

INTEGRATED FARM ASSURANCE SMART/GFS

Principles and Criteria for Aquaculture – Finfish, Crustaceans, Molluscs, Seaweed

ENGLISH VERSION 6.0_DEC23

VALID FROM: 1 OCTOBER 2022

OBLIGATORY FROM: 1 JANUARY 2024*

*Date on which IFA v6 GFS requirements become obligatory depends on GFSI recognition and will be confirmed

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INTRODUCTION

Site management

This section is intended to ensure that the land, aquaculture sites, buildings, and other facilities which constitute the farm are properly managed to ensure the safe and sustainable production of food.

Chemical compounds

Examples of chemical compounds include, but are not limited to: fuel, detergents, pesticides, fungicides, chemical treatments, disinfectants, probiotics, immune stimulants, medicines (all medicines except medicated feeds), and other chemical compounds (paints, preservatives, anti-foulants, lubricants, battery acids, etc.) used in and around the premises. Hazardous chemical compounds: chemical compounds which, alone or in combination, may present a health or physical hazard to humans or to the environment (e.g., because they are combustible/unstable/irritants/explosive/water-reactive/corrosive/flammable/toxic) as indicated in the product and safety data sheet.

Farmed aquatic species welfare, management, and husbandry

Farmed aquatic species welfare, management, and husbandry practices are all essential to a sound performance within aquaculture. Meeting the physical, nutritional, and environmental requirements of the fish will result in reduced mortality, improved growth, and good fish health. Protection of farmed aquatic species' welfare is furthermore an important aspect of the social acceptability of aquaculture.

Medicines

Refers to any product or substance that is deliberately used to modify the physiology of the farmed aquatic species.

The key objectives in this context are:

- Ensuring legal and responsible use of medicines and vaccines
- Protecting consumer health
- Preventing the development of resistant microorganisms
- Complying with the ethical obligation and economic need to keep farmed aquatic species in good health

Treatments

The use of medicines or any other substance to prevent or cure a disease or condition in the farmed aquatic species. Any substance which comes into contact with the farmed aquatic species should be considered a potential treatment.

Aquaculture feed

Feed, including encapsulated feed, shall meet the nutritional requirements of the aquaculture species and maintain the recognized human health benefits of the aquaculture species. Captured fish, if used, should come from fisheries that adhere to the FAO Code of Conduct for Responsible Fisheries. *GLOBALG.A.P. now requires the percentage of independently certified fish meal and fish oil in the feed to be recorded. The efficient use of fish meal/oil from sustainable and responsible sources should be maximized. Refer to the GLOBALG.A.P. Compound Feed Manufacturing standard, section A 5 “Responsible sourcing of feed materials.”*

Environmental and biodiversity management

This section is intended to ensure good practices with regard to the management and protection of the direct environment and natural resources. Farms shall be built and managed in a way that both responsibly addresses environmental and ecological aspects and conserves biodiversity and existing ecosystem functions while recognizing that other land uses, people, and species depend upon these same ecosystems.

Sampling and testing techniques

Farmed aquatic species shall be sampled and tested to monitor food safety and legality for the species produced on the farm. This is a tool for the producer to demonstrate that good aquaculture practices are well implemented and that the producer is producing a safe and legal aquaculture species.

Hatcheries and nurseries

The Integrated Farm Assurance (IFA) standard for aquaculture covers finfish, crustaceans, molluscs, and seaweed as well as all stages of the specific species registered by the producer, as long as the seedlings are derived from a certified supplier. Hatcheries shall be able to demonstrate that all brood stock is obtained through a breeding program. If wild-caught brood stock is used, the producer shall demonstrate origin from an ecologically managed wild fishery. Passively collecting seedlings from the planktonic phase is allowed for molluscs’ spat.

Mangroves, protected areas, and other high conservation value areas

New ponds, farms sites, and related facilities shall be built according to national planning and legal frameworks in environmentally suitable locations, make efficient use of land and water resources, and conserve biodiversity (including protected areas and Ramsar Sites), ecologically sensitive habitats (high conservation value areas) and ecosystem functions, recognizing that other land uses, people, and species depend upon these same ecosystems.

Section	Principle	Criteria	Level
AQ	AQUACULTURE: finfish, crustaceans, molluscs, seaweed <i>The standard applies to all stages of the aquatic species for all systems used in aquaculture.</i>		
	<i>Presently, the term “farmed aquatic species” within the standard refers to all species mentioned in the GLOBALG.A.P. product list published on the GLOBALG.A.P. website. This product list is extended for species based on demand and under consideration of brood stock origin. The term “farmed aquatic species” refers to finfish, crustaceans, molluscs, and macro-algae (seaweed) and depending on the criteria may apply exclusively to some of the groups.</i>		
AQ 01	SITE HISTORY AND SITE MANAGEMENT		
AQ 01.01	Site history		
AQ 01.01.01	The producer has a reference system for identifying sites used in production, other areas, and facilities.	Compliance shall require visual identification in the form of: a physical sign and a farm map which also identifies the location of water sources, storage/handling facilities, production units, entry and exit points, etc., and that can be cross-referenced to the identification system. No “N/A.”	Major Must
AQ 01.01.02	A recording system is established for each production unit to provide a record of the production activities undertaken.	Current records shall provide a history of GLOBALG.A.P. certified production at all production units. This shall be done either digitally or on paper. No “N/A.”	Major Must

Section	Principle	Criteria	Level
AQ 01.02	Site management		
AQ 01.02.01	A risk assessment is available for all sites registered for certification to evaluate whether the sites are suitable for continuing farming operations.	<p>A documented risk assessment to determine whether the sites (including rented land, structures, and equipment) are appropriate for production shall be available for all sites, considering aspects of food safety, the environment, and the health and welfare of farmed aquatic species. It shall be ready for the initial certification body (CB) audit and maintained, updated, and reviewed whenever new sites enter into production, when risks for existing ones have changed, or at least annually, whichever occurs first. The risk assessment may be based on a generic one but shall be customized to the farm situation.</p> <p>A list of all activities potentially affecting the aquaculture farm shall be available with regard to: potential physical, chemical (including allergens), and biological hazards. Cross-reference with AQ 20.02.16 and AQ 20.02.18.</p>	Major Must
AQ 01.02.02	A management plan that establishes strategies for minimizing the risks identified in the risk assessment for operation suitability has been developed and implemented and is reviewed regularly.	A management plan shall address the risks identified in AQ 01.02.01 and describe the hazard control procedures that justify that the site in question is suitable for production, ensuring sustainability and effectiveness. This plan shall be appropriate to farm operations, and there shall be evidence of its implementation. The plan shall address maintenance of grounds and areas within the site to prevent contamination. The plan shall be reviewed annually, or whenever changes occur that may impact the safety of food production and impact the food safety plan, whichever occurs first.	Major Must

Section	Principle	Criteria	Level
AQ 01.02.03	All structures are located, designed, and constructed to facilitate proper cleaning and pest control.	<p>Where appropriate, the design and layout shall permit compliance with good hygiene practices, including protection against cross contamination between and during operations. This requirement shall include all adjoining rooms, equipment, facilities, and feeding systems.</p> <p>A program of self-assessments/internal audits shall be established, implemented, and maintained to ensure the sites and equipment are routinely maintained in a suitable condition to ensure food safety, as applicable to the activity of the site. Self-assessments/Internal audits can be at an interval determined by the producer in accordance with the assessed risk.</p>	Major Must
AQ 01.03	Legislative framework		
AQ 01.03.01	Farm management is able to demonstrate awareness at interview of compliance with legislation.	<p>In the interview, farm management shall be able to demonstrate how it fulfills its legal obligations with respect to the food safety, farmed aquatic species health and welfare, feed formulation, environment, biodiversity, and workers' health and safety legislation applicable to its enterprise.</p> <p>No "N/A."</p>	Major Must
AQ 01.03.02	Aquaculture farms are registered as such with the relevant competent authority as required by national legislation for the specific farmed aquatic species.	<p>Registration and license documents shall be available. Examples include: seabed leases and consents for discharge of effluent and licenses/concessions from authority to grow a set biomass of aquaculture products or allocation of feed quota.</p> <p>No "N/A."</p>	Major Must

Section	Principle	Criteria	Level
AQ 02	INTERNAL DOCUMENTATION		
AQ 02.01	In the initial phase (initial certification body (CB) audit) of application of the standard, site records demonstrate compliance with the standard for the last three months.	Records shall be in place for the last three months demonstrating compliance sufficient to achieve GLOBALG.A.P. certification. No "N/A."	Major Must
AQ 02.02	A documented system with procedures and work instructions covering all processes is available and implemented.	Documented procedures and work instructions shall be available on the site demonstrating compliance with food safety, legal, and standard requirements, including supplier approval procedures. No "N/A."	Major Must
AQ 02.03	The aquaculture farm and the production units have an organizational structure with defined responsibilities.	A clear organizational structure identifying the job functions and responsibilities shall be established, implemented, and maintained. Workers whose activities have a potential impact on food safety shall be identified. No "N/A."	Major Must
AQ 02.04	Geographical coordinates identify all operations of the farm.	Geographical coordinates shall identify all sites where the actual aquatic operation takes place. The coordinates shall refer to the center of the production site (smaller sites; <1 ha) or the corners of the contours of the production sites (larger sites; >1 ha). The coordinates (degrees and minutes of latitude and longitude) shall be within an accuracy of two decimals in the geographical minutes (e.g., 15°22.65' N; 22°43.78' E) using the WGS-84 coordinate system. No "N/A."	Major Must
AQ 02.05	Records for auditing purposes are up-to-date. Records are kept for a minimum period of two years, unless a longer period is required.	The producer shall keep up-to-date records, including those relating to food safety, for a minimum of two years, or a longer period depending on customer or legal requirements. If the shelf life of the product exceeds two years, records shall be retained for a period	Major Must

Section	Principle	Criteria	Level
		<p>that exceeds the shelf life. Electronic records shall be valid and if they are used, the producer shall be responsible for maintaining back-ups of the information.</p> <p>Documents shall be securely stored, effectively controlled, and readily accessible. For the initial certification body (CB) audit, the producer shall keep records from at least three months prior to the date of the CB audit or from the day of registration, whichever is longer. New applicants shall have full records for each area covered by the registration with all of the activities related to GLOBALG.A.P. documentation required for this area. These records shall be available for the current cycle before the initial CB audit.</p> <p>No “N/A.”</p>	
AQ 02.06	A procedure is in place to manage and control documents and records.	A procedure describing the management of documented information shall be implemented and maintained. A method of tracking document changes shall be established to ensure workers are accessing the most recent version.	Major Must
AQ 02.07	The producer completes a minimum of one self-assessment/internal audit annually to the standard.	<p>There shall be documented evidence that, in Option 1 individual producers, a self-assessment has been completed under the responsibility of the producer (this may be carried out by a person different from the producer).</p> <p>Self-assessments shall include all applicable principles and criteria, even when a subcontracted company carries them out.</p> <p>A documented self-assessment for individual producers shall contain comments regarding the evidence observed for all not applicable and non-compliant Major Must and Minor Must principles and criteria. For internal farm and quality management system (QMS) audits, comments shall follow “GLOBALG.A.P. general regulations – Rules for producer groups and multisite producers with QMS.”</p>	Major Must

Section	Principle	Criteria	Level
		The self-assessment shall be completed before the certification body (CB) audit (see “GLOBALG.A.P. general regulations – Rules for individual producers”). No “N/A,” except for multisite producers with QMS and producer groups, which are covered by the internal QMS audit.	
AQ 02.08	Effective corrective actions are taken to address non-conformances detected during the self-assessments/internal audits.	Corrective actions shall be documented. Any necessary changes shall be implemented. Compliance with all applicable Major Musts and at least 95% of applicable Minor Musts is required. “N/A” only if no non-conformances are detected during self-assessments/internal audits.	Major Must
AQ 02.09	A continuous improvement plan is documented.	A continuous improvement plan based on self-assessments/internal audits and certification body (CB) audits shall be documented. Continuous improvements can be shown as a reduction in overall non-conformances during self-assessments/internal audits, evaluation of a root cause analysis, documented actions, or other applicable activities.	Major Must
AQ 02.10	There is evidence that a continuous improvement plan is implemented.	A continuous improvement plan based on self-assessments/internal audits and certification body (CB) audits shall be implemented. Continuous improvements can be shown as a reduction in overall non-conformances during self-assessments/internal audits, resource management plans documenting improvements, or other applicable activities.	Major Must
AQ 03	HYGIENE		
AQ 03.01	The farm has a documented hygiene risk assessment.	The documented hygiene risk assessment shall be appropriate to the activities taking place on the farm and shall be reviewed annually and updated when changes (e.g., other activities) occur. No “N/A.”	Major Must

Section	Principle	Criteria	Level
AQ 03.02	Documented hygiene procedures are in place to minimize food safety risks.	<p>The farm shall have hygiene procedures addressing the risks identified in the risk assessment in AQ 03.01. The procedures shall include instructions visibly displayed for workers, visitors, and subcontractors. The instructions shall also be based on the results of the hygiene risk assessment in AQ 03.01 and shall include at a minimum:</p> <ul style="list-style-type: none"> - The requirement to wash hands - The requirement to cover skin cuts - Limitation on smoking, eating, and drinking to designated areas - Immediate notification to management or supervisor of any relevant infections or conditions, including any signs of illness (fever, vomiting, jaundice, diarrhea, etc.), at which point these workers shall be restricted from direct contact with the product and food-contact surfaces - Back-to-work procedure in the case of absence due to illness - Notification of product contamination with bodily fluids - The use of provided suitable protective clothing wherever the individuals' activities might pose a risk of contamination to the product <p>No "N/A."</p>	Major Must
AQ 03.03	The farm's hygiene procedures are implemented, including visibly displayed hygiene instructions for all workers and visitors.	<p>Workers with tasks identified in the hygiene procedures shall demonstrate competence during interview, and there shall be visual evidence that the hygiene procedures are implemented, by way of clear signs (pictures) and/or in the relevant language(s) of the workforce. The effectiveness of the hygiene procedures in eliminating food safety risks shall be measured, based on the hygiene risk assessment in AQ 03.01. Cross-reference with AQ 20.02.09.</p> <p>No "N/A."</p>	Major Must

Section	Principle	Criteria	Level
AQ 04	WORKERS' WELL-BEING: OCCUPATIONAL HEALTH, SAFETY, AND WELFARE		
	<i>Compliance with GRASP is compulsory for the aquaculture scope. Therefore, full compliance with this section is required at all times.</i>		
AQ 04.01	Workers' occupational health and safety		
AQ 04.01.01	There is a documented risk assessment for workers' health and safety.	The documented risk assessment shall be appropriate to conditions on the farm, including the entire production process in the scope of certification. The risk assessment shall be reviewed and updated annually and when changes occur that impact workers' health and safety. Examples may include but are not limited to: risk of zoonosis (animal-to-human transmission of diseases), diving operations, new machinery, new buildings, exposure to chemical substances including medicines and vaccines, modified farming practices, moving machine parts, power take-off, electricity, farm machinery and vehicle traffic, fires in farm buildings (including identifying any site hazardous, including with regard to fire, to any type of worker accommodation or resting area), excessive noise, dust, vibrations, extreme weather conditions, ladders, fuel storage, slurry tanks, etc. No "N/A."	Major Must
AQ 04.01.02	The farm has health and safety procedures.	<p>The health and safety procedures shall address the points identified in the risk assessment for workers' health and safety in AQ 04.01.01 and shall be appropriate to the farming operations. They shall also include accident and emergency procedures, including for workers' accommodation or resting areas, as well as contingency plans that deal with any identified risks in the working situation, etc. The procedures shall be reviewed annually and updated when the risk assessment changes.</p> <p>The farm infrastructure, facilities, and equipment shall be</p>	Major Must

Section	Principle	Criteria	Level
		<p>constructed and maintained to minimize health and safety risks for the workers.</p> <p>Procedures shall comply with local health and safety regulations and ensure that only workers with at least minimum training operate equipment and enter confined spaces or enclosed areas with limited natural ventilation and/or where access and exit points are limited.</p> <p>The farm shall have a procedure explaining how the workers, with reasonable justification, can remove themselves from unsafe work without fear of facing retaliation.</p> <p>Whenever accidents occur, the root cause shall be identified and included in the risk assessment, and management shall define procedures to prevent the recurrence of similar incidents.</p>	
AQ 04.01.03	Diving operations are carried out in accordance with relevant legislation and in accordance with generally accepted principles for safe commercial diving practices.	<p>The producer shall demonstrate, via a documented risk assessment, that diving operations comply with the law and reflect best safe practices. At minimum, the operation shall comply with the requirements below:</p> <ol style="list-style-type: none"> 1. Commercial diving operations shall be authorized by the appropriate authority, e.g., by a department of government (health and safety authority, maritime authority, labor authority, or harbor master). The compressors to fill the air tanks and facilities for tank testing shall likewise be authorized by an appropriate authority. 2. The testing and maintenance of the air tanks, breathing apparatus, compressors, and individual diving (decompression) computers shall be set out according to documented schedules. 3. Records of equipment maintenance, repair/replacement and individual diver logs shall be maintained and made available during the certification body (CB) audit. 	Major Must

Section	Principle	Criteria	Level
		<p>4. Relevant worker responsibilities, training, and diving operations requirements:</p> <ul style="list-style-type: none"> 4.1. One person is identified by name as the contractor's or producer diving representative. 4.2. An appropriate number of diving supervisors are assigned to each diving project. 4.3. Responsibilities for ensuring safe diving have been clearly set and agreed with the farm, the diving representative, the diving supervisor(s), and the diver(s) and dive support team (e.g., boat crew). 4.4. Before the start of each dive project, the following shall be checked and recorded: <ul style="list-style-type: none"> a. The diver's experience, the status of their certified medical fitness and their certified dive qualifications b. A risk assessment of the dive site and dive plan c. Diving depth in relation to the breathing gases used d. Expected dive duration e. Water temperature (thermal stress risk) f. Agreed methods of communication g. Stand-by diver availability h. Entrance and exit of the water; hazards on the surface i. Safety of underwater tools j. The location of the nearest decompression/hyperbaric facilities k. Emergency procedures equipment, including oxygen supplies l. First aid materials 4.5. After each project, a post-dive evaluation and diver feedback shall be recorded. The evaluation shall also consider whether changes in future practice can improve diver safety. 	

Section	Principle	Criteria	Level
AQ 04.01.04	Workers have access to clean toilets, food storage areas, designated eating and rest areas, handwashing facilities, and drinking water.	Toilets, handwashing facilities, potable drinking water, a place to store food, and a designated place to eat and rest shall be provided to the workers. Workers shall be able to use resting areas when needed and shall not be subject to restrictions except if a crisis arises. No "N/A."	Major Must
AQ 04.01.05	Human waste from toilets is collected.	Human waste shall be disposed of through sanitary sewage disposal systems that prevent contamination of the operational area and prevent direct release into open water systems as raw untreated sewage. The method of disposal shall be known and records of waste removal and collection shall be in place (refer to AQ 06.01.01).	Major Must
AQ 04.01.06	All vessels have licenses and are fitted with safety equipment.	The valid licenses and appropriate safety equipment shall be present as required by legislation in the country of operation.	Major Must
AQ 04.02	Training and assigned responsibilities		
AQ 04.02.01	Workers have received health and safety training according to the risk assessment.	Workers, including subcontractors, shall demonstrate competence in responsibilities and tasks through visual observation (if possible, on the day of the certification body (CB) audit). There shall be evidence of instruction given in the appropriate language and training records. A suitably qualified person may conduct the health and safety training if training records and/or training material are available (i.e., the trainer need not be an outside individual). Training shall, where relevant, include at least: <ul style="list-style-type: none"> - Chemical handling - Machinery operation and failure emergency procedures - Boat handling - First aid, including training in CPR (cardiopulmonary resuscitation) - Emergency procedures 	Major Must

Section	Principle	Criteria	Level
		<ul style="list-style-type: none"> - Personal hygiene - Safety in water and diving - Confined spaces (enclosed areas requiring worker entry where there is limited natural ventilation and/or where access and exit points are restricted) - Mortalities handling (refer to AQ 04.01.01) - Informing workers, that with reasonable justification, they shall remove themselves from unsafe work without fear of facing retaliation - Information on or education about emergency and training in fire safety procedures - Any other risk identified in the risk assessment <p>Evidence shall be available that all the above points were covered.</p> <p>Cross-reference with AQ 04.01.01 and AQ 04.02.06.</p> <p>Health and safety training shall be provided on a timely basis and repeated regularly.</p> <p>Training shall also be repeated for new or reassigned workers and whenever there are changes in machinery, products, or procedures that may present new risks.</p> <p>No "N/A."</p>	
AQ 04.02.02	All persons on the farm have received hygiene training.	An introductory training course for hygiene shall be given in both written and verbal form. New workers shall receive this training and confirm their participation. This training shall be appropriate to their activities and cover all instructions defined in AQ 03.02. All persons, including the owners and managers, shall annually participate in the farm's basic hygiene training.	Major Must

Section	Principle	Criteria	Level
AQ 04.02.03	The hygiene training outlines the outcome of the risk assessment for hygiene, to be adopted by workers and visitors.	Workers and visitors shall have annually read, reviewed, and signed for the farm's hygiene procedure (based on the risk assessment for hygiene in AQ 03.01), which shall cover the requirements listed in the standard. Workers shall be able to demonstrate awareness at interview. The training shall include at least the following: the requirement for handwashing; the covering of skin cuts with waterproof adhesive bandage; confinement of smoking, eating, and drinking to the appropriate areas; notification of any relevant infections or conditions; the use of suitable protective clothing. Cross-reference with AQ 03.01. No "N/A."	Major Must
AQ 04.02.04	Workers directly responsible for handling farmed aquatic species receive species-specific training in health, welfare, and handling techniques.	Workers shall be able to demonstrate competence at interview. Training records and certificates for each worker (including their allocated functions or jobs) shall be in place and available for the certification body (CB) audit. Workers shall be able to demonstrate appropriate handling techniques and identify indicators of poor welfare, including but not limited to: signs of diseases, parasites, physical damage, behavioral abnormalities, morphological abnormalities, visual indicators of poor water quality, altered production parameters. As a minimum, training shall take place every five years.	Major Must
AQ 04.02.05	Records of all training activities are kept.	A record shall be kept for training activities, including the topic covered, the trainer, the date, and a list of the attendees, including evidence of attendance. No "N/A."	Major Must
AQ 04.02.06	Where workers with special duties are identified and competence in their tasks shall be demonstrated, records are available.	Workers handling and/or administering veterinary medicines, chemicals, disinfectants, biocides, and/or other hazardous substances and all workers operating dangerous or complex	Major Must

