

**Tasmanian Salmonid Growers Association
Biosecurity Program**



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Tasmanian Salmonid Growers Association Biosecurity Program

Version number: 1.0 September 2014

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1 Background and objectives

The Tasmanian salmonid aquaculture industry has developed extensive knowledge and experience in managing the biosecurity of its activities. Biosecurity is an essential element of fish health, safeguarding the sustainability and profitability of the industry.

In 2013, the salmonid industry engaged in discussions with the Department of Primary Industries, Parks, Water and Environment (DPIPWE) to consider an integrated Biosecurity Program (the Program) for the Tasmanian industry. The purpose of the integrated approach is to formalise biosecurity activities that are common to all industry operators, and to address the entire production life cycle and commercial activities of salmonid aquaculture.

The aims of the Program are to:

- prevent the introduction and establishment of aquatic diseases in Tasmania;
- limit the spread of existing diseases that pose a threat to primary producers;
- inform industry and government representatives of potential threats early enough to take precautionary actions;
- manage existing diseases, and where possible reduce their impact through coordinated mitigation strategies; and
- respond rapidly and effectively to new incursions of disease.

The aims of the Program are addressed in a management systems approach, to give attention to the elements of environmental and quality management systems, and enable continuous improvement. Company-specific details of biosecurity management support the Program through enterprise biosecurity plans.

The Tasmanian Salmonid Growers Association (TSGA) has developed the Program in consultation with DPIPWE, with significant involvement of its member companies. The objectives of the Program are to:

- establish a common understanding of industry compliance and regulatory obligations for finfish license conditions and plan area management controls, as per Tasmanian and federal legislation;
- gain industry and government agreement on the minimum biosecurity practices undertaken within the Tasmanian salmonid industry;
- document the biosecurity practices in a manner which clearly outlines responsibilities of all parties participating in the Tasmanian salmonid industry;
- identify biosecurity strategies that have been implemented to provide domestic and overseas markets with confidence in the high aquatic animal health standards of Tasmanian salmonids;
- establish a state-wide biosecurity program that is effective in managing the threats of disease to industry; and

- demonstrate transparent and consistent biosecurity decision-making and management practices consistent with state and national obligations.

The scope of the Program is limited to all aspects of salmonid disease biosecurity within Tasmanian waters.

The Program does not include any aspects of export biosecurity requirements imposed by trade agreements with foreign countries and customers. These requirements are managed independently by each commercial enterprise.

Company enterprise biosecurity plans describe specific procedures and guidelines which are consistent with this overall Program. Enterprise biosecurity plans include the detail of how biosecurity measures are implemented at specific company operating locations in Tasmania. It is recognised that enterprise biosecurity plans may be integrated with aquatic animal health plans which address all aspects of fish health.

2 Governance

2.1 Parties to this Program

The Parties to this industry Program, and contributors to this document are:

- Huon Aquaculture Group Pty Ltd (ABN No. 79 114 456 781);
- Petuna Aquaculture Pty Ltd (ABN No. 62 009 485 581);
- Tassal Operations Pty Ltd (ABN No. 28 106 324 127); and
- Van Diemen Aquaculture Pty Ltd (ABN No. 18 078 409 051).

2.2 TSGA Biosecurity Program Committee

Responsibility for decisions regarding changes to this Program lies solely with the TSGA Biosecurity Program Committee (TSGA BPC), which consists of:

- A chairperson, being *ex-officio* (with no voting rights) the Chair of the TSGA or an agreed delegate who is not a Party to this Program; and
- Persons nominated by each of the industry Parties to this Program, each having equal voting rights.
- DPIPW representative nominated by the Chief Veterinary Officer.

Any TSGA BPC member may disclose without limitation and in confidence to the wider TSGA BPC any company information that the member deems necessary to aid early discussion of biosecurity matters pertaining to the threat, diagnostics, detection, treatment, impact or control measures of disease.

The TSGA BPC will review all salmonid biosecurity protocols whenever it is informed of changes to management measures or other circumstances, and decide if timely actions to update the Program are necessary.

The process for identifying and managing breaches of the Program will be:

- Consideration of data and agreement of the TSGA BPC; or
- If this is not possible, consideration and agreement by the TSGA Board; or
- If this is not possible, independent mediation as outlined in Section 2.2.3.

