival, is limited to 10 ppm (10 mg astaxanthin/kg feed) for any feed size, at any life stage, and for all species.

Non-synthetic sources of astaxanthin/canthaxanthin, such as Astaxanthin-rich *Phaffia rhodozyma* (Phaffia), red carotenoid-rich *Paracoccus carotinifaciens* (Panafers), or shrimp shells as a by-product from processing, that are used for pigmentation and fish health are permitted and inclusion levels of these non-synthetic sources in feed are not limited. Producers must obtain approval from Whole Foods Market to use other types of colorants.

Furthermore, the intention of this standard is that producers move from using synthetic astaxanthin/canthaxanthin to non-synthetic sources during the development of the fish. Therefore, when feed is switched to contain non-synthetic astaxanthin/canthaxanthin at higher inclusion levels, usually for the purpose of pigmentation, feed shall not be boosted with another 10 ppm of synthetic astaxanthin/canthaxanthin.

Producer Guidance:
- Whole Foods Market permits a limited amount of synthetic astaxanthin/canthaxanthin due to the difficulty of obtaining customized starter feeds. Astaxanthin/canthaxanthin can be an important antioxidant or source of provitamin A, which is linked to survival during development phases, growth, as well as disease and stress resistance.
- By limiting permissible amounts of synthetic astaxanthin/canthaxanthin, Whole Foods Market is assured that astaxanthin/canthaxanthin is added for the purpose of fish health, rather than for pigmentation. Higher inclusion levels of astaxanthin/canthaxanthin in feed, starting at approximately 40 ppm, are typically associated with pigmentation of fish, which must be achieved by using non-synthetic sources.
5.16: EPA and DHA, additional for salmon:
To ensure that farmed salmon sold to Whole Foods Market provides enough beneficial omega 3 fatty acids, all farmed salmon must contain at least 910 mg of combined EPA and DHA per four-ounce piece of uncooked salmon (114 g).

The sampling and testing method must be consistent among all producers. With this standard Whole Foods Market specifies the required sampling and testing methods for fatty acid profiling that must be used:

- Annually, collect a total of three fish from different tanks/pens at the time of harvest. Select fish that have reached a size suitable for harvest, and are of average size compared to others in the tanks/pens.
- Due to the variability of fatty acid content across different parts of a fillet, all producers must take fillet samples from the same part of the fish. Prepare a Norwegian Quality Cut (NQC) standardized muscle sample from each fish instead of sending whole fish or entire fillets. The NQC relates to a region posterior to the dorsal fin to anterior of the anal fin. The best way to sample the quality cut is to remove a steak by cutting through the whole fish and by using one side of the steak for the sample. Remove any visceral and inter-connective tissue still attached to the flesh. However, do not trim or remove any of the belly flap. Reference:
- Place the sample in a labelled, sealable bag or wrap in foil and place in a bag and freeze at -20°C. Place on dry ice for shipping to the laboratory. This will help maintain freezing and prevent fatty acid breakdown during shipping in the event of a shipping delay.
- Ship samples in an insulated box to ensure that fish remains frozen.
- Prior to shipping samples, reach out to the lab to ensure your company order is set up to avoid any delays.
- Send your samples to one of the following two laboratories:
  - \textbf{Eurofins Food Integrity and Innovation - Sample Management}  
  3301 Kinsman Blvd., Madison, WI 53701 USA  
  EricaSpiegelberg@eurofinsUS.com
  - \textbf{Eurofins Food Integrity & Innovation - Sample Management}  
  Otley Road, Harrogate, HG3 1PY  
  North Yorkshire, United Kingdom  
  NickyBuckle@eurofins.co.uk
  - Specify that laboratories must use the Official Method No. 996.06, Official Methods of Analysis of the AOAC INTERNATIONAL (modified), 19th Ed., AOAC INTERNATIONAL: Gaithersburg, Maryland (2012).
  - Specify that laboratories must remove the skin from the sample. After removing the bulk of the flesh from the skin, laboratories shall run the blade of a knife along the skin to remove as much red muscle as possible to include in the sample for analysis.
Reporting Test Results:
- Specify that laboratories must report test results based on wet weight rather than lipid weight.
- The results must be expressed in milligrams of combined EPA and DHA per four-ounce piece of raw salmon (114 g).
- The test report must indicate the type of sample analyzed e.g., sample of 3 NQC sections.
- The test report must include the testing method used.
- Report the test results in the OP.