Section	Principle	Criteria	Level
		<p>equipment as defined in the risk assessment in AQ 04.01.01 shall have evidence of competence or details of other such qualifications. Records shall identify workers who carry out such tasks and can demonstrate competence (certificate of training and/or records of training with evidence of attendance). This shall include compliance with applicable legislation.</p> <p>Cross-reference with AQ 04.02.01. For workers administering medicines, evidence of adequate experience shall be in place.</p> <p>No "N/A."</p>	
AQ 04.03	Workers' hazards and first aid		
AQ 04.03.01	Accident and emergency procedures are displayed and communicated.	<p>Instructions based on the accident and emergency procedures shall be clearly displayed in accessible and visible location(s) for workers, visitors, and subcontractors. A named person is assigned as responsible for such procedures. These instructions shall be available in the relevant language(s) of the workforce and/or in pictograms. The procedures shall be appropriate to the size and type of production and level of risk and take into account all applicable national legal requirements. Emergency evacuation equipment and survival gear (where required) shall be accessible and of sufficient quantity and quality.</p> <p>The procedures shall identify the following:</p> <ul style="list-style-type: none"> - The farm address, map, or other location information (e.g., GPS coordinates) - The contact person(s) - An up-to-date list of relevant telephone numbers (police, ambulance, hospital, fire brigade, access to emergency health care on site or by means of transport, and the suppliers of electricity, water, and gas) 	Minor Must

Section	Principle	Criteria	Level
		<ul style="list-style-type: none"> - Emergency evacuation procedures, where applicable <p>Examples of other procedures that can be included:</p> <ul style="list-style-type: none"> - The location of the nearest means of communication (telephone, radio) - How and where to contact local medical services, hospitals, and other emergency services (Questions for contact with emergency services: WHERE did it happen? WHAT happened? HOW MANY injured people? WHAT kind of injuries? WHO is calling?) - The location of fire extinguisher(s) at structures and all buildings (including worker accommodation) that are considered a potential fire risk - The locations of emergency exits - Emergency cut-offs for electricity, gas, fuel, and water lines - How to record accidents and near misses and introduce preventive action - How to deal with accidents involving chemicals following safety data sheets (SDSs) 	

Section	Principle	Criteria	Level
AQ 04.03.02	Warning signs identify all potential hazards, emergency exits, and escape routes.	Permanent and legible signs shall indicate potential hazards, emergency exits, and escape routes. This shall include indicating, where applicable: ongoing treatments, waste pits, fuel tanks, workshops, warning signs in all buildings or permanent structures showing emergency exits, escape routes, safety equipment (fire extinguisher, washing facilities, etc.) and safety alarms (fire, CO ₂ , evacuation, tornado, etc.) and access doors of the storage facilities for chemicals. Fire exits and escape routes shall be kept open, accessible, and clear of obstacles to permit safe evacuation in case of an emergency. Warning signs shall be present and in the predominant language(s) of the workforce and/or in pictograms. No "N/A."	Minor Must
AQ 04.03.03	Safety advice for substances hazardous to workers' health and safety is immediately available and accessible.	Emergency information (website, telephone number, safety data sheet, etc.) on each hazardous substance shall be available and accessible in the appropriate locations. Cross-reference with AQ 19.01.02.	Minor Must
AQ 04.03.04	First aid kits are accessible at all permanent sites and fields near the work.	Complete and maintained first aid kits (i.e., complete and maintained according to local recommendations and appropriate to the activities being carried out) shall be available and accessible at all permanent sites and present in selected transport means (vessel, vehicle, etc.) where required by the risk assessment in AQ 04.01.01.	Minor Must
AQ 04.03.05	There is always at least one person trained in first aid present on the farm whenever on-farm activities are being carried out.	There shall always be at least one person trained in first aid (with valid training certificate) present on the farm whenever on-farm activities are being carried out.	Minor Must

Section	Principle	Criteria	Level
AQ 04.04	Personal protective equipment		
AQ 04.04.01	Workers, visitors, and subcontractors are equipped with suitable personal protective equipment (PPE).	Complete sets of suitable PPE, enabling compliance with label instructions and/or legal requirements and/or requirements as authorized by a competent authority, shall be available on the farm, utilized, and in a good state of repair. Complying with label requirements and/or requirements in the risk assessment for on-farm operations may include use of some of the following: rubber boots or other appropriate footwear, waterproof clothing, protective overalls, rubber gloves, face masks, appropriate respiratory equipment (including replacement filters), ear and eye protection devices, life-jackets, etc. There shall be evidence that the provided PPE is used by the workers. No "N/A."	Major Must
AQ 04.04.02	Personal protective equipment (PPE) is maintained in clean conditions and stored appropriately so as not to pose any contamination risk to personal items.	PPE shall be kept clean according to the type of use and degree of potential contamination and stored in a ventilated place. Protective clothing shall be laundered separately from personal clothing. Reusable gloves shall be washed before removal. Dirty and damaged PPE and expired filter cartridges shall be disposed of appropriately. Single-use items (gloves, overalls, etc.) shall be disposed of after one use. PPE shall be stored in a manner that prevents cross contamination with chemicals. No "N/A."	Major Must

Section	Principle	Criteria	Level
AQ 04.05	Workers' welfare		
AQ 04.05.01	A member of the management is clearly identifiable as responsible for the workers' health, safety, and welfare.	Documentation shall be available that clearly identifies and names the member of management who is responsible for ensuring compliance with and implementation of existing, current, and relevant national and local regulations on workers' health, safety, and welfare.	Major Must
AQ 04.05.02	There is communication between management and workers on issues related to their health, safety, and welfare.	<p>Records shall show that communication between management and workers about health, safety, and welfare issues can take place openly (i.e., without fear of intimidation or retaliation) and at least once a year.</p> <ul style="list-style-type: none"> - It shall be emphasized to workers that, with reasonable justification, they shall remove themselves from unsafe work. The use of this right in good faith shall eliminate any retaliation or consequence to the workers. - If accidents, near misses, or other dangerous incidents occur, they shall be reported and the cause determined and discussed with the workers. - Management shall define corrective actions to prevent recurrence of similar incidents and clearly explain the corrective actions to the workers. - Workers shall explain to management situations where they feel exposed to risk. - Management shall explain procedures for eliminating or reducing risk detected by workers. <p>The certification body (CB) auditor is not required to make judgments about the content, accuracy, or outcome of such communications. There shall be evidence that the concerns of the workers about health, safety, and welfare are being addressed.</p>	Major Must

Section	Principle	Criteria	Level
AQ 04.05.03	On-site living quarters are compliant with applicable local regulations, habitable, and equipped with basic services and facilities.	<p>The on-site living quarters for the workers shall be habitable and have a sound roof, windows, and doors, as well as the basic services of potable water, hygienic toilets, cooking facilities, and drains. At a minimum, the quarters shall comply with the local health and safety regulations.</p> <p>Living quarters shall be away from any chemical hazards (including fire hazards, inflammable substances or hazards, etc.), biological hazards (mold, sewage, etc.), and physical hazards (noise, radiation, poor ventilation, extreme temperatures, etc.) identified in the risk assessment.</p> <p>If there are no drains, septic pits may be acceptable if compliant with local regulations.</p>	Major Must
AQ 04.05.04	Transportation provided to workers is safe.	Transportation shall be safe for workers and take into account applicable safety requirements and regulations.	Minor Must
AQ 04.05.05	The producer is compliant with the GRASP v2 add-on (assessed by the same certification body (CB) conducting the audit for the Integrated Farm Assurance (IFA) standard for aquaculture).	<p>The producer shall be compliant with the GRASP v2 add-on, covering all stages of production included under the certification: hatchery, grow-out, and any post-harvest handling done by the same legal entity as the farm.</p> <p>Regarding subcontractors, refer to the GRASP v2 general rules.</p> <p>A compliant GRASP v2 result shall be required in order to be in compliance with AQ 04.05.05 and to receive GLOBALG.A.P. certification for the IFA standard for aquaculture. This applies for all farmed aquatic species, regardless of whether destined to be labeled or only having valid GLOBALG.A.P. certification.</p> <p>No "N/A."</p>	Major Must

Section	Principle	Criteria	Level
AQ 05	OUTSOURCED ACTIVITIES (SUBCONTRACTORS)		
	<i>Subcontracting is the practice of assigning, or outsourcing, part of the obligations and tasks under a contract to another party known as a subcontractor.</i>		
AQ 05.01	The producer ensures that outsourced activities comply with the principles and criteria of the standard which are relevant to the services provided.	<p>The producer shall verify that tasks performed by subcontractors are compliant with the relevant principles and criteria of this standard. This verification shall be recorded and made available during the certification body (CB) audit.</p> <p>Based on the subcontractor services:</p> <ul style="list-style-type: none"> i) GLOBALG.A.P. approved CB is allowed to verify compliance through a physical assessment, or ii) A GLOBALG.A.P. approved CB may assess the subcontractor directly. The subcontractor shall receive a letter of conformance from the CB with the following information: <ul style="list-style-type: none"> 1) Date of CB assessment 2) Name of the CB 3) Auditor name 4) Details of the subcontractor 5) List of the assessed principles and criteria <p>Other certificates issued to subcontractors against standards that are not officially recognized by GLOBALG.A.P. are not valid evidence of compliance with GLOBALG.A.P.</p> <p>All subcontractors physically handling live farmed aquatic species shall have evidence of animal welfare training. Any activity performed by subcontractors shall follow legislation, including when outside the farm (subcontracted companies removing waste, sludge, old equipment, etc.).</p>	Major Must

Section	Principle	Criteria	Level
AQ 06	ENVIRONMENTAL AND BIODIVERSITY MANAGEMENT		
AQ 06.01	Identification of waste and pollutants		
AQ 06.01.01	Waste products and sources of pollution are identified and classified in all areas of the farm.	<p>Possible waste products (paper, cardboard, plastic, oil, etc.) and pollution (exhaust smoke, oil, fuel, noise, effluent, chemicals, feed waste, algae produced during net cleaning, etc.) produced by the farm processes have been listed.</p> <p>Waste products shall be identified and classified by:</p> <ul style="list-style-type: none"> - type - methods of storage - disposal - recycling - reuse <p>Documented evidence shall be available.</p>	Major Must
AQ 06.02	Waste and pollution action plan		
AQ 06.02.01	A comprehensive, current, and documented waste management system is implemented.	A comprehensive, current, and documented waste management system that covers waste reduction, pollution, and waste recycling shall be available. Air, soil, and water contamination shall be considered where relevant, along with all products and sources identified (organic and inorganic). The waste management system shall include the list of the products and for each of them, the intended reuse/recycle/disposal methods, and where relevant the frequency of collection and removal. The waste management system shall be part of the environmental management plan (EMP).	Major Must
AQ 06.02.02	The site is kept in a tidy and orderly condition.	Visual assessment shall show that waste and litter are stored in the designated locations (tanks, bins, others). Incidental waste is acceptable as well as waste from the current day's work.	Major Must

Section	Principle	Criteria	Level
AQ 06.02.03	Holding areas for diesel and other fuel oil tanks are environmentally safe.	Holding areas shall be maintained in manner that mitigates risks to the environment. The minimum requirement is a bunded area, which shall be impervious and be able to contain at least 150% of the largest tank stored within it. There shall be no-smoking signs displayed and appropriate fire emergency provisions made nearby.	Minor Must
AQ 06.03	Environmental impact and management		
AQ 06.03.01	An environmental impact assessment (EIA) and an environmental risk assessment (ERA), both including biodiversity, are in place.	<p>An EIA and an ERA, both including biodiversity, shall be reviewed and shall be updated following relevant changes in the farm operations with respect to environmental threats. Legal compliance on all issues shall be demonstrated. Please refer to guideline AQ I, "Examples of environmental impact assessment (EIA), environmental risk assessment (ERA), and respective environmental management plans (EMPs)" and to guideline AQ II, "Biodiversity in environmental impact assessment" and guideline AQ III, "Environmental parameters of relevance based on the aquaculture system used."</p> <p>Qualified persons who can show documented evidence of their competence shall prepare the ERA. Minimum requirements for an EIA shall include the evaluation of the following. If there is no monitoring of some of these parameters, the farm shall properly justify why is not applicable.</p> <p>Effluent</p> <ul style="list-style-type: none"> - Effluent dissolved oxygen (DO) - Effluent ratio BOD₅/COD (biochemical oxygen demand/chemical oxygen demand) - Effluent Kjeldahl nitrogen, nitrate, and nitrite load - Effluent phosphorus load: feed and fertilizers - Effluent suspended solids load 	Major Must

Section	Principle	Criteria	Level
		<ul style="list-style-type: none"> - Salinity - pH <p>Other waste</p> <ul style="list-style-type: none"> - Disposal of solid wastes and litter - Use and legal disposal of all chemical compounds (refer to AQ 19.02), including pharmaceuticals - Emission of light, sound, and vibrations - Emission of exhaust gases <p>Requirements for an ERA may be, but are not restricted to, the following processes that do not normally occur, but may happen accidentally during the course of operations:</p> <ul style="list-style-type: none"> - Accidental spill during storage and handling of chemical compounds and fuels - Emissions resulting from fire and fire extinguishing - Escapes of farmed aquatic species, including seedlings (eggs, larvae, others) and their parasites - Release of pathogens and/or disinfectants - Salinization of groundwater and freshwater bodies - Temporary exceeding of water discharge limits - Disposal of water used for washing and cleaning purposes <p>No "N/A."</p>	
AQ 06.03.02	A biodiversity-inclusive environmental management plan (EMP) has been developed, setting out strategies to minimize all effects on the environment.	<p>An EMP, including biodiversity and based on the environmental impact assessment (EIA) in AQ 06.03.01 and the risk assessment in AQ 01.02.01, shall have been developed, setting out strategies to minimize all effects on the environment.</p> <p>It shall incorporate a regular environmental monitoring program, including the frequency of the parameters established to be</p>	Major Must

Section	Principle	Criteria	Level
		<p>measured.</p> <p>The records of disposal and emission shall demonstrate both legal compliance and accordance with the biosecurity plan (refer to AQ 20.08.01).</p> <p>Refer to guideline AQ III, “Environmental parameters of relevance based on the aquaculture system used,” where detailed guidance based on farming systems is provided.</p> <p>No “N/A.”</p>	
AQ 06.03.03	There is no significant negative impact on the biodiversity of the benthic fauna and/or recipient water body sediment/water column.	<p>For all farming systems, monitoring of benthic biodiversity, chemical indicators, and possible accumulation of chemical residues or organic waste in the recipient water body sediment shall take place. Type of analysis and monitoring frequency shall be determined based on the risks identified in the environmental impact assessment (EIA) (refer to AQ 06.03.01) and applicable legislation. Analysis results shall be available for the certification body (CB) audit, and the evidence provided shall show that there is no significant negative impact on the biodiversity of the benthic fauna and/or recipient water body sediment/water column.</p> <p>If a farmer considers that they may be exempted from benthic monitoring (e.g., due to the type of seabed substrate or water depth), they shall present evidence to support this position.</p>	Major Must
AQ 06.03.04	There is further evaluation to show that there is no significant negative impact on the biodiversity of the benthic fauna and/or recipient water body sediment/water column.	<p>A biological quality evaluation based on macro fauna should provide insight on the potential impact.</p> <p>As a precautionary rule, effluents shall be treated before discharge.</p>	Recom.

Section	Principle	Criteria	Level
AQ 06.04	Water usage and disposal		
	<i>Cross-reference with AQ 06.03.02</i>		
AQ 06.04.01	Water abstraction and discharge meet the requirements set by the competent authority and do not pose a risk to local communities and natural biodiversity.	The records of discharge licenses and abstraction rights for each site, plus records of abstraction amounts taken over 12 months, shall be available. The producer shall show evidence that the farming activities do not pose a risk to desiccation-sensitive biodiversity and do not limit access to household water for the local community.	Major Must
AQ 06.04.02	The communities surrounding the farm have access to fishing areas, where applicable.	The producer shall show evidence by means of documents (maps, official authorizations, licenses, regulations, stakeholder consultation, etc.) that communities are allowed to fish in a well-defined area around the aquaculture infrastructures (net cages, rope cultures, inlet pumping stations, etc.).	Major Must
AQ 06.04.03	Inlet/outlet water quality is in compliance with existing local regulations and requirements of the environmental impact assessment (EIA)/environmental management plan (EMP).	The sampling results, sampling plan (frequency and location of where samples are taken), and records of appropriate corrective actions following evaluation of inlet/outlet water quality shall be available for the certification body (CB) audit. Refer to guideline AQ III, "Environmental parameters of relevance based on the aquaculture system used."	Major Must
AQ 06.04.04	Fresh groundwater and/or potable water is not used to lower the salt concentration of farm water.	Well water or potable water should not be used to lower the salt concentration of farm water.	Recom.
AQ 06.04.05	Water quality – in all storage systems – is verified as adequate for its uses.	Indoor primary production facilities and any other water storage systems shall maintain a supply of water fit for its intended purposes. The water in all storage systems shall not compromise food safety, handwashing, equipment, and post-harvest washing.	Major Must

Section	Principle	Criteria	Level
AQ 06.04.06	Measured impacts of effluents are in accordance with legislation and with the prescriptions of the environmental impact assessment (EIA)/environmental management plan (EMP).	It is the responsibility of the producer to ensure that no process impacting the recipient water exceeds targets in the EMP. Farm management shall be able to demonstrate compliance and knowledge of legislation in the interview. The records and discharge permits, which shall be valid and operating within limits at each site, shall be in place. It shall be possible to monitor progress.	Major Must
AQ 07	CONSERVATION		
AQ 07.01	Impact of farming on the environment and biodiversity		
AQ 07.01.01	The producer has a wildlife management and conservation plan that acknowledges the impact of farming activities (including possible escapes) on the environment.	There shall be a documented action plan that aims to enhance habitats and maintain biodiversity, aiming for zero escapes. This can be either an individual plan or a regional activity that the farm participates in or is covered by. The action plan shall pay special attention to areas of environmental interest being protected and make reference to legal requirements, where applicable.	Major Must
AQ 07.01.02	The producer considers how to enhance the environment for the benefit of the local community and flora and fauna with a policy that is compatible with sustainable commercial aquaculture production, striving to minimize environmental impact.	<p>There should be tangible actions and initiatives that can be demonstrated:</p> <p>1) By the producer on the production site, at local scale, or at regional scale</p> <p>2) By participation in a group that is active in environmental support schemes concerned with habitat quality and habitat elements.</p> <p>There should be a commitment within the conservation plan to conduct a baseline evaluation of the current levels, location, condition, etc. of the fauna and flora on the farm, so as to enable actions to be planned. Within the conservation plan, there should also be a clear list of priorities and actions for enhancing habitats for fauna and flora where viable and for increasing biodiversity on the farm.</p>	Recom.

Section	Principle	Criteria	Level
AQ 07.02	Predator exclusion plan		
AQ 07.02.01	The producer performs a risk assessment to evaluate whether predator preventive nets are required.	A risk assessment shall be performed, with results determining whether predator nets may be required, which size would restrict access to the farmed stock, and how to avoid entanglement of the farmed aquatic species. Refer to AQ 20.02.14 on risk assessment for animal welfare.	Major Must
AQ 07.02.02	If nets are required, there is in place a regular net and predator net checking system used to reduce negative interaction with the wildlife.	The records and management system for nets shall be in place to prove that they exist and operate to reduce negative interactions with the wildlife. Interviews with workers shall be taken in account for justified records.	Major Must
AQ 07.02.03	Implemented predator control techniques avoid any type of lethal interaction with the wildlife.	<p>An effective predator control plan shall be in place, using exclusion measures and/or scaring devices.</p> <p>Documented anti-predator methods shall be in accordance with relevant legislation and codes of practice, including legislation on endangered species.</p> <p>If all nonlethal control options have been exhausted, lethal dispatch of predators (if workers' safety is in danger, to avoid significant suffering or mortality among farmed aquatic species, as an act of mercy, etc.) is within the constraints of legislation. The producer shall record all lethal dispatches of predators (number of animals and species). A legal permit allowing lethal dispatch shall be available.</p> <p>Lethal dispatch of predators shall be performed humanely.</p>	Major Must

Section	Principle	Criteria	Level
AQ 07.03	Escapes		
AQ 07.03.01	The environmental management plan (EMP) includes a contingency plan and a standard operating procedure to avoid escape of farmed aquatic species into the sea or local freshwater course.	<p>Procedures to avoid escapes shall be in place, paying special attention to climate change and taking into account site history.</p> <ul style="list-style-type: none"> - Precautions shall be in place to prevent the erosion of dams or channels that could lead to subsequent escapes. - The infrastructure shall be calculated for high flood levels. Evidence of high flood levels in calculations shall be presented. - Additional infrastructure to prevent escapes shall be part of the preventive measures. - The EMP shall include a contingency plan. <p>The contingency plans and records of all escaped stock for the previous certification cycle shall be available, along with confirmation that all escapes have been reported to the authorities for all sites. Information reported to the authorities shall include biomass, health status, and any food safety risk associated with the escaped farmed aquatic species.</p> <p>The hatchery/farm shall have an effective and documented procedure for preventing accidental release of the farmed aquatic species into the environment. Where applicable, pen structures and moorings shall be inspected according to a documented schedule based on the risk assessment. Routine maintenance, and repair procedures as necessary, shall be performed and recorded.</p> <p>Contingency plans should include plans for recapturing escaped farmed aquatic species.</p>	Major Must

Section	Principle	Criteria	Level
AQ 07.04	High conservation value areas		
AQ 07.04.01	The sites or related facilities have not been established within a designated national protected area (PA), in PAs with The International Union for Conservation of Nature (IUCN) categories Ia, “Strict Nature Reserve” through to IV, “Habitat/Species Management Area,” or in areas defined under international conventions (such as Ramsar or World Heritage). If farm facilities are within PA IUCN category V or VI, consent of the PA management is required.	There shall be evidence that the farm site or related facilities are not within a PA. “The World Database on Protected Areas (WDPA)” is the most complete compilation of protected areas data available. The datasets are available as free downloads at http://www.protectedplanet.net . Evidence shall include: geographic location provided at registration. If present within PA category V or VI, the certification body (CB) auditor shall contact PA authorities to establish if the site is in line with the management objectives of the PA. Information shall be made public. See guideline AQ IV, “The Ramsar convention on wetlands.”	Major Must
AQ 07.04.02	New ponds, sites, or related facilities have <i>not</i> been established (before April 2008) in areas that were previously within a mangrove ecosystem, within the natural intertidal zone, or a high conservation value area.	If the farm facilities were built after April 2008, there shall be evidence that the area was not previously part of a mangrove ecosystem, within the natural intertidal zone, or a high conservation value area (categories I–IV) before April 2008. Evidence shall be checked within the environmental impact assessment (EIA) (including biodiversity) and shall include: record of land use/status and habitat types prior to farm building, presence/absence of IUCN red list species, remote sensing/satellite imagery. The information shall be made public.	Major Must