The Program requires formal review and updating by the TSGA BPC at least every two years.

2.3 Decision-making process

Each Party must, when practical, give the TSGA BPC adequate notice of any proposed substantial changes in biosecurity practices which could reasonably be of concern to other fish farmers or the wider community. The purpose is to enable discussion and planning for

potential biosecurity threats or new vectors for disease. Variations to procedures described in this Program are handled in the same manner. In an emergency situation, communication to the BPC is a priority.

Agreement within the TSGA BPC should be reached on the basis of consensus:

- Where differences exist, the Chair will work to facilitate consensus.
- Where consensus cannot be reached after reasonable effort to resolve differences, the Chair will refer the matter to the TSGA Board for resolution.

All decisions with regard to the Program by the TSGA Board must be unanimous. Where differences exist, the TSGA Board Chair will attempt to facilitate a unanimous decision.

If a unanimous decision cannot be reached by the TSGA Board then the matter will be decided under the dispute resolution process (Section 2.2.3).

2.4 Dispute resolution

The Parties agree that they will first attempt to engage in good faith negotiations in an effort to find a solution that serves their respective and mutual interests under this Program before resorting to any formal conflict resolution process.

Unless a dispute cannot be resolved, the dispute resolution process follows the guidelines contained in the Macquarie harbour Area Management Agreement.

The parties will continue to perform their obligations under this Program while the parties attempt to resolve their dispute.

2.5 Enterprise biosecurity management

The Parties to this Program have the responsibility to manage the biosecurity activities of their marine farming leases, hatcheries and processing facilities (including any salmonid production activities managed by that Party but owned by another entity) to the requirements of this Program. Operational and enterprise-specific matters to address biosecurity requirements shall be covered in enterprise biosecurity plans (or otherwise incorporated in aquatic animal health plans, facility operating plans or other related documents).

Enterprise biosecurity plans are confidential, but will be made available for inspection by government authorities upon request (eg DPIPW, Inland Fisheries Service).

All Parties to this Program must:

- Comply with the requirements and actively participate in the delivery of this Program;
- Immediately report to other companies through the TSGA BPC any biosecurity matters requiring urgent attention, including but not limited to:
 - Signs of infectious disease;
 - Diagnostic reports identifying disease agents in fish; and
 - Treatment of fish to control clinical disease.
- Complete a Stock Health Certificate and Veterinary Health Certificate (Appendix 2) prior to any stock entering any marine zone (eg. smolt) or moved between any zone (eg. ova, eggs, alevin, fry, parr, smolt, adult stock, broodstock); and
- Complete a Decontamination Certificate (Appendix 2) prior to any equipment, vessels or road vehicles being transferred into another zone.

The Parties each undertake to observe and fully comply with any licence conditions and or any management controls as may be imposed by any relevant statutory or government authority from time to time in relation to their respective marine farming leases, hatcheries and processing facilities.

The Parties agree that if, there is a change to any licence conditions and or management controls imposed by any relevant statutory or government authority that affects or has the potential to affect biosecurity protocols, then the requirements of this Program will automatically be reviewed by the TSGA BPC and revised as necessary.

3 Policy and guiding principles

3.1 Tasmanian Biosecurity Policy and Strategy

The stated objective of the Tasmanian Biosecurity Policy is:

‘to protect and enhance Tasmania’s biosecurity status for the benefit of Tasmania’s industries, environment and public well-being, health, amenity and safety’ (DPIPWE 2006).

Some elements of the Policy are focussed on pre-border and border protection at a state level, and a whole-of-government approach to biosecurity. Even so, pre-border and border protection is informed by industry’s awareness and scientific knowledge of potential threats—information which is routinely shared with government authorities responsible for state quarantine activities at its borders.

The elements that are most relevant to the TSGA Biosecurity Program are those that apply to the salmonid industry’s management of biosecurity *after* the application of pre-border and border protection measures, these being federal or state responsibilities. The relevant elements of the Policy are:

- science-based risk analysis to identify threats and develop management measures to reduce risk (a shared responsibility between government and industry for pre-border and border protection);
- risk-based resource allocation to prioritise risk reduction activities;
- cost/benefit decision making for control and eradication of pests and diseases; and
- shared responsibilities for resourcing and management of Tasmania’s biosecurity system.