Producer Guidance:
- As producers and their feed manufacturers replace marine ingredients for reasons related to sustainability, cost, or availability, this standard aims to ensure that farmed salmon continues to be a good source of EPA and DHA.
- AOAC method No. 996.06 is an official method by the recognized authority AOAC INTERNATIONAL (also known as The Association of Analytical Communities) for testing fish tissue (not only fish oils). The two laboratories provided have harmonized their analysis, which will ensure the results are comparable between producers.
- This standard also aims to ensure that portions of farmed salmon contribute to meeting the USDA’s recommendation for omega 3s: 8 oz of seafood/week to provide an average consumption of 250 mg per day of EPA and DHA (1,750 mg/week or 875 mg/4 oz portion). Reference: https://health.gov/dietaryguidelines/2015/guidelines/chapter-1/a-closer-look-inside-healthy-eating-patterns/#callout-seafood.
- Portion Size: The portion size of Whole Foods Market Whole Catch frozen farmed salmon fillets is 4 oz. In addition, the FDA references a portion size of 4 ounces. Other agencies and medical organizations reference portion sizes ranging from 3-4 ounces. Reference: https://www.fda.gov/downloads/Food/FoodborneIllnessContaminants/Metals/UCM537120.pdf

5.17: **Cleaner fish feed, additional for producers using cleaner fish:**

If feed for cleaner fish is used and is of similar pellet size as the feed for the fish under production (e.g., salmon), the cleaner fish feed shall not contain any prohibited ingredients such as avian or mammalian products, or medication. This feed requirement is only applicable to cleaner fish feed where cleaner fish are stocked together with fish produced for Whole Foods Market.

Producer Guidance:
No feed manufacturer compliance statement is needed for cleaner fish feed; ingredients should be documented on feed labels or equivalent documentation from feed manufacturers.

5.18: **Eligibility, additional for Acipenseriformes:**

New sturgeon and caviar suppliers are eligible if harvest size fish have been raised on compliant feed for at least 3 years prior to initial certification, and all fish destined for Whole Foods Market, including early stages and juvenile fish, are being fed compliant feed.
Section 6: Environmental Contaminants

6.1: Maximum Levels of Contaminants

<table>
<thead>
<tr>
<th>Contaminant Group</th>
<th>Maximum Level</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCBs</td>
<td>0.011 ppm (11 ppb)</td>
<td>11 µg/kg</td>
</tr>
<tr>
<td>WHO-TEQs (dioxins, furans, dioxin-like PCBs)</td>
<td>2.16 ppt (parts per trillion)</td>
<td>2.16 pg/g or ng/kg</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.22 ppm</td>
<td>0.22 mg/kg</td>
</tr>
</tbody>
</table>

Whole Foods Market’s goal is to reduce concentrations of PCBs, TEQs (dioxins, furans, and dioxin-like PCBs), and mercury in fish to the levels listed above. To evaluate progress towards meeting this goal, producers must test fish for contaminants according to the protocols listed below and keep records of their results. Whole Foods Market will review records to evaluate progress.

Tests for environmental contaminants must be completed and results must be made available to the CB prior to first certification and by October 31 of each year thereafter. Samples must be submitted by either farm or processing facilities, not by both.

Companies that have used the correct testing methods and have tested under the maximum levels of the standard for two years in a row may begin testing fish every other year. Permission to reduce testing frequency must be received by the CB. The sampling plan and testing for environmental contaminants is not applicable for caviar at this time.

Producer Guidance:
- Maximum allowable contaminant levels are based on the values used by the U.S. EPA: 227 g meal size (8 ounces) and 70 kg body weight.
- Maximum allowable levels of PCBs and mercury are based on the U.S. Environmental Protection Agency’s (EPA) National Guidance for Assessing Chemical Contaminant Data. Whole Foods Market has chosen to use the EPA’s standards for seafood because they are the most protective standards available for human health. Until the EPA completes their dioxin reassessment, TEQs must meet the standards of the World Health Organization (WHO).
- See Appendix A: Required Sampling and Testing Methods
Section 7: Water Quality and Pollution Prevention

7.1: Inputs

7.1.1: Disinfectants
Disinfectants for cleaning must be safe and used in concentrations that are non-toxic to fish and aquatic systems. Any disinfectants used must be approved for use by the U.S. Food and Drug Administration (FDA), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), or the World Organization for Animal Health (OIE). Producers operating in countries outside the United States may alternatively refer to national guidelines for safe disinfectant use. Proper recommended procedures for disposal must be followed.