Section	Principle	Criteria	Level
AQ 07.04.03	Farms established between May 1999 and April 2008 within mangroves, the natural intertidal zone, or a high conservation value area show evidence that they are in the process of being retired, rehabilitating the area, and, if necessary, compensating surrounding communities. From the date of first certification, a maximum of three years is allowed to complete the retirement and rehabilitation process, after which new locations (if any, outside these areas) may be considered for certification.	There shall be a documented rehabilitation plan containing at least the objective(s), time frame, means, activities, expected output, and financing and compensation provisions in agreement with local communities. Evidence of recent funding of rehabilitation (plans) shall be available. The information shall be made public. Refer to the Convention on Wetlands (Ramsar) – Resolution VII.21, “Enhancing the conservation and wise use of intertidal wetlands” (adopted at the seventh Meeting of the Conference of the Contracting Parties to the Convention on Wetlands, San José, Costa Rica, 10–18 May 1999), article 15, “Contracting Parties to suspend the promotion, creation of new facilities, and expansion of unsustainable aquaculture activities harmful to coastal wetlands.”	Major Must
AQ 07.04.04	Farms within the intertidal zone, mangrove, or high conservation value areas improve the environment through management and restoration, retiring non-compliant ponds, and increasing productivity of remaining farm areas above the intertidal zone.	There shall be in place a documented restoration plan containing at least the objective(s), means, activities, expected output, and financing and compensation provisions in agreement with local communities. Evidence of recent funding of restoration (plans) shall be available if operations are in mangroves or intertidal zones.	Major Must
AQ 07.04.05	Mangroves are removed under prescribed purposes only.	The removal of mangrove vegetation shall be allowed only for channels or piping that service sites above the intertidal zones, and when official permits of the public sector have been granted and a rehabilitation plan is part of the permit. Restoration of removed mangroves shall be equal to or exceed the area removed and shall replicate the diversity of species removed.	Major Must

Section	Principle	Criteria	Level
AQ 07.04.06	There is a rehabilitation plan in place for when a site operation within mangroves or other sensitive ecosystems is retired.	There shall be in place a documented rehabilitation plan for when operations in mangroves or other sensitive ecosystems are retired. The plan shall contain at least objective(s), means, activities, expected output and financing. Restoration of removed mangroves shall be equal to or exceed the area removed and shall replicate the diversity of species removed.	Major Must
AQ 07.05	Ecological upgrading of unproductive sites		
AQ 07.05.01	Consideration has been given to the conversion of unproductive sites.	There should be a plan to convert unproductive sites and identified ecologically prioritized areas (low-lying wetlands, woodlands, headland strips, or areas of impoverished soil, etc.) into conservation areas, where viable, or into ecological focus areas for the encouragement of natural flora and fauna.	Recom.
AQ 07.06	Energy efficiency		
	<i>Farming equipment shall be selected and maintained for optimum energy efficiency. The use of renewable energy sources should be encouraged.</i>		
AQ 07.06.01	On-farm energy use is monitored.	There shall be records of on-farm energy use (e.g., invoices detailing energy consumption). The producer shall be aware of where and how energy is consumed on the farm and through farming practices. Trend analysis of energy use shall be available (listed per cycle and per biomass).	Minor Must
AQ 07.06.02	Based on the results of the monitoring, there is a plan to improve energy efficiency on the farm.	A documented plan identifying opportunities to improve energy efficiency shall be available (implementing insulation where needed, revising transport planning to optimize use of energy, etc.).	Minor Must

Section	Principle	Criteria	Level
AQ 07.06.03	The plan to improve energy efficiency considers minimizing the use of nonrenewable energy where possible.	The producer shall consider reducing the use of nonrenewable energy to the lowest possible and using renewable energy instead. Identification of renewable energy sourcing possibilities shall be available. The use of wood chips shall be taken with caution, as no forests shall be cut to produce them.	Minor Must
AQ 08	COMPLAINTS		
AQ 08.01	A complaint procedure relating to both internal and external issues covered by the standard is available and implemented.	<p>A documented complaint procedure shall be available to facilitate the recording and follow-up of all received complaints relating to issues covered by the standard and to record actions taken with respect to such complaints.</p> <p>In the case of producer groups, the producer group members do not need the complete complaint procedure, but only the parts that are relevant to them. If the producer is informed by a competent and or local authority that they are under investigation and/or has received a sanction within the scope of the certification, the complaint procedure shall require the producer to notify the GLOBALG.A.P. Secretariat via the certification body (CB).</p> <p>In the case of complaints related to the standard (food safety, workers' well-being, environmental protection, animal welfare, etc.) that can endanger the reputation and credibility of the GLOBALG.A.P. brand, the certificate holder shall inform the CB immediately.</p> <p>No "N/A."</p>	Major Must

Section	Principle	Criteria	Level
AQ 09	RECALL AND WITHDRAWAL PROCEDURE		
AQ 09.01	Documented procedures are in place to manage the recall and withdrawal of products originating from certified production processes from the marketplace, and such procedures are tested annually.	<p>The producer shall have a documented procedure that identifies:</p> <ul style="list-style-type: none"> - The types of events that may result in a recall and withdrawal - The persons responsible for making decisions on the possible recall and withdrawal - The mechanism for notifying the next step in the supply chain - The notification of relevant authorities when required - Steps taken to contact the certification body (CB), which in turn may contact the GLOBALG.A.P. Secretariat - The methods for reconciling stock <p>The procedure shall be tested annually for effectiveness and the results of the mock recall shall be recorded (e.g., selecting a lot and demonstrating that it can be effectively traced forward to the customer).</p> <p>Actual communications of the mock recall to the clients are not necessary. An up-to-date list of telephone numbers and email addresses is sufficient.</p> <p>If an actual recall and withdrawal occurred during the past year, documentation of these shall be provided for compliance.</p>	Major Must
AQ 10	FOOD DEFENSE		
AQ 10.01	A food defense system is in place to address risks associated with malicious attack or contamination.	<p>The system shall include:</p> <ul style="list-style-type: none"> - A risk assessment to identify potential threats to the safety of products, taking into account risks from deliberate attempt to inflict contamination or damage - A documented food defense plan to specify the measures to control any risks identified in the risk assessment - Consideration of identification of tampering to the premises and 	Major Must

Section	Principle	Criteria	Level
		products, monitoring of external storage and intake points, controlled access where relevant, receiving inputs from safe sources, and having available information for all employees and subcontractors - Worker, visitor, and subcontractor awareness of the need to support food defense measures, ensured through training, signs, pictograms, etc.	
AQ 11	GLOBALG.A.P. STATUS		
AQ 11.01	Transaction documentation includes reference to the GLOBALG.A.P. status and the GLOBALG.A.P. Number (GGN).	<p>Delivery notes, sales invoices, and, where appropriate, other documentation related to sales of products originating from certified production processes shall include the GGN of the certificate holder and a reference to the GLOBALG.A.P. certification status. This is not obligatory in internal documentation.</p> <p>Positive identification of the certification status is sufficient on transaction documentation (e.g., “GLOBALG.A.P. certified [product name]”). Products from noncertified production processes do not to be identified as “noncertified.”</p> <p>Indication of the certification status is obligatory regardless of whether the product from a certified production process was sold as such or not. This cannot be checked during the initial (first ever) certification body (CB) audit because the producer does not yet have certification and the producer cannot reference the GLOBALG.A.P. certification status before the first positive certification decision.</p> <p>“N/A” only if there is an up-to-date and documented bilateral agreement available between the certificate holder and their direct</p>	Major Must

Section	Principle	Criteria	Level
		buyer that all shipments contain only products originating from certified production processes.	
AQ 12	LOGO USE		
AQ 12.01	The GLOBALG.A.P. word, trademark, and QR code or logo, as well as the GLOBALG.A.P. Number (GGN) are used according to “GLOBALG.A.P. trademarks use: Policy and guidelines.”	<p>The producer shall use the GLOBALG.A.P. word, trademark, and QR code or logo, as well as the GGN, Global Location Number (GLN), or sub-GLN according to “GLOBALG.A.P. trademarks use: Policy and guidelines.” The GLOBALG.A.P. word, trademark, or logo shall never appear on the final product, on the consumer packaging, or at the point of sale. However, the certificate holder can use any and/or all in business-to-business communications.</p> <p>“N/A” for compound feed or GLOBALG.A.P. aquaculture ova or seedlings when not intended for sale to final consumers and definitely not appearing at any point of sale to final consumers.</p> <p>The GLOBALG.A.P. word, trademark, or logo cannot be in use during the initial (first ever) certification body (CB) audit because the producer does not yet have certification, and the producer cannot refer to the GLOBALG.A.P. certification status before the first positive certification decision.</p>	Major Must

Section	Principle	Criteria	Level
AQ 13	PARALLEL OWNERSHIP		
	<i>This section applies to all producers who need to register for parallel ownership (where products originating from certified and noncertified production processes are produced and/or owned by one legal entity). It does not apply to producers who want to achieve certification for 100% of the production processes of all products in their GLOBALG.A.P. scope and buy none of those products from other producers (with certification or not).</i>		
AQ 13.01	An effective system is in place to identify all products originating from GLOBALG.A.P. certified processes and segregate them from products originating from noncertified processes.	A system shall be in place to avoid mixing products originating from certified and noncertified production processes. This can be done via physical identification or product handling procedures, including the relevant records.	Major Must
AQ 13.02	The GLOBALG.A.P. Number (GGN) is indicated on all final products originating from certified production processes when registered for parallel ownership.	<p>For producers registered for parallel ownership (where products originating from certified and noncertified production processes are produced and/or owned by one legal entity), there shall be a system to ensure that all final products from a certified production process are correctly identified.</p> <p>Products originating from a certified production process, including those packed in final consumer packaging (either from farm level or after product handling) shall be identified with the GGN.</p> <p>It can be the GGN of the Option 2 producer group, the GGN of the producer group member, both GGNs, or the GGN of the Option 1 individual producer. The GGN shall not be used to label products originating from noncertified production processes.</p> <p>“N/A” only if the producer owns only products from GLOBALG.A.P. certified production processes, or if there is a documented agreement available between the producer and the client not to use the GGN, Global Location Number (GLN), or sub-GLN on the sale-</p>	Major Must

Section	Principle	Criteria	Level
		ready product. This can also be the client's own label specifications where the GGN is not included.	
AQ 13.03	A final verification step is in place to ensure correct dispatch of products originating from certified and noncertified production processes.	The check shall be documented to show that the products are correctly identified and dispatched according to certified or noncertified status of their production processes.	Major Must
AQ 13.04	Products that are purchased from different sources are identified.	<p>Procedures shall be established, documented, and maintained, appropriate to the scale of the operation, for identifying quantities of products originating from certified and, where applicable, noncertified production processes purchased from different sources (i.e., other producers or traders) for all registered products.</p> <p>Records shall include:</p> <ul style="list-style-type: none"> - Product description - GLOBALG.A.P. certification status - Quantities of product(s) purchased - Supplier details - Copy of the GLOBALG.A.P. certificates, where applicable - Traceability data/codes related to the purchased products - Purchase orders and/or invoices received - List of approved suppliers 	Major Must
AQ 13.05	A documented test of the traceability system is conducted annually.	A documented test of the traceability system shall be conducted annually. This exercise may be included with the test of recall and withdrawal procedures, or may be carried out separately, depending on the type of production.	Major Must

Section	Principle	Criteria	Level
AQ 14	FARM MASS BALANCE		
AQ 14.01	Sales records are available for all quantities sold for all registered products.	Sales details of the quantities of products originating from certified and, where applicable, noncertified production processes shall be recorded for all registered products, with particular attention to quantities sold and descriptions provided. The documents shall demonstrate the consistent balance between the input and the output of products originating from certified and noncertified production processes. No "N/A."	Major Must
AQ 14.02	Quantities (produced, stored, and/or purchased) are recorded and summarized for all products.	Quantities (including information on volumes or weight) of incoming (including purchased products), outgoing (including mortalities), and stored products (both from certified and, where applicable, from noncertified production processes) shall be recorded and a summary maintained for all registered products, so as to facilitate the mass balance verification process. The frequency of the mass balance verification shall be defined and be appropriate to the scale of the operation, but it shall be done at least annually for each product. Documents to demonstrate mass balance shall be clearly identified. This principle and the respective criteria apply to all producers applying for or maintaining GLOBALG.A.P. certification. No "N/A."	Major Must

Section	Principle	Criteria	Level
AQ 15	FOOD SAFETY POLICY DECLARATION		
AQ 15.01	The producer has completed and signed the food safety policy declaration.	<p>The producer's food safety policy declaration shall:</p> <ul style="list-style-type: none"> - Support the existence of a food safety culture, consisting of communication, training, feedback from workers, and measurable food safety objectives - Be annually completed and signed by the producer/manager responsible for food safety - Indicate people whose activities impact food safety - Serve as documented evidence of commitment to continuous improvement, food safety culture, provision of resources, and adherence to relevant prevailing regulations - Serve as documented evidence of review by management of all elements of the food safety system, on an annual basis or whenever changes occur that impact food safety - Substantiate the self-assessment checklist (Option 1 individual producers) - Be completed either by central management or on quality management system (QMS) level on behalf of Option 2 producer group members and Option 1 multisite producers with QMS) <p>No "N/A."</p>	Major Must

Section	Principle	Criteria	Level
AQ 16	FOOD FRAUD MITIGATION		
AQ 16.01	A system is in place to address risks associated with food fraud.	A documented risk assessment to identify potential vulnerabilities to food fraud (counterfeit chemicals, non-food grade packaging material, etc.) shall be available, annually reviewed, updated when any relevant change occurs, and implemented. This procedure may be based on a generic one, but shall be customized to the scope of the production. No "N/A."	Major Must
AQ 16.02	The producer has a food fraud mitigation plan, and it has been implemented.	A documented food fraud mitigation plan, specifying the measures the producer has implemented to address the food fraud threats identified, shall be available and implemented. No "N/A."	Major Must
AQ 17	SPECIFICATIONS, NON-CONFORMING PRODUCTS, AND PRODUCT RELEASE AT THE FARM		
AQ 17.01	Specifications for materials and services that are relevant to food safety are in place and readily available.	<p>A procedure shall be implemented and maintained for the control of suppliers of inputs and services that may introduce a food safety risk. The procedure shall include:</p> <ul style="list-style-type: none"> - Evaluation, approval, and continued monitoring of suppliers - Procurement in emergency situations to ensure materials and services still conform to specifications - Availability of records of evaluations, investigations, and follow-up actions <p>Specifications supporting the implementation of the standard and customer compliance shall be available. Specifications shall be reviewed annually or when changes occur, whichever is sooner. These changes may include the following, where relevant:</p>	Major Must

Section	Principle	Criteria	Level
		<ul style="list-style-type: none"> - Supplier specifications for packaging (where applicable) - Allowable and acceptable licenses or qualifications for service providers (pest control contractors, laboratory services, etc.) - Descriptions of customer requirements - Defined specifications for raw materials <p>Descriptions of how alternate suppliers will be evaluated in the event of emergency or supply chain disruptions shall also be available.</p>	
AQ 17.02	Procedures are in place to manage and handle non-conforming products.	Documented procedures shall be in place specifying that all non-conforming products be clearly identified and quarantined as appropriate. These products shall be handled or disposed of according to the nature of the problem and/or specific customer requirements.	Major Must
AQ 17.03	The producer has a system in place to ensure that the farmed aquatic species are ready to harvest from a food safety point of view.	The producer shall have in place a system to ensure that the farmed aquatic species are ready to harvest from a food safety point of view (maximum residue limit (MRL) compliance, conforming criteria, workers responsible for releasing products, etc.).	Major Must

Section	Principle	Criteria	Level
AQ 18	REPRODUCTION <i>This section provides the additional principles and criteria specifically to hatcheries, when covered under the certificate.</i>		
AQ 18.01	Brood stock and seedlings		
	<i>Depending on species: ova, smolt, fry, fingerling, larvae, alevin, spat, nauplii and post-larvae, others</i>		
AQ 18.01.01	Brood stock is obtained from a breeding program.	<p>Hatcheries shall be able to demonstrate that brood stock is obtained through a breeding program.</p> <p>If wild-caught brood stock are used to supplement the breeding program, the following shall be considered:</p> <ul style="list-style-type: none"> - The brood stock shall be legally caught. - There shall be evidence to demonstrate that supplementation is beneficial for farmed aquatic species improvement. - There shall be evidence that wild individuals originate from known sources of healthy populations. <p>Passively collecting seedlings (natural spat settlement for shellfish, entrance of nauplii through inlet water, etc.) from the planktonic phase is allowed. Active collection methods (e.g., using nets) are not allowed.</p> <p>No "N/A."</p>	Major Must
AQ 18.01.02	Animals that have been used for brood stock are risk-assessed before entering the human food chain.	There shall be documented evidence of identification, risk assessment, and, as necessary, disposal of brood stock for purposes other than human food.	Major Must
AQ 18.01.03	Farming of genetically modified (GM/transgenic) farmed aquatic species is prohibited.	The producer shall be able to show traceability to brood stock that are not from a GM/transgenic origin. This includes organisms originating from CRISP-Cas.	Major Must

Section	Principle	Criteria	Level
AQ 18.01.04	Invasive marking of the farmed aquatic species is avoided, or if ultimately necessary species are anesthetized before conducting the procedure.	Records shall show the use of anesthetics (if invasive marking is unavoidable). The least invasive method shall be used according to legislation.	Major Must
AQ 18.01.05	Specific to shrimp farming: all larvae sourced either internally or externally originate only from shrimp females without eye stalk ablation.	<p>Evidence in the shrimp supply chain shall identify larval origin with regard to eye stalk ablation. Examples of evidence can be supplier statements or photos, but preferably videos.</p> <p>A plan shall be in place to source only larvae originating from shrimp females without ablation (or any other type of physically invasive method for inducing breeding) not later than April 2024.</p>	Major Must
AQ 18.02	Hatchery management		
AQ 18.02.01	The hatchery keeps records of reproduction, spawning, and hatching when applicable.	Hatcheries shall be able to show procedures on spawning and hatching and the records of conditions (temperature, water properties, light, manipulation, etc.). Records shall be maintained, including farmed aquatic species health and welfare observations.	Minor Must
AQ 18.02.02	Documented procedures are in place to prevent cross contamination through all production stages, including separate equipment.	Clear, documented procedures for disinfection/biosecurity shall be available, especially between the brood stock area and holding spaces of earlier life stages. Documents and infrastructure shall be in place.	Major Must
AQ 18.03	Brood fish stripping		
	<i>If brood fish are stripped, this shall be done with consideration for the animals' welfare.</i>		
AQ 18.03.01	Fish are anesthetized during stripping and sperm collection to avoid stress.	Records of anesthetic use shall be available for the certification body (CB) audit.	Major Must

Section	Principle	Criteria	Level
AQ 18.03.02	If egg release requires incision, this is only done when the farmed aquatic species are anesthetized or dead.	A documented procedure for egg release shall be available for the certification body (CB) audit, and shall identify the specific procedure of anesthetizing or shall follow the specified mechanical or electrical stunning and killing methods.	Major Must
AQ 19	CHEMICAL COMPOUNDS		
	<i>Refer to the introduction, section "Chemical compounds."</i>		
AQ 19.01	Chemical compound storage		
AQ 19.01.01	A product inventory is documented and readily available for all chemical compounds in store.	For all chemical compounds in store, there shall be a documented, up-to-date record of the inventory including records of movements (use and supply). No "N/A."	Major Must
AQ 19.01.02	Technical data sheets (TDSs; manufacturer product specifications) and safety data sheets (SDSs) are available for all chemical compounds.	For all chemical compounds, TDSs and SDSs shall be available and at a minimum describe the compound's application, composition/active ingredients, toxicity information, dosing and application method, required personal protective equipment (PPE) for handling and emergency information, and actions in case of operator contamination. The use of chemical compounds shall follow the TDS and SDS. No "N/A."	Major Must
AQ 19.01.03	All chemical compounds are demonstrably approved for aquaculture production processes.	All chemical compounds shall be demonstrably approved for the use in aquaculture production processes in the country of production and destination. There shall be evidence of a risk assessment by a competent person where there is no legislation on specific chemical substances/active ingredients.	Major Must

Section	Principle	Criteria	Level
AQ 19.01.04	Chemical compounds are stored in accordance with manufacturer instructions and legislation.	Chemical compounds shall be stored in a secure lockable storage and in accordance with manufacturer instructions, legislation, and, where appropriate, be physically separated. Compliance shall require a visual assessment of the chemical store. No "N/A."	Major Must
AQ 19.01.05	The chemical compound storage is kept locked and with access limited to workers with training.	The chemical compound storage shall be kept locked at all times when not in use. Workers with access rights shall show evidence of training according to AQ 04.02.01. No "N/A."	Major Must
AQ 19.01.06	Chemical compounds are stored in their original packaging or dedicated suitable containers, to allow label instructions to be clearly identified.	Chemical compounds shall be stored in well maintained original packaging or dedicated suitable containers with readable labels. Small quantities for daily use may be put in suitable containers labeled with the chemical compound name.	Major Must
AQ 19.01.07	The chemical compound storage is well ventilated, able to retain spillage, and equipped with emergency facilities to deal with accidental spillage.	The chemical compound storage shall be visually assessed to prove that it is well ventilated and have retaining tanks or a bund of at least 110% of the largest liquid container to ensure that there cannot be any leakage or contamination to the exterior of the store. The chemical compound storage facilities and all mixing areas shall be equipped with a container of absorbent inert material (e.g., sand), a floor brush, a dustpan, and plastic bags in a fixed location with a sign giving instructions in case of accidental spillage of concentrated chemical compounds. For diesel and other fuel oil refer to AQ 06.02.03. No "N/A."	Major Must

Section	Principle	Criteria	Level
AQ 19.01.08	Facilities and equipment are suitable for measuring and/or mixing chemical compounds to ensure safe and accurate dosage.	The chemical compound measuring/mixing areas shall have suitable equipment for accurate measuring and dosing of all chemical compounds in store, including measuring cups, jars, and scales. Dosing equipment shall be identified and where relevant, shall be regularly calibrated or verified with documentary evidence and justified frequency. The equipment shall not be used for other purposes. Calibration shall be traceable to a national or international standard or method. No "N/A."	Major Must
AQ 19.01.09	Suitable equipment is available to prevent and to deal with operator contamination.	The chemical compound storage and measuring/mixing areas shall be visually assessed to prove they are sufficiently equipped to prevent and deal with operator contamination for all chemical compounds in store. Personal protective equipment (PPE) shall include protective gloves, eye-protectors, face masks (where required), eye wash capabilities, a source of water, a first aid kit and a clear accident emergency procedure. Procedures shall clearly warn that workers at greater risk (such as pregnant or lactating women) shall not handle hazardous substances. No "N/A."	Major Must
AQ 19.02	Empty containers and unused chemicals		
AQ 19.02.01	Empty chemical compound containers have records in place for reuse, recycling, and/or disposal. Reuse is possible only when risk-assessed by a competent person.	There shall be evidence that empty chemical compound containers are <i>not</i> reused in any form unless risk-assessed as safe by a competent person. There are records that chemical compound containers have been disposed of by a legally licensed chemical compound waste subcontractor or returned to the supplying company for recycling. No "N/A."	Major Must