The Tasmanian Biosecurity Strategy 2013-2017 (DPIPWE 2012) was developed to describe how the Tasmanian Biosecurity Policy will be delivered. The Strategy is built on the following foundations:

- the biosecurity continuum (pre-border, border and post-border activities);
- intelligent risk management for cost-effective decision-making;
- partnerships between government and industry (as well as other stakeholders); and
- Tasmanian commitments with regard to state, national and international obligations for biosecurity.

The TSGA Biosecurity Program is to be consistent with the principles of the Tasmanian Biosecurity Strategy.

3.2 Primary Industry 'Biosecurity is Our Future'

The TSGA has contributed to the Biosecurity is Our Future initiative of the Primary Industries Biosecurity Action Alliance (PIBAA 2013), supported by DPIPWE and the Department of Economic Development, Tourism and the Arts. It is an update of the initial Biosecurity for Our Future document that was launched in 2010.

Biosecurity is Our Future reflects the importance of biosecurity within Tasmania, and the value of Tasmania's hard-earned reputation for excellence in food production both domestically and on the world stage. PIBAA is comprised of a diverse group of primary producers, including the agriculture, aquaculture, fisheries, nursery and horticulture sectors.

The Biosecurity is Our Future document advocates biosecurity being a shared responsibility, active promotion of strong quarantine and biosecurity policy by the state government, and maintaining Tasmania's 'disease free status'. A total of 23 priorities are discussed to achieve these industry objectives, many of which are relevant and have been adopted in the development of the TSGA Biosecurity Program.

3.3 TSGA guiding principles for development of the Biosecurity Program

Development of the Program has been guided by the Biosecurity Strategy for Tasmania—Salmonid Industry Working Group (the Working Group), with input from industry companies and DPIPWE. The Working Group agreed to develop an integrated Biosecurity Program for the Tasmanian salmonid industry. Guiding principles for this Program, are to:

- Aim to be a world-class leader in salmonid aquaculture biosecurity by developing and implementing best practice biosecurity measures, with the goal to work toward best practice in all aspects of enterprise operations.
- Agree on the minimum industry-wide requirements for biosecurity, with clear expectations for operational requirements.
- Develop biosecurity zonation and establish controls for movement of stock and equipment between zones.
- Select locations for new facilities which are adequately separated from existing aquaculture operations, as well as other facilities which pose a biosecurity threat to salmonid aquaculture.
- Select new vessels, equipment and transport systems which are designed and operated to prevent translocation of disease agents.
- Determine protocols for identifying and communicating evidence of disease to industry companies and government authorities in a timely manner.

The Program addresses the aims of prevention, detection, control and response to disease through:

- identification of regions and zones as a management tool for appropriate biosecurity requirements;
- management measures for pathways that may introduce or spread disease to any part of the salmonid lifecycle, including contracted services (personnel, road vehicles and vessels);
- management measures for processors, waste and mortalities;
- detection of disease with surveillance and diagnostic capabilities;
- reporting and communication of disease incidents;
- emergency response arrangements; and
- monitoring of compliance.

In addition to these foregoing aspects of the Program identified by the Working Group, the TSGA identified the need for:

- identifying roles and responsibilities of key personnel involved in biosecurity decision-making;
- implementation of the Program in enterprise biosecurity plans;
- identifying corrective action to continuously improve the Program; and
- establishing review processes for the Program and managing change.

Together, these elements of the TSGA Biosecurity Program respond to the needs of industry for transparent and consistent biosecurity practices and decision-making, and are consistent with the Tasmanian Biosecurity Strategy and the PIBAA Biosecurity is Our Future document.

4 Government biosecurity regimes

Biosecurity for the prevention, detection, control and response to infectious disease relies upon the aquatic animal health provisions of Tasmanian and national biosecurity regimes.

4.1 National biosecurity legislation and plans

The relevant federal legislation for biosecurity is the *Quarantine Act 1908*. Although the Act is over 100 years old, it continues to be implemented for protection of Australia's economic, environmental and social values.