7.1.2: Manure
Producers must not use raw (untreated) manure as fertilizer for promoting phytoplankton blooms in ponds. Use of human waste—either treated or untreated—as fertilizer is not permitted.

7.1.3: Liming Materials, additional for ponds:
Liming materials used for neutralizing acidity in pond water or pond soils are permitted.

7.1.4 Net Treatment, additional for net pens/cages:
Treating net pens/cages or net structures with copper-based antifouling agents (e.g., paints), or other toxic antifoulant products is prohibited. Producers must not use nets that were previously treated with copper-based or other toxic antifoulants. This requirement applies to the entire farming site. Parallel production within a given farming site, whereby a portion of the site contains treated nets and another portion contains untreated nets, is prohibited.

Producer Guidance:
- Whole Foods Market's original standard included a phase out period for treated and previously treated nets. The phase out period has ended.
- To control net-fouling organisms, producers could use methods such as air-drying, mechanical cleaning, or other non-toxic methods. Non-copper-based and non-toxic net treatments could also be acceptable alternatives.

7.1.5: Power Washing
Underwater power washing is allowed if producers can demonstrate that bio-fouling organisms are not building up underneath pens and causing organic enrichment of benthic sediments. Sediment sampling, as specified in Standard 7.2.4, is sufficient for monitoring for organic enrichment.

7.1.6: Net pens/cages, additional for Acipenseriformes:
Production in net pens/cages in fresh water is prohibited.

7.2: Nutrient Management/Effluent

7.2.1: For ALL Producers using feed OR fertilizer:
Producers must work to minimize the negative impacts of effluent on receiving waters by reducing inputs of nitrogen and phosphorus. Producers must calculate total annual inputs
of these nutrients per metric ton of fish produced in one year; Calculate these values using the Excel Spreadsheet, Calculations for Whole Foods Market, provided by the CB.

This information, as well as the information in Standard 7.2.2, will be used to evaluate producers’ progress in reducing nutrient outputs and preventing environmental impacts, such as eutrophication. Calculations of total inputs assume a consistent level of production. Therefore, reducing inputs would reduce outputs of nutrients.

Producer Guidance:

For calculating inputs of nitrogen and phosphorus:
• Calculate total nitrogen inputs in the form of feed and fertilizer (kg nitrogen/mt of fish produced in 1 year)
• Calculate total phosphorus inputs in the form of feed and fertilizer (kg phosphorus/mt of fish produced in 1 year)
• Work with feed companies to get values of Total Nitrogen and Total Phosphorus if information is not printed on feed bags.

For reducing nutrient inputs:
• Improve efficiency of feeding practices
• Reduce fertilizer use, if applicable

7.2.2: For ALL Producers using feed OR fertilizer:
An effluent monitoring system must be in place to measure discharges of effluent into receiving waters. Producers must measure at least one of the following variables, but are encouraged to monitor all variables: total phosphorus, total nitrogen, total suspended solids, or 5-day biochemical oxygen demand. Producers must not increase the amount of water discharged to dilute effluent. Monitoring must occur monthly.

Requirements for effluent monitoring:
  o Monitor concentrations of total phosphorus, total nitrogen, total suspended solids, or 5-day biochemical oxygen demand in effluent (mg/L or g/m3) at the end of the discharge pipe to ensure that samples are not contaminated by surrounding waters.
  o Record total annual farm discharge, m3/year (amount of water discharged from farm annually)
  o Record total annual farm inflow, m3/year (amount of water coming into the farm annually)
  o Calculate load of variable using the Excel Spreadsheet, Calculations for Whole Foods Market, provided by the CB
    - Net pens/cages: Use Calculation Version 1
    - Watershed ponds and reuse systems: Use Calculation Version 2
    - Raceways or ponds with water exchange: Use Calculation Version 3
Producer Guidance:
For reducing environmental impacts:
For pond systems, producers can improve efficiency of water use and minimize impacts of effluent by:
• Reducing amount of water discharged
• Preventing overflow after heavy rains by providing extra space in ponds.
• Reusing water where possible. For example, use closed pond systems or re-circulating tank systems.

Possible methods for treating effluent could include:
• Holding effluent in settling ponds
• Using constructed wetlands.
• Using integrated multi-trophic aquaculture systems (polyculture)
• Methods for minimizing the impacts of effluent may be outlined in a National Pollutant Discharge Elimination System (NPDES) permit for producers operating farms in the United States.