Section	Principle	Criteria	Level
AQ 19.02.02	The storage and disposal of empty containers and unused chemical compounds is carried out in such a way as to avoid spills or rinses that may expose products, humans, and/or animals.	The system used for storage and disposal of empty chemical compound containers and unused chemical compounds shall ensure that products, persons, or animals cannot come into contact with the empty containers or chemical compounds and that spills or rinses are avoided. There shall be records that document that chemical compounds have been disposed of by officially authorized channels. No "N/A."	Major Must
AQ 19.03	Transport of chemical compounds		
AQ 19.03.01	Chemical compounds are transported according to documented procedures.	A documented procedure for chemical compounds transport shall be available and consider food safety, health, safety, and environmental risks.	Minor Must
AQ 20	FARMED AQUATIC SPECIES WELFARE, MANAGEMENT, AND HUSBANDRY (AT ALL POINTS OF THE PRODUCTION CHAIN)		
	<i>Any farmed aquatic species welfare problems seen during the self-assessment/internal audit performed by the producer shall be dealt appropriately and without delay.</i>		
AQ 20.01	Traceability and stock origin		
AQ 20.01.01	Farmed aquatic species are traceable to the previous farm(s) and back to their origins, including identification of corresponding batch(es) of seedlings and parents.	Farmed aquatic species shall be traceable to the previous farm(s) and back to their origins, including identification of corresponding batch(es) of seedlings and parents. Traceability records shall be on site. No "N/A."	Major Must
AQ 20.01.02	Farmed aquatic species movements, at any life stage within, to, and from the farm, are recorded and traceable.	Traceability records shall be on site. Records of all stock movements for all stages in the aquatic specie(s)'s life cycle shall include, where applicable: seedling/stock origin, species, numbers, biomass, and production unit ID.	Major Must

Section	Principle	Criteria	Level
AQ 20.01.03	Farmed aquatic species are identified (on a batch level) to specific batch(es) or input throughout the growing period.	At each stage of the growth cycle, it shall be possible to identify the composition of a batch from its inputs. No "N/A."	Major Must
AQ 20.01.04	Farmed brood stock is purchased from a source with GLOBALG.A.P. certification for the Integrated Farm Assurance (IFA) standard for aquaculture.	The records of purchase and certificates should be available for the certification body (CB) audit. Management should be able to demonstrate awareness at interview.	Recom.
AQ 20.01.05	Seedlings originate from a supplier (internal or external) with GLOBALG.A.P. certification for the Integrated Farm Assurance (IFA) standard for aquaculture.	<p>The records and certificates shall be available for the certification body (CB) audit. Management shall be able to demonstrate awareness at interview.</p> <p>- Certification audit: For initial compliance purposes, it is required that seedlings suppliers are registered with a GLOBALG.A.P. Number (GGN) in the GLOBALG.A.P. IT systems (as "GLOBALG.A.P. aquaculture seedlings (ova/juvenile)") at the time of the producer's initial CB audit. The supplier shall be able to show evidence of a self-assessment and provide a letter of commitment to certification by next CB audit.</p> <p>- Subsequent audit (second CB audit): Suppliers shall have GLOBALG.A.P. certification or certification to a GLOBALG.A.P. benchmarked scheme. Ongoing compliance at subsequent audits of the seedling supplier(s) (whether internal or external suppliers), is required.</p> <p>- After this first year, any additional seedling suppliers that start supplying the farm with GLOBALG.A.P. certification, shall be registered in the GLOBALG.A.P. IT systems from the moment seedlings are purchased and shall demonstrate their GLOBALG.A.P. certification status at their first CB audit after they</p>	Major Must

Section	Principle	Criteria	Level
		started supplying. No "N/A."	
AQ 20.01.06	Following certification, all stocked farmed aquatic species have spent their entire life on GLOBALG.A.P. registered farm(s).	Movement traceability records shall be in place to prove that all stocked farmed aquatic species since certification come only from GLOBALG.A.P. registered farms.	Major Must
AQ 20.02	Farmed aquatic species health and welfare		
AQ 20.02.01	An aquaculture health plan (AHP) is available, updated during the last 12 months, for the last production cycle, or whenever new medicines or treatments not previously used have been added.	<p>An AHP shall be available on the site. A certified veterinarian/aquatic animal health professional recognized by a competent authority shall approve the AHP. Name, affiliation, and dated signature shall be included in the AHP. A certified veterinarian/aquatic animal health professional is the professional responsible for health management on the farm who has the legal authority to diagnose disease and prescribe medication. This definition applies to all references to a veterinarian throughout the standard documents.</p> <p>The AHP shall be updated either:</p> <ul style="list-style-type: none"> a) Annually b) For each production cycle, if farmed aquatic species are on the farm for a period shorter than one year c) Whenever any of the content of the AHP requires updating (e.g., inclusion of new medicines or treatments) <p>The plan shall include but is not restricted to the following:</p> <ul style="list-style-type: none"> 1. Name and location of farm(s) 2. Potential diseases, including corresponding preventive measures of disease spread and disease mitigation 3. Vaccination protocols, which shall include available vaccines suitable for preventing or reducing possible diseases which could occur in this region, where applicable. If effective vaccines are 	Major Must

Section	Principle	Criteria	Level
		<p>available for a recurring disease, vaccination shall be preferred over therapeutic treatments. All fish shall be anesthetized prior to vaccination by injection, unless there are well justified health and welfare reasons not to do so. Sedation should be used when vaccinating by dip or bath if there is a risk of injury during handling.</p> <p>4. Quarantine procedures</p> <p>5. Medicines and treatments that may be used on the farm, including medicine name, active substance, indication, supplier, administration method, dosage, and preharvest withdrawal period</p> <p>6. Preharvest withdrawal period, beginning when medicated feed is flushed from the farm feeding system; use of flushed feeds (feed intended to clear residues from the feed system)</p> <p>7. Parasite records and controls, including frequency</p> <p>8. Biosecurity procedures</p> <p>9. Screening program for relevant pathogens</p> <p>10. Risk assessment of medicinal residues in relation to food safety issues and potential impact on wild stocks around the farm</p> <p>11. Stunning and killing procedures, including those for brood stock</p> <p>12. Action plan for harvestable farmed aquatic species if the maximum residue limit (MRL) in the country of production and/or destination has been exceeded or is likely to be exceeded</p> <p>13. Frequency and methods of culling, removal of sick and disposal of dead animals</p> <p>14. Frequency and methods of mortality inspection</p> <p>15. Frequency of monitoring of sensitivity/resistance and rotation of medicines to avoid antimicrobial resistance (AMR), where applicable</p> <p>16. Recording of mortality and its causes, which shall be done daily or as often as possible. Where a disease outbreak is suspected or mortalities are higher than expected, the veterinarian/aquatic animal health professional and relevant government official shall be notified.</p>	

Section	Principle	Criteria	Level
		<p>17. Internal procedure for disease breakout notification, including who will be notified</p> <p>18. Animal health treatments: Antibiotics shall be used if and only if specific diseases are diagnosed and there is no alternative and farmed aquatic species welfare and health may be compromised.</p> <p>18.a) Critically important antimicrobials as per the World Health Organization (WHO, www.who.int) recommendations shall be used if and only if it is the only last resort. Critical important antimicrobials (highest priority and high priority) listed for human medicine can be used only in exceptional circumstances under the judgement, prescription, and supervision of a veterinarian/aquatic animal health professional and if microbial sensitivity results (historic antibiogram) demonstrate that the selected antimicrobial is the only efficient treatment option.</p> <p>The veterinarian/aquatic animal health professional shall give justification in writing for each occasion of this use. If there is such use, there shall be evidence of communication from the producer's certified veterinarian/aquatic animal health professional instructing the feed suppliers to mix prescribed antimicrobials into compound feed. It is the responsibility of the farmer to inform an external prescribing veterinarian or aquatic animal health professional of this requirement.</p> <p>18.b) Consideration of the World Organization for Animal Health (WOAH, www.woah.org) recommendations on the "WOAH List of Antimicrobial Agents of Veterinary Importance":</p> <p><i>"Among the VCIA – Veterinary Critically Important Antimicrobial Agents in the WOAH List, some are considered to be critically important both for human and animal health; this is currently the case for Fluoroquinolones and for the third and fourth generation of</i></p>	

Section	Principle	Criteria	Level
		<p><i>Cephalosporins. Colistin has been moved in 2016 to the WHO category of Highest Priority Critically Important Antimicrobials. Therefore, these two classes and Colistin should be used according to the following recommendations:</i></p> <ul style="list-style-type: none"> - <i>Not to be used as preventive treatment;</i> - <i>Not to be used as a first line treatment unless justified, when used as a second line treatment, it should ideally be based on the results of bacteriological tests; and</i> - <i>Extra-label/off-label use should be limited and reserved for instances where no alternatives are available. Such use should be in agreement with the national legislation in force;”</i> <p>19. Any trials or testing of nonlicensed medical treatments</p> <p>20. Following periods and procedure instructions, where applicable</p> <p>21. Coordinated disease responses and preventive measures with neighboring farmers</p> <p>22. Medicines and treatments that are not allowed to be used, which shall include those compounds that are banned under the United Nations Food and Agriculture Organization (FAO)/WHO Codex Alimentarius: nitrofurans (as well as its derivatives), triarylmethane dyes (including, but not limited to malachite green, crystal violet, and brilliant green), stilbenes (including, but not limited to stilbene, dienestrol, diethylstilbestrol, hexestrol), chloramphenicol, nitroimidazoles (including, but not limited to dimetridazole, ipronidazole, metronidazole) or β-agonists (including, but not limited to clenbuterol)</p> <p>23. Where applicable, records of routine assigned veterinarian/aquatic animal health professional visits</p> <p>No “N/A.”</p>	

Section	Principle	Criteria	Level
AQ 20.02.02	Equipment is designed and fit for the purpose of avoiding physical damage and ensuring minimal stress to the farmed aquatic species.	Pumps, surfaces, and equipment that come into contact with farmed aquatic species, including vaccination facilities, shall be suitably designed and operated to avoid physical damage and to ensure minimal stress to the farmed aquatic species.	Major Must
AQ 20.02.03	Where there is a legal requirement for health status certification, farmed aquatic species or seedlings introduced to the farm are certified free from known diseases.	Farmed aquatic species or seedlings introduced to the farm shall be certified free from known diseases. Records shall be available on site. If there is no corresponding legal requirement, refer to AQ 20.02.06.	Major Must
AQ 20.02.04	Brood stock prior to breeding is screened and verified free of diseases that may be vertically transmitted.	Records and certificates shall be in place showing that brood stock prior to breeding has been screened and verified free of diseases that may be vertically transmitted.	Major Must
AQ 20.02.05	Seedling suppliers (internal or external) provide a health assessment report.	The condition of the farmed aquatic species shall have been assessed, and analytical test certificates of routine surveillance disease monitoring of seedlings, at least for known diseases for the specific species as defined in the aquaculture health plan (AHP), shall be available. Records shall include information on sampling protocols, analysis type, frequency, and results. The competent authority shall recognize the laboratory used for notifiable disease monitoring.	Major Must
AQ 20.02.06	Farmed aquatic species intended to be moved show a state of good health and welfare following established parameters.	Farmed aquatic species intended to be moved shall show a state of good health and welfare following established parameters (including cleaner fish). Risk assessment of the common diseases of the species/location before moving to grow-out areas shall be in place. No "N/A."	Major Must

Section	Principle	Criteria	Level
AQ 20.02.07	Documented instructions to notify the relevant competent authority of disease problems, where stipulated by law or by the World Organization for Animal Health (WOAH), are in place.	The producer shall demonstrate knowledge of which notifiable diseases or types of mortality events shall be reported to the statutory authority or WOAH. At a minimum, any diseases stipulated as notifiable by the WOAH shall be disclosed (www.woah.org). No "N/A."	Major Must
AQ 20.02.08	The hatchery/farm has in place a system to monitor and register farmed aquatic species health and welfare indicators and all disease occurrences.	<p>A system to monitor and register farmed aquatic species health and welfare indicators and all disease occurrences at hatcheries/farm sites shall be in place.</p> <p>The register shall contain at least:</p> <ul style="list-style-type: none"> - Observations - Diagnosis - Treatment - Mortalities <p>Appropriate mechanisms for on-site checking and records of identification for health and welfare indicators shall be in place, including visual monitoring (directly or by video). The checking shall demonstrably be used as an early warning system for farmed aquatic species health and welfare, and additional care shall be shown in cases of abnormalities.</p> <p>Health and welfare observations shall be recorded at a minimum on a weekly basis.</p> <p>Workers shall be able to demonstrate awareness at interview.</p> <p>No "N/A."</p>	Major Must

Section	Principle	Criteria	Level
AQ 20.02.09	The producer demonstrates both understanding of hygiene practices regarding farmed aquatic species health and welfare, and implemented hygiene procedures which are suitable to the farm.	<p>A documented hygiene plan shall detail the most important elements regarding farmed aquatic species health and welfare:</p> <ul style="list-style-type: none"> - Water quality - Cleaning methods - Cleaning agents (labeled for food contact surfaces, where appropriate) - Disinfectants - Application period - Application frequency - Collection and handling of mortalities <p>The plan shall be implemented and recorded. Workers shall be able to demonstrate awareness at interview. Cross-reference with AQ 03.03. No "N/A."</p>	Major Must
AQ 20.02.10	Farmed aquatic species batch numbers, average weight, and total biomass are monitored at production unit level.	Farmed aquatic species batch numbers, average weight, and total biomass shall be monitored at production unit level. Records of monitoring and documentation shall be available.	Major Must
AQ 20.02.11	Size variation within stocks of farmed aquatic species is controlled.	Size variation within one holding unit (tank, pond, net pen, rope) shall be monitored. Levels at which size grading is necessary for the species shall be established and justified. Procedures shall be present to assess and minimize factors affecting size variation. All grading events shall be recorded.	Minor Must

Section	Principle	Criteria	Level
AQ 20.02.12	The farm has in place a system to ensure appropriate feeding levels and feed usage records.	The farm shall have in place a system to ensure that feeding levels are in accordance with needs based on, e.g., feed manufacturer's guidelines or farming experience. The system shall ensure an even distribution of feed to the population, and have a mechanism for the adjustment of feeding levels depending on appetite and expected biomass and for minimizing feed waste, avoiding competition, and mitigating aggression. Feeding records shall be present and shall demonstrate monitoring of feed efficiency.	Major Must
AQ 20.02.13	The farm/hatchery/transport operates according to set densities.	A density shall be established in relation to farmed aquatic species' size, production stage, environment, and production system. Where there are no corresponding legislative requirements, the farm shall show that limits are based on scientific evidence or industry best practices regarding health and welfare and food safety. Density limits shall not be set as an average for the system or as a production cycle average. Set densities shall not be exceeded. Stocking densities shall be calculated, and records shall be in place.	Major Must
AQ 20.02.14	A risk assessment for animal welfare is conducted.	An up-to-date, documented risk assessment with associated control measures on animal welfare shall be present, which includes, but is not necessarily limited to: <ul style="list-style-type: none"> - Predation - Extraneous species present in the farm unit - Intensity and changes in artificial/sun light; diurnal rhythm - Acoustic disturbance and vibrations due to (engines, pumps, aerators, etc.) - Visual disturbances (moving objects, persons, shadows, etc.) - Design and method of farmed aquatic species grading and counting systems - Electricity leakage into the holding facilities - Biotic factors (e.g., algal blooms) 	Major Must

Section	Principle	Criteria	Level
		<ul style="list-style-type: none"> - Contaminations (contingency plan mandatory) - Physical marking – invasive procedure - Water flow rate <p>Cross-reference with AQ 01.02.01. There shall be documented evidence that any animal welfare problem seen during a certification body (CB) audit is dealt with appropriately and without delay.</p>	
AQ 20.02.15	The producer considers enhancing the rearing conditions to improve performance and animal welfare of the farmed aquatic species.	<p>Based on the increased understanding of the husbandry of farmed aquatic species, consideration shall be given to better meeting physiological and behavioral needs, e.g., through environmental enrichments.</p> <p>Efforts shall be made to give farmed aquatic species an environment which is suitable to their needs. For instance, considerations shall be given to social, structural, sensory, and dietary enrichments.</p>	Minor Must
AQ 20.02.16	A risk assessment is conducted to demonstrate that water quality does not compromise food safety or farmed aquatic species health and welfare.	<p>A documented risk assessment shall be in place covering all potential water pollution sources affecting food safety or farmed aquatic species health and welfare. Where risks have been identified, measures such as water treatment, filtration, disinfection, etc. shall be taken.</p> <p>Water sources not suitable for the aquaculture process shall, where available, be clearly marked.</p> <p>No "N/A."</p>	Major Must
AQ 20.02.17	The infrastructure of the facilities ensures no cross contamination of the intake water.	Intake and discharge shall be controlled and independent from each other in order to avoid unwanted cross contamination of intake water. This aspect shall be included in the risk assessment (refer to AQ 01.02.01).	Major Must

Section	Principle	Criteria	Level
AQ 20.02.18	The farm/hatchery/transport and holding facilities have a routine water quality monitoring and control program based on a risk assessment and taking into account potential contamination, farmed aquatic species health and welfare, and the production system.	The farm shall have in place a monitoring and control program based on a risk assessment for water quality to ensure that the health and welfare of the farmed aquatic species is not compromised. The risk assessment (refer to AQ 20.02.16) shall include relevant water quality parameters, fluctuations, and sampling points (at farm or production unit level), such as temperature, dissolved oxygen, carbon dioxide, dissolved nitrogen (over-saturation), pH, ammonia, nitrate, nitrite, suspended solids, and microbiological parameters (e.g., fecal indicators), among others identified in the risk assessment as necessary. Records for each site shall be in place. Frequency shall be related to the aquaculture system used and shall be established by the risk assessment. Laboratory testing shall occur in a manner consistent with industry requirements and prevailing regulations. No "N/A."	Major Must
AQ 20.02.19	Farmed aquatic species are treated and handled at all times in such a way as to protect them from pain, stress, injury, and disease.	Farmed aquatic species shall, at all times, be treated and handled in such a way as to protect them from pain, stress, injury, and disease. Workers shall be able to demonstrate awareness at interview. No "N/A."	Major Must
AQ 20.02.20	Periods of crowding, time out of the water, grading, transport, and fasting are recorded and justified by the certified veterinarian/aquatic animal health professional.	For each particular farmed aquatic species, the number and length of periods of crowding, grading, time out of water, transport, and fasting (prior to harvesting, vaccination, transport, etc.) shall follow the certified veterinarian/aquatic animal health professional's guidelines included in the aquaculture health plan (AHP), with limits to the duration and frequency of each period established. Records showing adherence shall be available. Crowding shall consider the equipment used and the water quality. Crowding may also occur when feeding or during other routine processes.	Major Must

Section	Principle	Criteria	Level
AQ 20.02.21	Feedback relating to animal welfare from the preceding production stage is in place and recorded.	<p>From the farm to the hatchery/nursery and from the slaughter facility/primary processing to the grow-out farms, health and welfare indicators of the farmed aquatic species such as mortalities, exterior damage (scale loss, fin erosion, predator bites, handling scars, lesions resulting from aggression, parasite lesions, etc.), and deformities, shall be noted upon arrival: at the farm, when arriving from hatcheries and/or at the slaughter/processing plant, when arriving from grow-out stages.</p> <p>There shall be a system in place for recording and sharing farmed aquatic species health and welfare information, and for making necessary improvements and changes based on the feedback.</p>	Minor Must
AQ 20.02.22	Culling of farmed aquatic species is done according to prescribed methods respecting animal welfare and the aquaculture health plan (AHP).	Culling of farmed aquatic species (removal, killing and disposal, including extraneous species, sick or deformed specimens) shall be done according to prescribed methods, including safe disposal. Culling procedures shall be in place. Cross-reference with AQ 20.02.01 on the AHP.	Major Must
AQ 20.02.23	A management plan for cohabitant species not intended for human consumption is in place, and this plan applies the same welfare, feed management, biosecurity, and environmental enrichment principles as for the commercially grown species.	<p>There shall be a management plan for cohabitant species not intended for human consumption (e.g., cleaner fish in salmon farming). This management plan shall apply the same animal welfare and biosecurity principles as those for the commercially grown species. Operational controls for the management of these species shall be demonstrated.</p> <p>Any use of cohabitant species (e.g., cleaner fish) shall be risk-assessed.</p> <p>Cohabitant species shall be sourced from known origins.</p>	Major Must

Section	Principle	Criteria	Level
AQ 20.02.24	Elements of the risk assessment on animal welfare are applied for transport of live farmed aquatic species, eggs, and juveniles.	<p>The addressed elements in the risk assessment on animal welfare shall apply to transport of live farmed aquatic species, eggs, and juveniles.</p> <p>Moribund and diseased animals shall not be transported.</p> <p>Waters used for transport shall have similar properties with regard to farmed aquatic species welfare parameters such as (but not limited to) oxygen, pH, salinity, and temperature. Records of measurements shall be in place. Refer to AQ 20.02.18.</p>	Major Must
AQ 20.03	Treatments		
AQ 20.03.01	If effective vaccines are available for a recurring disease, vaccination is preferred over therapeutic treatments.	The producer shall use only those vaccines that are permitted by the relevant competent authority for use in aquaculture and for the named species. A list of all vaccines that may be used on the farm shall be available as part of the aquaculture health plan (AHP). Cross-reference with AQ 20.04.01.	Major Must
AQ 20.03.02	The producer uses only medicines and treatments that are permitted by the relevant competent authority and stipulated in the aquaculture health plan (AHP) for use in aquaculture and for the named farmed aquatic species.	The producer shall use only those medicines and treatments that are permitted by the relevant competent authority for use in aquaculture and for the named species. A list of all medicines and treatments that may be used on the farm shall be available as part of the AHP. Cross-reference with AQ 20.04.01.	Major Must
AQ 20.03.03	The producer is able to demonstrate compliance regarding maximum residue limits (MRLs) in the market where the farmed aquatic species will be traded (domestic or international).	The producer shall have available a list of currently applicable MRLs for the market(s) where the farmed aquatic species are traded (whether domestic or international). The MRLs shall be identified by either demonstrating communication with clients confirming the intended market(s) or by selecting the specific country (or group of countries) where the producer intends to trade the farmed products	Major Must

Section	Principle	Criteria	Level
		and presenting evidence of compliance that meets the currently applicable MRLs of the country (group). Where a group of countries is targeted for trading, the producer shall comply with the strictest currently applicable MRLs. If there is any change in the list of countries of destination, this shall be updated and the certification body (CB) informed.	
AQ 20.03.04	Vaccines, medicines, and treatments used on the farm are authorized and/or prescribed by a certified veterinarian/aquatic animal health professional.	Vaccines, medicines, and treatments used on the farm shall be authorized and/or prescribed by a certified veterinarian/aquatic animal health professional. Application has to be carried out according to label instructions and veterinary prescriptions, following the instructions included in the aquaculture health plan (AHP). Where the prescription follows the cascade principle, this shall be clearly recorded with justification for each treatment.	Major Must
AQ 20.03.05	Mixing feed with medicines on the farm is avoided. When justified, this practice follows the medication and treatment requirements listed in the aquaculture health plan (AHP).	<p>Mixing feed with medicines on the farm shall be avoided. The practice shall be used only when justified, and in those rare cases shall follow medication and treatment requirements listed in the AHP.</p> <p>Records for this practice shall include:</p> <ul style="list-style-type: none"> - Target with justification - Person responsible for prescription - Trained person responsible for mixing feed with medicines - Records of feed used - Active ingredient and product name - Concentrations used and mixing procedures following label instructions - Feeding administration procedure - Evidence of active ingredient concentration - Withdrawal times 	Major Must