Federal legislation is administered by the Department of Agriculture under the Aquatic Animal Health Program (AAHP). The main roles of the AAHP are to:

- provide national co-ordination and leadership for aquatic animal health management, including:
 - support national committees (Figure 3.1),
 - develop and manage the National Strategic Plan for Aquatic Animal Health—AQUAPLAN, and
 - manage the aquatic animal disease surveillance and reporting system;
- contribute to enhanced aquatic animal disease emergency preparedness and response, including:
 - maintain the Aquatic Veterinary Emergency Plan—AQUAVETPLAN, and
 - support the Aquatic Consultative Committee on Emergency Animal Diseases (AqCCEAD); and
- provide leadership in international aquatic animal health activities, including:
 - contribute to the development of international standards of the OIE, and
 - support aquatic animal health management capacity in the Asia-Pacific region.



¹ Animal Health Committee, Department of Agriculture, October 2011: <http://www.daff.gov.au/animal-plant-health/aquatic/reporting/reportable-diseases>, accessed December 2013.

Table 4.1 National list of notifiable animal diseases of relevance to salmonids (as of December 2013).

Disease	Exotic to Australia?	Exotic to Tasmania?	Susceptible hosts
Epizootic haematopoietic necrosis	No	Yes	Rainbow trout
Infectious haematopoietic necrosis	Yes	Yes	Atlantic salmon Rainbow trout
Viral haemorrhagic septicaemia	Yes	Yes	Rainbow trout
Viral encephalopathy and retinopathy	No	No	Atlantic salmon
Infectious pancreatic necrosis	Yes	Yes	Atlantic salmon Rainbow trout
Infectious salmon anaemia	Yes	Yes	Atlantic salmon ²
Epizootic ulcerative syndrome (<i>Aphanomyces invadans</i>)	No	Yes	Rainbow trout
Bacterial kidney disease (<i>Renibacterium salmoninarum</i>)	Yes	Yes	Atlantic salmon Rainbow trout
Piscirickettsiosis (<i>Piscirickettsia salmonis</i>)	Yes	Yes	Atlantic salmon Rainbow trout
Gyrodactylosis (<i>Gyrodactylus salaris</i>)	Yes	Yes	Atlantic salmon Rainbow trout
Furunculosis (<i>Aeromonas salmonicida</i> subsp. <i>salmonicida</i>)	Yes	Yes	Atlantic salmon Rainbow trout
<i>Aeromonas salmonicida</i> —atypical strains	No	No	Atlantic salmon Rainbow trout
Whirling disease (<i>Myxobolus cerebralis</i>)	Yes	Yes	Atlantic salmon Rainbow trout
Enteric redmouth disease (<i>Yersinia ruckeri</i> —Hagerman strain)	Yes	Yes	Atlantic salmon Rainbow trout

State and territory governments maintain animal disease lists which contain all of the diseases in the national list, but can include others that are specific threats to that state or territory. In Tasmania, it is the state legislation that makes a disease reportable (refer to Section 4.2). In the event of a major biosecurity incident involving notifiable animal diseases, AQUAVETPLAN is mobilised for the response.

² Rainbow trout is known to be an asymptomatic carrier of this disease.

4.2 Summary of Tasmanian biosecurity legislation and plans

All of the diseases relevant to salmonids on the national list (Table 4.1) are included in the state list of notifiable diseases with the following additions³:

- List A diseases which are exotic to Tasmania, including all of those on the national list plus 'sea lice' (an external disease caused by copepod parasites); and
- List B diseases which are endemic to Tasmania or the Australian mainland, plus:
 - Tasmanian Rickettsia-like organism (RLO);
 - Streptococcus of salmonids; and
 - Aquabirnavirus.

A new, previously unknown disease which causes elevated mortalities or other evidence of impacts to fish health would be referred to state authorities for investigation with company-appointed veterinarians and fish health managers (Section 8.8).

Government legislation and plans which are relevant to the Biosecurity Program for the salmonid industry are summarized in Table 4.2.

³ Biosecurity and Product Integrity Division, DPIPWE: <http://www.dpiw.tas.gov.au/inter,nsf/WebPages/CPAS-5QZ2AP?open#ListADiseases>, accessed December 2013.

Table 4.2 Summary of Tasmanian government biosecurity requirements.