7.2.3: Unconsumed Feed
Unconsumed feed must not accumulate on the seafloor beneath or adjacent to net pens or cages. Producers must have a system for monitoring the feeding process with a mechanism in place to control excess feeding. Producers must be able to confirm with data that unconsumed feed is not accumulating under cages.

Producer Guidance:
Video surveys of seafloor may be used to evaluate presence or absence of unconsumed feed.

7.2.4: Benthic Impacts, additional for net pens/net cages in marine systems:
Under or within 30 meters of net pens, sediment samples from soft bottom benthic environments (mud, sand, or shell) must have Redox potential levels greater than -100 mV nhe, or sulfide levels below 1300 micromoles prior to stocking fish.

Producer Guidance:
• Take sediment samples and measurements in a manner that prevents contamination of samples from oxygen in water or air.
• Results of seafloor monitoring (e.g., video surveys) must confirm that unconsumed feed is not accumulating beneath or adjacent to net pens or cages.

7.2.5: Mortalities
Dead fish must promptly be removed from enclosures. Inspections for dead fish must occur daily (weather permitting) to maintain good water quality in culture systems, prevent transmission of disease, and to avoid attracting predators. Dead fish must be disposed of appropriately to avoid negative impacts on quality of surface or groundwater.

Producer Guidance:
Follow local regulations governing appropriate disposal of dead fish, which could include methods such as burial or composting.

The following information must be included in farm documentation, as applicable:
   ○ Number of mortalities
   ○ Cause of mortalities
7.2.6: Soil Salinization, additional for shrimp and other species raised in saline ponds:
Producers must not damage nearby lands with salt-laden soils or saline water intrusion.

Producer Guidance:
- If signs of a problem are evident, solutions could include constructing drainage canals or planting high growing, salt-resistant grasses around the farm.
- One possible way of demonstrating that no salinization is occurring are soil and water testing results from environmental impact statements or surveys.

7.3: Water Use

7.3.1: Freshwater Salinization, additional for pond production in marine/brackish waters:
Salinization of fresh groundwater or soils must be prevented. Chloride concentrations must be maintained at the natural average salinity of local groundwater.

Producer Guidance:
Producers can prevent degradation of freshwater and soils from salinization or other contamination by:
- Clearly defining mechanisms for preventing salinization, if farming marine species at inland farms.
- Having methods for verifying that salinization is not occurring, if farming marine species at inland farms.
- Evaluate leakages of pond water, effluents, and pond sediments as possible sources of salinization.
- Not siting farms on sandy soils or in places where there is a high likelihood that salt water from ponds will enter agricultural land or freshwater supplies.
- Using seepage reduction measures. For example, shrimp farms located inland may line ponds to prevent seawater from seeping into fresh groundwater supplies.
- Using low salinity water for preventing salinization, provided that farms don’t rely on fresh groundwater for salinity control.
- Monitoring freshwater wells located on or near farms annually for Chloride concentrations.

7.3.2: Discharge
Saline water must not be discharged into bodies of freshwater.

7.3.3: Use of Freshwater, additional for shrimp:
Freshwater resources, such as from aquifers, must not be depleted. Use of fresh groundwater for salinity control is not permitted.

7.4: Stocking Density, additional for salmon raised in net pens/cages:
To avoid causing stress, injury, or illness to confined animals and to reduce the overall environmental impacts of production, stocking densities (calculated as total biomass/total volume of pen) in open net pens must not exceed 20 kg per cubic meter. Closed containment facilities may operate at higher densities if evidence of low stress to fish can be provided.

7.5: Injured Fish
Injured fish or seriously ill fish that appear unlikely to recover must be promptly and humanely euthanized. Internal policies shall specify how injured or ill fish are handled.
Section 8: Siting

8.1: Legal Approval
Producers must demonstrate that they have legal approval for aquaculture production where their farm is sited.

Producer Guidance:
- Present the CB with permits, leases, or concessions required by government.
- Present the CB with up-to-date maps showing the location of all farms. Maps must indicate public and private land and water zones, any points of potential contamination, water flow direction, effluent discharge points, and show that producers do not exclude local communities from access to public fishing grounds, mangrove areas, or other resources used for hunting and gathering or fishing.

8.2: Risk Avoidance
Farms must be sited appropriately to minimize the risks of disease or parasite transfer to wild aquatic life and ecosystems. For salmon raised in net pens, the farms must be sited at adequate distances from areas known to be important for wild salmon populations such as the mouths of salmon rivers.

