Global Seafood ALLIANCE™

Salmon Farm Standard

Issue 3.0
04-AUGUST-2025

Best Aquaculture Practices Certification Standard

Environmental Responsibility • Social Responsibility • Food Safety • Animal Health and Welfare

Previous Issue Invalid August 5, 2026

Contents

A. Summary of Key Changes from Issue 2.4 to 3.0

- Stricter procedures for safe diving, response to diver emergencies, requirements for diver training and certification
- Adoption of forage fish dependency ratio (FFDR) as a metric
- Stronger requirements for protection of predator species and endangered, threatened, and protected species
- More emphasis on the use and documentation of operational welfare indicators
- A greater focus on protecting the welfare of cleaner fish
- Stricter requirements for humane harvest / slaughter (with SOPs for slaughter, etc.)
- More requirements for biosecurity and fish welfare during transport or crowding

B. Introduction

BEST AQUACULTURE PRACTICES CERTIFICATION

The following Best Aquaculture Practices standards and guidelines apply to the production of salmon and trout in net-based cages in marine waters. Salmonid species included in the scope of this standard are, but not limited to: Atlantic salmon, (*Salmo salar);* Chinook / King salmon, (*Oncorynchus tshawytscha);* coho salmon, (*Oncorynchus kisutch)*; rainbow / steelhead trout, (*Oncorynchus mykiss*); and sea trout, (*Salmo trutta*).

Certification to this standard encompasses all production of salmon from the time they are stocked in marine sites until they are harvested. Marine waters are defined as open waters in the sea in areas which experience semi-diurnal astronomic tidal effects. Juvenile or post-smolt production that is done in land-based systems or freshwater lake systems, before being moved to marine sites, is outside the scope of the Salmon Farm Standard.

The BAP standards are achievable, science-based and continuously improved global performance standards for the aquaculture supply chain that assure healthful foods produced through environmentally and socially responsible means. They are designed to assist program applicants in performing self-assessments of the environmental and social impacts, and food safety controls of their facilities. BAP Standards lead to certification of compliance after verification of the farm's facilities by BAP approved third-party certification bodies. For further information, please refer to the additional resources listed throughout this document.

BAP standards demand compliance with local regulations as the first step toward certification. However, not all regulations are equally rigorous in all aspects. For this reason, BAP standards set out requirements for documentation and procedures that shall be in farm management plans, whether they are prescribed by local regulations or not. By so doing, they seek, where possible, to impose consistency in performance among facilities in different producing regions and to engage the industry as a whole in a process of continuous improvement.

In parallel with the implementation of these standards for salmon farms, the Global Seafood Alliance gathers data from audit reports to establish performance trends and for future GSA-sponsored research. The agreement of farms to this data policy is obtained as part of the certification process. In addition to data collected through audit clauses, GSA also requests specific datapoints within the standard, denoted with a request for "*Data*." Facilities shall provide data wherever requested, though no specific compliance threshold must be achieved.

In common with ISO usage, these standards use the words "shall" to mean compliance is required and "should" to mean compliance is recommended. Auditable points are "shall" statements listed at the end of each standard.

BAP standards are developed by committees of technical experts following a process aligned to the FAO Technical Guidelines on Aquaculture Certification.

References

https://www.bapcertification.org/Standards
http://www.fao.org/3/a-i2296t.pdf

Acknowledgements
An expert group, the BAP Salmon Farm Standard Technical Committee, develops and endorses the Standard, with representatives throughout the supply chain and with interested parties including industry associations, processors, producers, regulators, non-governmental organizations and conformity assessment and standards experts. The GSA is grateful to the members of the Salmon Farm Standard Technical Committee who provided valuable input during this 2021-2024 update of the BAP Salmon Farm Standard.

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The GSA is grateful to past members of the Salmon Farm Standard Technical Committee who created earlier versions of the Standard:

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Sonja Saksida – Atlantic Veterinary College, University of Prince Edward Island
Teresa Ish – Environmental Defense Fund

C. Standard Requirements – Food Safety

Control of Potential Food Safety Hazards

Farming practices shall prevent the introduction of potential consumer health hazards linked to the consumption of finished products. Chemical residues and contaminants shall be controlled and kept below regulatory limits through good farming practices and regular monitoring. Antibiotics, drugs and other chemical compounds that are proactively prohibited in producing or importing countries shall not be used.

Reasons for Standard

Farmed salmon can become contaminated at several stages in the farming process. Possible contaminants include medicinal residues in smolts and/or juvenile fish brought on the farm from outside sources with inadequate controls; microbial, chemical or other environmental contamination in the unlikely event that a salmon farm is located close to a source of such contaminants; heavy metals or PCBs/dioxins in fish feed; residues of medicinal compounds used during the farming process; and lubricants, fuel, paints or other materials to which the fish might be exposed when they are harvested and transported to a processing plant. Fish can also become contaminated by unclean water, ice, and transport containers used during transit to processing plants or markets.

Residues of improperly applied therapeutic agents can accumulate in fish tissue and present a potential health hazard to humans. Therefore, certain compounds have been proactively prohibited (meaning they have been specifically disallowed from use), and residue limits mandated for others. Irresponsible use of antibiotics can also threaten human health by leading to antibiotic resistance or by impacting the surrounding environment through accumulation of drug residues in the food chain.

In rare situations, farmed salmon can become infested with certain parasites that are potentially transmissible to humans unless adequate control measures are taken.

Implementation

Farm sites shall be selected after review of possible sources of toxic materials in the area consistent with the BAP standards in the Environmental Section. Where a potential contamination risk exists in the vicinity or may affect farm waters either from natural runoff or direct discharge, the farm shall check for that contaminant in the flesh of exposed fish annually, at a minimum.

To avoid possible contamination of fish, farms shall control:

- inputs of smolts and juvenile fish
- the risk of contaminated feed
- the use of any medicinal feeds
- parasites that are potentially transmissible to humans
- sanitation procedures during the transport of harvested fish

Guide to Drug, Vaccine and Pesticide Use in Aquaculture

Federal Joint Subcommittee on Aquaculture Working Group on Quality Assurance in Aquaculture Production – 2007 https://freshwater-aquaculture.extension.org/wp-content/uploads/2019/08/Drug_Guide_7-5-07.pdf

Judicious Therapeutic Use of Antimicrobials in Aquatic Animal Medicine

American Veterinary Medical Association

https://www.avma.org/resources-tools/avma-policies/judicious-therapeutic-use-antimicrobials-aquatic-animal-medicine

Fish and Fishery Products Hazards and Controls Guidance

Department of Health and Human Services, U.S. Food and Drug Administration Office of Food Safety – 2022 http://www.fda.gov/downloads/food/guidanceregulation/ucm251970.pdf

Standards

1.1: Farms shall not use antibiotics or chemicals that are proactively prohibited in the country in which production is occurring, or in the country to which fish will be exported, nor any treatment that could result in harmful residue in fish.

1.2: Documentation shall be available that states all fish in the farm have been grown from smolts or juvenile fish that were reared without the use of proactively prohibited medicines such as malachite green or other substances prohibited in food animals.

1.3: Documents shall be available from feed manufacturers stating antibiotics or other drugs are absent in non-medicated feed, detailing drugs or antibiotic content in medicated feeds and stating that levels of heavy metals, PCBs or dioxins in feed are below limits for those compounds set by the countries in which the feed mills operate.

1.4: Documentation shall be available that identifies local parasite species that may infest farmed salmonids and which are potentially transmissible to humans and describes the control measures taken to minimize the risk of such infestation. Records of any such parasite infestations shall be available.

1.5: Antibiotics shall only be used to treat diagnosed bacterial disease in accordance with a defined treatment plan prescribed by a certified aquatic animal veterinarian and shall not be used as growth promoters.

1.6: Where there is a discharge of potential contaminants within 5 kilometers of a farm, the farm shall check for that contaminant in the flesh of exposed fish in advance of fish harvests to verify that levels are below those required by the exporting and importing countries.

1.7: Equipment and containers used to harvest and transport fish shall be clean and free of lubricants, fuel, metal fragments and other foreign material.

1.8: Ice in which fish are placed following slaughter, if it occurs at the farm, shall be made from potable water or seawater that has been disinfected to an equivalent microbiological standard as that of the potable water. Potability test reports shall be available.

D. Standard Requirements – Social Accountability

Property Rights and Regulatory Compliance

Farms shall comply with local and national laws and environmental regulations and provide current documentation that demonstrates legal rights for land use, water use, construction, operation and waste disposal.

Reasons for Standard

Regulations are needed to assure that farms provide pertinent information to governments and pay fees to support relevant programs. The BAP program requires compliance with applicable business-related laws and environmental, social and food safety regulations, including those concerning protection of sensitive habitats, effluents, operation of landfills and predator control, because it recognizes that not all regulations are uniformly enforced.

Some salmon farms and their support facilities may be sited in water bodies or on land to which farm owners do not have exclusive legal rights. These areas may be used by coastal communities for fishing, recreation, tourism and other uses. Unauthorized installation of farms can interfere with the use of resources by local communities.

Implementation

Regulations regarding the operation and resource use of farms vary significantly from place to place. Among other requirements, such laws can call for:

- business licenses
- aquaculture licenses
- land deeds, leases or concession agreements
- land use taxes
- construction permits
- water use permits or leases
- protection of sensitive habitats
- therapeutics use
- predator control permits
- protection of the rights of native peoples
- environmental impact assessments or reporting on fish health
- compliance with zoning or area management programs

BAP auditors cannot know all laws and regulations that apply to salmon farming in all nations. Participating farms have the responsibility to obtain all necessary documentation for siting, constructing and operating their facilities, and make these available to auditors.

Assistance in determining these necessary permits and licenses can be sought from governmental agencies responsible for agriculture, environmental protection, fisheries, aquaculture, water management and transportation, as well as local aquaculture associations. Auditors should also attempt to become familiar with the legal requirements within the areas they service.

The BAP program imposes repeated audits on participating facilities. It augments existing regulations that may require aquaculture facilities to perform environmental impact assessments before beginning construction and to comply with regulations during operation.

During the BAP audit, the representative of the farm shall present all necessary documents, including documents relating to local agreements such as Area Management Agreements, to the auditor. Farms must comply with the requirements stipulated by the documents. In cases where governmental agencies have waived one or more permits or the need for compliance with existing permits, proof of these waivers shall be available.

Standards

2.1: The farm shall have current, valid documents to prove legal land and water use.

2.2: The farm shall have current, valid documents to prove all necessary business and operating licenses have been acquired.

2.3: The farm shall have current, valid documents to prove compliance with applicable environmental and other regulations for construction and operation.

2.4: Where applicable, current and valid documents shall be available to prove compliance with Area Management Agreements or other local agreements to which the farm has committed. (See also Standard 2.7.)

2.5: Where applicable, current and valid documents shall be available to prove compliance with laws protecting the resources of indigenous peoples and/or independent agreements the applicant may have made with them.

2.6: Where applicable, current and valid documents shall be available to show compliance with the farm's own industry codes of practice.

Community Relations

Farms shall strive for good community relations, conduct their businesses responsibly and be responsive to those affected by their operations.

Reasons for Standard

Some salmon farms may restrict access by local people to areas used for fishing or recreation. Farmers should find ways to accommodate these uses, if possible.

Implementation

Participants in the BAP program shall be good neighbors and seek to cooperate with other rightful users of land and water to earn community acceptance. Farm management shall communicate regularly with local leaders and respond helpfully to public requests for information.

Farms shall post signs that identify possible safety hazards and should provide barriers to entry by unauthorized persons where this is legal and practical. However, farm management should try to accommodate traditional uses of natural resources by cooperating with established local interests.

During a farm audit, the auditor assesses compliance with these standards through examination of maps that define public and private zones and concession areas, on-site verification of fences and other barriers, and interviews with local people and farm workers selected by the auditor.

Area Management Agreements

The BAP program strongly supports the concept of nationally-mandated biosecurity zones, neighborhoods or voluntary Area Management Agreements (AMAs) among farms to provide a means for communication with the local community and the coordination of production and environmental management within defined hydrographic areas. Where AMAs already exist, BAP certified farms shall participate in such AMAs and be able to demonstrate compliance with the procedures they define.

Boundaries for AMAs are defined in different jurisdictions by distance or hydrographical characteristics (tidal excursion), with work ongoing to improve precision. It is probable that definitions will evolve over time as better tidal models become available and more is learned about the mechanisms of effective farm separation. Therefore, the BAP program does not yet prescribe a single approach to defining management areas, only compliance with existing management area rules in countries where these are established.

The BAP program also encourages the creation of AMAs where they do not exist and their improvement when their boundaries are not based on hydrographic characteristics. However, because the ability to coordinate management among farms is not under the control of a single BAP applicant, the creation of, and/or setting of boundaries for, an AMA is not yet a requirement for initial BAP certification. One agreed process for establishing and gaining recognition for an Area Management Agreement is detailed in BAP's Biosecurity Area Management Standard: contact GSA Program Integrity for more information.

Nonetheless, applicants must demonstrate their concerted effort to cooperate with other relevant parties, including regulatory agencies, to define or improve a management area and to coordinate management activities among farms within it. Such efforts can include, for example, mapping of the hydrographic zone of influence of the BAP applicant farm and submission of this data to the other relevant parties.

Further, BAP applicants in this position must project a timeline for implementation of an AMA and report on progress during the BAP audit. If the timeline has not been met, the farm must provide documentary evidence to show why the failure was beyond its control.

Certified farms not within an AMA must also cooperate with other neighboring BAP-certified farms and work together as if part of an AMA to coordinate activities whenever AMAs are required by these standards. As a general rule, other certified farms within an area twice the regulatory minimum separation distance to an upper limit of a 5-kilometer radius of the farm shall be considered neighboring.

Standards

2.7: The farm shall accommodate local inhabitants by not blocking access to fishing areas and other public resources. Where access is not direct, the applicant shall provide signage and a written access plan demonstrating consideration of biosecurity and employee and public safety.

2.8: The farm shall clearly identify farm lease boundaries and post signs that warn the public and staff of potential safety hazards.

2.9: The farm shall demonstrate interaction with the local community to avoid or resolve conflicts through meetings performed annually or more often, committees, correspondence, service projects or other activities.

2.10: The farm shall record, review and respond helpfully to requests for information received from the public, including sharing of non-proprietary farm data, and to reasonable complaints that are specific to the farm's operation and provide details in writing of the alleged failing.

2.11: Where applicable, the farm shall demonstrate dialogue with local indigenous peoples and a process for conflict resolution with them under the laws governing their rights.

2.12: The farm shall participate in or be working toward participation in an Area Management Agreement and shall demonstrate compliance with the terms of such an agreement or a projected timeline for establishment of an agreement.