Legislation	Relevant areas of the Act	Required action	Frequency of required action, and/or required reporting time
<i>Animal Health Act 1995</i> This is the principle Act relating to the prevention, detection and control of animal diseases, including diseases of salmonids, in Tasmania. This Act will normally take precedence over other Acts in matter relating to animal disease and biosecurity.	<i>Part 4, Importation</i> Describes controls and requirements relating to importation of animals, restricted materials and infected animal materials into Tasmania from interstate or overseas.	A person or company must not import any animal or restricted animal material unless the specific importation is authorised by a 'general authority' or 'special authority', and is done so according to the conditions outlined on the relevant authority. A person or company must not import any animal or material suspected of being infected with a List A or List B disease, unless specifically authorised to do so.	Persons/ companies wishing to import animals or restricted animal products must adhere to conditions outlined on the relevant authority ² . Where an authority is not available, importation of the animal or product may not occur.
	<i>Part 5, Notification of Disease</i> Describes the mandatory legal obligations for the reporting of specific diseases (as listed in List A and List B ¹ of the Act) and/or other disease conditions.	Any person knowing of or suspecting the presence of a List A disease (exotic diseases) or List B disease (significant endemic diseases), is required to notify an inspector within DPIPWE immediately. Similar reporting requirements also exist for diagnosis or suspicion of new diseases, and the occurrence or suspicion of an unknown disease causing significant mortality or morbidity.	Knowledge or suspicion of any significant disease or pathogen must be reported immediately. Disease events may be reported directly to a DPIPWE inspector or via the Disease Watch Hotline on 1800 675 888.

Table 4.2 Summary of Tasmanian government biosecurity requirements (continued).

Legislation	Relevant areas of the Act	Required action	Frequency of required action, and/or required reporting time
	<p><i>Part 6, Disease Control</i></p> <p>Relates to the control and management of animal disease occurring within Tasmania through the ability to declare areas where disease occurs and apply control measures.</p>	<p>Where an 'infected place', 'restricted area', 'control area' or 'protected area' has been declared, persons/ companies working within or moving between such areas must make themselves aware and adhere to any conditions prescribed to it. Persons and/ company must also be aware and adhere to conditions of any approved control program implemented under the Act.</p> <p>In addition, a person must not knowingly expose an animal to a List A or list B disease, new disease or unknown disease without appropriate authorisation of the Chief Veterinary Officer.</p> <p>A person my not sell or transfer any animal or animal material suspected of being infected by a List A or List B disease, new disease or unknown disease, unless specifically authorised under the Act.</p> <p>The Act also has provisions to require owners of any premise to dispose of carcasses in a suitable manner and within a reasonable amount of time.</p>	<p>Person and companies should make themselves aware of any gazetted areas for the purposes of animal disease control and ensure that they adhere to the specific conditions of each.</p>

Table 4.2 Summary of Tasmanian government biosecurity requirements (continued).

Legislation	Relevant areas of the Act	Required action	Frequency of required action, and/or required reporting time
	<i>Part 7, Artificial Breeding</i> Relates to the sale and distribution of ova, semen or embryos.	It is illegal to sell or otherwise distribute semen, ova or embryos if there is reason to suspect that they may be infected with a disease or genetic abnormality. This aspect of the Act has not previously been used within aquaculture, but may have relevance to any approved disease control program, and the movement of eggs between hatcheries.	Hatcheries should be aware of their responsibilities under this section of the Act and seek appropriate authorisation if they suspect stock is infected.
	<i>Part 8, Responsibilities and Powers of an Inspector</i>	This section outlines powers provided to an Inspector (persons gazetted under the Act) for the purposes of investigating, preventing and controlling animal disease; including (but not limited to) the ability to enter a premise, examine product, record information and seize animals or product. Section 66 of Part 8 identifies that an Inspector may give instructions requiring the owner to take action considered necessary to control disease.	Person and companies should provide Inspectors with all reasonable assistance to carry out their duties.

Table 4.2 Summary of Tasmanian government biosecurity requirements (continued).