Producer Guidance:
- Disease and parasite transfer can occur from escapes. See Section 9 for escape prevention requirements.
- Maintaining adequate distance from the mouths of salmon rivers helps to protect wild salmon populations by minimizing interaction between farm stock and wild smolts, including the spread of sea lice.
- Producers should work with local experts to determine the appropriate distance for their region.

Methods of preventing disease and parasite transfer could include:
- Using closed containment systems.
- Not siting farms in areas that contain seasonal aggregations or dense populations of wild fish or other wildlife that are known to be susceptible to diseases or parasites found at the farm.
- Using ecological buffers to separate farms from habitat for threatened or endangered species that are vulnerable to disease or parasites.
- Using barriers to physically separate farm stock from natural water bodies.
- Controlling effluent and minimizing the discharge of effluent.

8.3: Ecosystem Protection
Ecosystem damage and habitat loss must be prevented. Producers must not convert areas of high ecological sensitivity into new sites or new farms, or for expanding current farms. All new sites or new farms must be sited above the average high tide line.

Producer Guidance:
- Areas of high ecological sensitivity include coastal wetlands (including mangrove ecosystems), coral reefs, and freshwater bodies with little water exchange.
- Land-based farms should be sited in areas previously developed or formerly used for agriculture, rather than converting sensitive natural areas to farms.
- Farms should not be sited in special areas such as marine protected areas unless an Environmental Impact Assessment is conducted and can demonstrate low risk of impact and the producer can demonstrate a history of no significant interactions with wildlife.
8.4: **Mangrove and Wetland Protection, additional for shrimp/species on coastal farms:**
Whole Foods Market will only source seafood from producers who demonstrate a commitment to “no mangrove or wetland loss.” Whole Foods Market will not source from farms that were converted from wetlands or mangrove forests to aquaculture operations after 1980 (either by their own company or a previous owner), unless the producer completed the requirements for mangrove or wetland restoration by July 1, 2013, as specified in the producer guidance.

**Producer Guidance:**
- In 2008, when the Whole Foods Market Quality Standards for Finfish and Shrimp were released, we provided a five-year time period for restoration of mangroves for producers that were farming on land that had been converted to shrimp farms or other type of aquaculture. This allowance ended July 1, 2013. By that date, suppliers must have completed restoration in order to sell fish to Whole Foods Market from such farms. Restoration requirements stated that at least a hectare of new habitat must be restored for each hectare of wetland or mangrove forest converted to ponds (i.e., a 1:1 ratio).
- Restore the diversity of natural mangrove species rather than use mono-culture planting.
- Consider local hydrology (e.g., depth, duration, and frequency of tidal flooding).
- Consider possibility of fallowing farm sites to allow recovery of natural vegetation and biodiversity when appropriate.

8.5: **Local Hydrology**
Land-based farms must be sited and constructed in such a way that local hydrology—surface and groundwater bodies—is not disturbed.

8.6: **Site Suitability, additional for net pens/cages:**
Farms must be sited in areas with suitable environmental characteristics, including current speed, water depth, and flushing action.

8.7: **Distance from Neighboring Farms, additional for salmon raised in net pens/cages:**
Farms must be sited at adequate distances from other salmon farms to avoid parasite and disease transfer. Farms with a history of recurring disease or parasite problems due the proximity of neighboring farms may not be approved to sell fish to Whole Foods Market.
Section 9: Escape Prevention

9.1: **Containment Management System, additional for net pens/net cages:**

Whole Foods Market will source farmed fish from producers that can demonstrate exceptional effort in preventing escapes, with the goal of working to as close to zero escapes as possible. Producers must have a site-specific Containment Management System (CMS) for preventing escapes (including “leakage”) of farmed fish into open water. Routines and protocols specified in the CMS are subject to announced and unannounced audits by the CB.