2.12.A: *Data:* Is the farm in an established Area Management Agreement?

2.13: Where an AMA has not been established, farms shall nevertheless demonstrate cooperation on matters of stocking, fallowing, fish health and biosecurity with BAP-certified farms within an area twice the regulatory minimum separation distance to an upper limit of a 5-kilometer radius.

Community

Social Accountability Requirements

Farms shall comply with local and national labor laws to assure adequate worker safety, compensation and, where applicable, on-site living conditions. They shall also comply with local and national labor laws related to young and/or underage workers and not engage in any form of forced or indentured labor.

Reasons for Standard

Farm work is potentially dangerous because of the types of equipment employed and the nature of the work in and on water. Workers may not fully understand the risks at farms and safety instructions related to them.

Salmon farms may be located in remote areas, requiring that staff live on site for periods to provide security and respond to farm emergencies. Conditions of employment for salmon farm employees or subcontracted workers must reflect these special demands in addition to provision of fair wages and other employee benefits.

Implementation

At a minimum, certified farms shall provide legal wages, a safe working environment and adequate living conditions. Farm management must demonstrate that the farm complies with local or national laws governing the rights and conditions of employment of farm personnel, including casual labor and work by subcontractors. Efforts should be made to exceed the minimum requirements, because certified farms should be progressive and socially responsible.

Laws notwithstanding, the farm shall have a written employment policy, verified during the farm audit, that bans forced or bonded labor and employment of workers under 15 years old outside the existing International Labor Organization conventions and standards. Policies shall allow employees to organize collective bargaining under the respective nations' laws and provide written employment contracts in the predominant language of the employees.

Policies shall enable employees to express grievances to company representatives without discrimination or harassment. Farms shall provide insurance or other means to pay wages to employees who cannot work because of injuries sustained at work and for fair and reasonable severance payments to employees who are made redundant.

Staff shall be given training on the work they are required to do, as well as on safety procedures, with allowance made as needed for workers whose first language is not the local language. Safety documents shall be available, and workers shall be trained in first aid and be capable of addressing emergency response procedures.

Safety equipment such as goggles, gloves, hard hats and life jackets shall be provided when appropriate and kept in working order. A plan shall be available for obtaining prompt medical assistance for injured or ill workers.

Farms shall apply dive safety plans that require adequate training of staff divers and minimize daily dive frequency. Dives shall be conducted according to Defense and Civil Institute of Environmental Medicine tables or equivalent approved tables to reduce the risk of decompression illness to minimal levels.

Divers shall maintain procedural logs and maintenance records for diving equipment, which shall be audited at least monthly through a documented internal audit process. Written procedures and staff training for dealing with diving

emergencies such as decompression sickness are also required.

Living quarters, if provided, shall meet local and national standards (e.g., water-tight structures, adequate space, heating/ventilation/cooling), and shall provide adequate clean washing/shower and toilet facilities. Food services, if provided, shall provide wholesome meals for workers at prices that do not exceed local standards. Trash and garbage shall not accumulate in living, food preparation or dining areas.

For subcontractors who work on the farm, the subcontracting companies or individuals shall provide documents to prove they are legally licensed or registered to work in the relevant jurisdiction. Records of subcontracting shall be maintained, and individuals who work as subcontractors more than 100 hours in any month shall receive the same safety training provided to direct-hire employees. Individuals or companies contracted for diving work shall follow the same procedures as direct-hire employees.

During the farm audit, the auditor will evaluate whether conditions comply with labor laws. The auditor will also interview a random sample of workers to obtain their opinions about wages, safety and living conditions. Any discrepancies will be investigated.

Standards

Business Ethics

2.14: The facility shall have a business ethics policy in place, approved by senior management, to demonstrate the facility's commitment to comply with all applicable national anti-bribery laws and prohibit any act of corruption, extortion, embezzlement, or any form of bribery – either directly or indirectly.

Wages and Benefits

2.15: The farm shall ensure that workers are paid at least the legal minimum wage for a standard work week, excluding overtime payments, or the wage rate established by an employment contract or collective bargaining agreement, whichever is higher. The farm shall have a plan, and document steps taken to achieve the plan, which is reviewed at least annually, to pay workers a living wage that shall be based on local assessment of the wage requirements to cover the workers' basic expenses and allow for some discretionary funds for use by workers and their families.

2.15A: *Data:* Input the legal minimum wage paid by the facility in United States Dollars (USD) equivalent.

2.15B: *Data:* Input the living wage as calculated by the facility.

2.16: The farm shall provide benefits that, at a minimum, are required by local or national law or collective bargaining agreements. If not required by law, the facility shall endeavor to provide at minimum benefits that provide decent working conditions for workers, including holiday entitlements, sickness benefits, medical or health insurance and paid maternity/paternity leave.

2.17: The farm shall compensate workers for overtime hours worked beyond the nationally mandated standard work week, at a premium rate, equal to the rate determined by an employment contract, collective bargaining agreement or local law, whichever is higher.

2.17.A: *Data:* Input the average overtime rate per hour paid in United States Dollars (USD) equivalent.

2.18: The farm shall not make deductions from wages that are not permitted by national law. Workers shall be made aware of how their deductions are calculated. Farms shall not make deductions from wages as part of a disciplinary process. Other prohibited deductions include but are not limited to provision of work tools and transportation.

2.19: The farm shall only have access to a worker's bank account to make deposits. Payment of wages shall not be made to someone other than the worker or into an account not controlled by the worker.

2.20: All workers shall be paid in full, in legal tender or directly into a bank account in his/her name at least monthly or more frequently, as specified in the worker's employment contract. Delay in payment or irregular payments are

not permitted. Forced savings shall not be permitted. All wage payments shall be documented, and a pay slip shall be issued to the worker reflecting at least wages and deductions.

2.21: The farm shall maintain all relevant documents, including complete and accurate work records and time sheets, that verify all workers, including piece rate workers and those who are hired through a third-party, are paid in compliance with local and national laws governing minimum wage, overtime, and benefits.

2.22: The farm shall not use the contractors, subcontractors, temporary workers, homeworkers, apprentices, or other non-full-time employment schemes to avoid the payment of benefits, social security, etc. required by local or national law under a regular employment relationship.

Working Hours

2.23: The farm shall set working hours for a standard work week that shall not exceed 48 hours, excluding overtime, that comply with local or national laws, collective bargaining or contractual agreements, where applicable, or industry standards in the country, whichever affords greater welfare to workers.

2.23.A: *Data:* Input the average number of hours for a worker in a regular work week (excluding overtime).

2.24: Documentation of the time each worker starts and finishes each workday shall be accurately recorded and accessible to both farm managers and each worker.

2.25: No worker shall work more than 12 hours overtime in any standard working week unless it has been granted under exceptional circumstances, is permitted by national law, and it has been demonstrated that safeguards exist to protect worker health and safety.

2.25.A: *Data:* Input the average number of overtime hours per week for workers.

2.26: If applicable national laws permit working hours greater than 60 hours per week, the maximum total hours worked shall be verified as meeting national requirements and the worker's name, position and number of hours worked in a given week shall be recorded.

2.27: All workers shall be provided rest days, and rest and meal breaks during work shifts in compliance with local and national law, at a minimum. Where national laws do not specify rest day entitlements, workers shall be entitled to at least one full rest day (24 consecutive hours) after 6 consecutive days work, or two full rest days in a 14-day period. For shift work positions, workers may choose, instead, to accumulate rest days to be taken consecutively.

2.28: Farms shall maintain records that verify compliance with working hour laws, overtime, meal and rest breaks and termination for all workers including but not limited to piece rate workers, contractors/subcontractors, hourly, salaried, and temporary workers.

Forced, Bonded, Indentured, Trafficked and Prison Labor

2.29: All work, including overtime, shall be voluntary, and shall not be under threat of any penalty or sanctions.

2.30: The farm shall not engage in any form of human trafficking, including forced or indentured labor and shall not use involuntary prison labor. This includes, the confiscation or holding of original identity papers and other valuable possessions, prohibiting workers from leaving the premises after their shift, or other means of coercion intended to force anyone to work. Where the holding of original identity papers is required by national law, such papers must be immediately returned to workers upon request and be readily available to them at all times.

2.31: Bonded labor shall be prohibited. The farm shall not require the payment of deposits, bonds or collateral guarantees, recruitment fees or related costs, directly or indirectly.

2.32: Workers shall have the right to leave the premises after their work shift. Workers shall also have the right to terminate their employment after reasonable notice. The farm shall not otherwise unreasonably restrict workers' freedom of movement including but not limited to surveillance during rest or non-work hours, during transportation, or in dormitories provided by the farm.

2.33: The farm shall have information regarding hot-lines, competent authorities, and other resources for victims of labor rights abuse displayed prominently for easy access to workers.

Child Labor and Young Workers

2.34: The farm shall not engage in or support the use of child labor. The farm shall comply with local child labor laws

regarding minimum working age, or the age of compulsory education, or the ILO Minimum Age Convention 138, whichever is higher. Although the ILO Minimum Age Convention 138 states that the minimum age shall be 15, local or national law of minimum age of 14 may apply if it is in accordance with developing nation's country exceptions under this convention. The farm shall collect, verify, and retain copies of age-related records of workers to confirm that the age requirements are being met.

2.35: The employment of young workers (above the minimum age but under 18 years old) shall be in compliance with local or national laws, including required access to compulsory education and any restrictions on hours and time of day.

2.36: Young workers shall not be subjected to conditions which compromise their health, safety, moral integrity, or which harms their physical, mental, spiritual, moral or social development. This includes restrictions on working hours and prohibiting night work and hazardous work.

2.37: The farm shall have in place procedures for support to anyone identified as a child laborer in the farm. Depending on the age of the child, support must include at a minimum removal and reintegration into education (for children below the minimum age and/or children who have not completed basic education and/or changing job functions for young workers above the minimum age to other non-hazardous tasks).

Hiring and Terms of Employment

2.38: The farm shall only employ workers with a legal authorization to work in the country they are employed in. Work performed and terms of employment shall be in compliance with local, national law or international labor standards, whichever provides the highest protection to the worker. Records shall be collected, verified and copies retained to document authorization to work.

2.39: The farm shall provide to all workers, prior to hire and during employment written and understandable information regarding:

- the terms and conditions of employment
- worker's rights, benefits, compensation
- expected working hours
- details of wages for each pay period each time they are paid
- and farm policies regarding disciplinary actions
- grievance procedures
- any authorized deductions from pay
- physical work requirements
- environment and housing
- workplace safety

This information shall be provided in the appropriate language of the employees. This requirement shall apply to all workers regardless of status, including but not limited to hourly, salary, piece rate, temporary and seasonal workers.

2.40: Where contracted/subcontracted or temporary workers are hired through a labor recruiting agency or employment service, the farm shall ensure that these services provide the information cited at clause 2.39 prior to and during hire, in the appropriate languages, to ensure workers are aware of their rights and conditions of employment as described above.

2.41: All labor recruiting agencies or employment services used by the farm must be licensed to operate by the local or national government as a labor provider. Workers shall not be subject to recruitment practices that utilize threats, penalties, coercions, physical force, or fraud.

2.42: The farm shall have a policy or procedure reflecting the Employer Pays Principle that is publicly available and communicated to all workers, recruitment agencies, and other business partners.

2.43: The farm shall document the agencies used to recruit, hire, and/or employ workers, in addition to any known fees paid by or debts accrued by workers in order to secure employment.

2.43.A: *Data:* Input average fees paid to labor recruiting agency per worker in United States Dollars (USD).

2.43.B: *Data:* Input the name(s) of the labor recruiting agency(ies) used to recruit, hire, and/or employ workers.

Discrimination, Discipline, Abuse and Harassment

2.44: The farm shall provide for equal opportunity with respect to recruitment, hiring, terms of employment, compensation, access to training, promotion, termination, or retirement.

2.45: The farm shall have an equal opportunity policy or procedure in place that prohibits engaging in, or permitting discrimination in all aspects of recruitment, employment, and compensation based on legally protected personal characteristics. Terms and conditions of employment shall be based upon the ability to do the job, not on personal characteristics or beliefs.

2.46: The farm shall treat workers with dignity and respect and not engage in or permit physical, verbal or sexual abuse, bullying or harassment.

2.47: The farm shall have a written disciplinary procedure made available in the appropriate language of the workers. Records shall be maintained of all disciplinary actions. The farm shall ensure that disciplinary actions do not include fines, or the threat or mention thereof, or other deductions not permissible by national legislation.

2.48: The farm shall not terminate employees for pregnancy, subject workers to pregnancy or virginity or human immunodeficiency virus (HIV) or sexually transmitted infection (STI) testing (unless the STI testing is done for the purpose of preventing food safety risk), force the use of contraception, or reduce wages after maternity leave.

2.49: The farm shall have in place an established complaints and remediation system to handle cases and allegations, including sexual abuse/harassment, bullying and discriminatory practices. This shall, at a minimum, include a confidential reporting mechanism, information on any hotlines or other outside support services available and the possibility of initiating an independent assessment/arbitration.

2.50: The farm shall have a written worker grievance policy / process available to all workers, that allows for the confidential or anonymous reporting of grievances, to company management without the fear of retaliation. The written procedure shall include that retaliation against a party making a complaint shall not be tolerated and shall allow for the reporting party to bypass their direct supervisor if the grievance is with the actions of that supervisor.

2.51: Cases of human trafficking, work-related death, and prison, indentured, forced, bonded or child labor within a facility's operation or associated supply chain, whether perceived or proven, shall be reported to GSA and the facility's certification body immediately, or at least within 48 hours of such issue being identified by the facility.

2.51.1: If a death is reported, an independent investigation shall be initiated to determine the root cause of the incident and whether there was negligence on the part of the facility.

Freedom of Association and Collective Bargaining

2.52: Farms shall respect the rights of workers to associate, organize, and bargain collectively (or refrain from doing so) without the need of prior authorization from management. Farms shall not interfere with, restrict, or prevent such activities and shall not discriminate against or retaliate against workers exercising their right to representation in accordance with international labor standards.

2.53: Where the right to freedom of association and collective bargaining is prohibited or restricted under local or national law, the farm shall not prevent alternative means to facilitate worker representation and negotiation (for example, the election of one or more workers by other workers to represent them to management).

2.54: The farm shall grant worker representatives access to the workplace in order to carry out their representative functions.

2.55: The farm shall inform workers of their rights to freedom of association and collective bargaining and shall consult with their nominated trade union or worker representative on all issues that could impact the workers.

Employee Facilities and Housing

2.56: If provided or mandated by the farm or employment agency/labor agency, employee housing shall be located separately from operational and storage areas, meet local and/or national standards including but not limited to clean, watertight structures, adequate space as per occupational load for the housing facility, heating/ventilation/cooling, pest control, and a sufficient number of sink, shower and toilet provisions.