Section	Principle	Criteria	Level
AQ 20.03.06	Neither natural nor synthetic hormones nor antibiotic agents are used for the purpose of growth promoting.	The producer shall be able to demonstrate that hormones and antibiotic agents are used properly and not for promoting growth.	Major Must
AQ 20.03.07	When stocks are vaccinated, it is according to the aquaculture health plan (AHP) under AQ 20.02.01.	The vaccination records shall be available for the certification body (CB) audit.	Major Must
AQ 20.03.08	Antibiotic agents are only applied following the diagnosis of an infectious bacterial disease.	Antibiotic agents shall not be used prophylactically, but shall be applied as a therapeutic treatment only where an infectious bacterial disease is diagnosed. Refer to the aquaculture health plan (AHP).	Major Must
AQ 20.03.09	Unused medicines or medicated feed past their use-by date and empty medicine containers or empty medicated feed bags are disposed of in a controlled manner that will not result in subsequent misuse.	There shall be a documented procedure in place detailing methods of disposal for medicines and medicated feed (according to the manufacturer's instructions and legal requirements, where applicable) and justification.	Major Must

Section	Principle	Criteria	Level
AQ 20.04	Treatment records		
AQ 20.04.01	The producer maintains up-to-date records of medicines and treatment purchases or deliveries, including medicated feed, and records of administering medicines/medicated feed to farmed aquatic species.	<p>Any and all medicines and medicated feed in use/storage shall be recorded in accordance with standard requirements, and records shall be in place.</p> <p>The purchase record shall include date of purchase, name of product, quantity purchased, batch number, expiry date, and name of supplier.</p> <p>The administration record shall include batch number, date administered, identity of farmed aquatic species group treated, quantity or biomass of farmed aquatic species treated, dosage, method of administration and total quantity of medicine used, date treatment finished, date withdrawal period completed, earliest date the farmed aquatic species are available for consumption, name of the person(s) who administered the medicine by date.</p>	Major Must
AQ 20.04.02	The producer is able to provide a complete history and current overview and trend analysis of farmed aquatic species treatments and application methods.	<p>All farmed aquatic species treatments and treatment trend analysis shall be recorded and carried out according to the aquaculture health plan (AHP).</p> <p>Typical trend analysis may include:</p> <ul style="list-style-type: none"> - Where antibiotics are used, a trend relating to the quantity of active ingredient versus harvest tonnage can be calculated for defined batches. - Where chemical compound treatments are used, a trend relating volumes used versus farmed aquatic species numbers produced can be calculated for defined batches. - Number of treatments and frequencies of specific disease treatments 	Major Must

Section	Principle	Criteria	Level
AQ 20.04.03	There is in place a system for identifying batches of farmed aquatic species which have received treatment requiring a preharvest withdrawal period.	At the site, there shall be a system for identifying – and preventing accidental harvesting of – batches of farmed aquatic species that have received treatments and are in a preharvest withdrawal period. Workers shall be able to demonstrate awareness at interview.	Major Must
AQ 20.04.04	Preharvest withdrawal periods for relevant treatments and for relevant production units are known and strictly adhered to.	There shall be documented confirmation of the nature and the date of treatment and the date that the preharvest withdrawal period will be completed. Any farmed aquatic species subsequently sold to another farm before the preharvest period has expired, shall be identifiable as such. Required withdrawal periods for production units that may be indirectly affected by treatment of another production unit (through feed spill, sharing the same waters, etc.) shall be based on the risk assessment (refer to AQ 20.02.01 on the aquaculture health plan (AHP)). Workers shall be able to demonstrate awareness at interview.	Major Must
AQ 20.05	Mortality		
AQ 20.05.01	Mortality inspection and removal from the production units are carried out according to the aquaculture health plan (AHP).	Mortality records shall be available for the certification body (CB) audit. Moribund farmed aquatic species shall be removed as they appear. No “N/A.”	Major Must
AQ 20.05.02	Mortalities, cause of death, and mortalities trend analysis are recorded at production unit level.	Records of mortalities and cause of death, when known, shall be in place per production unit. The frequency of mortalities recording shall be defined and be performed as often as possible. Records shall also include percentage per production stage. Workers shall show awareness of farmed aquatic species’ health status/mortality causes at interview. Actions shall be taken when	Major Must

Section	Principle	Criteria	Level
		trends are identified. The self-assessment/internal audit and certification body (CB) audit reports shall have a value of the overall percentage of mortalities per production stage and values linked to the causes of death.	
AQ 20.05.03	The farm has a system for dead farmed aquatic species removal, storage, and disposal that ensures that environmental aspects are not compromised and avoids spreading of pathogens and diseases to own stock and to the wild.	Dead farmed aquatic species shall be removed, intermediately stored, and disposed of in a way that ensures that environmental aspects are not compromised and avoids spreading of pathogens and diseases to own stock and to the wild. Farm records shall be in place to show protocols for dead farmed aquatic species removal, storage, and disposal.	Major Must
AQ 20.05.04	The farm has a contingency plan for dealing with mass mortalities.	The farm shall have a contingency plan for dealing with mass mortalities. Workers shall be able to demonstrate awareness at interview. No "N/A."	Major Must
AQ 20.06	All pens in bodies of water		
AQ 20.06.01	Suspended pen nets never touch the bottom of the body of water.	The records of depths measurements shall demonstrate that suspended pen nets never touch the bottom of the body of water in which they are suspended.	Major Must
AQ 20.06.02	Nets in use are individually identifiable and maintained in good condition.	Maintenance records shall be kept for each net documenting age, condition, repair, types and dates of treatments/cleaning, location, net inspection records, divers' observations (where applicable), and records of corrective actions that have been taken according to results of monitoring operations. The integrity of the nets shall be visually inspected as frequently as required in the risk assessment or manufacturer guidelines and	Major Must

Section	Principle	Criteria	Level
		immediately after any special event (e.g., a storm) to ensure that any damage that may lead to risk of farmed aquatic species escapes is identified and corrected. Net strength shall be tested according to manufacturer guidelines.	
AQ 20.06.03	The recorded net mesh sizes are appropriate for the size of farmed aquatic species (including cohabitant species) to prevent escapes and risk of injuries to the farmed aquatic species.	Records of net mesh measurement shall be in place. Net mesh size shall be appropriate for the farmed aquatic species size (including cohabitant species) to prevent escapes and risk of injuries to the farmed aquatic species.	Major Must
AQ 20.06.04	Pens and mooring systems are suitably designed for their location and weather conditions according to a risk assessment and are correctly installed.	<p>A risk assessment that considers the suitability of cage and mooring design shall be available for the certification body (CB) audit. Specifications for cages and mooring systems shall be available, including names of the person(s) or company carrying out the installations. Evidence of the experience/qualifications of persons responsible for installation and maintenance shall be available.</p> <p>A documented maintenance plan for anchors, mooring equipment, and cages, including details of renewed parts, shall be available. Pens and mooring systems shall be maintained on a regular basis by persons with suitable training or experience and according to a written plan.</p>	Major Must
AQ 20.06.05	Pens are clearly marked with navigation aids.	Pens shall be appropriately marked where necessary.	Major Must

Section	Principle	Criteria	Level
AQ 20.07	Ponds		
AQ 20.07.01	Fallow periods are defined, and where there is no fallowing, this has been defined in the aquaculture health plan (AHP).	The fallowing and restocking dates for sites/ponds (where these are independent units) shall be defined and records kept. Where ponds are not fully drained, checks shall have been done to ensure all farmed aquatic species are removed from the individual units and, crucially, before treatment of any water remaining in the pond. Workers shall be able to demonstrate awareness at interview. Where there is no fallowing, this shall be defined in the AHP. A farmed aquatic species health risk assessment shall be in place.	Major Must
AQ 20.07.02	Vegetative buffer zones and habitat corridors around pond systems and adjacent to farm boundaries are maintained in good order and, where practical, improved.	Vegetative buffer zones and habitat corridors shall be maintained to minimize the effect of site operations on the environment. Consideration shall be given to the creation of vegetative buffer zones and habitat corridors where they are not already in place.	Minor Must
AQ 20.07.03	Neither sewage nor manure is used as fertilizer.	The producer shall demonstrate that treated or untreated sewage waters and animal manure are not used on the farm. Workers shall be able to demonstrate awareness at interview.	Major Must
AQ 20.07.04	Where pond rearing is based on or complemented by inorganic fertilization, there are defined procedures available, and records are kept of any quantities of fertilizers added to the pond.	Documented procedures and records of inorganic fertilizers added to pond and their quantities shall be in place. Special attention shall be given to phosphorus, considering it is a limited natural resource.	Major Must
AQ 20.07.05	Dredged sediment is disposed of according to the environmental management plan (EMP).	Records of disposal of dredged sediment shall be in place, including disposal done by subcontractors. Any activity performed by subcontractors shall follow legislation, including when outside the farm.	Major Must

Section	Principle	Criteria	Level
AQ 20.08	Biosecurity		
	<i>In addition to food defense requirements; refer to AQ 10.</i>		
AQ 20.08.01	Sites have a documented biosecurity plan.	<p>A biosecurity plan is in place and shall include at a minimum:</p> <ul style="list-style-type: none"> - Risk assessment - Training - Site hygiene - Risk of introduction of pathogens and diseases - Systems to prevent and disinfect - Area management plan - Requirements to control entry and exit points to the site and equip them for cleaning and disinfecting - Visitor authorization procedure - Visual prohibition/warning signage around the farm perimeter or entrances <p>No "N/A."</p>	Major Must
AQ 20.08.02	If there is an area management plan, the farm is actively participating and can demonstrate compliance with the plan's requirements.	<p>An area management plan is an agreement between producers, usually at the same body of water, that includes measures to prevent the introduction and spread of pathogens and disease. If there is such a plan, the producer shall show documented evidence of participation.</p> <p>Where no area management plan is in place, farms from different aquaculture companies sharing the same body of water shall demonstrate efforts with specific actions to collaborate in relevant aspects affecting their farming operations. Examples may include disease control, movement of animals, predators, evaluation of macro-fauna, etc.</p>	Major Must

Section	Principle	Criteria	Level
AQ 20.8.03	Where used, harvesting containers are cleaned and disinfected before reuse and transfer to the grow-out sites.	Records of cleaning and disinfection of harvesting containers shall be in place, where applicable.	Major Must
AQ 20.8.04	There is a documented equipment cleaning and disinfection plan.	<p>The producer shall be able to demonstrate both understanding of biosecurity practices and cleaning and disinfection procedures that are suitable to the farm.</p> <p>A documented cleaning and disinfection plan shall be in place, detailing the most important elements, in particular:</p> <ul style="list-style-type: none"> - Cleaning water quality - Cleaning methods - Cleaning agents - Disinfectants - Application period - Application frequency - Disease control - Storage conditions of cleaning equipment to avoid risk of contaminating product <p>The plan shall be in place, implemented, and recorded. Equipment in direct or indirect contact with the farmed aquatic species shall be constructed of materials that do not hinder proper cleaning and disinfection. Workers shall be able to demonstrate awareness at interview.</p> <p>No "N/A."</p>	Major Must
AQ 20.08.05	For all machinery and equipment (including filters), a record is kept of maintenance details, cleaning, and disinfecting.	Records of maintenance, daily cleaning, and disinfecting shall be in place for all machinery and equipment (including filters), where applicable.	Major Must

Section	Principle	Criteria	Level
AQ 20.08.06	Vehicles and vessels (including all transport systems and associated equipment) used for transporting farmed aquatic species or aquaculture feed, whether owned by the producer or subcontractors, show evidence of cleaning and disinfection procedures.	The risk assessment shall specify the required cleaning and disinfection procedures. Records and corrective actions shall be in place for the self-assessment/internal audit and certification body (CB) audit. Transportation of farmed aquatic species shall maintain traceability and adherence to local legislation on movement of fish. No "N/A."	Major Must
AQ 20.08.07	There is segregation or disinfection of equipment, workers, and vehicles between operating sites to reduce transfer of diseases.	Documented procedures and records of disinfection where required shall be in place. No "N/A."	Major Must
AQ 20.08.08	The infrastructure supports quarantine procedures for the site or farm in case of an infectious disease outbreak.	If an infectious disease breaks out, the infrastructure shall support the documented quarantine procedures.	Major Must
AQ 20.08.09	Unless the health status is verified in advance, brood stock/seedlings are held in quarantine until their disease status is verified prior to their transfer to other areas.	Health status or quarantine records shall be in place.	Major Must
AQ 20.08.10	Sites are maintained in a clean and hygienic condition.	Sites shall be kept in a clean and hygienic condition in order to: - Reduce the risk of disease and pathogen spread between operation areas and/or production units - Comply with the environmental management plan, taking into account the perimeter of the farm No "N/A."	Major Must

Section	Principle	Criteria	Level
AQ 20.08.11	A risk assessment that includes the need for incoming water disinfection in hatcheries and subsequent impact of discharge water is in place.	A risk assessment that includes consideration of the need for incoming water to be disinfected in hatcheries shall be in place. If disinfection is required, it shall be carried out effectively. Reference shall be made to the environmental impact assessment (refer to AQ 06.03.01) with respect to release of pathogens and/or disinfectants.	Major Must
AQ 20.09	Machinery and equipment		
AQ 20.09.01	Equipment and systems are designed, installed, and operated so as to minimize the risk of compromising farmed aquatic species' health and minimize the risk of farmed aquatic species escapes.	Equipment and systems shall be designed, installed, and operated to minimize the risk of compromising farmed aquatic species' health and welfare and minimize the risk of escapes. Workers shall be able to demonstrate awareness at interview.	Major Must
AQ 20.09.02	Measures are in place to prevent the escape of farmed stock into the local watercourse or ingress of indigenous species into the farmed aquatic species holding areas.	The contingency plans, records of all escaped farmed aquatic species for the previous 12 months, and documentation that escape incidents have been reported to the authorities shall be in place for all sites. The hatchery/farm shall have an effective and documented procedure to prevent accidental release of stock into the environment. Where applicable, pen structures and moorings shall be inspected according to a documented schedule based on the risk assessment. Routine maintenance and repair or replacement shall be actioned and recorded.	Minor Must
AQ 20.09.03	Machinery and equipment (including filters) critical to ensuring good farmed aquatic species health and welfare have maintenance records.	For machinery and equipment critical to ensuring good farmed aquatic species health and welfare (e.g., oxygen probes), a record shall be kept with the following: details of maintenance and calibration, details of calibration or verification of the testing and monitoring equipment by a second party. Records demonstrating appropriate maintenance and calibration or verification shall be in place.	Major Must

Section	Principle	Criteria	Level
AQ 20.09.04	Where farmed aquatic species health and welfare is dependent upon automatic systems/equipment (oxygen level, pump pressure, etc.), the systems are equipped with alarms and backup systems.	Where farmed aquatic species health and welfare may be compromised due to system/equipment failure, this equipment/system shall be equipped with alarms in case of failure. These alarms shall be tested on a regular basis. Records of alarm testing shall be in place. A system for notifying the responsible person(s) shall be in place.	Major Must
AQ 20.09.05	Where risk assessments show that oxygen levels could drop below the minimum for farmed aquatic species health and welfare, oxygen supplementation systems are available and maintained in good repair.	An oxygenation supplementation system shall be available for the peak stocking density at lowest predictable oxygen levels. A backup oxygen supplementation system shall be available in case of failure of the principal system. For closed recirculation systems, equipment to saturate water with O ₂ is necessary due to the high density of farmed aquatic species. Refer to AQ 20.02.14 on the risk assessment on animal welfare.	Minor Must

Section	Principle	Criteria	Level
AQ 21	SAMPLING AND TESTING OF FARMED AQUATIC SPECIES		
AQ 21.01	A sampling program, including frequency of testing, based on likely contaminants, residues, and substances for the type and location of the aquaculture operation and feed ingredients is in place.	<p>Based on the food safety risk assessment, farmed aquatic species tissue residue analyses shall be carried out to verify compliance with maximum residue limits (MRLs) for approved medicines and treatments and to verify that no residues of nonapproved substances are present.</p> <p>The list of substances to be analyzed shall be based on:</p> <ul style="list-style-type: none"> - Local/National legislation - Requirements given by the customer(s) - Substances listed in the aquaculture health plan (AHP) <p>Analysis frequency shall be determined based on the risks identified in the sampling program. Analysis results shall be available for the certification body (CB) audit.</p> <p>No "N/A."</p>	Major Must
AQ 21.02	The laboratory used to test for likely contaminants, residues, and substances is accredited to the ISO/IEC 17025 standard or successfully participating in a proficiency ring-testing program.	<p>Testing as required according to point AQ 21.01 shall be carried out by a laboratory accredited to ISO/IEC 17025 or having evidence of successful participation in a proficiency ring-testing program.</p> <p>Accreditation shall be demonstrated either on official letter head or in accreditation schedules. Documentation that shows the laboratory is in the process of accreditation to the applicable scope by a competent national authority is acceptable. Nonaccredited laboratories shall have documentary evidence of successful participation in proficiency ring-testing for the applicable scope.</p> <p>Where national surveillance and control programs operate, these can be used as supportive evidence.</p>	Major Must

Section	Principle	Criteria	Level
AQ 21.03	Laboratory test results are traceable to the specific batch.	The laboratory test results shall be traceable to the specific batches or production units' ID (refer to AQ 20.01.02). No "N/A."	Major Must
AQ 22	FEED MANAGEMENT		
	<i>While the aquaculture industry is expected to grow in the future, reliance on forage fish use in feed should not. Sustainable sourcing, efficient use of marine ingredients, and the use of alternatives to forage fish are fundamental steps to reducing and eliminating detrimental effects in the marine ecosystem. Refer to the GLOBALG.A.P. Compound Feed Manufacturing standard.</i>		
AQ 22.01	General		
AQ 22.01.01	Farmed aquatic species receive a compound feed diet which is suitable for the species farmed.	Documentation and specification of the compound feed used (including for cohabitant species) shall demonstrate its suitability.	Major Must
AQ 22.01.02	Compound feed used on the farm, for both targeted species and cohabitant species, has been manufactured by and obtained from a recognized source.	<p>The compound feed manufacturing (CFM) production locations from which the feed is sourced (whether internal or external), shall be certified against at least one of the following:</p> <ul style="list-style-type: none"> i) GLOBALG.A.P. CFM standard ii) A standard that has been successfully benchmarked against the GLOBALG.A.P. CFM standard iii) A feed safety scheme accredited to either ISO/IEC Guide 17065 or ISO/IEC 17021* <p>For compound feed recognized through option iii), a letter from the feed supplier stating compliance with the GLOBALG.A.P. CFM standard version 3, section A 5, "Responsible sourcing of feed materials" shall be in place.</p>	Major Must

Section	Principle	Criteria	Level
		<p>For option i), the CFM production locations shall be registered in the GLOBALG.A.P. IT systems (by the time of the producer's first certification body (CB) audit) with a GLOBALG.A.P. Number (GGN) that will link it to the aquaculture producer. For options ii) and iii), registration of supplier name and accredited scheme used shall replace the GGN in the GLOBALG.A.P. IT systems. Refer to the GLOBALG.A.P. website, "Compound Feed Manufacturing/Recognized feed safety schemes."</p> <p>*ISO/IEC 17065 (same as EN 45011): Conformity assessment – Requirements for bodies certifying products, processes and services. ISO/IEC 17021 (former EN 45012): Conformity assessment – Requirements for bodies providing audit and certification of management systems.</p>	
AQ 22.01.03	If the hatchery uses either raw and unpasteurized or live feed, this is based on a food safety and biosecurity risk assessment.	Specific to hatcheries: A risk assessment shall be available to show that either raw and unpasteurized or live feed (artemia, microalgae, rotifers, etc.) will not affect the biosecurity of the farmed aquatic species and will not have a negative impact on food safety and animal welfare. Evidence of routine surveillance disease monitoring for pathogens shall be in place and make up part of the risk assessment. If the use of compound feed is possible, it shall be the preferred solution.	Major Must
AQ 22.01.04	Protein elements in the compound feed are <i>not</i> obtained from the same farmed aquatic species, unless hydrolyzed protein of the same species is verified as adequate.	Feed specifications and specific records on the proteins used shall be in place, and these shall demonstrate that proteins are sourced from different farmed aquatic species. If protein elements are obtained from the same species: Protein hydrolysates (peptide size) of the same species shall be tested to verify that <10,000 Daltons are permissible, and documentation from feed suppliers of such	Major Must

Section	Principle	Criteria	Level
		testing shall be in place. The term “hydrolyzed proteins” refers to polypeptides, peptides, and amino acids, and mixtures thereof, obtained by the hydrolysis of animal by-products.	
AQ 22.02	Feed records		
AQ 22.02.01	Batches of feed are traceable from the feed manufacturer to the batch of farmed aquatic species stock.	Batches of feed from the feed manufacturer shall be traceable to batches of farmed aquatic species stock. A verification system or documentation shall be in place.	Major Must
AQ 22.02.02	Documentary records of feed suppliers from whom compound feeds have been purchased are kept for two years or one year longer than the life cycle of the farmed aquatic species, whichever is longer.	Records of feed purchases (e.g., invoices) shall be in place and held for two years or one year longer than the life cycle of the farmed aquatic species whichever is longer. Records shall include the type of feed, quantity, source, and date of delivery.	Major Must
AQ 22.02.03	Farms obtain from their feed suppliers a declaration that the composition of each feed conforms to the GLOBALG.A.P. requirements on fishmeal and fish oil.	<p>Statements specifying conformance shall be in place. The compound feed supplier shall provide information on the fishmeal and fish oil composition upon request, including fish meal and fish oil percentage and, where possible, origin (wild catch, industrial by-products, other).</p> <p>Farms shall have in place a fish-in/fish-out ratio (whole fish from wild catch).</p> <p>The self-assessment/internal audit and certification body (CB) audit reports shall have at least two values recorded: average fish meal and fish oil percentage (where possible, both described for each origin) <i>and</i> the fish-in/fish-out ratio.</p>	Major Must

Section	Principle	Criteria	Level
AQ 22.02.04	Feed is consumed before the shelf life expires.	Feed for which the shelf life has expired shall not be used, but shall be disposed of in an environmentally responsible manner according to documented procedures. Feed in storage shall be verified for expiry dates on labels.	Major Must
AQ 22.02.05	Records of feed conversion ratios (FCRs) and efficient use of feed monitoring systems are in place.	<p>Records of FCRs and efficient use of feed monitoring systems shall be in place.</p> <p>Overfeeding shall be avoided at all times.</p> <p>The economic feed conversion ratio (eFCR) is the quantity of feed used to produce the quantity of fish harvested (net production is the live weight): $\text{eFCR} = \text{Feed (in kg or mt)} \div \text{net aquaculture production (in kg or mt; live weight)}$ </p> <p>The self-assessment/internal audit and certification body (CB) audit reports shall have at least one FCR value recorded: eFCR per production life cycle.</p>	Major Must
AQ 22.02.06	The producer shows evidence that there is a procedure in place to collect and store samples of feed used during the grow-out period.	<p>The producer shall show evidence that there is a procedure in place to collect and store samples of batches of feed – taken by the producer or by the feed manufacturer – starting at least four months before harvest and continued during the grow-out period. The samples shall be retained for at least six weeks after sale of the farmed aquatic species.</p> <p>Workers shall be able to demonstrate awareness at interview.</p>	Major Must