*Producer Guidance:*

The Containment Management System should include, but is not limited to:

- Protocols for safely removing dead, sick, or wounded fish
- Exact counting of all dead fish
- Methods for preparing for and responding to storms and other emergencies
- Protocols and schedules for regular inspection of containment systems
- Protocols for preventing and responding to predator attacks if predators are present in the area (see Section 10 for acceptable predator control methods)
- Procedures for responding to escapes should they occur
- List of Critical Control Points (CCP)—the points at which fish are most likely to escape—and proactive measures to prevent escapes from occurring at the CCPs Protocols for security and surveillance to prevent vandalism
- Methods for controlling nets before transferring fish to pens
- Size and grading specifications for fish prior to transferring to pens
- Mesh size requirements relative to fish size
- Protocols for maintenance of all equipment and containment systems, such as net integrity and cleanliness, and structural integrity of mooring and cage supports.
- Farm records showing net/mesh inspection, etc.
- Protocols for operating boats safely around pens/cages

*Note: Escape Prevention Methods can include using closed, re-circulating production systems.*

*Additional resources: Norway’s NYTEK Regulations, the U.S. State of Maine’s requirements for CMS’s and the North Atlantic Salmon Conservation Organization’s (NASCO) Guidelines on Containment of Farmed Salmon CNL (01)53.*

9.2: **Reporting on Escapes/Leakage**

In addition to meeting the requirements for reporting escapes or leakages to local, regional, or federal agencies, producers must inform the CB in writing within 48 hours of any escapes involving over 50 fish. Producers must also keep records of any escapes and the cause of the incidents, and make records available during audits.

9.3: **Physical Barriers, additional for pond/tank/raceway systems:**

Producers must use physical barriers, such as screens, filters, or size-appropriate grids in areas where effluent leaves the farm to prevent fish from escaping into local water bodies. In cases where fish reproduce in ponds, multiple screens or barriers may be necessary to prevent escapes.
Section 10: Predator Control

10.1: Predator Prevention

Exclusion of wildlife predators or other non-lethal methods must be the first level of defense. Lethal means of predator control can only be employed if non-lethal means have been ineffective. Producers must report the non-lethal methods that were attempted and the reasons they failed.

Producer Guidance:
- Non-lethal methods may include: Top nets to prevent bird predators from reaching fish, with special attention to preventing entanglement or trapping of birds and bird scaring techniques such as e.g., bangers, screamers and propane cannons.
- Examples of lethal methods include shooting predators on the farm and oiling or destroying bird nests to prevent hatching.
- An example of a situation where lethal means are necessary is where a predator is entangled or injured and cannot be removed safely. Wildlife includes birds, aquatic and terrestrial mammals, reptiles, and amphibians.
- When establishing new ponds, or re-building ponds, consider reconfigurations such as smaller ponds to facilitate the use of exclusion methods.

10.2: Lead Shot

Producers must not use lead shot for scaring or killing predators.

Producer Guidance:
This standard is intended to prevent toxic lead from entering the environment and harming birds and other wildlife.

10.3: Protected Species

Producers must not intentionally kill predators listed nationally or globally as vulnerable, endangered, or critically endangered (e.g., by IUCN).

10.4: Avoidance of Suffering

Predator control methods must not cause wildlife to suffer. Lethal means of predator control must result in immediate death.

10.5: Interactions with Predators

Producers must document incidental takes of avian, terrestrial, or mammalian predators (e.g., drownings or entanglements in predator nets). Details on the number of deaths, injuries, and the species affected must be documented in both the OP as well as the producer’s records, which are subject to audit:

a) Descriptions of any predator interactions that have occurred, with details on injuries, and the species affected
b) Records of any intentional or incidental lethal take of predators. For take of bird predators on farms in the United States, a copy of the annual report to the U.S. Fish and Wildlife Service is sufficient.
c) Records of any lethal control methods used

Deaths of protected or endangered species must be immediately reported to the CB within 48 hours in writing.
10.6: **Predator Nets, additional for net pens/cages:**
If predators are present in the area, either as residents or as a migratory population, predator nets (*e.g.*, secondary nets for marine mammals and/or top nets for birds) are required. Predator nets must be maintained to ensure that no holes or tears are present.

10.7: **Acoustic Harassment Devices**
Acoustic Harassment Devices (AHDs) are prohibited.

*Producer Guidance:*
*Acoustic Harassment devices are also referred to as Acoustic Deterrent Devices, (ADDs), “pingers,” or seal scarers.*
Section 11: Traceability

11.1: Electronic Traceability System
Whole Foods Market will only source from approved supply chains:
  o Suppliers must utilize Whole Foods Market’s selected electronic traceability software to allow Whole Foods Market to verify sourcing of all farmed products and to track products throughout the supply chain. Traceability data are continuously crosschecked using rules set up by Whole Foods Market as well as by internal and independent third-party audits.
  o Suppliers must enter data into their respective accounts in the electronic traceability software for each production lot.