Legislation	Relevant areas of the Act	Required action	Frequency of required action, and/or required reporting time
	<p><i>Part 3, Quarantine</i></p> <p>Describes the establishment and management of a quarantine area within Tasmania for purposes of importing animals.</p>	<p>Allows the establishment of a quarantine area for purposes of facilitating import of animals into Tasmania. May also be used in the movement of animals between regions within Tasmania</p>	<p>Specific conditions will be developed for each specific quarantine situation. Limited relevance in relation to ongoing biosecurity measures.</p>
<p><i>Living Marine Resources Management Act 1995</i></p>	<p>Section 64 provides for the licensing of marine farming operations and establishing licence conditions regulating operations.</p>	<p>Relevant generic licence conditions include:</p> <ul style="list-style-type: none"> ▪ License holders must report known or suspected incidents of disease and/or mortality. ▪ License holders must notify DPIPWE of the presence of any unusual or uncharacteristic marine flora or fauna found within the lease area. 	<p>Holders of marine farming licenses should be familiar with the conditions of their license and acquaint staff of any reporting responsibility and procedures.</p>



Table 4.2 Summary of Tasmanian government biosecurity requirements (continued).

Legislation	Relevant areas of the Act	Required action	Frequency of required action, and/or required reporting time
<i>Marine Farming Planning Act 1995</i>	This Act provides for the preparation of marine farming development plans that may also contain management controls to regulate marine farming activities.	Section 24 of the Act provides that plans may contain operational constraints (management controls). Management controls may be amended through the provision of Section 33. Management controls vary between areas but generally require leaseholders to comply with provisions of the <i>Animal Health Act 1995</i> .	Lease holders should be aware of any management controls relevant to the area that they operating.

Table 4.2 Summary of Tasmanian government biosecurity requirements (continued).

Legislation	Relevant areas of the Act	Required action	Frequency of required action, and/or required reporting time
<i>Inland Fisheries Act 1995</i>	This Act allows for the licensing and setting of license conditions for inland fish farm establishments. Each fish farm will have a specific set of conditions listed on its license, as determined by the Director of the Inland Fisheries Service.	<p>Section 42 relates to condition of a fish farm license. Generic condition of the license dictate the species that may be grown, that the licensee must participate in the 'Tasmanian Salmonid Health Surveillance Program' and licensed premises must maintain an approved enterprise biosecurity plan.</p> <p>Section 51 requires that the holder of a fish farm licence must keep adequate records relating to fish movements off the farm.</p> <p>Section 132 states that a person must not import fish of any species without written consent from the Director of Inland Fisheries. Specifically, salmonid species may not be imported without written approval under this Act or the <i>Animal Health Act 1995</i>.</p> <p>Section 133 states that a person must not propagate or strip salmon or possess fertilised salmon eggs without appropriate written consent.</p>	Managers of hatcheries must be aware of the conditions on the relevant fish farm license and ensure that staff and contractors comply with all conditions.

Table 4.2 Summary of Tasmanian government biosecurity requirements (concluded).

Legislation	Relevant areas of the Act	Required action	Frequency of required action, and/or required reporting time
<i>Agricultural and Veterinary Chemicals (Control of Use) Order 2001.</i>	The order prescribes responsibilities and minimum standards that apply to the supply and use of veterinary chemical products in Tasmania.	<p>Conditions for the use of veterinary chemicals are outlined within the 'Code of Practice for the Supply and Use of Veterinary Chemical Products'.</p> <p>The Code applies to veterinary chemical products that are scheduled poisons for the treatment of animal species that are used by people for food, or from which food products are derived.</p> <p>Currently, in relation to the Code, fish species are not included in the list of 'major food species' in Tasmania. However, an animal of any food species, including salmonids, may only be treated with a registered product 'off-label', with an unregistered product, or with a registered human pharmaceutical unless the animal/s is under the care of a veterinarian and it/they are fully identified.</p>	Veterinarians and fish farm managers must make themselves aware of their responsibilities under the Code.

5 Framework of the Program

The relationship between this TSGA Biosecurity Program, company (enterprise) biosecurity plans, and state and federal biosecurity requirements is shown in Figure 5.1. The industry Program is designed to identify a common approach toward meeting industry's expectations for biosecurity and meeting government requirements. Importantly, the Program describes biosecurity practices and requirements that are agreed to be essential by all industry companies.

Details of how biosecurity is implemented at the enterprise level are contained in company biosecurity plans, veterinary health plans, farm management plans and other company-specific documents. The enterprise-level biosecurity plans can include standard operating procedures that are independently developed, and may contain commercially confidential information.

Industry has developed an Area Management Agreement for Macquarie Harbour. It contains an agreed biosecurity regime for three industry enterprises operating marine farms and shore-based facilities in the Harbour, as well as agreed protocols for contractor personnel, vehicles, vessels and equipment.