Section	Principle	Criteria	Level
AQ 22.03	Storage of aquaculture feeds		
AQ 22.03.01	Specific feeds for different farmed aquatic species are clearly identified.	The site and records shall be verified to prove identification of feedstuffs for different farmed aquatic species.	Major Must
AQ 22.03.02	Feeds, including all medicated feeds, are stored and handled according to label instructions to minimize any risk of contamination.	Proper training and instructions for storing, checking, and handling aquaculture feeds shall be in place and implemented for regular and medicated feeds (separated for different species and for parallel ownership, where applicable). The storage sites and feed components shall be checked at regular intervals for cleanliness, fungus, molds, temperature, and other potential contamination.	Major Must
AQ 22.03.03	Documented instructions on how to deal with contaminated feed, excess medicated feed, and flushed feed are in place.	There shall be documented instructions in place regarding the storage, checking, and handling of aquaculture feeds. The documentation shall include evidence that consideration has been given to preharvest withdrawal periods following the use of flushed feed. There shall be a preharvest withdrawal period, beginning when medicated feed is flushed from the farm feeding system; flushed feeds (feed intended to clear residues from the feed system) shall have been used. Instructions shall include withdrawal and containment of contaminated feedstuffs. Workers shall demonstrate awareness at interview.	Major Must
AQ 22.03.04	Medicated feeds and contaminated feeds are kept in separate, clearly labeled, and identified bulk or bag storage.	The site and records shall be verified to prove that there is no cross contamination between medicated and nonmedicated feed. Clear labeling/identification shall be in place.	Major Must

Section	Principle	Criteria	Level
AQ 23	PEST CONTROL		
AQ 23.01	The producer or subcontractor controls the risk of pest infestation in buildings.	Monitoring records of identified risk locations and preventive measures shall be in place and available. The location of all pest control measures shall be identified on a plan/diagram of the site, which plan/diagram shall include all operations. No "N/A."	Major Must
AQ 24	HARVESTING AND POSTHARVESTING OPERATIONS		
AQ 24.01	Harvesting – Method of harvest/dispatch		
AQ 24.01.01	Harvesting and transport, where under the responsibility of the producer, is undertaken in a way that does not compromise food safety.	A documented harvest plan and transport hygiene records (including temperature, where applicable) shall be in place. Transportation shall maintain traceability and follow local legislation on movement of farmed aquatic species.	Major Must
AQ 24.01.02	For transportation to the product handling unit (PHU)/processing plant, farmed aquatic species are transported in clean conditions (containers or pipes) which prevent contamination during handling.	All facilities shall be available for certification body (CB) auditing activities. Cleaning records shall be available for the CB audit. Lids shall be secured to prevent loss of farmed aquatic species and leakage during handling. Workers shall be able to demonstrate awareness at interview. No "N/A."	Major Must
AQ 24.01.03	The temperature of the product is reduced as quickly as possible towards the temperature of melting ice.	Working instructions shall ensure appropriate cooling. The temperature records shall be available for the certification body (CB) audit.	Major Must
AQ 24.01.04	If ice comes into contact with the product, it is initially manufactured from potable water according to applicable legislative requirements and transported in hygienic containers.	Records of ice supply, the verification of water quality used in ice manufacturing, and documentation of transport conditions of ice shall be in place.	Major Must

Section	Principle	Criteria	Level
AQ 24.02	Traceability of harvested farmed aquatic species		
AQ 24.02.01	Traceability of the harvested farmed aquatic species is maintained up to the packing/process line, including packaging where the producer is responsible for packing.	The farm records for all farmed aquatic species shall be available for the certification body (CB) audit. No "N/A."	Major Must
AQ 24.02.02	It is possible to trace a batch of farmed aquatic species from the packing case back to the brood stock.	Traceability records throughout the life cycle shall demonstrate that all origins and movements are traceable and shall be available for the certification body (CB) audit.	Major Must
AQ 25	HOLDING AND CROWDING FACILITIES		
AQ 25.01	Farmed aquatic species welfare in holding and crowding facilities, including live well boat transfer, and/or prior to slaughter		
	<i>Minimizing stress of the farmed aquatic species immediately prior to slaughter is necessary to prevent welfare problems.</i>		
AQ 25.01.01	Workers responsible for harvest operations have appropriate training in farmed aquatic species welfare and handling techniques.	Workers shall be able to demonstrate competence at interview. Training records and certificates for each worker with allocated functions or jobs shall be verified.	Major Must
AQ 25.01.02	The condition of the farmed aquatic species is monitored regularly prior to transfer to the point of harvest, avoiding unnecessary stress of the farmed aquatic species.	Records of monitoring shall be audited by the certification body (CB). A designated worker shall be tasked with constant monitoring during transport and be appropriately trained in identifying/remedying any welfare indicators that become compromised throughout the entire transport process. Refer to AQ 04.02.04. Also applicable for subcontracted activities.	Major Must
AQ 25.01.03	The oxygen level of the holding areas is controlled and recorded.	Documented records shall be available on site to demonstrate control of the oxygen level.	Minor Must

Section	Principle	Criteria	Level
AQ 25.01.04	Farmed aquatic species holding facilities, including live fish well boats, are <i>not</i> contaminated by blood water, factory effluent, and/or spillage or discharge from marine traffic.	Farmed aquatic species holding facilities, including live farmed aquatic species well boats, shall <i>not</i> be contaminated. Records of blood water and effluent disposal shall be in place and collection facilities verified. The environmental risk assessment (refer to AQ 06.03.01) shall also include fuel spillage risk at farmed aquatic species holding facilities.	Major Must
AQ 25.02	Mortalities in holding facilities, including well boats, and/or prior to slaughter		
AQ 25.02.01	The producer has a plan to monitor and record trend analysis in mortality.	Site plans to monitor mortality and records of mortality trend analysis shall be assessed.	Minor Must
AQ 25.02.02	For the legal disposal of large-scale mortalities, a contingency/action plan is in place in case of a severe disease episode or mass mortality.	The contingency/action plan shall be verified and shall comply with legal requirements where these exist. Workers shall be able to demonstrate awareness at interview.	Major Must
AQ 25.02.03	Mortalities are recorded and removed from the holding areas and reasons for death are recorded, where known.	Records of cause of death shall be verified.	Minor Must
AQ 25.03	Escapes and indigenous species		
AQ 25.03.01	Measures are in place to prevent escape of farmed stock into the local watercourse and to prevent indigenous species' entry into the farmed aquatic species' holding areas.	The producer shall be able to demonstrate that measures are in place to prevent escapes and ingress of indigenous species into the holding areas. The contingency plans, records of all escaped farmed aquatic species for the previous certified cycle, and confirmation that all escapes have been reported to the authorities for all sites shall be verified.	Major Must

Section	Principle	Criteria	Level
AQ 26	SLAUGHTER ACTIVITIES		
AQ 26.01	Stunning and bleeding		
AQ 26.01.01	There is feedback relating to animal welfare from slaughter facility/primary processing plant to the farm.	Health indicators on the exterior such as damage (scale loss, fin erosion, predator bites, handling scars, lesions resulting from aggression, parasite lesions, etc.), deformities, and internal signs (blood pH, flesh color, appearance of viscera, blood spots, etc.) shall be noted upon slaughter. There shall be a feedback system of such information in relation to farmed aquatic species health and welfare on the farm.	Minor Must
AQ 26.01.02	The slaughter method used is specified in the aquaculture health plan (AHP) with consideration of the farmed aquatic species welfare.	The slaughter method used shall be specified in the AHP and considers farmed aquatic species welfare. Workers shall be able to demonstrate awareness at interview.	Major Must
AQ 26.01.03	Harvesting workers receive farmed aquatic species welfare training in relation to the slaughter process.	Records of training in farmed aquatic species welfare in relation to the slaughter process, including specific training in the stunning and bleeding techniques (where applicable), shall be in place. Workers shall be able to demonstrate awareness at interview.	Major Must
AQ 26.01.04	Farmed aquatic species are effectively stunned, with consideration of farmed aquatic species welfare.	<p>Farmed aquatic species shall be stunned using an effective stunning method and immediately become unconscious. Monitoring procedures shall be in place.</p> <p>Monitoring procedures shall include manufacturer guidance, where applicable, and effectiveness of the stunner. Refer to “Aquatic animal health code,” section “Stunning and killing methods” of the World Organization for Animal Health (www.woah.org).</p>	Major Must

Section	Principle	Criteria	Level
		If technology is available for a particular species and proven to be effective, the use of ice slurry or asphyxia shall be phased out.	
AQ 26.01.05	When farmed aquatic species are bled, this is done immediately after stunning.	Farmed aquatic species shall be bled immediately after stunning and remain unconscious while they bleed to death. Monitoring procedures shall be in place to verify that no farmed aquatic species show signs of recovery.	Major Must
AQ 26.02	Blood waters		
AQ 26.02.01	Blood water is collected and treated before disposal and does not cause any veterinary or environmental threat.	Blood water shall be contained for disposal. Treatment shall ensure no veterinary or environmental threat. Collection and disposal records shall be available for the certification body (CB) audit.	Major Must
AQ 27	DEPURATION		
AQ 27.01	Bivalve molluscs supplied directly to the consumer are depurated.	Farms producing bivalve molluscs to be supplied directly for human consumption shall carry out depuration according to legal requirements or industry standards and in accordance with the requirements of the Codex Alimentarius. Records of depuration time and the parameters for effective depuration shall be in place. All batches of bivalves shall be traced to harvesting areas when received at depuration stations. Documentation or internal procedures shall demonstrate a monitoring plan, including red tides where the molluscs have been farmed.	Major Must

Section	Principle	Criteria	Level
AQ 28	POSTHARVEST – MASS BALANCE AND TRACEABILITY		
	<p><i>Legal entities that perform farming and postharvest handling of farmed aquatic species shall demonstrate compliance with the mass balance and traceability criteria at the postharvest units.</i></p> <p><i>For the sake of simplicity, this section will use the terms “certified products,” “certified producers,” and “certified sources.” However, products, producers, and sources themselves are not certified. “Certified product” refers instead to a product originating from an Integrated Farm Assurance (IFA) certified production process. “Certified producer” and “certified sources” refer to a producer/source whose production processes have been certified.</i></p>		
AQ 28.01	Management structure		
AQ 28.01.01	The producer has been granted the legal right to carry out postharvest handling of farmed aquatic species.	There shall be documentation clearly demonstrating that the producer has been granted the legal right to carry out postharvest handling of farmed aquatic species. No “N/A.”	Major Must
AQ 28.01.02	The producer operates a management structure that addresses the postharvest requirements, including well-documented procedures, processes, and workers’ training that are appropriate to the postharvest unit’s size, type, and complexity of activities.	<ul style="list-style-type: none"> - The producer shall have a central responsible person for managing conformance to the postharvest criteria; responding to requests for information and documents; and communicating with trade partners, the certification body/bodies (CBs), and the GLOBALG.A.P. Secretariat. - The producer shall document postharvest handling procedures and processes in a manner appropriate to the postharvest unit’s size, type, and complexity of activities. Cross-reference with AQ 02.02. - There shall be evidence of worker training based on responsibilities. Evidence of animal welfare and food safety training, where applicable to the operations, shall be available for the CB audit. No “N/A.”	Major Must

Section	Principle	Criteria	Level
AQ 28.01.03	An annual self-assessment/internal audit of conformance to the standard is conducted at postharvest unit level.	A completed self-assessment/internal audit no older than 12 months shall be available at the time of the certification body (CB) audit. Cross-reference with AQ 02.07. No "N/A."	Major Must
AQ 28.01.04	A documented mass balance calculation is performed for all processes at the postharvest unit.	Documentation of the mass balance calculation shall show that the quantity of products sold as certified does not exceed the quantity of inputs from certified sources. These outputs shall be calculated as inputs received as certified minus conversion loss and quantity in storage. Information on the quantity (weight) of all certified, noncertified, incoming, outgoing, and stored products shall be recorded. A summary of these records shall be available so as to facilitate the mass balance verification process. The conversion loss rates (processing yields) of certified outputs originating from certified inputs shall be calculated, verified (based on average industrial yield), and recorded for each step between receipt and dispatch of certified products. Records of the calculations of conversion loss rates shall be available to certification body (CB) auditors. Parameters such as by-products generated, rejected/returned items, etc. shall be taken into consideration. An up-to-date list of conversion rates shall be available. No "N/A."	Major Must
AQ 28.01.05	For each postharvest unit, the producer has a documented procedure to ensure that non-conformances and complaints related to certified products are recorded, addressed, and resolved.	A documented procedure shall be in place to ensure that non-conformances and complaints related to certified products are recorded, addressed, and resolved, including a record of actions taken. No "N/A."	Major Must

Section	Principle	Criteria	Level
AQ 28.01.06	For each postharvest unit, the producer maintains an up-to-date list of all subcontractors that handle certified products, and these subcontractors are classified in accordance with a risk assessment.	<p>For each postharvest unit, the producer shall keep available a list of all subcontractors that handle certified products as part of AQ 05.01 compliance evidence along with evidence of the last certification status verification update.</p> <p>All subcontractors shall be classified according to the risk related to misidentification, substitution, or dilution of certified products with noncertified products.</p> <p>“N/A” if no subcontractors are used.</p> <p>Based on the rules of the GLOBALG.A.P. Chain of Custody (CoC) standard, the following guidance on subcontractor risk assessments applies for subcontractors:</p> <p>a) Subcontractors shall be audited by a certification body (CB) according to the risk related to misidentification, substitution, or dilution of certified products with noncertified products:</p> <p>(i) Subcontractors that engage in (re)processing, (re)packing, and/or (re)labeling of certified products, that engage in storage and handling of bulk products (unpacked, unsealed, or unlabeled), or that engage directly in storage and handling of packed but unlabeled products are classified as high-risk.</p> <p>(ii) Subcontractors that engage in storage and handling of packed, sealed, and labeled products with minimal risk of product mixing or identity modification are classified as low-risk.</p> <p>b) If the subcontractor has not been audited by a CB, neither achieved Integrated Farm Assurance (IFA) nor Chain of Custody (CoC) certification, the CB shall perform an on-site risk-based sampling audit at the subcontracted postharvest handling operations. Subcontractors with high-risk processes related to the</p>	Major Must

Section	Principle	Criteria	Level
		<p>scope ((re)packing, (re)labeling, any type of (re)processing, etc.) shall be audited by a CB every year.</p> <p>c) Subcontractors with low-risk processes do not need to be audited annually by the CB. A list of subcontractors classified as low-risk shall be continuously updated, and the CB shall be immediately informed of any new low-risk subcontractor.</p>	
AQ 28.01.07	For each postharvest unit, the producer demonstrates that high-risk subcontractors (subcontractors carrying out the activities described in AQ 28.01.06) are audited within the producer's certification or have valid Chain of Custody (CoC) or Integrated Farm Assurance (IFA) certification.	For each postharvest unit, the producer shall demonstrate that high-risk subcontractors either are audited annually within the producer's certification or have their own valid CoC or IFA certification.	Major Must
AQ 28.01.08	The producer keeps accurate purchase and sales records for each postharvest unit.	<p>For each postharvest unit, the producer shall keep and make available relevant purchase and sales records, including but not limited to: purchase orders, purchased products and quantities, purchase contracts, supplier invoices, supplier delivery notes, transporter or shipper details, incoming goods receipt inspections, receipts/invoices detailing sold products and quantities, sales contracts, sales invoices, sales delivery notes, transporter or shipper details, outgoing goods shipment inspections.</p> <p>If the producer acts as a subcontracted party for postharvest handling, incoming and outgoing delivery documents shall be kept.</p> <p>No "N/A."</p>	Major Must

Section	Principle	Criteria	Level
AQ 28.01.09	Postharvest handling records are kept for a minimum of one year after the products' expiration date or as per legal requirements, whichever is longer.	Records shall be kept for a minimum of one year after the products' expiration date or as per legal requirements, whichever is longer. No "N/A."	Major Must
AQ 28.02	Input and output verification		
	<i>This section does not apply if the producer processes only their own farmed products and is not registered in the GLOBALG.A.P. IT systems for parallel ownership.</i>		
AQ 28.02.01	Before or during the transfer of ownership, the producer has a procedure for systematically authenticating, via the GLOBALG.A.P. IT systems, suppliers' GLOBALG.A.P. Numbers (GGNs) or Chain of Custody (CoC) Numbers, the expiration date of their certificates, and the country of destination included in each certificate.	Inputs shall be verified in all cases. Suppliers providing certified products to the producer shall have Integrated Farm Assurance (IFA) certification (or certification to an equivalent benchmark scheme) or Chain of Custody (CoC) certification. The producer shall have a procedure in place for systematically authenticating each direct supplier's GGN or CoC Number, verifying the expiration date of their certificate, and confirming the country of destination included in the scope of the supplier certificate. This procedure shall use the GLOBALG.A.P. IT systems for verification and shall ensure that each supplier's certificate is verified on a regular basis and is valid at the moment products are purchased/received by the producer. The producer shall maintain records (including GGN and/or CoC Number) of suppliers from which they buy certified products. A log or other evidence of supplier verification shall be available.	Major Must

Section	Principle	Criteria	Level
AQ 28.02.02	For each postharvest unit, the producer verifies that the product and quantity received internally or from suppliers with GLOBALG.A.P. certification (GLOBALG.A.P. Number (GGN) or Chain of Custody (CoC) Number), match the information in the delivery documents and purchase orders.	For each postharvest unit, the producer shall have in place a procedure to verify that the quantity of each certified product received matches the information in the delivery documents and/or purchase orders. A log or other evidence of matching delivery documents and/or purchase orders shall be available.	Major Must
AQ 28.02.03	The producer has a written procedure in place for recording and reporting delivery discrepancies during operations at each postharvest unit. Products that have been ordered as certified but delivered without the supplier's GLOBALG.A.P. Number (GGN) or Chain of Custody (CoC) Number in sales documents or in internal delivery notes and/or that fail the input/output verification are immediately relabeled as noncertified and handled as noncertified products.	For each postharvest unit, a written procedure shall be in place for recording and reporting delivery discrepancies, and a log of delivery discrepancies shall be available. Products that have been ordered as certified but delivered without the supplier's GGN or CoC Number in sales documents or in internal delivery notes and/or that fail the input/output verification shall be immediately relabeled as noncertified and handled as noncertified products. Corrective action by the supplier resulting in a reinstatement of the certification status and in product relabeling and handling shall be documented.	Major Must
AQ 28.02.04	The producer has a procedure for systematically filing a complaint with the GLOBALG.A.P. Secretariat any time a supplier fails the input verification in the GLOBALG.A.P. IT systems (certificate may be counterfeit, issued to another legal entity, expired, etc.).	Failure to find a supplier's GLOBALG.A.P. Number (GGN) or Chain of Custody (CoC) Number (certificate may be counterfeit), to authenticate legal credentials (certificate may have been issued to another legal entity), and/or to establish certificate validity (certificate may have expired) in the GLOBALG.A.P. IT systems may indicate fraud on the part of the supplier. The producer shall have a procedure for systematically filing a complaint with the GLOBALG.A.P. Secretariat any time a supplier fails the input verification in the GLOBALG.A.P. IT systems. The complaint shall include the supplier's GGN or CoC Number as well as identifying information.	Major Must

Section	Principle	Criteria	Level
AQ 28.02.05	If a trade partner requires output verification, the producer has a procedure for systematically verifying the expiration date(s) of suppliers' certificates in the GLOBALG.A.P. IT systems before certified products are shipped out to that trade partner.	Trade partners purchasing products as certified and labeled with the GLOBALG.A.P. Number (GGN), the Chain of Custody (CoC) Number, and/or the GGN label may request output verification. The producer shall verify the validity of the respective supplier's certificate in the GLOBALG.A.P. IT systems. This verification shall occur before or during the product shipping process and shall be recorded in a log or other documentation protocols. This log/documentation shall be available to certification body (CB) auditors. Products labeled with a GGN, CoC Number, and/or GGN label shall not be shipped if the supplier's certification status changes from valid during production and storage to nonvalid at the time of shipment to trade partners. Output verification requested by trade partners shall be disclosed to the relevant CB. A clearly documented procedure, with remedial steps and actions to be taken when a supplier's certification status changes from valid during production and storage to nonvalid at the time of shipment to trade partners, shall be in place. "N/A" if the trade partner does not request output verification.	Major Must
AQ 28.02.06	The GLOBALG.A.P. word, trademarks, logo, and the GLOBALG.A.P. Number (GGN) are used on outgoing products in accordance with the GLOBALG.A.P. general regulations and "GLOBALG.A.P. trademarks use: Policy and guidelines."	The GLOBALG.A.P. general regulations and "GLOBALG.A.P. trademarks use: Policy and guidelines" shall be consulted and followed with regard to trademarks use and product labeling.	Major Must

Section	Principle	Criteria	Level
AQ 28.03	Traceability		
AQ 28.03.01	The producer uses either the product segregation method or the identity preservation method to ensure traceability.	<p>The producer shall ensure traceability in one of the following ways:</p> <ul style="list-style-type: none"> - By using the segregation method to ensure traceability to more than one certified Option 1 individual producer or Option 2 producer group - By using the identity preservation method to ensure traceability to a certified Option 1 individual producer or Option 2 producer group - By using both segregation and identity preservation methods <p>Segregation method</p> <p>The segregation method permits mixing of certified products from a variety of certified producers. Physical mixing of certified products from different certified producers shall be documented accordingly, via traceability data linked to a traceability code (e.g., batch number). Certified products shall not be physically mixed with noncertified products (with the exception of multi-ingredient retail consumer items).</p> <p>The producer shall label the final product with their GLOBALG.A.P. Number (GGN) and a traceability code (e.g., batch number) which links it to either the CoC Numbers of suppliers or to the GGN of an Option 1 individual producer (or Option 2 producer group).</p> <p>If some but not all ingredients of a multi-ingredient product come from certified production processes, the GGN of the certified producer shall be specified. The different sources of the different ingredients in a multi-ingredient product shall be separately identified – e.g., pangasius (producer #1 GGN), tilapia (producer #2 GGN) – and the producer's GGN or processor's/packer's GGN or CoC Number, if outsourced, shall be specified.</p>	Major Must