2.57: Safe and potable drinking water shall be readily available to workers.

2.58: The farm shall have enough private, clean, and safe toilets, hand wash stations, lockers, and changing facilities in compliance with local and national laws. These shall be readily accessible to workers and kept in good repair.

2.59: If meals are provided, they shall be safe, wholesome and commensurate with local eating customs.

Worker Health and Safety

2.60: The farm shall appoint a member of management responsible for overseeing worker health, safety and safety training.

2.61: The farm shall appoint an employee safety committee to review work practices and work conditions. The safety committee shall regularly hold safety meetings where employees can draw attention to safety problems in need of correction. A log or journal shall be kept with records of accidents and issues presented at safety meetings.

2.62: The farm shall identify, prevent, eliminate or minimize any workplace health and safety hazards through risk assessment analysis conducted by a competent individual at least annually or after an incident or accident or near miss. This includes a requirement for documenting incidents, and investigations of accidents and their cause and correction.

2.62.1: Any workplace incidents resulting in the death of any facility employee or onsite visitor shall be notified immediately to BAP and the Certification Body, including an assessment of root cause and corrective action to prevent recurrence.

2.63: Safe working practices shall be documented for such dangers as handling boats and other equipment, working around water, lifting heavy objects, and other hazards identified in accordance with clause 2.62.

2.64: The farm shall monitor that equipment and machinery are safe through, but not limited to: properly functioning shields or guards; warning signs/pictures; emergency shut-off switches; and/or implementation of lock-out/tag-out procedures to prevent start-up during maintenance.

2.65: Farms shall monitor the strength, stability and safety of buildings and equipment in work, dining and, where applicable, housing areas. This includes but not limited to structural welding/fastening, ensuring proper electrical safety through proper wiring, grounding of cables, and coverage of circuit boxes.

2.66: The farm shall have a fire and emergency protection and prevention plan in place covering all parts of the farm including work, rest, dining, and where applicable, housing areas. This includes but is not limited to provision of sufficient number of smoke detectors and/or fire alarms, adequate numbers of functioning fire extinguishers as per legal requirement; sufficient number of emergency exits (including provision of appropriately designed emergency stairwells on multi-story buildings to support evacuation of personnel), provision of fire hydrant, and evacuation routes that are clearly marked, properly lit and kept clear and unlocked while employees are present; proper training and enforcement for handling of flammable liquids and chemicals; and procedures to prevent fires during such activities as welding.

2.67: An Emergency Response Plan shall be prepared for serious illnesses, accidents, natural disasters or other incidents.

2.68: Farm employees responsible for the Emergency Response Plan shall be trained in the implementation of the Plan and in first aid of electrical shock, profuse bleeding, cardiopulmonary resuscitation (CPR) for prevention of drowning, boat accidents and other possible medical emergencies. A list of the trained workers shall be maintained. At least one of the trained workers shall be present at the farm while it is in operation or maintenance.

2.69: Emergency evacuation drills (in case of fire, chemical leak or similar) shall be conducted, at a minimum, annually, to include all buildings, floors, barges and vessels, as applicable. Drills shall be conducted similarly in housing facilities. The fire and evacuation drills shall be documented and verified.

2.70: All Emergency Response Plans shall include procedures to relocate workers away from imminent danger to a safe location and the facility must have the necessary equipment and transportation to do so safely.

2.71: The facility shall have a safety policy or procedure that includes the right to refuse unsafe work and a requirement to inform management of any perceived risk. The policies or procedures shall stipulate that prior approval to relocate by the management team is not required.

Personal Protective Equipment (PPE) and Clothing

2.72: Personal protective gear and equipment (e.g., eye protection for welding, gloves for shop work, boots for wet areas, and life vests/survival suits for work above water) in good working order and in alignment with local customs and work conditions shall be provided to workers, and properly maintained and replaced, free of charge for the duration of their employment, based on an assessment of workplace risks. Workers shall be trained on proper use of PPE and safe operation of all relevant equipment. Usage of personal protective equipment by workers shall be mandated.

2.73: Electrical pumps and aerators shall be connected to power supplies according to standard safe procedures that include proper wiring, grounding of cables, and coverage of circuit boxes. Machinery shall have proper driveshaft and/or drivebelt safety guards.

Medical Care

2.74: First aid kits shall be clearly marked and readily available to workers, and any expired content shall be replaced. In the event of accidents or emergencies, the farm shall provide basic medical care, including access to or communication with medical and emergency authorities.

Employee Training

2.75: The farm shall have a training program to verify that workers who handle or are exposed to antimicrobial agents, agricultural chemicals, fuels, or other toxic substances that represent a physical, human health, animal health, or environmental hazard are properly trained in their safe use.

2.76: The farm shall provide training in personal health and hygiene to promote worker health and safety. The farm shall also provide refresher training to all employees on these subjects at least annually.

Diver and Boat Safety

2.77: The farm shall comply with laws that govern diving on aquaculture farms and develop a written Dive Safety Plan that documents procedures for safe diving, response to diver emergencies, equipment maintenance, requirements for diver training, use of dive tenders, and the maintenance of logs that records safety-related incidents and equipment maintenance. Limits for time under water shall be established and monitored through diver logs and the frequency of ascents during the dive day shall be established and monitored according to Defense and Civil Institute of Environmental Medicine tables or equivalent approved tables.

2.78: Diving operations shall only be conducted by certified divers who are authorized to rest as needed and restrict, prohibit or suspend an operation or diver if they have safety concerns.

2.79: The farm shall provide written procedures and staff training for handling diving emergencies and shall audit diving logs and procedures monthly using a documented audit process. Emergency response equipment for divers shall include oxygen for resuscitation.

2.80: The farm shall provide written procedures and staff training for the safe operation of boats to avoid accidents and the risk of drowning.

2.81: Subcontractors who provide services such as diving, harvesting, environmental monitoring and system inspection and maintenance to the farm shall provide documents to prove they are legally licensed to do such work and shall be required to comply with the farm's relevant health and safety procedures. Records of subcontract services used shall be maintained and made available.

E. Standard Requirements – Environmental

Sediment and Water Quality

Farms shall be located and operated in such a way that they minimize negative impacts on sediment quality outside a defined sediment impact zone, or on water quality within the general vicinity of the farm.

Reasons for Standard

Salmon farms can affect their local environment through the nutrients and solids derived from the feeding activity of the farms. Settleable solids can accumulate under farms if not managed correctly. Sediment accumulation can be caused by settlement of feces and uneaten food, detachment of fouling debris from nets, or sloughing of antifouling materials. Salmon facilities can also affect water quality near the farm due to excretion of metabolic wastes by the fish. The actual environmental impact from these factors varies greatly depending upon the characteristics of the receiving environment, but sediment monitoring has been shown to be the most practical means of detecting change.

Water column and benthic effects can be caused by other aspects of farm operation, such as the use of medicines and chemicals to treat fish for parasites or diseases, careless waste disposal, unintentional loss of farm materials, or spills of fuel and toxic chemicals. These aspects are addressed in subsequent sections of the standard.

Implementation

Sediment

Farms are usually located following a hydrographic, biological and physical study of the site to determine that farm operations will not have significant negative impacts on animal populations that comprise the benthos under or near the farm. Then “allowable” benthic impacts are set as conditions in the operating permits for the farm, which are defined in terms of one or more of several chemical properties of the sediments. Sometimes these are then correlated with species density and diversity determinations, which are based on prior knowledge of local sediment biology or analysis of sediment reference samples collected from the farm location.

Farm permits and/or local regulations usually define an allowed “sediment impact zone” or “allowable zone of effect”, sometimes also called the “footprint of deposition”, and prescribe monitoring protocols to check it. Because biological sampling of sediments requires special expertise and is time-consuming and expensive, chemical sediment properties are usually used as leading indicators of sediment conditions. Biological sampling is only required in some jurisdictions if an indicator trigger point is exceeded.

Chemical indicators used for this purpose include sulfide, REDOX potential, total organic carbon or total volatile solids.

Some methods are better suited to some environments than others. For example, sulfide determination works well in silt or clay sediments containing up to 50% sand, as does determination of total organic carbon. Above this level of sand, an indicator such as total organic carbon works better. On hard bottoms with over 10% gravel, visual recording by video is best because grab sampling is impossible, and many such sea bottoms are erosional in nature, not depositional.

In some jurisdictions protocols for visual monitoring and analysis of benthic species abundance have been approved by the regulatory authority as stand-along indicators of benthic condition, especially for sites where bottom type (e.g. cobble without sediments) or depth prevent effective sediment collection or chemical analyses.

Since different methods or combinations of methods may be required by different jurisdictions, based on local hydrographic or benthic conditions, no preferred method is specified in these standards, only that whatever method is used shall be undertaken using standard methods of sampling and analysis that conform to standards set by national regulators or to generally accepted international standards.

BAP requirements for sediment monitoring differ depending on whether relevant regulations are established or not and are detailed in the Standards below. Unless required by local regulations, BAP will not require sediment monitoring in salmon farms located in waters with depths greater than 60 meters.

Water Quality

Farm operation effects on water quality are usually measured using internationally standardized methods, but these effects are dependent on temporal and local factors and are often transitory.

Most farms measure dissolved-oxygen levels frequently or continuously to ensure the well-being of their fish, but determination of metabolites such as phosphates and ammonia is not considered necessary for BAP certification for a single farm, except where this is already required as a condition of the farm's operating permits.

However, there may be reasons for concern about the cumulative and far-field effects on water quality of several farms in one area, especially in nutrient-poor areas. In such cases, coordinated nutrient monitoring shall be included within the specifications of an Area Management Agreement.

All farms shall calculate an environmental loading index for total nitrogen based on data collected on feed use and harvested fish, using the following formulas, and the data shall be recorded in audit reports:

Net weight of fish produced per year class crop (kg) _____ (harvested weight minus the weight of juvenile fish at initial stocking)

Feed used per year class crop (kg) _____

Feed protein (%) _____

Feed N content (%) = Feed protein (%) x 0.16

Harvested fish default N content = 2.5% (fish)

Nitrogen Load Index (kg/mt) = (Feed used per year class crop x N content of feed) – (Net weight of fish produced per year class crop (kg) x N content of fish)

Additional Information

Marine Farming Development Plans

Tasmanian Department of Primary Industries, Parks, Water and Environment

https://dpipwe.tas.gov.au/sea-fishing-aquaculture/marine-farming-aquaculture/marine-farming-development-plans/current-marine-farming-development-plans

Regulating and monitoring British Columbia's marine finfish aquaculture facilities 2018

https://www.dfo-mpo.gc.ca/aquaculture/management-gestion/mar-rep-rap-2018/index-eng.html

Code of Good Practice for Scottish Finfish Culture

Scottish Salmon Producers Organization

https://thecodeofgoodpractice.co.uk/

Reference Points for Antifoulant Use

Amara I, Miled W, Slama RB, Ladhari N. Antifouling processes and toxicity effects of antifouling paints on marine environment. A review. Environ Toxicol Pharmacol. 2018 Jan;57:115-130. doi: 10.1016/j.etap.2017.12.001. Epub 2017 Dec 8. PMID: 29258017. https://pubmed.ncbi.nlm.nih.gov/29258017/.

Standards

Regions where Sediment Monitoring Is Not Required and/or where an Allowed Sediment Impact Zone is not Defined

3.0.A: *Data:* Which best describes the region in which the farm operates? (Select one option)

1. Region where Sediment Monitoring is Not Required and/or where an Allowed Sediment Impact Zone is not Defined" or

2. Region where Sediment Monitoring is Required, and Allowed Sediment Impact Zones are Defined

3.1: All farms located in waters less than 60 m in depth shall document and implement a Sediment Monitoring Plan (SMP). The SMP shall be based on historical benthic sampling results for the site or modelled on historical current speeds and current directions at the site.

3.2: The farm shall nominate a qualified individual or company with demonstrated expertise in sediment sampling and analysis to design a Sediment Monitoring Plan appropriate to the farm conditions and to conduct sediment monitoring.

3.3: The Sediment Monitoring Plan shall chart an allowable sediment impact zone, utilizing suitable modelling software, that shall neither exceed the total area of the farm nor extend more than 40 meters beyond its perimeter. The sediment impact zone may be shifted in any direction to account for normally occurring uneven current patterns as long as the total area remains the same.

3.4: The SMP shall address how to monitor the build-up on the seabed of organic matter and copper (for sites where copper-based antifoulants are used), within the sediment impact zone. The choice of method shall be justified by prior documentation of the type of sediments over which the farm is located, and shall define benthic "trigger levels" for chemical sediment indicators appropriate to the sediment conditions in the area of the farm.

3.4.A: *Data:* Does the site use copper-based antifoulants?

3.4.B: *Data:* If yes, input defined "Benthic trigger levels".

3.5: The farm shall conduct sediment sampling according to its SMP coinciding with the period of peak feeding during each crop cycle. (Note: The Animal Welfare Section requires cyclical stocking and harvesting for fish health reasons. Therefore, all BAP-certified salmon farms must operate on a cyclical production schedule). Samples shall be taken along at least two transects that pass directly through the farm and align with the dominant flow of water at the farm site. One sample with five replicates shall be taken at the edge of the farm and another sample with five replicates at the 40-meter boundary. Five replicate samples shall also be taken from at least two reference stations within 1 kilometer of the farm that have similar depth and sediment characteristics as occur at the farm and where there is no other salmon production and no other significant aquaculture or industrial activity.

3.6: The farm shall demonstrate, by statistical analysis of the results, that there is no significant change in any of the relevant chemical sediment indicators or increase in the concentration of copper (if copper-based antifoulants are used) at the boundary of the allowable sediment impact zone by comparison to the reference station, as determined by the monitoring method chosen. The detection of any trend towards exceedance of the farm's established "trigger level" indicators shall be immediately followed by corrective actions to bring conditions back within acceptable levels.

Regions where Sediment Monitoring is Required, and Allowed Sediment Impact Zones are Defined

3.7: The farm shall provide documents that describe local standards for benthic impacts under salmon farms, which shall include the benthic indicator "trigger level" above which the farm has exceeded accepted thresholds, following which corrective actions such as fallowing would be required. Farms shall fully comply with the legally required corrective action process in cases where they have exceeded the trigger level, but in no case shall exceed the accepted thresholds for more than one full production cycle.

3.8: Monitoring of sediment conditions shall be undertaken at the time of peak feeding during the production cycle and shall be conducted according to the requirements of the farm's operating permits.

3.9: Established farms shall provide three years of monitoring data, which shall demonstrate that the farm meets or exceeds sediment and water quality criteria specified in clause 3.7, its operating permits and/or its own monitoring plan at current operating levels.