11.2: Internal Traceability
Producers must have a tracking system to ensure the identity and history of all fish from point of arrival on the farm to point of sale to the processor. This must include:
  o Purchase/sales records with relevant batch number
  o Receiving records
  o Farm records (use of feed, movement of stock, biomass)
  o Mortality records
  o Transport records
  o Harvest records
  o Processing records

11.3: Product Labelling
The standards contain a list of Latin and common names approved for use in labelling. If Whole Foods Market or the CB suspects that imprecise labels are used or mislabeling has occurred, a final product sample may be collected and submitted for testing (e.g., DNA analysis) to verify species identification and origin. Sampling will be done at the producer’s expense. Product mislabeling will result in loss of certification.

11.4: CITES Labelling Requirements, additional for Acipenseriformes:
Domestically packed caviar for retail sale must include the common species name and country of origin. All information required by CITES, at present Resolution 50 CFR 23.71, for products sourced internationally must be available to the CB.

Producer Guidance:
• Note that there are a number of sturgeon species listed under the U.S. Endangered Species Act, including beluga sturgeon (Huso huso) for which the permitting and labelling requirements, both for import and for movement within the United States, may differ.
• CITES guidance is available at the CITES Secretariat's website, Resolution Conf. 12.7 (Rev. CoP17–4, Annex 1 (or any updated version thereof):
Appendix A.

Sampling and Testing Methods for Environmental Contaminants

<table>
<thead>
<tr>
<th>Contaminant group</th>
<th>Maximum Level</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCBs</td>
<td>0.011 ppm (11 ppb)</td>
<td>11μg/kg</td>
</tr>
<tr>
<td>WHO-TEQs (dioxins, furans, dioxin-like PCBs)</td>
<td>2.16 ppt (parts per trillion)</td>
<td>2.16 pg/g or ng/kg</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.22 ppm</td>
<td>0.22 mg/kg</td>
</tr>
</tbody>
</table>

Producers must follow the following steps.

I. Sampling Method

1. Sample fish for environmental contaminants testing on an annual basis.

2. Submit a sampling plan to the CB annually by March 31. The plan must include the following information:
   - Sampling date
   - Expected date of receipt of results
   - Lab to be used
   - Number of farms from which samples will be taken
   - Number of ponds/tanks/raceways/pens from which samples will be taken
   - Reason for reduced sampling program, if applicable (see #3 below), with details demonstrating that the criteria for the reduced sampling are being met

3. Producers must collect samples from each farm/site unless they qualify for a reduced sampling program. Companies with several farms may be eligible to implement a reduced sampling program, whereby samples are collected from only one farm. Any company that wishes to carry out a reduced sampling program must submit their request to the CB for approval in their annual sampling plan (see #2 above). The sampling plan must include details of the farms to be tested. The criteria for reduced sampling are that all farms:
   - Are under the same management
   - Use the same feed
   - Source water from the same water body

Producer Guidance:
A “farm” or a “site” refers to a cluster of ponds, tanks, raceways and pens that are relatively close together, managed by the same staff, and typically tended to at the same time, or within a very short period of time.

4. Collect one fish from each of several ponds/tanks/raceways/pens. Several are defined as 10% of the total number of ponds/tanks/raceways/pens at the farm site. The minimum number of animals to be collected is three.
5. The total weight of the sample must be a minimum of 250 grams. If the total sample does not weigh at least 250 grams, add additional animals to reach this minimum amount. This requirement applies to all farms, both those participating in a normal sampling program and those participating in a reduced sampling program.

Producer Guidance:
If the total weight of the sample is less than 250 grams, add additional animals from the same ponds that are being sampled. For example, if three ponds are being sampled, take two animals from each pond instead of one to reach the minimum of 250 grams.

6. Select fish for sampling that have reached a size suitable for harvest.

7. Select fish for sampling that are of average size compared to others in the ponds/tanks/raceways/pens.

8. Wrapping:
   - **Finfish:** Wrap each fish of a sample individually, whole and gutted, and pack with the other fish of that sample to send to the laboratory.
   - **Shrimp:** Wrap all animals in the sample together. If frozen, put shrimp in a jar so that when they are defrosted in the laboratory, the liquid can be used for analysis.