Section	Principle	Criteria	Level
		Identity preservation method If the GGN is used as the traceability code (e.g., batch number), the product identity preservation method shall be used. The identity preservation method prohibits the physical mixing of certified products with other certified or noncertified products. Products from different certified producers shall not be physically mixed. The identity preservation of products shall be documented accordingly. The certified product shall be traced back to a certified producer. The producer shall label the final identity preserved product with their GGN and with the GGN(s) of the producer(s) of origin.	
AQ 28.03.02	There is a traceability system in place.	Traceability records shall be accurate, complete, and unaltered. For every batch of products sold (or handled, if the producer acts as subcontracting party) as certified, the traceability system shall be capable of tracing the product back from internal sales invoices (or outgoing delivery documents if the producer acts as subcontracted party) to production sites and/or one or more certified suppliers, and of recording and tracing the quantity of certified products between receipt and dispatch, including intermediate processing and storage steps. No "N/A."	Major Must
AQ 28.03.03	The producer has documented procedures for managing/initiating withdrawal/recall of certified products from the supply chain or from the market, as appropriate, and these procedures are tested annually.	The producer shall have a product withdrawal/recall plan, and the procedure shall be tested annually. Cross-reference with AQ 09.01. The producer shall have a documented procedure that identifies the type of event that may result in a withdrawal/recall, the persons responsible for making decisions on the possible product withdrawal/recall, the mechanism for notifying the next step in the supply chain and the GLOBALG.A.P. approved certification body (CB), and the methods of reconciling stock. The procedure shall be tested annually to ensure that it is effective. This test shall be	Major Must

Section	Principle	Criteria	Level
		<p>recorded (e.g., by picking a recently sold batch, identifying the quantity and whereabouts of the product, and verifying whether the next step involved with this batch and the CB can be contacted). Actual communications of the mock recall to the trading partners are not necessary. A list of telephone numbers and email addresses is sufficient.</p> <p>If the producer has a valid GFSI-recognized post-farm gate certification for the postharvest unit at the time of the CB audit, this principle and the relevant criteria are considered complied with.</p> <p>No "N/A."</p>	
AQ 28.03.04	The traceability code (e.g., batch number) associates a trade item with relevant information for its traceability.	<p>The traceability code (e.g., batch number) shall associate a trade item with relevant information for its traceability. It shall link the batch to the origin of the trade item itself or of the items contained, as well as to the suppliers' GLOBALG.A.P. Numbers (GGNs) or Chain of Custody (CoC) Numbers.</p> <p>No "N/A."</p>	Major Must
AQ 28.04	Identification of output with certified status (originating from certified production processes)		
AQ 28.04.01	The producer uses the "GGN" prefix correctly, as per the requirements of the standard.	<p>The producer shall be identified with a GLOBALG.A.P. Number (GGN). The GGN identifies an Option 1 individual producer or an Option 2 producer group and consists of the prefix "GGN" and a 13-digit number.</p> <p>Note: This requirement applies both to on-product identification and to use on the sales and transport documents.</p> <p>No "N/A."</p>	Major Must

Section	Principle	Criteria	Level
AQ 28.04.02	Transaction and shipment (transport) documentation for the outgoing certified products contains the minimum information required by the standard.	<p>Outgoing sales invoices, shipment (transport) documents in paper or electronic format, and all other documentation related to transactions of certified products shall contain at least the following information:</p> <ul style="list-style-type: none"> - GLOBALG.A.P. Number (GGN) - Consignment number, if available - Shipped product name(s) or identification code(s) - Shipped quantity (weight or number of units) - Shipping date - Logistic unit identification codes, if available - Certification status, stating: "GLOBALG.A.P. certified" (Cross-reference with AQ 11.01) <p>Positive identification is sufficient, noncertified status does not need to be identified.</p> <p>Note: This point applies even if there is a written agreement between the producer and the trading partner not to identify the product with the GGN.</p>	Major Must
AQ 28.04.03	The logistics units, trade items, and/or packed retail consumer items containing certified products are identified with the minimum information required by the standard.	<p>Logistics units (pallets, bins, etc.), trade items (boxes, crates, etc.), and/or packed retail consumer items (containers, bags, nets, shrink wrap, clamshells, etc.) shall be identified with at least:</p> <ul style="list-style-type: none"> - Chain of Custody (CoC) Number: CoC Number of the supply chain company, where applicable - GLOBALG.A.P. Number (GGN) of the producer or producer group (if the company uses the identity preservation method) - Product name - Traceability code (e.g., batch number) <p>Additional information may be displayed depending on the requirements of the trading partner.</p>	Major Must

Section	Principle	Criteria	Level
		"N/A" if there is a written agreement available between the producer and the trading partner not to identify the product with the GGN.	
AQ 28.04.04	If the product is not individually identified (e.g., bulk product), the producer includes the minimum information required by the standard.	<p>Supplementary delivery documents shall contain at least:</p> <ul style="list-style-type: none"> - GLOBALG.A.P. Number (GGN) or Chain of Custody (CoC) Number: GGN of the Option 1 individual producer or Option 2 producer group or CoC Number of the supplier(s), where applicable - Product name or code - Quantity (weight or number of units) - Traceability code (e.g., batch number) or producer's GGN if the supplier is a producer or producer group (identity preservation) or shipping container code (serial number, license plate, etc.) - Link to sales document information (invoice number, delivery note number, etc.) <p>Additional information may be shown depending on the requirements of the trading partner.</p> <p>"N/A" if there is a written agreement between the producer and the trading partner not to identify the product with the GGN.</p>	Major Must
AQ 28.05	Products with the GGN label visual elements		
	<p><i>Applicable only to products with the GGN label visual elements</i></p> <p><i>Licensed companies are entitled to use and label their products with the GGN label visual elements in addition to the GLOBALG.A.P. Number. For the requirements and guidelines on using the GGN label visual elements, see the GGN label user manual for product packaging. The GGN label visual elements are linked to a public online portal that enables direct verification of GLOBALG.A.P. Numbers (GGNs) and Chain of Custody (CoC) Numbers.</i></p>		
AQ 28.05.01	A valid GGN label license agreement is in place, and a person responsible for conformance to the GGN label license terms and conditions has been identified.	The producer shall have been granted approval under the terms of a valid license agreement to use the GGN label visual elements, and there shall be a designated person responsible for the producer's conformance to the GGN label license terms and conditions.	Major Must

Section	Principle	Criteria	Level
		"N/A" if the producer operates as the subcontractor of a licensed company.	
AQ 28.05.02	The producer uses packaging bearing the GGN label visual elements only for certified products and uses only packaging designs approved by the GGN label administration.	A procedure shall be in place to ensure that only certified products are labeled with the GGN label visual elements. Packaging designs shall be approved by the GGN label administration before use. "N/A" if the producer operates as the subcontractor of a licensed company.	Major Must
AQ 28.05.03	Off-label materials (price tags, signs, leaflets, etc.) with GGN label logo used to identify loose products are approved by the GGN label administration before use.	Off-label materials shall be approved by the GGN label administration. "N/A" if the producer does not handle off-label materials with GGN label visual elements.	Major Must
AQ 28.05.04	Trade items and/or packed retail consumer items featuring the GGN label visual elements are labeled with the minimum information required by the GGN label regulations and sanctions.	Trade items and/or packed retail consumer items featuring the GGN label visual elements shall be labeled according to the GGN label regulations and sanctions. At minimum, the following information shall be included: - GLOBALG.A.P. Number (GGN) - Product name, including scientific name as listed in the GLOBALG.A.P. product list. Additional information may be shown on the GGN label visual elements depending on the requirements of the trading partner. No "N/A."	Major Must
AQ 28.05.05	If the producer no longer has a valid license agreement for the use of the GGN label visual elements, the packaging with the GGN label visual elements is replaced in the market with packaging without the GGN label visual elements, and all off-product label use is discontinued.	If the producer no longer has a valid license agreement for use of the GGN label visual elements, records shall be available of instructions to: - Replace product packaging bearing the GGN label visual elements in the market with packaging not bearing the GGN label visual elements, and - Discontinue all off-product use of the GGN label visual elements.	Major Must

Section	Principle	Criteria	Level
		If the producer is not willing or able to renew the license agreement for the use of the GGN label visual elements, a record of destruction or disposal of the remaining packaging with the GGN label visual elements shall be available.	
AQ 28.05.06	Products assigned for featuring the GGN label visual elements are identified and segregated from other products.	The producer shall have in place procedures to ensure effective identification and segregation of products assigned for featuring the GGN label visual elements. No "N/A."	Major Must
AQ 28.06	Food safety system		
AQ 28.06.01	For each postharvest unit, the producer has a food safety system in place at the time of the certification body (CB) audit.	This principle and the relevant criteria shall be marked as compliant if the producer has been certified to a GFSI-recognized post-farm gate standard or to a third-party certified Codex Alimentarius-based HACCP system which is accredited at the time of the CB audit. No "N/A." Note: For transparency purposes, the type of recognition is indicated in the GLOBALG.A.P. IT systems.	Major Must
AQ 28.06.02	Documented procedures for managing exceeded legal limits are in place.	The producer shall have in place documented procedures in case legal limits are exceeded. These procedures shall include up-to-date records of all cases, including investigation, remedial actions, closure of each case, and notification to suppliers, to the producers of origin, and to the certification body (CB).	Major Must

GUIDELINE AQ I EXAMPLES OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA), ENVIRONMENTAL RISK ASSESSMENT (ERA), AND RESPECTIVE ENVIRONMENTAL MANAGEMENT PLANS (EMPS)

Table A Example of EIA combined with the EMP (impacts inherent to farming operations; levels 4–7 in stages of impact assessment)

	Impact	Applicable law	Working instruction
1	Disposal of empty food bags	Municipal license	Dispose of empty food bags weekly on municipal dump
2	Discharge of sludge	E.g., province regulation on coastal protection 2003	Use settling pond; clean every two months
3	Disposal of settled sludge	Municipal license; directive on fertilizers in agriculture	200 metric tons/year of sludge can be brought to the rubber tree farms; Bring excess sludge to municipal dump
4	Use of electricity	None	Only use paddle wheels in accordance with working instruction on oxygen in ponds
5	Exhaust gases generator	E.g., government regulation 23/568 on exhaust gases	Dealer shall perform yearly check on engine adjustment
6	Pesticides for weed control	Product permits/approvals; application instructions	E.g., only use “Herbclean” once a month according to working instructions
7	Use of diesel fuel	None	Generator only uses diesel. See 4 and 5
8	Noise of the generator to surrounding neighbors	Municipal permit; agreement with neighbors	Keep doors of generator housing closed. Use ventilator at high room temperatures

Table B Example of ERA combined with the EMP (realistic risks associated with farming operations)

	Risk	Applicable law	Preventive action
1	Empty food bags blown with the wind	Municipal license	Always close the container
2	Sludge floating instead of settling; discharge into nature	E.g., province regulation on coastal protection 2003	Stop discharge and clean settling pond
3	Excessive sludge production	None	Assess pond biomass; recalculate feeding regime
4	Leakage of fluid chemicals from the storage room	Municipal license	Store all fluids on dedicated storage devices
5	Diesel spilled onto/leached into the ground	Municipal license	Store diesel in an approved tank on concrete floor; filling only under supervision

Table C Example of biodiversity impact assessment (impacts inherent to farming operations)

	Impact	Ecological consequence	Mitigation
1	Conversion of natural habitats	Loss of fish breeding ground, endangered species habitat	Consider alternative sites
2	Nutrient/organic matter/sludge release to surrounding ecosystem	Additional growth of weed and algae; oxygen depletion of bottom (dependent on tidal flow to avoid build-up of concentrations)	Settlement ponds; limiting water exchange
3	Leaching of saline pondwater into the ground or surface water	Salinization of soil, ground water, or surface water bodies; change in vegetation and fresh water supply on and around the site	No use of ground water for ponds; yearly monitoring of surrounding ground water
4	Release of pathogens	Endangering native species	Prevention of escapes; effluent handling

Table D Example of biodiversity risk assessment and management plan (realistic risks to biodiversity associated with farming operations)

	Impact	Ecological consequence	Mitigation
1	Fish or shrimp escape	Introduction of unwanted species or pathogens threatening native species	Prefer native species; utmost precautions should be in place to prevent escapes
2	Flooding of settling pond (e.g., by storm or spring tide)	Significant change in habitat in recipient water	Dikes should be of above average height
3	Release of large quantities of chemicals	Damage to aquatic life in recipient water	Ensure adequate storage; avoid excessive chemical stocks

GUIDELINE AQ II BIODIVERSITY IN ENVIRONMENTAL IMPACT ASSESSMENT¹

Introduction

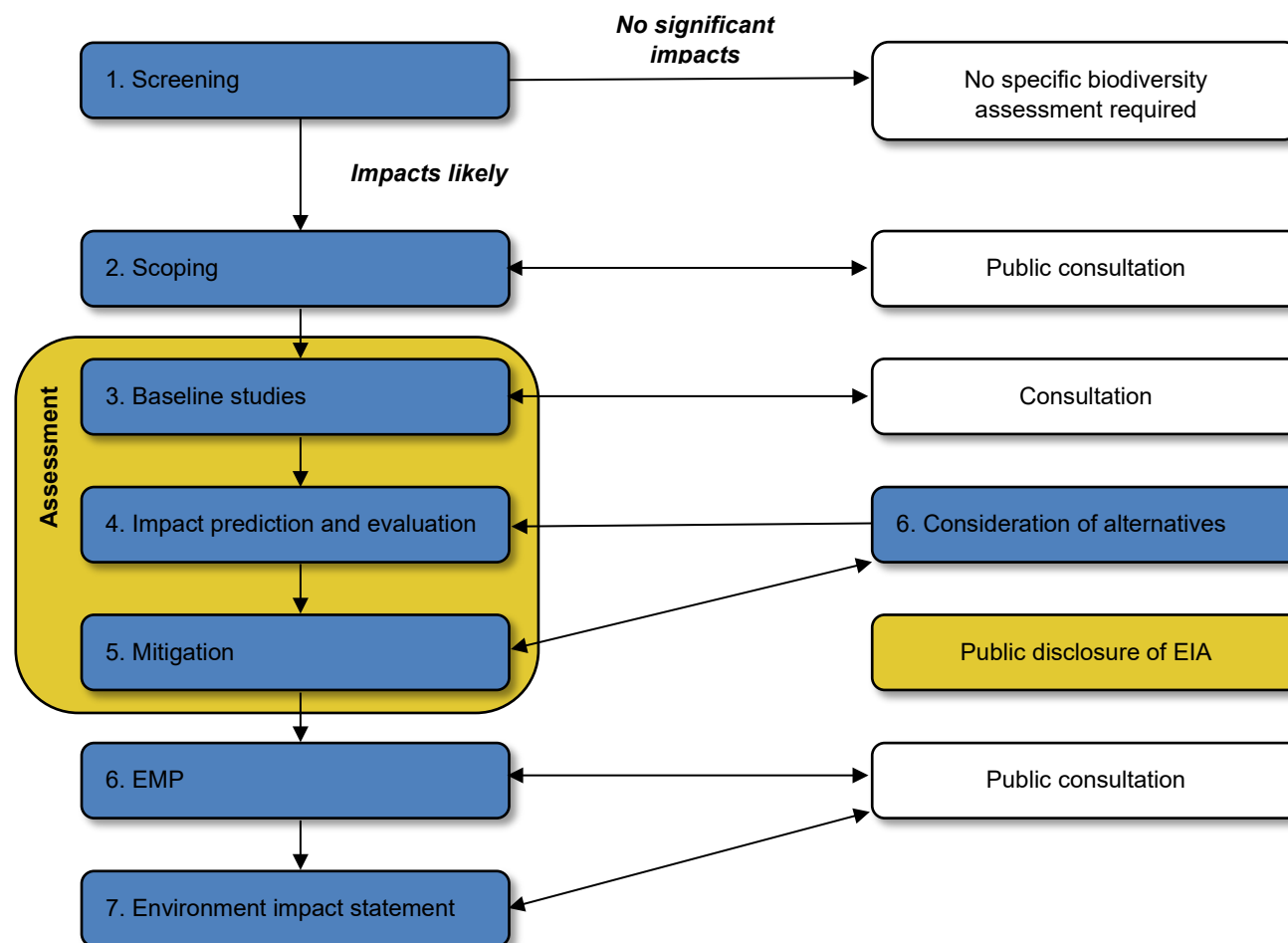
The Convention on Biological Diversity defines biodiversity as “the variability among living organisms from all sources including, amongst others, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.”

Biodiversity in more simple terms is the variety of life on earth at all levels, from genes to worldwide populations of the same species; from communities of species sharing the same small area of habitat to worldwide ecosystems.

Environmental impact assessment (EIA) provides opportunities to ensure that biodiversity values are recognized and taken into account in decision-making. Importantly, this involves a participatory approach with people who may be affected by a proposal (those living on or around the site). The participatory approach and stakeholder feedback are also key indicators as to the quality and credibility of the assessment.

¹For key reference documents, see [International Association of Impact Assessment \(IAIA\)](https://www.iaia.org/).

Figure A An overview of the principal stages of an EIA relevant to biodiversity



Operating principles

1. Screening – to determine whether a proposal should be subject to an EIA or not, and if so, at what level of detail.

Use screening criteria that include biodiversity to determine whether important biodiversity resources may be affected. Biodiversity screening “triggers” for EIA should include:

- Potential impacts on protected areas and areas supporting protected species
- Impacts on other areas that are not protected but are important for biodiversity (see the following list regarding high conservation value areas)
- Activities that pose a particular threat to biodiversity (in terms of their type, magnitude, location, duration, timing, reversibility)
- Areas that provide important ecosystem services including indigenous people’s territories, wetlands, fish breeding grounds, soils prone to erosion or acidification, relatively undisturbed or characteristic habitats, flood storage areas, and groundwater recharge areas, etc.

Encourage the development of a biodiversity screening map indicating important biodiversity values and ecosystem services. If possible, integrate this activity into the development of a national biodiversity strategy and action plan (NBSAP) and/or biodiversity planning at subnational levels (e.g., coastal zone management plans in regions, local authorities, towns) to identify conservation priorities and targets.

Areas of high conservation value are areas that:

- Support endemic, rare, or declining habitats/species/genotypes
- Support genotypes and species whose presence is a prerequisite for the persistence of other species
- Act as a buffer, linking habitat, or ecological corridor, or play an important part in maintaining environmental quality
- Have important seasonal uses or are critical for migration
- Support habitats, species populations, or ecosystems that are vulnerable, threatened throughout their range, and/or slow to recover
- Support particularly large or continuous areas of previously undisturbed habitat
- Act as a refuge for biodiversity during climate change, enabling the persistence and continuation of evolutionary processes
- Support biodiversity for which mitigation is difficult or its effectiveness unproven, including habitats that take a long time to develop characteristic biodiversity
- Are currently poor in biodiversity but have the potential to develop high biodiversity with appropriate intervention

2. Scoping and 3. Baseline study – to identify the issues and impacts that are likely to be important and to establish terms of reference for the EIA.

Use scoping as an opportunity to raise awareness for biodiversity concerns and discuss alternatives to avoid or minimize negative impacts on biodiversity.

It is good practice to produce a scoping report for consultation. This should address the following issues (on the basis of existing information and any preliminary surveys or discussions):

1. The type of project, program, plan, or policy, possible alternatives, and a summary of activities likely to affect biodiversity
2. An analysis of opportunities and constraints for biodiversity (include “no net biodiversity loss” or “biodiversity restoration” alternatives)
3. Expected biophysical changes (in soil, water, air, flora, fauna) resulting from proposed activities or induced by any socioeconomic changes
4. Available information on baseline conditions
5. Likely biodiversity impacts associated with the proposal in terms of composition, structure, and function
6. Biodiversity services and values identified in consultation with stakeholders and anticipated changes in these (highlight any irreversible impacts)
7. Possible measures to avoid, minimize, or compensate for significant biodiversity damage or loss, making reference to any legal requirements
8. Proposed EIA methodology and timescale

4. Impact prediction and evaluation – to determine the potential harm caused.

Address biodiversity at all appropriate levels and allow for enough survey time to take seasonal features into account. Focus on processes and services that are critical to human well-being and the integrity of ecosystems. Explain the main risks and opportunities for biodiversity.

Questions to ask:

At the gene level, to what extent will the proposal have significant effects on:

- Opportunities for species populations to interact, e.g., by increasing habitat fragmentation and isolation
- Risk of extinction

At the species level, to what extent will the proposal:

- Affect species identified as priorities in NBSAPs and/or subnational biodiversity plans (e.g., Red List species)
- Increase the risk of invasion by alien species

At the ecosystem level, to what extent will the proposal:

- Change the amount, quality, or spatial organization of habitat
- Damage ecosystem processes and services, particularly those on which local communities rely

Finally:

- If habitats will be lost or altered, are alternative habitats available to support associated species populations?
- Are there opportunities to consolidate or connect habitats?

Take an ecosystem approach and involve relevant stakeholders (including local communities). Consider the full range of factors affecting biodiversity. These include direct drivers of change associated with a proposal (e.g., land conversion and vegetation removal leading to loss of habitat – a key driver of biodiversity loss, emissions, disturbance, introduction of alien and genetically modified species, etc.) and indirect drivers of change that are harder to quantify, including demographic, economic, sociopolitical, cultural, and technological processes or interventions. Evaluate impacts of alternatives with reference to the baseline situation. Compare with thresholds and objectives for biodiversity. Use NBSAPs, subnational biodiversity plans, and other conservation reports for information and objectives. Take into account cumulative threats and impacts resulting from repeated impacts of projects of the same or different nature over space and time, and from proposed plans, programs, or policies.

5. Mitigation – to determine the framework for preventing or at least minimizing harm.

Remedial action can take several forms: avoidance (or prevention), mitigation (including restoration and rehabilitation of sites), and compensation. Apply the “positive planning approach,” in which avoidance has priority and compensation is used as a last resort. Avoid “excuse”-type compensation. Look for opportunities to positively enhance biodiversity. Acknowledge that compensation will not always be possible; there will still be cases where it is appropriate to say “no” to development proposals on grounds of irreversible damage to biodiversity.

6. Review and decision-making – to assess the suitability of the framework for harm prevention.

Where biodiversity impacts are significant, a specialist with appropriate expertise should undertake a peer review of environmental reports.

Depending on the level of confidentiality of public decision-making, consideration should be given to the involvement of affected groups and civil societies. Avoid pitting conservation goals against development goals; balance conservation with sustainable use for economically viable and socially and ecologically sustainable solutions.

For important biodiversity issues, apply the precautionary principle where information is insufficient, and the “no net loss” principle in relation to irreversible losses associated with the proposal.

7. Environmental management plan (including monitoring, evaluation, and auditing plans) – to determine how to move forward.

It is important to recognize that the prediction of biodiversity response to perturbation is uncertain, especially over the longer term. Management systems and programs, including clear management targets (or limits of acceptable change) and appropriate monitoring, should be in place to ensure that mitigation is effectively implemented, unforeseen negative effects are detected and addressed, and negative trends are identified as early and quickly as possible. Provision is made for the regular auditing of impacts on biodiversity. Provision should be made for emergency response measures and/or contingency plans where upset or accident conditions may threaten biodiversity.

8. Environmental impact statement – to provide transparency and opportunities for dialogue.

One of the most effective ways to ensure that an EIA is fair and credible is through full and public stakeholder engagement with all affected and interested parties and the public disclosure of environmental impact statements.