3.10: Newly established farms, or recently expanded farms, meaning having an increase in total biomass, shall provide modelling and baseline sampling data collected in accordance with recommendations by an independent consultant, characterizing the hydrographic and benthic characteristics of the area and providing the consultant's opinion (given without liability) that the farm can meet or exceed the defined sediment and water quality criteria if operated correctly. This opinion shall be provided in reference to sampling results during each third-party CB audit, and results of monitoring shall demonstrate that the farm is operating within the defined limits.

3.11: The results of sediment monitoring shall be reported to and approved by the appropriate regulators. Where regulatory approval is conditional upon implementing a program of remedial action, this shall have been implemented and completed to show compliance with clause 3.8.

All Regions

3.12: Farms shall provide documents to show that sediment quality was determined using generally accepted, or legally mandated, sample collection and analytical methods.

3.13: Production cycles, fallowing and nutrient monitoring shall be coordinated with other neighboring farms, in particular with members of any established Area Management Agreement in which the farm is participating.

3.14: The farm shall calculate its feed-based nitrogen discharges and calculate a Nitrogen Load Index using the formulas provided in the implementation guidelines. Results shall be recorded in the audit report.

3.14.A: *Data:* Input the calculated Nitrogen Load Index (kg/mt).

Sustainability of Fishmeal, Fish Oil and Other Key Feed Ingredients

Farms shall use feeds and feed ingredients produced by responsible methods, accurately monitor feed inputs and make efficient use of fishmeal and fish oil derived from wild fisheries.

Reasons for standard

Most feeds manufactured for salmon contain fishmeal and fish oil as protein and lipid sources. Like many renewable resources, reduction fisheries can be vulnerable to over-exploitation if they are not responsibly managed and there are limits to the amount of fishmeal and fish oil they can sustainably supply. The BAP program therefore actively encourages the use of feed ingredients derived from terrestrial sources and novel processes as well as fishmeal and fish oil produced from by-products or from aquatic species that are invasive or cultivated. In addition, by improving the efficiency with which feed is converted into fish biomass, farmers can lessen the amount of fishmeal and fish oil used. More efficient feed conversion also has a direct beneficial impact on water quality and limits the release of excess nutrients to the environment.

Implementation

Aquaculture feeds are typically manufactured at commercial facilities and delivered to farms. Farms shall obtain feed from suppliers that provide reliable information on the crude protein and fishmeal and fish oil content in the feeds. In addition, farms shall obtain documents from their feed suppliers that list the type and inclusion rate of all non-marine ingredients used at inclusion rates over 5%. Farms shall record the characteristics of all feeds used, the total amounts of each feed used each year and the total annual fish production.

To promote the responsible sourcing of marine ingredients, the applicant shall obtain feed from a BAP-certified feed mill or a feed mill that declares and documents compliance with the relevant criteria of the BAP Feed Mill Standard

Issue 3.0. These criteria address sourcing policies for marine ingredients, covering traceability for species and origin, the exclusion of IUU (illegal, unregulated, unreported) sources and the exclusion of any species designated on the IUCN Redlist as endangered or critically endangered.

For salmonid feeds, the BAP Feed Mill Standard mandates a minimum of 75% of fishmeal and fish oil derived from either wild fisheries or processing by-products shall be from sources that are certified under GSSI-recognized standards, from Marin Trust-certified producers, or from farmed or invasive species.

Salmon farms can also reduce their use of marine ingredients (and ingredients from all sources) by optimizing the efficiency of feed use at the individual production level. Daily feed management at the farm can reduce overfeeding and decrease feed wastage through the use of integrated systems employing underwater cameras and such software technology as image analysis for pellet detection, Artificial Intelligence that examines fish behavior to estimate satiety or AI control of feeding, with or without operator intervention,

To promote efficient usage of marine ingredients, farmers are also required to calculate and not to exceed set Forage Fish Dependency Ratios.

Forage Fish Dependency Ratio

The Forage Fish Dependency Ratio (FFDR) is a measure of reliance on wild fisheries. It is the ratio of the amount of wild fish-derived ingredients in feed, as fishmeal (FFDRm) or fish oil (FFDRo), to the amount of harvested fish.

Salmon farms shall estimate these ratios for each year class of fish once it has all been harvested. This is accomplished using the FFDR equations below.

FFDR is a new indicator for this standard. Thresholds were set conservatively to allow GSA to collect time-series data on FFDR in regions where BAP-certified farms are located. FFDR data from BAP-certified farms will be reviewed no later than 24 months after publication of this standard. Maximum allowable FFDR will be adjusted accordingly based on this review.

Calculation of an FFDR requires input of the yield values for fishmeal or fish oil. Yield values commonly used in key literature and by industry are 22.5% for fishmeal and 5.0% for fish oil, but these default values can be replaced if the feed manufacturer supplies batch / lot-specific values.

Fishmeal and fish oil inclusion levels in feed shall include any meal or oil derived from wild-caught fish, krill, mollusks or any other wild marine animals. However, fishmeal and fish oil derived from trimmings, by-products or other processing wastes, or invasive or aquacultured species are NOT included. Thus, if data are available for such ingredients, they can be subtracted from the inclusion levels used in the FFDR calculation. Use weighted averages across the year-class for each variable:

a) fishmeal inclusion level = _____ %

b) fishmeal from trimmings* = _____ %

(* obtain from feed supplier; use 0 if unknown; includes by-products, or other processing wastes, or invasive or aquacultured species)

c) fish oil inclusion level = _____ %

d) fish oil from trimmings* = _____ %

(* obtain from feed supplier; use 0 if unknown; includes by-products, or other processing wastes, or invasive or aquacultured species)

e) fishmeal yield % = _____ (use 22.5 if value is unknown)

f) fish oil yield % = _____ (use 5.0 if value is unknown)

g) eFCR = ____

$$\mathrm{FFDR_m} = \frac{(\mathrm{a} - \mathrm{b})\ \mathrm{x}\ \mathrm{g}}{\mathrm{e}}$$

$$\mathrm{FFDR_o} = \frac{(\mathrm{c} - \mathrm{d})\ \mathrm{x}\ \mathrm{g}}{\mathrm{f}}$$

Example 1:

Consider a salmon feed that contains 20.0% fishmeal and 12.0% fish oil, and in the example below, the feed mill has provided documentation that states that no fishmeal and fish oil derived from trimmings were used. eFCR was determined for the year-class in grow-out to be 1.2. Assume a yield of fishmeal from wild fish of 22.5% and yield of fish oil from wild fish of 5.0 % FFDRm and FFDRo would be calculated as follows:

$$\mathrm{FFDR_m} = \frac{(20)\ \mathrm{x}\ 1.2}{22.5} = 1.07$$

$$\mathrm{FFDR_o} = \frac{(12)\ \mathrm{x}\ 1.2}{5.0} = 2.88$$

Example 2:

Again, considering a salmon feed that contains 20.0% fishmeal and 12.0% fish oil, but in the example below, the feed mill has provided documentation that 10% of the fishmeal (meaning 10 out of the 20%) and 10% of the fish oil (meaning 10 out of the 12%) are obtained from trimmings. eFCR was determined for the year-class in grow-out to be 1.2. Assume a yield of fishmeal from wild fish of 22.5% and yield of fish oil from wild fish of 5.0%. FFDRm and FFDRo would be calculated as follows:

$$\mathrm{FFDR_m} = \frac{(20 - 10)\ \mathrm{x}\ 1.2}{22.5} = 0.53$$

$$\mathrm{FFDR_o} = \frac{(12 - 10)\ \mathrm{x}\ 1.2}{5.0} = 0.48$$

eFCR = Economic Feed Conversion Ratio (year class) = total annual feed use ÷ (Total harvested fish weight – weight of smolts intially stocked)

bFCR = Biological Feed Conversion Ratio (year class) = total feed used over a period ÷ total biomass gained over the period

For extenuating circumstances where catastrophic mortality events, such as caused by environmental factors or disease, cause eFCR and the resulting FFDR values to be high, bFRC may be used in place of eFCR in the calculation of FFDR. Evidence of the mortality event must be documented. Use of bFCR in the calculation of FFDR may not be done for two consecutive production cycles.

Additional Information

Best Aquaculture Practices Feed Mill Standard (Current Issue)

https://bapcertification.org/Standards

FAO Code of Conduct for Responsible Fisheries

www.fao.org/3/a-v9878e.pdf

MarinTrust Standard

https://www.marin-trust.com/programme/main-standard

The State of World Fisheries and Aquaculture

http://www.fao.org/state-of-fisheries-aquaculture/en/

Standards

3.15: Farms shall have systems in place, such as underwater cameras and software, to allow farm staff to actively monitor feeding behavior during the feeding of fish. To avoid feed wastage, staff responsible for feeding the fish shall be trained in fish behavior and estimation of satiety and should slow down and end feeding appropriately.

3.16: The farm shall source feed from a BAP-certified feed mill or a feed mill that declares and documents compliance against the ingredient sustainability requirements stated in the current active BAP Feed Mill Standard, covering the key inputs of fishmeal, fish oil, soy ingredients and palm oil. In cases where non-BAP certified feed sources are used, the farm shall provide evidence of each supplier's compliance with BAP requirements for these ingredients, and the audit report shall describe how compliance was determined.

3.16.A: *Data:* Which option best describes the feed sources used by the facility (Select one)?

1. Feed is purchased from all BAP-certified Feed Mills

2. Feed is purchase from Feed Mills that declare and document compliance against the ingredient sustainability requirements of the current BAP Feed Mill Standard

3. A mix of both A and B above.

3.17: Documents from feed suppliers shall be available that assure the traceability to source of marine protein and marine lipid ingredients present in feed at levels of 1% or more and non-marine ingredients at levels of 5% or more. (not applicable when sourcing from BAP certified feed mills, which already meet this traceability requirement).

3.18: The farm shall record the characteristics of all feeds fed to fish and shall record the total amounts of each feed used and the total fish production for each year class.

3.19: The farm shall calculate and record an economic feed-conversion ratio (eFCR) for each year class.

3.19.A: *Data:* Input the calculated eFCR for the most recent year class harvested.

3.20: For each year class in production and / or harvested within the past calendar year, the farm shall calculate and report Forage Fish Dependency Ratios ($FFDR_m$ and $FFDR_o$).

3.20.A: *Data:* Input the calculated $FFDR_m$ for the most recent year class.

3.20.B: *Data:* Input the calculated $FFDR_o$ for the most recent year class.

3.21: For each year-class of *Salmo salar* and *Oncorhynchus mykiss* the farm shall achieve an FFDRm of 1.5 or less and FFDRo of 3.0 or less.

3.22: For other species of farmed salmonids, FFDR targets will be set once adequate datasets have been created, but in no case shall exceed 5.0, and shall not exclude byproducts in this calculation.

Control of Escapes

Salmon farms shall take all practical steps to prevent escapes and, if they occur, minimize possible adverse effects on aquatic wildlife.

Reasons for Standard

Salmon can escape from farms under a number of circumstances. Typically, escapes occur when holes develop in nets due to wear and tear, collisions with boats, human error or attack by large predators. Damage can also occur during severe weather or from vandalism or robbery, when nets are damaged or cut, leading to substantial losses. Escapes sometimes happen when fish are removed from the water for grading or harvesting, or if net meshes are too large for the smallest fish stocked in the cages.

Escapees may affect wild salmon and other wild fish by competing with them for food and/or habitat, or by transmission of disease. When the escaped fish are the same species as wild salmon in the area, they may interbreed and cause changes in genetic profile of wild salmon populations.

Implementation

Fish Containment Plan

Farms shall have a written Fish Containment Plan (FCP) that includes provisions stipulated in the farm's operating permits as well as the provisions listed in this standard, if not so stipulated. It shall address the following key elements:

- Escape prevention
- Dealing with known or suspected escapes
- Inventory accounting procedures

The FCP shall include a classification of the farm site based upon current conditions and degree of exposure (such as Norwegian Standard NS 9415, and see also the MarLIN definitions referenced below), an engineer's structural report, a mooring certification, an escape risk analysis, monitoring procedures that respond to the risk analysis, predator deterrence procedures, precautions related to the use of boats, fish handling procedures and inventory accounting procedures.

Limiting Impacts of Escapes

Farms shall not be located in habitat areas officially designated as "critical" or "sensitive" (or equivalent regional terminology) with respect to wild salmon unless it can be demonstrated that the situation was considered specifically by regulators in granting operating permits and approvals, and that such consideration was backed by an independent environmental analysis.

For the purposes of the BAP Salmon Farm Standard, "wild" salmonids are defined as those naturally spawning salmonid populations that have had little or no direct stocking of hatchery-reared fish for at least two generations.

Non-native Species

Introductions of species of salmon to countries where such species are either not native or not already farmed shall be subject to the provisions of the 2005 ICES Code of Practice on the Introductions and Transfers of Marine Organisms.

Use of Sterile Fish

The use of sterile farmed salmon (fish that are not capable of reproducing) can substantially reduce the risk of genetic introgression from farmed salmon into wild salmon populations, if an escape were to occur. The use of sterile salmon, such as produced through the induction of triploidy, is encouraged.

Transgenic Salmon (Genetically Modified or Bioengineered)

Cage farms shall not stock transgenic fish, which are defined as fish that have been genetically modified/bioengineered by artificial transfer of genetic material from a different species. Sex-reversed salmon and their offspring, and organisms created by hybridization and polyploidy are not transgenic.

Technical Notes

Techniques to produce sterile salmon that cannot interbreed with local wild salmon if they escape are the subject of current research. This will be kept under review by the BAP program and its advisors and may be a future requirement for certification.

Methods for marking fish so that farmed fish caught in the wild can be traced to their source are feasible, but difficult

to use on a large scale. Nonetheless, such marking is a desirable goal and thus will also be kept under review as a possible future requirement for BAP certification.

Additional Information

Environmental Regulation for Aquaculture (RAMA) Chile DS No. 320-01
www.subpesca.cl

ICES Code of Practice on Introductions and Transfers of Marine Organisms 2005
https://www.ices.dk/community/Documents/Expert%20Groups/WGITMO/ICES%20Code%20of%20Practice.pdf

Marine Fish Farms N.S. 9415
https://standard.no/en/sectors/fiskeri-og-akvakultur/floating-aquaculture-farms/

Marine Scotland: A Technical Standard for Scottish Finfish Aquaculture (2015)
https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2015/06/technical-standard-scottish-finfish-aquaculture/documents/00479005-pdf/00479005-pdf/govscot%3Adocument/00479005.pdf

The Marine Life Information Network: Wave exposure definitions
https://www.marlin.ac.uk/glossarydefinition/waveexposure

Code of Containment For the Culture of Salmonids in Newfoundland and Labrador
Aquaculture Development Division, Department of Fisheries, Forestry and Agriculture
https://www.gov.nl.ca/ffa/files/DOC-2022-04405-Salmonid-Code-of-Containment-Updated-October-20222.pdf

Technical Requirements for Fish Farming Installations
Norwegian Ministry of Fisheries and Coastal Affairs
http://www.regjeringen.no/upload/kilde/fkd/bro/2005/0013/ddd/pdfv/255320-technical_requirements.pdf

General Permit Atlantic Salmon Aquaculture
Maine Pollutant Discharge Elimination System Permit, Part II Special Conditions State of Maine Department of Environmental Protection – 2008

https://www3.epa.gov/region1/npdes/permits/2008/finalmeg130000permit.pdf

Standards

3.23: If the farm operates in a jurisdiction where there are government regulations for fish containment, the farm shall comply with the regulations and provide records of compliance.