9. Filleting:
   - Sending one fillet per fish (in contrast to whole fish) is allowed, but the entire fillet must be sent to the lab, including the belly flap and skin. The fillet size must not be cut down. Prior to preparing fillets, and in between fish, wash and scrub filleting tools with soapy water, and then rinse well to get rid of all soap. In addition, clean and rinse the work surface before use and between fish. Put a fresh piece of heavy-duty foil on the surface where fillets are being prepared.
   - Next individually wrap each complete fillet per fish in two layers of foil and seal in a zipper bag for freezing and shipping to the laboratory. Fillets thaw more easily than whole fish (and can lose fluid) so they must be well frozen before being sent and kept cold on more ice, or on dry ice during shipment. Warm samples may not be possible to analyze.

10. Require laboratories to use the testing methods specified below and to follow the quality assurance rules associated with each method.
II. Testing Methods

1. Prior to conducting chemical analysis, laboratories should do the following:
   o **Finfish**: Fillet each whole fish and then homogenize whole fillets from each fish. Fillets must include both the belly flap and the skin unless the fillets are sold to Whole Foods Market skinless (e.g., catfish). A sub-sample of the homogenate can then be taken for analysis.
   o **Shrimp**: De-head, peel, and homogenize each shrimp. Vein should be left in. A sub-sample of the homogenate can then be taken for analysis.

2. Test results must be based on wet weight, rather than lipid weight.

3. All testing for environmental contaminants must be conducted by third party, independent laboratories. Laboratories should be accredited for the tests they are performing to ISO 17025 or the U.S. National Environmental Laboratory Accreditation Program (NELAP) standards. Actual laboratory results should be submitted to the Control Body (CB) as soon as they’re available. Whole Foods Market and the CB have the right to request additional testing.

4. **PCBs**: Whole Foods Market requires that producers have fish tested for Polychlorinated Biphenyls (PCBs). Laboratories shall analyze samples for all 209 congeners. Report both the concentration of the 209 individual congeners and total PCBs as represented by the sum of the congeners. Laboratories should use the High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS) method for analysis (*EPA Method 1668A, 1668C, or an equivalent method that provides detection limits of no more than 0.02 μg/kg per congener). Results shall be reported in μg/kg or parts per million (ppm).

5. **WHO-TEQs**: Producers must have fish tested for polychlorinated dibenzo-\(p\)-dioxins (PCDDs) and polychlorinated dibenzo-\(p\)-furans (PCDFs)(List #1 below), which includes the twelve dioxin-like PCBs (List #2 below). Laboratories shall also analyze dioxin, furan, and PCB congeners that have WHO Toxic Equivalency Factors (TEFs) (List 1 below) and report results in WHO-TEQs. If any compound is not detected, WHO-TEQs shall be reported as 0.5 of the Detection Limit (ND=0.5DL). Laboratories shall use EPA Method 1613b for dioxins & furans and EPA Method 1668A for dioxin-like PCB’s. Results shall be reported in pg/g, ng/kg, or parts per trillion (ppt).
1. **Dioxins (PCDDs) and Furans (PCDFs)**
   Required for Testing

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<tr>
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2. **Dioxin-like PCBs**
   Required for Testing

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6. **Mercury**: Producers must have fish tested for total mercury (Hg). Laboratories may use the following methods:
   - EPA Method 1631, Appendix, Analysis by Cold Vapor Atomic Fluorescence Spectrometry, with Digestion I (section A11.1)
   - EPA Method 6020, Analysis by ICP-MS, with Digestion Methods 3050B, 3051, 3052
   - EPA Method 245.6, Analysis by Cold Vapor Atomic Absorption (section 11.1 - 11.2) (method specifies digestion method)
   - EPA Method 7471A, Analysis by Cold Vapor Atomic Absorption, with Alternate. Follow Digestion Method in Section 7.2. (Note: there is evidence that a low bias to the total Hg results may be seen if other digestion methods are used.)
   - EPA Method 7471B, Analysis by Cold Vapor Atomic Absorption, with Alternate. Follow Digestion Method in Section 11.2. (Note: there is evidence that a low bias to the total Hg results may be seen if other digestion methods are used.)

Results shall be reported in mg/kg or parts per million (ppm).
III. Results

1. The following must be submitted to the CB by October 31 of each year:
   o Original reports from the laboratory.
   o The results summary provided by the lab should include, but is not limited to, the following:
     - sampling date
     - species tested
     - name of the sampled farm
     - date of analysis
     - method used
     - results for PCBs, WHO-TEQs and mercury given in the required units, as indicated in the standard
     - detection limit used for each compound.

2. Producers must record their results in the Operator Profile (OP).