GUIDELINE AQ III ENVIRONMENTAL PARAMETERS OF RELEVANCE BASED ON THE AQUACULTURE SYSTEM USED

When referring to the environmental impact of aquatic food production, a distinction should be made between *fed/fertilized* aquaculture and non-fed, or *extractive*, aquaculture. Examples of the latter are seaweed culture or shellfish culture: The farmed organisms are not fed and grow using the naturally available nutrients (algae/seaweed) or food (shellfish). The latter systems may still have an impact on the environment via the (human-based) operational activities, such as fuel needed for boats, engines, equipment, materials disposed of (e.g., ropes used for the shellfish lines), etc., but the farmed organisms do not generate environmental (nutrient) enrichment above natural levels. Their impact potentially alters the natural environment mainly by clearing the surrounding water of particles (causing light penetration changes), affecting the species composition of the phytoplankton in the water around the shellfish production sites, concentrating dissolved and suspended matter on the sea floor through the deposition of pseudofeces, etc.

The situation is very different in production systems using feeds or fertilizers. Most of the discharged organic matter, nitrogen, and phosphorus in these systems originates from the feed. As any animal growth process occurs with a certain degree of inefficiency, all animal food production systems, terrestrial or aquatic, produce a significant amount of waste. Mass balance studies show that typical retention rates in fish vary from 35–45% of the supplied feed carbon (C), and 30–40% and 10–16% of the feed nitrogen (N) and phosphorus (P), respectively. The remaining parts are excreted, either via feces (solid waste) or via the gills (dissolved waste). Open systems such as net enclosures or raceways, but also semi-closed systems, such as ponds with a water renewal rate of 15%/day (for example) discharge most of the excreted waste directly to the outside environment. Literature reports that for net enclosures, 40–80kg N and 3–10kg P are discharged into the environment per metric ton of fish produced. However, the impact is usually local, and effects are hardly detectable at a distance of 100–200m from the cages.

In more closed systems, such as stagnant ponds and recirculating aquaculture systems (RASs), part of the excreted waste remains within the system, where it affects the within-system ecology and water quality. For instance, solid waste may sink to the bottom of the pond, where it is converted by the local microbial community or even immobilized; dissolved nitrogen and phosphorus may be assimilated by the phytoplankton community in the pond, and so on. The advantage of RASs is that they have a semi-closed water loop, reducing the amount of discharged effluents enormously. However, in general, RASs do not immobilize waste products. Solid waste is collected and still needs to be discharged. Unless a denitrification reactor is used, nitrogen losses are converted into less toxic nitrate, which is partly discharged. To avoid eutrophication into receiving water bodies, some countries require farms with RAS to discharge their effluent into the regular sewage system, so that it can be treated in municipal wastewater treatment plants. The latter is not possible for marine farms with RAS because of the saline water.

However, taking into account the growth of aquaculture globally and the clustering of farms in certain regions, the collective amount of organic carbon, nitrogen, and phosphorus discharged by these farming activities can be significant, even when on-farm mitigation procedures are applied. Even if its local impact is not always noticeable, the sheer total volume of waste excretion by aquaculture warrants social awareness and a search for more sustainability. The local risk of the environmental impact of aquaculture depends on a complex range of factors which together may determine whether the impact is measurable, moderate, or significant.

Source: Consultancy provided by Prof. Dr. Johan Verreth, expert on ecological fish farming sustainability.

Ratio BOD₅/COD

BOD refers to the biochemical oxygen demand of microbial organisms for the biodegradation of organic matter. It is calculated from the oxygen decrease in a water sample (in a BOD bottle, kept in the dark) at 20°C after a period of 5 days. COD additionally incorporates the chemical oxygen demand for the chemical degradation of (organic plus inorganic) products. Therefore, COD levels are always higher than BOD₅ values. The ratio BOD₅/COD helps determine the biodegradability of the waste; in wastewater treatment, a ratio below 0.4 is considered poorly degradable. As COD measurements are sensitive to salinity, following the APHA method for COD analysis in seawater is recommended. BOD is a useful indicator for the impact of farm effluent on the receiving water body, as it gives an estimation of the amount of oxygen required to oxidize the organic matter discharged via the effluent. The impact on the receiving water bodies depends not only on the concentration in the effluent, but also on the amount of water discharged per day or per week, and on the absorption capacity of the receiving water body. A confined lake or bay has a lower absorption capacity than a river with high water flow or than an open ocean environment. For example, for marine and coastal farms, the local water currents and exchange may dilute the concentrations significantly, hence the impact of the BOD₅ discharge may be limited. However, in highly protected areas, its effect may still be measurable.

	Net enclosures	Ponds	RASs (incl. hatcheries)	Flow-through systems
Risk of env. impact	Low	Moderate to significant	Significant	Significant
Typical values	Typical aquaculture effluents have a BOD ₅ ranging between 5 and 30mg/l; if there is a risk of industrial pollution, it is wise to measure the COD as well; normally the BOD ₅ is about 60–65% of the COD; a ratio below 40% indicates more chemical than organic pollution.			
Frequency	Monthly, when in full operation	At the end of the production cycle	Monthly, when in full operation	Monthly, when in full operation
Where to sample	During feeding outside the pen, and at the lowest possible part	At the outlet of the pond, or in the drainage channel	At the discharge tube	At the outlet of the tank or in the drainage channel/tube

CO₂

High levels of free CO₂ may impair the growth, health, and welfare of the farmed aquatic species, as CO₂ reduces pH and impairs the oxygen uptake capacity of the aquatic species. It can be mitigated by strong aeration or by adding sodium, magnesium, or calcium (bi)carbonate salt. Natural levels of free CO₂ range between 5 and 10/15ppm. 20ppm is considered the maximum threshold for good aquaculture water quality, yet this figure should be treated flexibly. In intensive farms, especially in RASs, it can even increase to levels of 25–40ppm. In natural water, free CO₂ is seldom a problem as it is in equilibrium with the bicarbonate/carbonate buffer system. Alkalinity is a suitable parameter for estimating the strength of this buffer system. As long as pH in the water remains above 6.5, the risk of free CO₂ levels in natural water being too high is always limited. Problems with free CO₂ occur mainly in the culture water of intensive closed production systems and need to be managed as part of the farm operation.

	Net enclosures	Ponds	RASs (incl. hatcheries) and flow-through systems
Risk of env. Impact	Low	Low	Low
Typical values	5–10ppm	CO ₂ levels show diel (diurnal) fluctuations with maximum levels at sunrise and minimum levels at sunset; liming may help adjust the water alkalinity	In intensive systems where pure oxygen is added (e.g., RASs, some flow-through systems), free CO ₂ levels may be elevated. Levels should not be much higher than 20–30ppm. Mitigation involves managing pH and degassing; the gas/liquid ratio in the stripping systems should preferably be around 5; CO ₂ removal may increase pH; care should be taken to keep the latter under 7–7.5 to avoid ammonia accumulation to toxic levels; adding sodium or calcium carbonate can help maintain pH levels within the proper range.
Frequency	Incidentally	Incidentally	High (daily or a few times per week)
Where to sample	Inside the pen	Water column sample	RASs: in the sump tank Flow-through systems: near the outlet

H₂S

H₂S is produced by sulfuric bacteria in anaerobic conditions by reduction of sulfates. Its presence is usually related to anaerobic patches in pond sediments, in denitrification units, or anywhere else where anaerobic patches may be created (e.g., in pipes). As sulfates are more elevated in seawater (up to 2700ppm) than in freshwater (typically around 2ppm), H₂S problems occur more easily in marine farms. The production of H₂S is impaired by high oxygen or nitrate levels; high pH also reduces the concentrations, as H₂S exists in a pH-related equilibrium with HS⁻. As a consequence, keeping dissolved oxygen levels in the water high is crucial to minimizing H₂S problems. Concentrations of 0.002ppm (freshwater) to 0.005ppm (seawater) can impair health and welfare. Marine species are more tolerant than freshwater species. The LC50 values for marine fish are 50–200ppm.

	Net enclosures	Ponds	RASs (incl. hatcheries)	Flow-through systems
Risk of env. impact	Low	Low	Low to moderate	Low
Typical values	From undetectable to 7ppm (e.g., in an anoxic area of the Black Sea)	0.1–0.2 ppm (in anaerobic patches)	25–100ppm (in anaerobic conditions)	From undetectable to 0.05ppm
Frequency	Incidentally	Incidentally	High (daily or several times per week)	Incidentally
Where to sample	Inside the pen	10cm above the bottom	In the biofilter and in the sump tank	Near the outlet

NH₄-N, NO₃-N and NO₂-N

The catabolic end product of protein utilization is ammonia, which is excreted by the fish. In water, ammonia can be taken up by algae and, if discharged, constitute a major factor causing eutrophication. For production systems in open air, total ammonia levels are limited due to assimilation by phytoplankton. In closed systems such as RASs, it is essential to convert the toxic ammonia into nitrite and subsequently to the less toxic nitrate using a nitrification bacterial reactor. Under proper conditions, nitrite concentrations will remain low while nitrate levels accumulate. In pond water or surface waters receiving farm effluents nitrate can also be absorbed by algae and thus contribute to eutrophication, but normally the absorption of ammonia by algae will reduce its availability for nitrification. In RASs, the water renewal rate (and thus discharge of effluent) is often geared to keep system nitrate-N levels below 100ppm. If a denitrification reactor is added to the RAS, nitrate can be converted into nitrogen gas, which can be stripped to the air, reducing the risk for eutrophication due to nitrogen emissions in the effluent. Based on recent scientific literature, chronic exposure to this concentration is considered safe for the health and welfare of the farmed aquatic species. However, its discharge into the environment can contribute to eutrophication. The impact of the discharge of the various dissolved inorganic nitrogen (DIN) species depends on their concentrations, on the amount of water discharged per hour, on the water flow in the receiving water body, etc. Although the discharged concentration levels may be low, the total amount of nitrogen discharged into the environment may be considerable, in particular for net enclosures and flow-through systems where no within-farm assimilation or sedimentation occurs, as only 35–40% of feed N is retained in the fish body.

	Net enclosures	Ponds	RASs (incl. hatcheries)	Flow-through systems
Risk of env. impact	Moderate	Moderate to significant	Significant	Significant
Typical values NH ₄ -N NO ₂ -N NO ₃ -N	Total DIN: 0.01–0.1ppm	0.2–10ppm 0.01–1.5ppm 0.05–5ppm	<1ppm <1ppm 60–140 ppm	1–2ppm <0.5ppm 1–5ppm
Frequency	Weekly	Weekly	At least weekly	Weekly
Where to sample	Inside the pen	Different locations in the pond; water column sample	In the sink (after nitrification reactor)	Before the outlet

PO₄³⁻P

In aquatic systems, phosphorus (P) appears in different forms. It can be present as any of the dissolution ions of H₃PO₄ (dissolved inorganic phosphorus (DIP)), bound to organic compounds (dissolved organic phosphorus (DOP)), present in particulate matter (particulate phosphorus (PP)) or bound to sediments. Reactive phosphate gives the amount of dissolved orthophosphate ions (PO₄³⁻) measured in the filtrate of a water sample, poured over a 0.45µm filter. P measured in the substrate remaining on the same filter gives an estimation of the PP. Total phosphorus is analyzed after acid digestion of an unfiltered water sample by measuring the total amount of inorganic, organic, and particle-bound phosphorus (e.g., P incorporated in bacteria and plankton organisms). Reactive P is a direct measure of the eutrophication potential as the orthophosphate ions are easily taken up by algae. The majority of P in aquaculture originates from feeds (or fertilizers, where applied). As aquafeeds increasingly use plant ingredients, most of the P in these ingredients is phytate-bound and unavailable to the fish and is therefore excreted via the feces (solid waste). Studies show that at least 45–70% of the feed-P ends up in the environment. Fecal (and feed remnant) P adds to the PP complex. Depending on their physical characteristics, particles remain floating as suspended solids or settle to the bottom (in oceans, lakes, or ponds). The sediments in oceans, lakes, and ponds constitute a major sink for P, as the latter is usually immobilized in soil-based iron complexes which are insoluble in aerobic conditions and/or acid soil pH. However, these conditions may fluctuate seasonally and sediments are therefore also a source of P in the water column during reflux periods, contributing to the risk of eutrophication. In RASs and flow-through systems with a solids separator, the collected sludge may be rich in P and organic N, and, after water extraction, can be used as a fertilizer in agriculture. In RASs with a denitrification unit, however, this sludge-bound P may be released into the sump as orthophosphate ions, enriching the effluent water. Mitigation measures are not easy in cases of orthophosphate discharge. Phosphorus removal from effluents is technically possible but extremely expensive; solid-bound P can be handled via the solid waste management procedures (e.g., being used as fertilizer, see above). The impact of orthophosphate discharge into the environment ultimately depends on the size of the recipient water body, the possible dilution effect from water currents, etc.

	Net enclosures	Ponds	RASs (incl. hatcheries)	Flow-through systems
Risk of env. impact	Significant	Moderate	Significant	Significant
Typical values	0.005–0.1ppm PO ₄ ³⁻ -P in the culture water	0.005–5ppm in the culture water	15–50ppm	0.10–0.15ppm
Frequency	Weekly	Bi-weekly	Monthly	Weekly
Where to sample	Inside the pen	Near the outlet; water column sample	In the sump tank	Near the outlet

Suspended solids

Suspended solids are solid particles that float in the water. Particle size can vary from less than 1µ to >100µ (microns). Particles smaller than 2µ are considered dissolved solids. Total suspended solids are measured by filtering a known volume of water over a 2µ fiberglass filter and weighing the dry substrate on this filter. Larger particles can be removed via sedimentation or by screens. Drum filters, which are commonly used in RASs, usually have screens of 60–200µm. The very small particles (<30µ) can be removed via foam fractionation. Suspended solids originate from feed remnants, feces, inorganic particles, microbial flocks, and the amount of suspended solids that enter the system via input water. The latter may be significant if, e.g., eutrophic river water is used to fill or renew ponds. To determine their environmental impact, it is important to quantify the ratio of organic vs inorganic particles in the suspended solids. Remediation can involve the use of settling tanks, screens (e.g., drum filters), or hydrocyclones (swirl separators), etc., before discharging the effluent into the open environment. These measures may reduce the suspended solid load by 60% or more.

	Net enclosures	Ponds	RASs (incl. hatcheries)	Flow-through systems
Risk of env. impact	Low (within 100m)	Moderate to significant	Moderate	Moderate to significant
Typical values	3–10mg/l	25–150mg/l	5–50mg/l	5–75mg/l
Frequency	Monthly	Monthly	Monthly	Bi-weekly
Where to sample	Underneath the pen	Near the outlet	In the effluent tube/in the sump tank	Near the outlet

Chemicals

Producing aquatic foods requires the incidental use of chemotherapeutics (antibiotics, etc.) to combat diseases or parasites. The level of use differs strongly between production sectors and geographical areas. For example, the use of antibiotics has been reduced to nearly zero in Norwegian salmon culture but is still widespread in Chilean salmon farming. Further, chemicals are often used as antifouling agents in net pen cultures. Heavy metals may leach from equipment suspended in water. Disinfecting agents may be used to disinfect pond soils between production cycles and/or to disinfect equipment.

The risk to the environment is not necessarily high, and usually local. However, record keeping and close monitoring are warranted.

	Net enclosures	Ponds	RASs (incl. hatcheries)	Flow-through systems
Risk of env. impact	Low	Low	Low	Low

Glossary

BOD: Biochemical (or biological) oxygen demand

The BOD refers to the amount of dissolved oxygen consumed by a water sample (mostly due to the respiration of microorganisms and decomposition of organic compounds in the water, but also due to respiration of other organisms in the water such as zooplankton and phytoplankton) over a given period of time. Typically, this is a period of 5 days, hence the notion of BOD₅, but this period may change depending upon the amount of organic matter in the sample. To enable a proper estimation, there must be dissolved oxygen left at the end of the measuring period. As the amount of dissolved oxygen in water is limited (saturation concentration), the water sample may be diluted if the water has a high organic load.

COD: Chemical oxygen demand

The COD refers to the amount of dissolved oxygen needed to completely oxidize all organic compounds in the water. It is measured by adding potassium dichromate to an acidified water sample at boiling temperature. Typically, the procedure lasts two hours and is therefore a quicker method than analyzing BOD. As COD also includes the chemical oxidation of compounds, it is always higher than the BOD levels in the same water.

The ration between BOD and COD can be used as an indicator for the biodegradability of the organic matter in the water and is frequently used in wastewater treatment. For aquaculture plants, the higher the biodegradability of the organic matter in the effluent, the more easily it can be treated (reduced) before emitting it to the environment.

CO₂: Carbon dioxide

CO₂ is a known greenhouse gas that also dissolves in water. In water, CO₂ reacts with water to form carbonic acid (H₂CO₃) which dissociates immediately into its ionic forms HCO₃⁻ (bicarbonate) and CO₃²⁻ (carbonate). The molecular form under which CO₂ is prevalent in a particular body of water is highly dependent on the water pH.

Its concentration in the water seeks an equilibrium with the CO₂ in the air above the water surface. If the CO₂ in the water is above the equilibrium level, the gas will be stripped to the air. A main source of CO₂ in the water is the respiration of organisms, while algae and submerged plants may absorb it from the water during photosynthesis.

H₂S: Hydrogen sulfide

Also known as “sewer gas,” hydrogen sulfide produces a strong odor of rotten eggs, even at low concentrations. It is produced by bacteria that decompose organic matter containing sulfur. It occurs mainly in anaerobic conditions.

NH₄-N: Ammonia-nitrogen (to be distinguished from NH₄: ammonia)

The amount (moles) of nitrogen present in a particular mass of ammonium ions (often colloquially referred to as ammonia) in water. As the molar weight of the different nitrogen species in the water differs according to the ion type, referring to the molar concentration of the nitrogen atom is usually preferred to enable comparison between the different forms in which nitrogen is present.

The NH₄⁺ concentration in the water is the result of ammonia (NH₃) excretion by animals on one hand and, where relevant, the uptake by algae and plants on the other hand; the extremely toxic free ammonia (NH₃) reacts with water to form the less toxic ammonium ion (NH₄⁺). However, as the dissociation equilibrium of NH₃/NH₄⁺ is highly dependent on pH, even relatively small amounts of NH₄⁺ in water may convert into toxic NH₃ at pH levels above 7.5 to 8.

NO₂-N: Nitrite-nitrogen

The amount (moles) of nitrogen present in a particular mass of nitrite ions (NO₂⁻). Nitrite is predominantly formed by bacterial conversion from ammonia in the first step of the nitrification reaction. Nitrite is highly toxic to most aquatic organisms. A bioreactor in an RAS is specifically designed to convert the toxic ammonia into the less toxic nitrate; this is a two-step reaction driven by different bacterial species; if the two reaction steps are not well balanced, nitrite may (temporarily) accumulate in the water.

NO₃-N: Nitrate-nitrogen

The amount (moles) of nitrogen present in a particular mass of nitrate ions (NO₃⁻). Nitrate is predominantly produced in the final step of the nitrification of ammonia; the NO₃-N levels in the water are the result of nitrate production and its absorption by the plants/algae in the water.

DIN: Dissolved inorganic nitrogen

The total amount of dissolved inorganic nitrogen, i.e., the combined amount of NH₄-N, NO₂-N, and NO₃-N dissolved in the water.

PO₄³⁻-P: Orthophosphate phosphorus; to be distinguished from orthophosphate

The amount (moles) of phosphorus (P) present in a particular mass of orthophosphate ions (PO₄³⁻). Orthophosphate is one of the ions into which phosphoric acid can dissociate and the form which can be absorbed by aquatic plants/algae. For the latter reason, it is also called reactive phosphorus or soluble reactive phosphorus.

H₃PO₄: Phosphoric acid

Phosphoric acid dissociates in water:

$\text{H}_3\text{PO}_4 \leftrightarrow \text{H}_2\text{PO}_4^- \leftrightarrow \text{HPO}_4^{2-} \leftrightarrow \text{PO}_4^{3-}$. Being a weak acid, phosphoric acid does not dissociate completely, and per unit mass phosphoric acid, only a tiny amount ends up as orthophosphate ions (PO_4^{3-}). Most of the dissolved phosphorus in water will be present as H_2PO_4^- . However, it is the orthophosphate ion that is biologically active.

DIP: Dissolved inorganic phosphorus

Although DIP is usually measured as soluble reactive phosphorus (i.e., PO_4^{3-}), it often exists as the sum of all dissociation ions of phosphoric acid. De La Rocha and Passow (Treatise on Geochemistry, 2014) mention that at common seawater pH (8), 87% of DIP consists of HPO_4^{2-} and only 12% of PO_4^{3-} .

PP: Particulate phosphorus (or particle-bound phosphorus)

Phosphorus attached to the particulate matter that remains on the filter.

GUIDELINE AQ IV THE RAMSAR CONVENTION ON WETLANDS

Contracting parties in order of their accession

The “Convention on Wetlands of International Importance,” called the “Ramsar convention,” is the intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources. The convention was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975. Since then, almost 90% of UN member states from all the world’s geographic regions have acceded to become contracting parties.

The convention’s mission is “the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world.” Wetlands are among the most diverse and productive ecosystems. They provide essential services and supply all our fresh water. However, they continue to be degraded and converted to other uses.

The convention uses a broad definition of wetlands. It includes all lakes and rivers, underground aquifers, swamps and marshes, wet grasslands, peatlands, oases, estuaries, deltas and tidal flats, mangroves and other coastal areas, coral reefs, and all human-made sites such as fishponds, rice paddies, reservoirs, and salt pans.

Key information on each Ramsar contracting party can be found [here](#).

A list of the contracting parties and the date on which the convention entered into force for each party can be found [here](#).

(Source: Ramsar official website, www.ramsar.org)

VERSION/EDITION UPDATE REGISTER

New document	Replaced document	Date of publication	Description of modifications
220607_IFA_Smart_P&Cs_AQ_interim_final_amended_v6_0_Jun22_en	220426_IFA_Smart_P&Cs_AQ_interim_final_v6_0_Apr22_en	7 June 2022	04.03.01 Clarification of C: accident procedure 04.03.04 Change of wording in C: first aid kits 04.05.04 Clarification of P&C: transport of workers 06.02.03 Clarification of C: fuel oil tanks and holding areas
220929_IFA_Smart_GFS_P&Cs_AQ_v6_0_Sep22_en	220607_IFA_Smart_GFS_P&Cs_AQ_interim_final_amended_v6_0_Jun22_en	29 September 2022	02.07 Clarification of C regarding internal audits 19.02.02 Clarification of C: avoidance of risks 22.01.03 Clarification of C: raw and unpasteurized or live feed in hatcheries 28.01.06 Clarification of C: a) (ii) minimal risk
230307_IFA_Smart_GFS_P&Cs_AQ_v6_0_Mar23_en	220929_IFA_Smart_GFS_P&Cs_AQ_v6_0_Sep22_en	7 March 2023	04 Clarification on GRASP compliance
231215_IFA_Smart_GFS_P&Cs_AQ_v6_0_Dec23_en	230307_IFA_Smart_GFS_P&Cs_AQ_v6_0_Mar23_en	15 December 2023	Guideline AQ I, Table C: clarification of impact 3

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