Fish Containment Plan (FCP)

3.24: The FCP shall include a classification of the farm site using the method proposed in Marine Fish Farms NS 9415 E:2009 or equivalent, based on expected wave heights and currents based on local estimates of 10-year and 50-year maximum wind speeds and durations.

3.25: The FCP shall include a report from a qualified engineer or accredited third party that confirms the farm structural design is appropriate, given the site classification.

3.26: The FCP shall include documents that show the farm's moorings were installed according to the manufacturer's and/or engineer's specifications and with regard to any site-specific considerations.

3.27: The FCP shall include a site risk analysis, updated at least annually, that identifies the potential and actual causes of fish escapes, determines their relative likelihood of occurrence or recurrence at the farm site, and identifies critical control points for effective escape risk monitoring, escape risk reduction and response to escapes by farm staff.

3.28: The FCP shall include procedures based on the risk analysis in clause 3.27 that include management protocols and actions designed to monitor escape risks, reduce them when identified, and respond to escape events in a timely and effective manner. The efficacy of these measures shall be verified and documented frequently throughout the year.

3.29: The FCP shall include procedures that require the main surface components of the system to be examined by qualified inspectors at least annually and repaired or replaced as needed. The sub-surface components shall be inspected by qualified divers or by remote means or shall be taken ashore or lifted for detailed inspections at least every two years or between each crop cycle, and any faulty components shall be repaired or replaced as needed.

3.30: The FCP shall include net inventory management procedures that track the ages of all nets deployed on the farm and provide strength tests on all nets between crops. Nets shall be retired when their strength is below levels specified in local regulations or, where there are none, below the manufacturer's or supplier's recommendations. All nets which have been held in storage for more than two years shall be inspected for any signs of deterioration and strength-tested as needed, before being deployed on farm sites. Any deficiencies shall be addressed before deployment or the nets shall be retired.

3.31: The FCP shall include cage inspection procedures that ensure all operational nets are surface checked for holes at least weekly and checked sub-surface at least every two weeks. Nets and cage superstructure shall be checked in a timely manner for holes and other indications of structural damage after risk events such as storms or big tides, when inspections can be safely conducted.

3.31.1: Sub-surface cage inspections may be conducted at a maximum interval of every four weeks if the facility conducts a detailed risk assessment demonstrating no increased risk of net damage and predation during the current production cycle.

3.32: The FCP shall include predator deterrence infrastructure and procedures that minimize the risk of predators making holes in nets.

3.33: The FCP shall include boat equipment and procedures, such as guards on propellers, boat docking protocols, and staff training procedures that minimize the risk of contact between boats and farm nets.

3.34: The FCP shall include procedures and equipment consistent with local Coast Guard rules to warn non-farm marine traffic of the farm's presence.

3.35: The FCP shall include procedures for handling live fish to prevent "spillage."

3.36: The FCP shall include a training program for all staff, which shall be part of their initial training, on all procedures in the Fish Containment Plan, and records of all such training shall be maintained in employee files.

3.37: During the audit, a subset of employees shall be interviewed and must demonstrate familiarity with the implementation of the FCP.

Known and Suspected Escapes

3.38: Farms shall maintain equipment for attempting fish recapture and have written procedures for its use in situations where it might work. The procedures must enable rapid response, subject to legal constraints on the types of equipment that can be used.

3.39: If an escape is known or suspected to have occurred, the cause shall have been investigated immediately, and actions shall have been taken to address it. Records of actions taken shall be available.

3.40: If a substantial escape (>500 fish) is known or suspected to have occurred, the number of fish remaining in the cage or cages shall be counted and recorded. If recounts cannot be accomplished in a timely manner because water quality and animal welfare indicators raise concern that it would result in excessive distress to the fish, then the farm shall inform BAP and the Certification Body of the known or suspected escape, and the recount can be scheduled as soon as conditions improve.

3.41: BAP certification shall be suspended if two or more known escapes of more than 500 fish from individual cages are documented over two consecutive production cycles, or if such escapes cumulatively exceed 5,000 fish.

3.42: BAP certification shall also be suspended if there is a single escape of more than 5,000 fish at any time. The escape shall be reported immediately to the regulator, as may be required by the farm's permits. BAP and the Certification Body shall also be immediately notified with details concerning the escape.

3.43: Following any suspension, reinstatement of BAP certification shall be subject to an independent engineering and/or operational review and risk assessment to determine the cause(s) of the escape(s), and to recommend corrective action(s) where the risks are matters the applicant can reasonably be expected to control.

3.44: Following any suspension, reinstatement shall also be subject to proof presented by the applicant that effective corrective action(s) have been taken.

3.45: Details of known escapes shall be collected and shared with other farms participating in an Area Management Agreement, where such an agreement is in place, and with other BAP-certified farms within a 5-kilometer radius of the farm.

3.46: Known escapes shall be reported to the regulator when they exceed reportable thresholds where they exist, with proof of reporting maintained in farm records.

Inventory Accounting Procedures

3.47: A certificate signed by an authorized hatchery representative shall accompany all shipments of juvenile fish (smolts) received that states how many fish are in the shipment and the estimated margin of error in the count. The margin of error shall be verifiable by reference to documented hatchery procedures and records.

3.48: After a year class of smolts is fully stocked, the number shall be recorded, and a projection shall be prepared of the number of fish expected to be harvested from it, based on the number of smolts received and taking into account possible error in the hatchery count, as well as other projected losses during the production cycle.

3.49: The projected harvest quantity of a year class shall be compared with the actual number harvested and any variance shall be explained by reference to farm records of known losses.

3.50: The farm shall provide documents to show that the variance between the projected and actual harvest numbers of fish from the last year class harvested was within ± 3% after accounting for known losses.

3.51: Inventory variances outside ± 3% that cannot be explained shall prompt a follow-up audit or investigation at the farm's expense to determine the cause, and, if a satisfactory explanation is not found, shall result in loss of BAP certification.

Limiting The Impact of Escapes

3.52: The farm shall not be located within an area officially designated as "critical" or "sensitive" habitat (or equivalent terminology) with respect to wild salmon unless site-specific, valid, official documentation authorizing an exemption, supported by an environmental impact analysis, can be provided.

3.53: The applicant shall provide documents that prove the species of salmon farmed is approved for farming in that country and that the stocked fish are not transgenic (genetically modified / bioengineered as described in the Implementation section above). Where the species farmed is not native or not already farmed, further documents shall be provided to demonstrate that approval for farming is based on the 2005 ICES Code of Practice on Introductions and Transfers of Marine Organisms.

Predator and Wildlife Interactions

Farms shall manage physical interactions with wildlife and not reduce the biodiversity of ecosystems.

Reasons for Standard

Salmon farms are located along mostly undeveloped coastlines where abundant marine wildlife is common. Wildlife species may interact with salmon farms because they are intimidated by the farms' presence or because they are attracted to farms as habitat, somewhere to perch or hide, or a place to find food.

For this section, these interactions are defined as "physical interactions," distinguished from the "biological interactions" with wild salmon addressed elsewhere in the Standard. Many physical interactions with wildlife are harmless, but in some cases, they can injure wildlife through entanglement and drowning, or damage farm equipment. Wildlife in areas designated as "critical" or "sensitive" habitat can be particularly vulnerable to adverse interactions, and salmon farms may be required to adopt special precautions if they are permitted to locate in such areas.

Wildlife species that interact with salmon farms include but are not limited to diving birds that attack small fish through net meshes, predatory birds that take fish from the surface and small marine mammals such as otters that enter cages and kill fish. Large marine mammals may attack fish from the outside and damage nets. Certain fish species may chew on nets and create holes.

Implementation

Farms shall have a written Wildlife Interaction Plan (WIP) that includes provisions stipulated in local laws and the farms' operating permits, as well as the requirements listed in the clauses below, if not so stipulated. The WIP shall describe area wildlife and include copies of important, relevant reference documents, where these exist. It shall also highlight specific points of concern or ecological sensitivity and itemize policies and procedures the farm will follow to accomplish the goal of avoiding harm to wildlife while protecting farmed fish and farm infrastructure.

The BAP program strongly encourages farms to employ humane, non-lethal measures for predator exclusion and/or control, even when lethal methods are permitted. Common exclusionary systems for aquatic predators include high-strength, properly tensioned anti-predator nets (e.g., high-density polyethylene or similar) or main production nets with a steel core. Above the cage, anti-bird-netting can be employed. Above-water fences or other physical controls can be used to prevent marine mammal haul-out.

Farms shall record all predator mortalities (species and numbers). All marine mammals, seabirds and species listed as "critically endangered" or "endangered" on the International Union for Conservation of Nature Red List or protected by local or national laws shall not be subject to control by any means except physical exclusion, unless human safety is at risk or an independent environmental audit provides justification for such control, and specific written permission for an alternative means of control has been granted by the regulator with jurisdiction.

Although there are cultural and legal differences among countries regarding the protection of wildlife, particularly with respect to pinnipeds, farms must do all they reasonably can to not harm wildlife, irrespective of local customs.

Additional Information

International Union for Conservation of Nature Red List of Threatened Species:

http://www.iucnredlist.org

NOAA Guidelines for Safely Deterring Marine Mammals:

https://www.fisheries.noaa.gov/action/guidelines-safely-deterring-marine-mammals

2018 Revision to the Technical Guidance for Assessing the Effects of Anthropogenic Sound of Marine Mammal Hearing (Version 2.0):

https://www.fisheries.noaa.gov/resource/document/technical-guidance-assessing-effects-anthropogenic-sound-marine-mammal-hearing

Standards

Legal Compliance

3.54: If the farm operates in a jurisdiction with government regulations related to interactions with wildlife and predator control, the applicant shall comply with the regulations and provide records of compliance.

Critical Habitats and Endangered, Threatened or Protected (ETP) Species

3.55: The farm shall not operate within an area officially designated as "critical" or "sensitive" habitat (or equivalent terminology) with respect to ETP species, without official documentation which recognizes the designation and authorizes the farm to be located within this area. The farm shall document any regulatory directives given to mitigate potential impacts on ETP species or their habitat.

3.56: If the farm is authorized to be located within an area officially designated "critical" or "sensitive" habitat (or equivalent terminology) and possible farm interactions with wildlife have not been considered by the regulators in granting the farm(s) licenses, the farm shall obtain an independent expert's risk assessment of such interactions and shall address how they manage the identified risks without negative impacts on such habitats.

3.57: The farm shall provide an up-to-date list of local species classified as ETP under local or national laws and/or listed as "critically-endangered" or "endangered" on the IUCN Red List. This list shall include only species which have been documented within 2 kilometers of the farm, unless suitable justification for their exclusion can be given. ETP cetaceans and sea turtles that have been documented within 60 km of the site shall be listed. This list shall be updated where necessary to show wildlife established after the farm was started.

3.58: The farm shall provide effective training for designated farm staff in recognizing ETP species identified in the list from 3.57. Training records and criteria for which staff positions are trained shall be available. The farm shall institute suitable response plans for local ETP species in case they are encountered near the farm. Trained staff shall record and report observations of such species, and farm staff response, to farm management.

3.59: The farm shall not use controls, other than non-lethal exclusion, on species listed as "critically endangered" or "endangered" on the IUCN Red List or that are protected by local or national laws, except under exceptional circumstances, such as risk to human life, and then, if not an emergency, only after written authorization is obtained from regulators.

Wildlife Interaction Plan

3.60: Local rules notwithstanding, the farm shall develop and implement a written Wildlife Interaction Plan (WIP), which shall define procedures for the management of wildlife interactions and predator controls. These shall include predator-specific response plans.

3.61: The WIP shall include a list of relevant local laws and specific conditions of the farm's operating permits that apply to wildlife management and protection.

3.62: The WIP shall specify the farm's passive measures to deter the entry into cages by predatory birds or small mammals and to protect cages from underwater attack by marine mammals, including measures to avoid enticing predators, such as timely removal of dead fish from cages.

3.63: The WIP shall specify procedures for the regular inspection of cages to check and report on the integrity of all supplementary passive control measures that have been installed for the deterrence of predators.

3.64: If acoustic harassment devices approved by regulators are in use at the farm, the WIP shall include documentation to show that the devices are used in an approved manner, with specific reference to possible impacts upon endangered, protected, or threatened cetacean species in the area. Such devices shall not be deployed if such species will be adversely affected.

3.65: The WIP shall include procedures for regulatory authorization, implementation and reporting of lethal control measures when these are deemed necessary.

3.66: The WIP shall include reporting procedures if control measures cause the accidental death of wildlife and procedures for developing action plans to prevent such incidents in the future.

3.67: The WIP shall specify that, in the engineering of farm construction components and passive predator controls, consideration be given to reducing the risk of accidental harm (e.g., entanglement or collision) to ETP species.

3.68: Farm employees who are responsible for the implementation of the WIP shall be trained, and records of all such training shall be maintained in employee files.

Predator Controls

3.69: The farm shall actively favor passive and/or active non-lethal methods of predator control, with active lethal methods only used after all applicable/permitted non-lethal methods have been attempted or are known to be ineffective. Records of fish mortality, damage to system integrity and/or documented threats to employee safety shall be available for inspection and shall be utilized in any decisions made to employ lethal methods.

3.70: The farm shall have suitable passive or physical predator exclusion controls in place, unless the location of the farm, or extenuating circumstances, renders these unnecessary.

3.71: For predator species commonly found near the farm, the WIP shall include written plans for how to remove entangled or trapped animals from within the production system, including the equipment needed. With species for which expert advice is needed for disentanglement (such as cetaceans) the WIP should list contact numbers for such experts.

3.71.A: *Data:* Input the total number of reported cetacean interactions and entanglements in the last 12 calendar months.

3.71.B: *Data:* Input the total number of reported pinniped interactions and entanglements in the last 12 calendar months.

3.72: The farm shall record, and report when required, the species and numbers of all avian and mammalian predator mortalities, including accidental mortalities, entanglements, and corrective actions taken to prevent such mortalities.

3.72.A: *Data:* Input the number of reported avian mortalities (all species combined) in the last 12 calendar months.

3.72.B: *Data:* Input the number of reported mammalian mortalities (all species combined) in the last 12 calendar months.

3.73: The frequency of incidences of active deterrence in which wildlife is affected shall be reduced over time unless extenuating circumstances can be demonstrated. Records of incidents shall be available with evidence of analysis of trends in frequency of incidents.

3.74: Any deterrent used for marine mammals shall be among those listed in NOAA Guidelines for Safely Deterring Marine Mammals and shall adhere to the guidelines defined in the 2018 Revision to the Technical Guidance for Assessing the Effects of Anthropogenic Sound of Marine Mammal Hearing.

3.75: Active deterrents shall only be used when passive avoidance is ineffective. This can be determined by human or effective automated tools. Where human controlled, the WIP shall designate sufficient staff members at the farm

to carry out the active deterrent system. These staff must have received suitable training to identify ETP. The least impactful deterrent method should be attempted first, and phased alternatives used, if that method is not effective.

3.76: Farms shall coordinate acoustic deterrent activity with nearby farms that could overlap acoustic signals and ensure there are breaks in acoustic activity. Farms should also consider an acoustic attenuation system.

3.77: The farm shall only use non-lethal deterrents, such as seal bombs / crackers, “bean bags”, seal scarer caps, or any form of lethal predator control, which are specifically authorized for use by the regional legislative authority.

3.77.1: These devices shall only be deployed under the surveillance of a trained animal health professional, and any adverse impacts to predators shall be recorded.

3.77.2: Farms that actively use these devices shall demonstrate a written commitment to the phase out of these devices by January 1, 2035, as well as active, ongoing adoption and trial of alternative predator deterrence methods.

3.78: All incidents of entangled or trapped predators must be fully documented and records shall be maintained for three years. Any entangled or trapped animals must be immediately released following procedures outlined in local law and the WIP.

Lethal Control / Harmful Interactions

3.79: The WIP shall designate at least one staff member at the farm to carry out lethal control measures, if specifically allowed in a license or permit issued by a competent authority and shall train such individuals in humane slaughter methods as specified in the authorization.

3.80: In the event of an interaction where an ETP species has been severely harmed or killed, either intentionally or accidentally, an incident report shall be provided to BAP outlining the cause and planned actions to prevent a repeat incident.

3.81: Lethal control measures to control predatory species must only be used where specifically allowed in a license or permit issued by a governmental authority. The WIP shall require training in humane slaughter methods for farm staff who are designated to carry out the lethal control measures specified in the authorization.

3.81.A: Data: Input the reported number of predators dispatched using lethal control in the last 12 calendar months.

3.81.B: Data: Input the names of predator species dispatched using lethal control in the last 12 calendar months.

Storage and Disposal of Farm Supplies, Management of Antifoulants

Feed, fuel, lubricants and chemicals shall be stored and disposed of in a safe and environmentally responsible manner. Paper and plastic waste shall be reused, recycled or disposed of in a sanitary and responsible way. The use of antifoulants shall be managed to protect the environment.

Reasons for Standard

Modern salmon farming uses feed that is susceptible to spoilage and infestation by vermin and pests unless stored properly. Farms use fuel, oil and grease to power and lubricate boats, pumps, aerators and other mechanical devices. Some farms may use parasiticides and antifoulants. Other products employed include paints, disinfectants and detergents.

Fuels and other chemicals are highly flammable and/or explosive, and parasiticides and antifoulants are toxic. They shall therefore be considered potential hazards to workers.

Spills or careless disposal of petroleum products and chemicals can affect aquatic organisms and other wildlife in the immediate vicinity and result in water pollution over a wider area.

Farms generate waste that can cause pollution, odors and human health hazards when not disposed of properly. Human

food scraps, out-of-date feed and other organic waste can attract scavengers.

Empty plastic bags and other containers used for feed, fertilizer and other materials do not decompose quickly. They can be a hazard to animals that become entangled in them or ingest them. Cage farms normally contain various types of aquaculture gear (cage collars, work platforms, nets, ropes, buoys, etc.) and, particularly as a result of storm damage, can become sources of 'ghost' gear that can entangle and endanger wildlife.

These wastes may be stored prior to disposal at a land base from which the farm is supplied, as well as transported on boats and barges to and from the farm. Land bases shall take equal precautions to prevent hazards from chemical contamination. Safe, responsible transport, storage, handling and disposal of these materials are necessary at all times. Well-developed policies for material reuse, recycling and waste reduction can reduce the environmental footprint of a salmon farm.

Procedures for the collection and sanitary disposal of dead fish recovered from the cages are described under biosecurity procedures in the Animal Welfare Section.

Salmon cages are located in natural water bodies and attract a wide variety of fouling organisms that settle on the mesh and eventually impede the free movement of water, known as biofouling. If not controlled, this fouling becomes detrimental to water quality and eventually impacts fish welfare. In response, farm operators often find it necessary to treat their nets with chemicals that are toxic to fouling organisms. However, the use of such products carries environmental risks and they must be carefully managed so that negative impacts, particularly on sediments beneath cages, are controlled and reduced over time.

Implementation

Farms shall have a written Materials Storage, Handling and Waste Disposal Plan (MSHWDP) that includes provisions stipulated in local laws and the farms' operating permits, as well as the requirements detailed in this standard, if not so stipulated. Procedures for the management of antifoulants shall be clearly defined to control the risk of negative environmental impacts and how 'ghost' gear shall be managed.

Note: The use of toxicant-based antifoulants will not be allowed at BAP-certified farms once the utility of alternatives is fully established. This will be a priority consideration at the next review of these standards.

Additional Information

USDA NRCS Guide Sheet No. 701

Spill Prevention Control and Countermeasures

https://efotg.sc.egov.usda.gov/references/public/AL/G14Generaloperationsandworkersafety.pdf

Standards

Materials Storage, Handling and Waste Disposal Plan (MSHWDP)

3.82: Farms shall prepare, and provide evidence of compliance with, a Materials Storage, Handling and Waste Disposal Plan (MSHWDP) that includes provisions stipulated in local laws and the farm's operating permits, as well as this Standard's requirements, if not so stipulated.

3.83: The MSHWDP shall require that the farm maintains an accurate, current inventory of all hazardous materials including any chemotherapeutants used, and wastes stored and/or disposed of by the farm.

3.84: The MSHWDP shall ensure that material safety data sheets for all hazardous materials in the inventory can be readily accessed.

3.85: The MSHWDP shall address the safe storage, warning signage, transport, handling, labeling, disposal and use of

fuel, oil, lubricants, chemicals and other potentially toxic materials used on the farm and any land base to limit the risk of accidental spills, fires, explosions and release into the environment. If stored in the same building, hazardous materials shall be stored near feed, employee housing, or dining areas in a manner that avoids cross-contact and/or contamination.

3.86: The MSHWDP shall specify procedures and the necessary materials and equipment for emergency containment and cleanup of spilled materials. Such supplies shall be readily available onsite, and designated staff shall be trained in their use.

3.87: For individual or multiple fuel storage tanks, secondary containment shall be provided equivalent to the total fuel container capacity plus 10%.

3.88: The MSHWDP shall address refueling, maintenance and record-keeping procedures for all equipment that uses oil or fuel to prevent leaks or spills and ensure that used oil is sent to an approved handling facility.

3.89: The MSHWDP shall include procedures for the collection, storage and disposal of trash, garbage, refuse and other waste materials. Such material shall be disposed of in compliance with local regulations and shall avoid environmental contamination, and human food waste shall be protected from pests in covered, leak-proof receptacles.

3.90: The MSHWDP shall include procedures for the sanitary storage and disposal of human waste (black water).

3.91: The MSHWDP shall include procedures for the sanitary storage and handling of feed and its protection from pests, and procedures for periodic cleaning of feeding systems.

3.92: The MSHWDP shall include procedures for minimizing marine debris by reusing and recycling waste and other materials, where this is feasible.

3.93: The MSHWDP shall include procedures for the safe disposal of materials deemed surplus or out of date, including medicated feed.

3.94: Farm employees responsible for activities under the MSHWDP shall be trained in its implementation and records of such training shall be available.

Antifoulants

3.95 The farm shall have a program to monitor biofouling on each net and establish action levels for biofouling control.

3.96: The MSHWDP shall include procedures for washing nets treated with copper or other toxicant-based antifouling materials.

3.97: Nets treated with topically-applied antifoulants that are known to be toxic, such as copper, shall be cleaned out of the water at a licensed off-farm net cleaning establishment, or on the farm if equipment and procedures are in place to treat the wash water and collect the solid waste before disposal. In all cases, methods of collection and treatment shall comply with national or regional regulations governing the disposal of toxic wastes.

3.98: Farms shall utilize or test alternatives to the use of topically-applied toxicant-based antifoulant paints on farm nets with the goal of reducing release of toxicants to the environment, especially toxicant residues that can accumulate in marine sediments.

3.99: In farms that are shifting from the use of antifoulants to in situ net cleaning or alternative net materials, copper-based antifoulant-treated nets may be cleaned onsite only if the nets have first been cleaned onshore at a licensed facility (see clause 3.97) and not retreated before redeployment.

Management of Abandoned, Lost or Otherwise Discarded Gear and Ocean Plastics

3.100: Farms shall demonstrate that all cages, collars, production nets and predator nets deployed are uniquely marked and identifiable, or they shall develop a plan to have all cages and nets deployed uniquely marked and identifiable by the next production cycle.

3.101: A procedure shall be in place to manage the disposal of all aquaculture gear used by the farm, which details how all gear deployed will be recovered and disposed of as necessary. Relevant farm staff shall be trained in responsible gear and debris management.

3.102: A procedure shall be in place to manage the storage and disposal of all inorganic/non-biological waste produced from, or recovered from, farm operations. The procedure shall detail how waste shall be brought ashore to be disposed of in an authorized manner that will not have a detrimental impact on the environment. Records of how this waste material is disposed of shall be retained.

3.103: A procedure shall be in place for the management and recording of lost gear, derelict gear, or other plastics that may be recovered in the vicinity of the farm. If the gear or plastics cannot be recovered, that shall be recorded as well.

F. Standard Requirements – Animal Welfare

Health and Welfare

Animal welfare can be defined as the overall physical and mental health and wellbeing of a population. In fish farming, ensuring that fish are treated well and pain and suffering are avoided, results in what is considered good welfare.

Producers shall demonstrate that all operations on farms that involve fish, including "cleaner fish" if used, are conducted with animal welfare in mind. Employees shall be trained to provide appropriate levels of husbandry and care.

Reasons for Standard

Various stages and circumstances in the salmon farming process can cause distress to fish. These include but are not limited to the transport of smolts or larger fish from hatcheries, handling during sampling, grading and counting, treatments for health problems, pre-harvest holding and slaughter if slaughtered at the farm. Poor water quality conditions, such as those associated with low levels of dissolved oxygen, phytoplankton blooms in surrounding waters, or extreme water temperatures or temperature fluctuations, can also cause fish to be distressed. However, such distress can be limited, and production efficiency increased by applying good husbandry techniques and selection of farm sites where water quality is expected to be good.

Implementation

Fish farmers use Operational Welfare Indicators (OWIs) to collect information on the state of welfare of their fish. These indicators result from observations of the fish, such as body condition, mortality, disease and behavior and from environmental data such as temperature, salinity and dissolved oxygen.

The farm shall apply good aquatic fish stock management and husbandry practices, overseen by an accredited fish health professional as part of the farm's Fish Health Management Plan.

Farms shall provide facilities for holding and rearing fish that allow them to thrive. High quality feed shall be offered at regular intervals except when fasting periods are needed, to lower metabolic activity in times of suboptimal dissolved oxygen levels, or before fish are handled, such as before grading or harvesting.

Survival and feed conversion ratio (eFCR) are good indicators of long-term fish welfare and well-being and farms shall attain or better set targets.

Trained farm staff shall regularly inspect the culture units, noting water quality, appearance and behavior of the fish, and report observations to management daily. All reports of behavioral distress shall be followed up with the accredited fish health professional, or his or her designee, to determine the cause of problems and resolve them.

Abnormal behaviors include fish breaking away from the school, surfacing, head shaking, abnormal swimming and weak feeding response. Distressed fish may also display respiratory distress such as rapid opercular movements.

External changes in color, fin and skin lesions, ocular damage and deformities are also indicators of distress and the use of sub-surface cameras, if available, is encouraged in order to make these observations. However, these physical changes are lagging indicators that can often be predicted or avoided by observing the behavioral indicators noted above and by taking appropriate pre-emptive action. When morphological abnormalities are present their causes must be determined and corrected to the best of the farm's ability.

Sudden changes in artificial illumination or other such environmental disturbances that might startle fish shall be avoided where possible.

Dead fish shall be regularly removed from cages and be disposed of in a hygienic manner. Fish that are still alive but are obviously sick or injured shall be removed from their cages and euthanized humanely. If cleaner fish are used (see Cleaner Fish below) and cannot be re-used following harvest of the farm fish, they shall also be euthanized humanely.

The farm shall have a written Water Quality Management Plan (WQMP) that includes the monitoring, mitigation measures and training indicated in the numbered requirements below.

When fish are crowded for management purposes, stocking densities shall be moderate and consider local and temporal factors such as fish size, water temperature, dissolved oxygen levels, the hydrographic patterns of the farm location and the time for which crowding will last.

Fish shall be harvested and transported to processing plants or other markets in a manner that maintains temperature control and minimizes distress. Before slaughter, they shall be stunned instantly by humane means. Carbon dioxide asphyxiation, ice slurry slaughter, bleeding without effective pre-stunning and asphyxiation in air, shall not be used.

Biomass density shall not exceed 25 kg/m3, and site-specific biomass density criteria should be developed based on local conditions and be assessed using historical Operational Welfare Indicators. When fish are kept at higher densities farm managers must ensure that all practical steps are taken to ensure that their welfare is not compromised.

Cleaner Fish

In recent years cleaner fish such as lumpsuckers and wrasse have been stocked with salmon in the cages to help control sea lice infestation. These may be wild-caught or hatchery reared, and the latter should be used where they are available. Their welfare creates an additional responsibility for salmon farmers who use them. Since their use for this purpose is relatively new, specific welfare measures are still under development, but farms that use them shall have a documented Cleaner Fish Welfare Plan. The plan shall include documentation of mortalities, checks on their health alongside checks on the salmon, provision of shelter for them in the cages and supplemental feed and a plan for their reuse once the salmon are harvested, or for their humane slaughter if this is not possible.

Fish Welfare at Harvest and During Transport to a Processing Plant

Movements of fish on-farm, including during harvests, crowding and transfer of fish shall be accomplished as quickly and carefully as possible. It shall be determined prior to audit if the responsibility for fish welfare when fish are rendered insensible and bled at the farm, or transported live to a processing plant, lies with the farm or the processing facility. It shall be audited as part of the Salmon Farm Standard only if responsibility is determined to lie with the farm, or if the fish are to be processed at a plant that is not certified to a standard that addresses animal welfare in a manner consistent with the Seafood Processing Standard (https://www.bapcertification.org/Standards).

Additional Information

Farm Animal Welfare Committee – 2014
Department for Environment, Food and Rural Affairs in England and the Devolved Administrations in Scotland and Wales.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/319323/Opinion_on_the_welfare_of_farmed_fish.pdf

RSPCA Welfare Standards for Farmed Atlantic Salmon –2024
Royal Society for the Prevention of Cruelty to Animals
https://science.rspca.org.uk/sciencegroup/farmanimals/standards/salmon

Welfare indicators for farmed Atlantic salmon NOFIMA
https://nofima.no/wp-content/uploads/2021/05/FISHWELL-Welfare-indicators-for-farmed-Atlantic-salmon-November-2018.pdf

Code of Practice for the Care and Handling of Farmed Salmonids
National Farm Animal Care Council (Canada)
https://www.nfacc.ca/codes-of-practice/farmed-salmonids

Opinion on the Welfare of Farmed Fish at the Time of Killing

Farm Animal Welfare Committee
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/319331/Opinion_on_the_welfare_of_farmed_fish_at_the_time_of_killing.pdf

Standards

4.1: Fish health and fish welfare shall be overseen and reported on by an accredited designated fish health professional whose qualifications and experience shall be documented and available.

4.2: The farm shall be located in waters where salmon would be expected to thrive, and farm facilities shall be clean and orderly.

4.3: Farm staff who are responsible for working with fish shall be trained annually in good fish welfare practices through study of one or more fish welfare training programs and/or by the accredited fish health professional. This training shall include species-specific behaviors, signs of stress and injuries typical in crowding and transport situations as well as appropriate control and corrective measures. Training must also be specific to the production method, considering the development of new rearing methods for salmon in both closed and offshore pens.

4.4: Where weather conditions allow, trained staff shall make at least daily inspections of the cages, water quality, and behavior and condition of fish and report to the designated accredited fish health professional or farm manager.

4.5: Individual-based welfare indicators of physical health shall be regularly measured in each production unit such as: mortality rate; body condition factor; lesions, abrasions or fin damage; ocular lesions; and gill damage or condition.

4.6: Group-based behavioral welfare indicators shall be observed and recorded for each production unit, such as: feeding response, swimming behavior, and feeding and growth rates.

4.7: The accredited fish health professional and/or farm management shall investigate and address all fish health and welfare concerns raised in the daily reports in a timely manner.

4.8: When impaired farm fish, cleaner fish or unwanted intruder species are observed in the cages they shall be removed, where possible, and where permitted by law, and be humanely euthanized. The carcasses shall be disposed of in a manner that adheres to good biosecurity practices and in accordance with applicable local and national regulations.4.9: Any unwanted native/local intruder species that are detected in cages shall be removed, where possible, returned to the marine environment without harm.

4.10: If cleaner fish are used, the farm shall be able to demonstrate compliance with a written Cleaner fish Welfare Plan, which includes the provision of appropriate shelter, supplemental species-appropriate feed, proper handling and veterinary care. The farm shall monitor Operational Welfare Indicators (OWIs) for cleaner fish.

4.10.1: All cleaner fish used on a salmon farm shall be of a species which is endemic to the region in which the farm is located. If wild-collected cleaner fish are used, the farm shall develop a written plan to phase out their use or to switch to hatchery-raised cleaner fish within seven years.

4.10.2: All farm staff shall be trained in, and shall exercise care in, handling cleaner fish to avoid causing them distress. Limits shall be specified by management, based on guidelines for good cleaner fish welfare practices for crowding, time out of water and other actions that may cause them distress.

4.10.3: Where the farming company has care and control of cleaner fish during transport, this operation shall be planned thoroughly with stocking density and fish number per tank calculated in advance. Equipment shall be used to monitor and to manage dissolved oxygen levels during live transport operations, and dissolved oxygen shall be maintained at concentrations greater than 80% saturation. For live transport in excess of 12 hours duration, carbon dioxide level and/or ammonia concentration shall be monitored, and if found to be above established benchmarks, the farm should adjust transport procedures with respect to stocking density, aeration and fasting, for subsequent transport events.

4.10.4: For any salmon handling procedures requiring removal of the salmon from a cage (i.e. harvest, grading, therapeutant treatment) cleaner fish shall be separated from the salmon biomass and held separately. During this time cleaner fish welfare shall be monitored and maintained.

4.10.5: When cleaner fish are to be slaughtered at the farm, the farm shall follow Standard Operating Procedures (SOP) for slaughter, developed in consultation with the accredited fish health professional. The SOP for

slaughter shall ensure that cleaner fish be quickly rendered unconscious by humane means. Where cleaner fish will be slaughtered, a written plan for responsible utilization or disposal will be followed.

4.10.6: Where cleaner fish in a salmon cage are to be reused with a different group of salmon a risk assessment for salmon and cleaner fish health shall be performed prior to reuse. This shall include an operational plan for the process.

4.11: All farm staff shall exercise care in handling fish to avoid causing them distress. Limits shall be specified by management, based on guidelines for good fish welfare practices, for crowding, time out of water and other actions that may cause them distress. Documentation shall be maintained that demonstrates the farm's compliance with the limits they have established. Transport of fish shall be planned thoroughly with stocking density and fish number per tank calculated in advance.

4.12: The applicant shall be able to demonstrate compliance with a written Water Quality Management Plan (WQMP), which shall require frequent or continuous monitoring of dissolved oxygen concentration, at least daily monitoring of water temperature, periodic verification of salinity levels, presence of nuisance organisms such as jellyfish and algal species implicated in causing harmful algal blooms, and any other aspects of water quality that may affect fish both within the farm and in the vicinity of the farm.

4.13: The WQMP shall require training of staff on measuring temperature, dissolved oxygen, salinity, and presence of nuisance organisms. Records of such training provided shall be available.

4.14: The WQMP shall include a list of practical mitigation measures that can be used in the event of water quality problems, as well as available equipment and trained staff to deploy it rapidly.

4.15: The WQMP shall require the provision of equipment to monitor and to manage dissolved oxygen levels when fish are being crowded and during live transport operations, and shall be maintained at concentrations greater than 80% saturation. For live transport in excess of 12 hours duration, carbon dioxide level and/or ammonia concentration shall be monitored, and if found to be above established benchmarks, the farm should adjust transport procedures with respect to stocking density, aeration and fasting, for subsequent transport events.

4.16: The number of fish stocked per cage shall be based on historical site conditions, production history and historical fish welfare indicators. Number stocked shall result in biodensity per cage that is below 25 kilograms per cubic meter. Biodensity shall be allowed to increase above this limit for no more than 5 percent of the production cycle, and only during or immediately prior to harvest.

4.16.1: The farm shall record quantifiable operational welfare indicators (health and physiological indicators, behavioral indicators and water quality indicators), for each site, at any period when biodensity is greater than 21 kilograms per cubic meter. Number of fish stocked to the site in subsequent production cycles shall take the results into consideration.

4.16.A: *Data:* Input the maximum biodensity in any individual cage recorded in the last 12 calendar months (kg/m^3).

4.17: When fish are purposefully crowded for any reason, the process shall be managed under conditions set by the farm's accredited fish health professional and shall take into account fish size, water temperature, dissolved oxygen concentration, the hydrographic patterns of the farm location and the duration crowded conditions will be maintained.

4.18: If farms utilize artificial illumination systems, the farm shall incorporate dimmable switches designed to avoid sudden changes in artificial illumination that might disturb the fish, other than as may be necessary under emergency situations. Staff shall be trained in the use of such systems, and records demonstrating successful completion of training shall be available.

4.19: Once fish are harvested, survival rate and Food Conversion Ratio (eFCR) shall be calculated for each year class and, for Atlantic salmon, coho salmon and rainbow trout, in the absence of extenuating circumstances, survival shall be equal to or greater than 85% and eFCR equal to or less than 1.4. For all other species of salmonids survival shall be equal to or greater than 80% and eFCR shall be equal to or less than 2.2. Farm sites that report a survival rate below 80% for two consecutive production cycles shall conduct an investigation to determine root cause and appropriate corrective action.

4.20: Fish shall be harvested under conditions, set by the accredited fish health professional and designed to minimize crowding time, to ensure gentle handling as they are loaded either into live transport tanks or into vessels at the farm prior to being rendered insensible and bled on site.

4.21: In situations where fish are to be slaughtered at the farm before transport, the Farm shall follow Standard Operating Procedures (SOP) for slaughter, developed in consultation with the accredited fish health professional. When requirements of the SOP are not met, the root cause and corrective actions shall be documented.

4:22: The SOP for slaughter shall ensure that fish be quickly rendered unconscious by humane means and slaughtered while unconscious. Fish should not be out of water any longer than absolutely necessary before stunning. The effectiveness of the stunning process shall be evaluated at the beginning of the stunning operation and periodically throughout the stunning process. Staff present at slaughter shall be trained in evaluation of stunning effectiveness, indicators of unconsciousness, and procedures to be followed if signs of recovery are observed.

4.23: If the responsibility for fish welfare during live transport of harvested fish lies with the farm, mortality rates shall be monitored and recorded, and if it exceeds an average of 5%, the farm shall demonstrate that steps are being taken to reduce it.

Biosecurity and Disease Management

Farms shall operate with the aim of preventing outbreaks of infectious diseases, but when diseases or parasites infect farmed fish, diagnosis and treatment shall be carried out promptly and judiciously under the supervision of an accredited fish health professional and in a manner that minimizes impacts on the environment.

Reasons for Standard

Infectious disease outbreaks at farms imply increased risks for disease transmission to surrounding farm sites and, in some cases, wild fish populations. Diseases also result in poor performance and suffering in the affected fish.

Precautions should be taken in salmon farming to reduce the likelihood of infection and clinical disease and limit their impacts by appropriate treatment if they occur.

Implementation

Biosecurity measures shall be imposed under the direction of a veterinarian or a fish health professional with equivalent qualifications, who is accredited or licensed by the governing regulatory authority in the region/country and has the legal authority to prescribe the use of medicines. The accredited fish health professional shall develop and implement a Fish Health Management Plan (FHMP) that accomplishes disease prevention through biosecurity and, if needed, disease treatment.

The FHMP shall operate at two levels: 1. at the farm site and 2. among neighboring sites and aquaculture establishments within a defined area. The second level requires the establishment of an Area Management Agreement (AMA) in which the applicant salmon farm coordinates its activities with neighboring farms.

Sea Lice

There are two genera of sea lice that commonly infest wild and farmed salmon; *Lepeophtheirus* sp. (more specifically *L. salmonis*) and *Caligus* spp. of which there are six species reported to infest farmed salmon in different parts of the world: *C. elongatus*, *C. curtus*, *C. clemensi*, *C. rogercresseyi*, *C. teres* and *C. orientalis*. Of these *L. salmonis* is generally considered to be the species most likely to pose potential threats to wild salmon and is the subject of regulation in some countries.

Farms shall establish a sea lice surveillance and treatment plan and comply with current national or regional regulations and policies to minimize parasite reproduction and optimize control. Controls may include setting limits for maximum levels of sea lice of different stages on the farm's fish and participation in coordinated delousing in regions where such arrangements are in place. Farms shall comply with government rules, where these exist, on therapeutic use to prevent the build-up of resistance / tolerance to therapeutants and with government rules that set a limit on the maximum average number of lice per fish (abundance). The farm shall seek to reduce parasite load over time. When practical non-

chemical treatments for sea lice are fully developed, such as the use of cleaner fish and/or mechanical delousers, their use may become a future BAP requirement.

Selective breeding, particularly using genomic markers to select broodstock, can reduce susceptibility of salmon to sea lice infection, and is encouraged within breeding programs.

Applicants shall be able to demonstrate that Area Management Agreement (AMA) rules and sea lice management procedures have been written for the protection of wild salmon, as well as the farmed fish. The rules and management shall include monitoring of sea lice loads and the setting of treatment trigger thresholds that take into account key factors such as season, the life cycle stages of farmed and wild fish, and the specific characteristics of the area in question.

Additional Information

OIE Aquatic Animal Health Code – Import Risk Analysis

https://www.oie.int/fileadmin/Home/eng/Health_standards/aahc/current/chapitre_import_risk_analysis.pdf

Judicious Use of Antimicrobials for Treatments of Aquatic Animals by Veterinarians

American Veterinary Medical Association

https://www.avma.org/resources-tools/avma-policies/judicious-therapeutic-use-antimicrobials-aquatic-animal-medicine

WHO List of Medically Important Antimicrobials: a risk management tool for mitigating antimicrobial resistance due to non-human use

https://cdn.who.int/media/docs/default-source/gcp/who-mia-list-2024-lv.pdf

Evaluation of Bay Management Area Scenarios for the Southwestern New Brunswick Salmon Aquaculture Industry

B. D. Chang, F. H. Page, R. J. Losier, P. Lawton, R. Singh, D. A. Greenberg – 2007

https://www.researchgate.net/publication/237324549_Evaluation_of_Bay_Management_Area_Scenarios_for_the_Southwestern_New_Brunswick_Salmon_Aquaculture_Industry_Aquaculture_Collaborative_Research_and_Development_Program_Final_Project_Report

Standards

4.24: The farm shall develop, and be able to demonstrate compliance with, a written Fish Health Management Plan (FHMP) that encompasses the farm's biosecurity and disease management procedures and covers any fish species under culture or use at the farm.

4.25: The farm shall designate an accredited fish health professional to oversee the FHMP, direct the diagnosis and treatment of fish diseases and coordinate activities with neighboring farms under an Area Management Agreement (AMA), where such an agreement is in place. The accredited fish health professional shall be available in person or by phone at audit to answer questions. The applicant shall notify the certification body if the accredited fish health professional changes.

4.26: The accredited fish health professional shall have the required licenses and accreditations to act in the farming region they are servicing.

4.27: The accredited fish health professional shall ensure compliance with all legal requirements for disease testing, fish movements (including zoosanitary regulations of inbound and outbound transports), treatments for fish diseases and reporting of notifiable diseases.

4.28: The Fish Health Management Plan (FHMP) shall require cyclical production of fish that mandates a fallow period of at least four weeks after the completion of harvesting and before restocking, and that is coordinated with neighboring BAP-certified farms and, where there is an established Area Management Agreement (AMA), with all farms in the AMA.

4.28.1: For all farms declaring a fallow period between four and eight weeks in length, farms shall also demonstrate validated regulatory approval for the declared fallow period, as well as validated measurements demonstrating no increased environmental or animal health and welfare impacts compared to an eight-week fallow period baseline.

4.29: The FHMP shall address the mitigation of potential biosecurity risks.

4.29.1: The FHMP shall require that only smolts certified clinically healthy and free of reportable pathogens / parasites and parasites specified in applicable national fish health regulations are brought onto the farm. Before any group of fish are transported for stocking, health surveillance shall be performed as close as practical to transport date.

4.29.2: The FHMP shall require vaccination of fish against known pathogens as required by competent authorities governing regulatory authorities before they are brought onto the farm and revaccination, if needed, under the direction of the accredited fish health professional.

4.29.3: The FHMP shall require cleaning and disinfection of all fish handling equipment before it is brought onto or taken out of the farm.

4.29.4: The FHMP shall require management and limitation of "visiting" vessels from sites of higher or unknown risk, and a supplemental plan for increased oversight in the event of disease concerns.

4.29.5: The FHMP shall require disinfection or changes of footwear by all personnel entering or leaving the farm.

4.29.6: The FHMP shall require accurate recording of all fish movements and transfers to, from and within the farm.

4.30: The FHMP shall include procedures for the accurate and regular cage-by-cage monitoring of 'normal mortality', disease-related mortality and unexplained mortality. Monitoring shall occur weekly, at a minimum, unless sea conditions pose a risk to human life and the FHMP shall address the sanitary disposal of dead fish recovered from cages.

4.31: The FHMP shall include an alert status that defines extra precautions, checks on fish and increased vigilance if an occurrence of infectious disease is known or suspected in the region.

4.32: The FHMP shall include a recovery, transport and disposal plan for dead fish in the event of a mass kill, with available equipment in place and identified services that can be called on to help quickly.

4.33: The FHMP shall include procedures for the monitoring of endemic parasitic, bacterial and viral infections, the diagnosis and treatment of disease in fish, and the recording of findings and actions taken.

4.34: The FHMP shall include indicators for disease that inform and direct farm staff, as they tend fish or remove dead fish from the cages, and provide procedures for timely reporting if an indicator is observed.

4.35: The FHMP shall include a disease outbreak investigation plan to ensure rapid diagnosis if disease is suspected, followed by prompt management.

4.36: The FMHP shall include an emergency response plan that establishes steps to be taken when an infectious disease outbreak requires containment measures.

4.37: The FHMP shall include procedures based on current guidelines for best professional veterinary practices on how medicinal treatments with drugs, vaccines or anesthetics, and any non-medicinal use of chemicals (i.e. for disinfection or water treatment) shall be selected and administered in accordance with the OIE Aquatic Animal Health Code to minimize risks to human health and the environment.

4.38: The FHMP shall include procedures to ensure that withdrawal times following treatment with medicinal products are adequate to minimize the risk of residues remaining in the fish when they are harvested, including periodic verification testing to confirm the effectiveness of the defined withdrawal periods.

4.39: The FHMP shall include a procedure for antibiotic sensitivity testing prior to or during antibiotic treatments (where a delay may be unavoidable before testing can be completed), for each course of antibiotic treatment. Where results cannot be obtained because the pathogen is difficult or impossible to culture this is not required. Results concerning antibiotic sensitivity testing shall be monitored to detect any developing trends towards antimicrobial resistance.

4.40: The farm shall employ a written Integrated Pest Management Plan (IPMP) (or equivalent document) which specifies the management of sea lice.

4.40.1: The IPMP shall document regulatory requirements, where they exist, for monitoring and treatment of sea lice and the farm shall collect records to show compliance with them.

4.40.2: The use of parasiticides to control sea lice should be limited in favor of non-chemical methods, where possible.

4.40.3: The IPMP shall require that all equipment (e.g. hydrolicers) involved in physical removal of sea lice be inspected and in good working order prior to each application.

4.40.4: Fish welfare shall be assessed during physical sea lice removal operations to ensure that the operation does not result in a net loss of fish welfare, considering sea lice reduction and fish condition indices.

4.40.5: The farm shall maintain records of sea lice levels, treatments used, and non-therapeutic measures applied. Records shall be maintained for a minimum of three years.

4.41: If used, drug treatments shall be based on authorizations by the accredited fish health professional, who shall be guided by the FHMP and principles of judicious use and best practice for the veterinary profession.

4.42: The accredited fish health professional shall prescribe medicines only to treat diagnosed diseases in accordance with instructions on product labels and/or national regulations.

4.43: Farms shall not use antimicrobials designated by the WHO Medically Important Antibiotic (MIA) List as “authorized for use in humans only”. Use of drugs classified as either a Highest Priority Critically Important Antimicrobial (HPCIA) or Critically Important Antimicrobial (CIA) by the WHO as “authorized for both humans and animals” shall be minimized, used only under the advice of a qualified veterinarian, and only where such use has been approved by relevant national legislation.

4.44: Records shall be maintained for every application of drugs and other chemicals that include the date, compound used, batch number of the drug, “use by” date of the drug, reason(s) for use, dose, anticipated withdrawal time and harvest date, cage number(s) treated, reporting of any adverse events, and follow-up to determine the efficacy of the treatment. Summary information on antibiotic usage (kg of named antibiotic per MT of fish produced per year class) shall be reported to the auditor and this data shall be included in the audit report.

4.44.A: *Data:* For each year class harvested in the last 12 calendar months, input the harvest weight of the year class in MT.

4.44.B: *Data:* For each year class harvested in the last 12 calendar months, input the name and weight of each antibiotic applied in kg.

4.45: If the farm is a member of an Area Management Agreement (AMA), the farm shall demonstrate compliance with

the fish health management requirements of the AMA or, if an AMA is not yet in place, that it coordinates fish health management activities with other farms in an area twice the regulatory minimum separation distance to an upper limit of five kilometers.

4.46: The farm shall accept that if the auditor has concerns about any aspects of how the FHMP is written or implemented, a second opinion can be sought from an independent fish health specialist.

4.47: The farm shall train select farm staff in the implementation of the biosecurity and health management procedures in the FHMP. Training records shall be available.

4.48: The FHMP shall have written procedures for crowding fish, based on current fish welfare guidelines.

4.49: The FHMP shall have written procedures for protecting fish welfare during the movement of fish in wellboats. Procedures shall include monitoring of water quality and fish behavior.

4.50: For each movement of fish in a wellboat, whether live or dead, prior to the operation a Risk Assessment shall be conducted with respect to biosecurity risks to populations of fish at any farms that will be within five kilometers of the planned route of the vessel or within fish management areas / zones other than the one in which the fish originated.

4.51: In cases where a cage containing fish is moved, prior to the operation a Risk Assessment shall be conducted with respect to biosecurity risks to populations of fish at any farms that will be within five kilometers of the planned route. Cages shall not be moved across fish management areas / zones.

G. Standard Requirements – Traceability

To establish product traceability, the following data shall be recorded for each culture unit and each production cycle:

- culture unit identification number
- unit area or volume
- stocking date
- common and scientific names of fish
- quantity of smolts stocked
- source of smolts (hatchery)
- antibiotic and drug use
- herbicide and other pesticide use
- manufacturer and lot numbers for each feed lot and type used
- movement of fish among cages
- unusual events that could affect quality or safety
- results of tests for contaminants before harvest
- harvest date
- harvest method
- harvest quantity
- transport method
- processing plant(s) or purchaser(s).

Reasons for Requirement

Product traceability is a crucial component of the BAP program. It connects the links in the production chain and allows tracing of each processed lot back to the culture unit and inputs of origin. Food quality and safety analyses by accredited laboratories can also be included. Traceability ultimately assures purchasers that all steps in the production process were in compliance with environmental, social and food safety standards.

Implementation

Farms may utilize any traceability system that meets the BAP requirements. This can be a third-party software platform, a farm's own in-house database, paper records, files and documents; or a combination thereof. Where paper records, documents or notebooks are used, if possible, the information should also be transferred to computer database files to allow electronic transmission. The original files or paper records shall be kept to allow for verification of the electronic data.

The record-keeping process requires a high degree of care and organization. At large farms, managers could collect initial data for those aquaculture products for which they are responsible. A single clerk or team could then be given the task of collecting the data from managers and transferring it to a computer database. Farm management shall review the effort at regular intervals to verify it satisfies BAP requirements.

Product Identity Preservation

To assure the integrity of the Best Aquaculture Practices "star" system, traceability controls must be in place that allow verification of all facilities that contribute to the claim of multiple-star BAP-certified status.

To ensure the proper separation and traceability of all farm inputs and outputs, the following components must be in place:

- Farms that purchase all of their smolts and feed from BAP-certified sources shall maintain records of the sources

of stocking material and feeds used.

- Farms that purchase stocking material and feed from both BAP- and non-BAP-certified sources shall identify all sources and have adequate systems in place to distinguish between BAP and non-BAP sources.
- To enable mass balance verification of multiple-star products, certified farms shall maintain a list, including harvest dates and volumes, of the facilities to which they sell or deliver products.
- The farm must verify their traceability systems by conducting backward and forward trace exercises.

BAP Logo Use

Use of the Best Aquaculture Practices logo, a registered trademark of the Global Seafood Alliance, for any purpose shall be approved by BAP in advance and used in compliance with the BAP trademark usage agreement.

Customer Complaints

The farm shall prepare and implement an effective system for the management of complaints and complaint data to control and correct shortcomings relating to its products' compliance with the BAP standard

Standards

5.1: The farm shall operate an effective record-keeping system that provides timely, organized, accurate entries, performed and overseen by a designated trained person or team responsible for collecting the data, ensuring it is complete and accurate, and that traceability requirements are met.

5.2: The traceability system of the farm shall consist of a third-party software platform or a farm's own in-house database, paper records, documents, forms, notebooks and/or files, or a combination thereof and the records shall be available for verification during the audit.

5.3: The farm shall keep complete and accurate records for each culture unit and production cycle, including the culture unit identification number, unit area and volume, species stocked and, if applicable, species specifications such as triploid.

5.4: The farm shall keep complete and accurate records concerning any antibiotic, pesticide or other drug use at the farm.

5.5: Complete and accurate records regarding manufacturer and lot numbers for each feed type used in each culture unit shall be maintained. Farms that purchase feed from both BAP- and non-BAP-certified feed mills shall have systems in place to clearly identify when any mixing of BAP- and non-BAP-certified feed occurs within production units.

5.6: The farm shall maintain complete and accurate records of the sources and numbers of juvenile fish (smolts) stocked, stocking dates and all feeds used for each culture unit. Farms that purchase stocking material from both BAP and non-BAP certified hatcheries shall have systems in place to clearly identify when any mixing of BAP- and non-BAP-certified stocking material occurs within production units.

5.7: Complete and accurate records regarding the harvest date, harvest quantity, movement document number (if applicable) and receiving processing plant(s) or purchaser(s) shall be maintained. If product lots are destined to more than one plant or purchaser, each lot shall be separately identified.

5.8: The farm must record and provide to the auditor evidence of a documented relationship with all BAP-certified facilities to which the farm is linked for purposes of BAP star status claims, including:

- The names and BAP ID's of all supplying BAP-certified facilities (feed mills and hatcheries/nurseries)
- The names and BAP ID's of all receiving BAP-certified facilities (seafood processing plants), and
- The corresponding annual volume of BAP-star status product exchanged between the named BAP-certified facilities in numbers of animals (for hatcheries / nurseries) and metric tons/year (of feed for feed mills and of harvested fish for processing plants).

Farms shall provide the volume/mass balance data concerning the above exchanges of BAP-certified products during the external CB audit.

5.9: During the annual certification audit the farm shall perform under the instruction of the auditor a minimum two trace-back exercises, one to feed and one to stocking materials, and one trace-forward exercise to a processing plant. The results of the trace-forward and trace-back exercises and their mass balance for each eligible star status shall achieve 100% accountability within 4 hours. Note: At the discretion of the auditor, additional trace exercises may be conducted.

5.10: The farm shall keep records of any customer complaints related to its products' compliance with the BAP standards.

5.11: The farm shall keep records of investigations of such complaints and actions taken to address/correct them.

5.12: All records specified in this Section shall be retained for a period that exceeds both 12 months and the expected shelf life of the aquaculture products.

Sample Product Traceability Form

<table>
<tr><td colspan="2">Farm Name</td><td colspan="2">Cage Number</td><td>Cage Volume</td></tr>
<tr><td colspan="3">SMOLTS</td><td colspan="2">FEED</td></tr>
<tr><td colspan="3">Stocking Date</td><td colspan="2">Feed Type</td></tr>
<tr><td colspan="3">Stocking Quantity</td><td colspan="2" rowspan="2">Manufacturer(s)</td></tr>
<tr><td colspan="3">Fish Name, Common</td></tr>
<tr><td colspan="3">Fish Name, Scientific</td><td colspan="2" rowspan="2">Lot Numbers</td></tr>
<tr><td>Hatchery</td><td colspan="2">BAP No.</td></tr>
<tr><td colspan="3">Confirmation: No Use of Proactively Prohibited Chemicals</td><td colspan="2">Confirmation: No Use of Proactively Prohibited Chemicals</td></tr>
<tr><td colspan="3">THERAPEUTIC DRUG USE</td><td colspan="2">PESTICIDE USE</td></tr>
<tr><td colspan="3">Compound 1</td><td colspan="2">Compound 1</td></tr>
<tr><td colspan="3">Disease Treated</td><td colspan="2">Condition Treated</td></tr>
<tr><td colspan="3">Application Rate</td><td colspan="2">Application Rate</td></tr>
<tr><td colspan="3">Application Period</td><td colspan="2">Application Period</td></tr>
<tr><td colspan="3">Compound 2</td><td colspan="2">Compound 2</td></tr>
<tr><td colspan="3">Disease Treated</td><td colspan="2">Condition Treated</td></tr>
<tr><td colspan="3">Application Rate</td><td colspan="2">Application Rate</td></tr>
<tr><td colspan="3">Application Period</td><td colspan="2">Application Period</td></tr>
<tr><td colspan="5">MOVEMENT AMONG CAGES</td></tr>
<tr><td colspan="5">UNUSUAL EVENTS</td></tr>
<tr><td colspan="5">CONTAMINANT TEST RESULTS</td></tr>
<tr><td colspan="3">HARVEST</td><td colspan="2" rowspan="4">Harvest Purchaser Name/Address</td></tr>
<tr><td colspan="3">Harvest Method</td></tr>
<tr><td colspan="3">Harvest Quantity (kg)</td></tr>
<tr><td colspan="3">Transport Method</td></tr>
</table>