The content of this document necessarily relies on material that all industry companies agree upon and can publicly disclose without commercial sensitivity. Aspects of biosecurity which are met by specific company management practices, or involve commercially sensitive information and designs will remain with enterprise biosecurity plans.

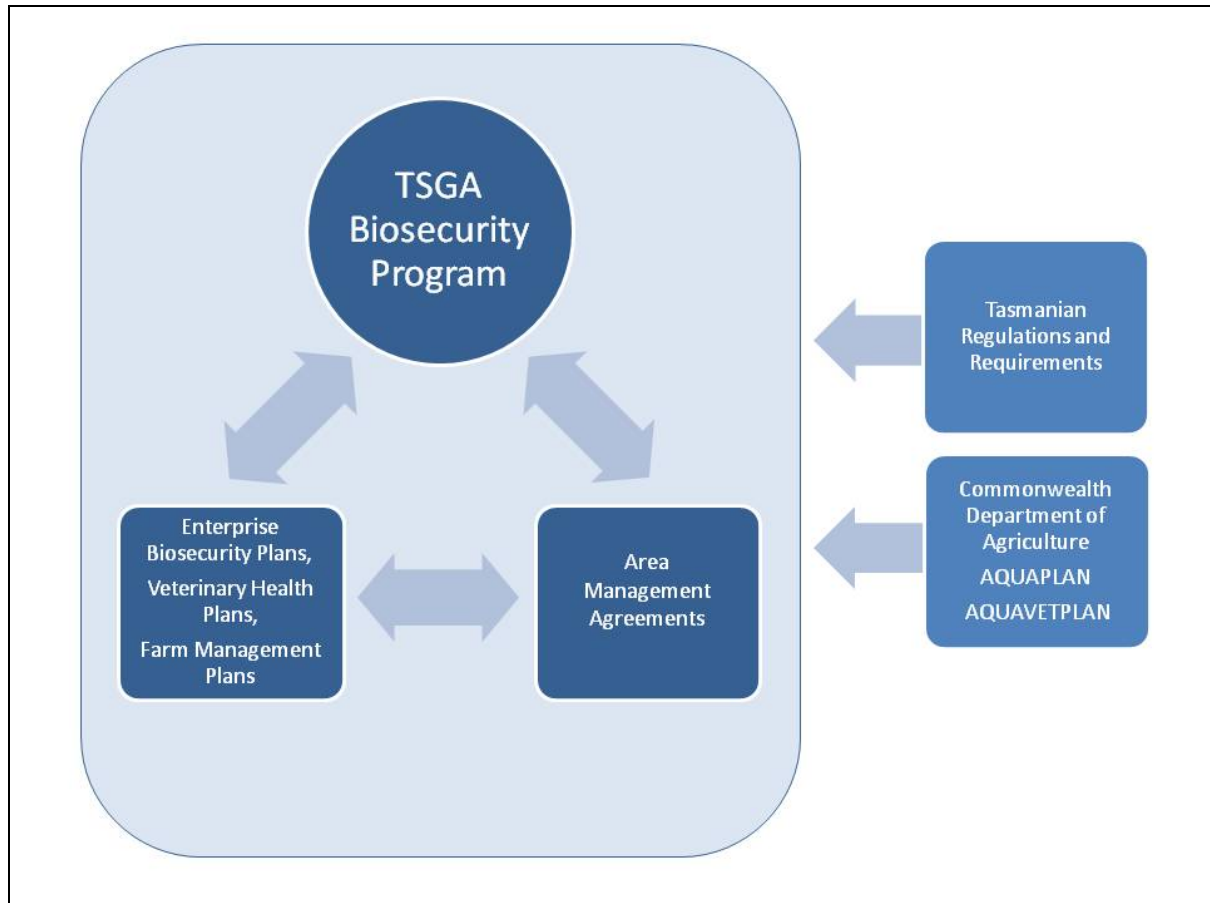
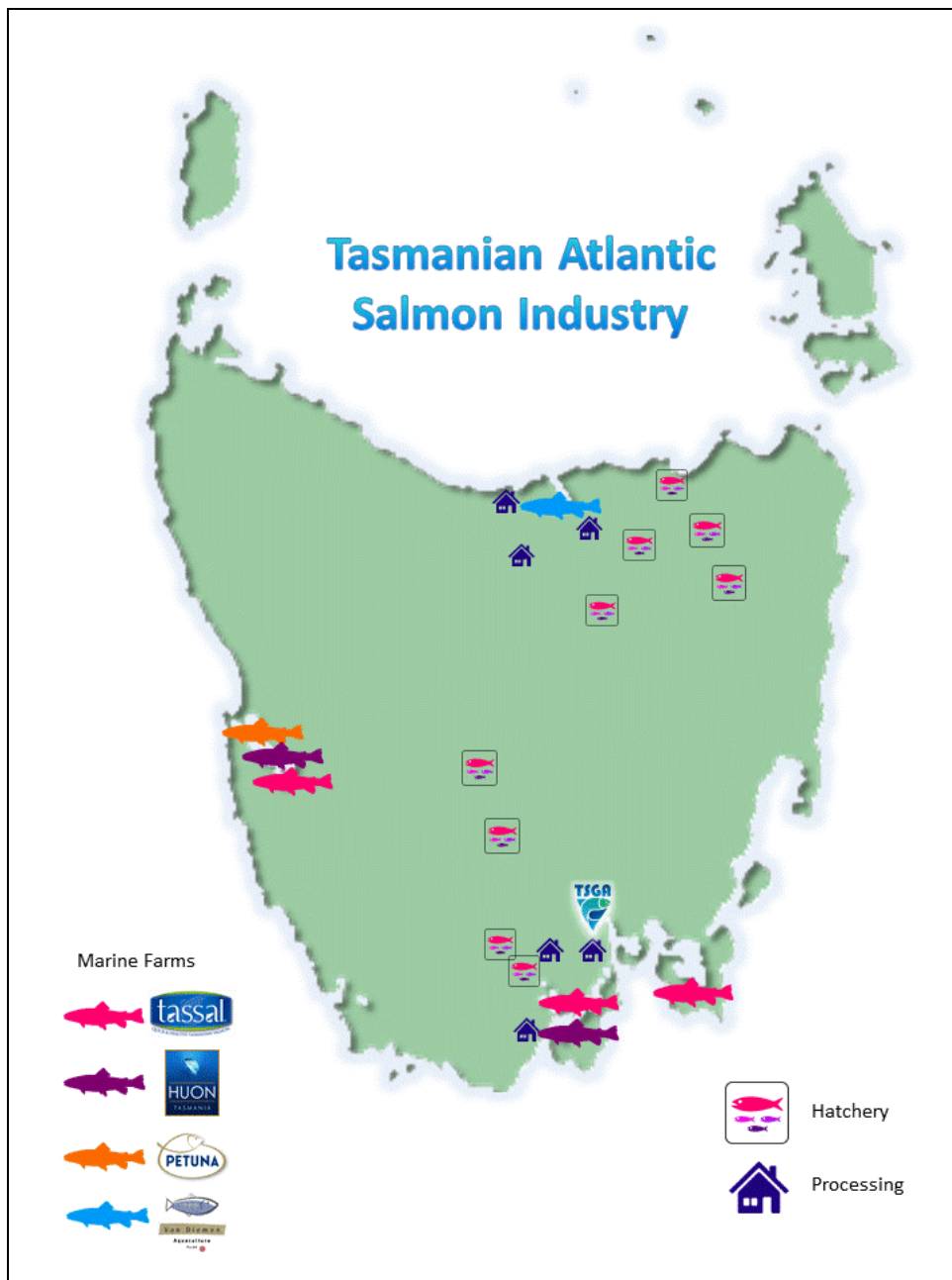


Figure 5.1 Relationship of the TSGA Biosecurity Program to government requirements and enterprise biosecurity plans.

6 Biosecurity regions and zones

Zonation is a management tool used to implement biosecurity requirements in Tasmania. It adopts the World Organisation for Animal Health (International des Epizooties, or OIE) Aquatic Animal Health Code objectives for defining zones and compartments (OIE 2013).

Figure 6.1 Overview of Atlantic salmon production locations in Tasmania.



6.1 Tasmanian state region

Tasmania, being an island state, is naturally isolated from mainland Australia and constitutes a biosecurity region. Biosecurity management of the importation of goods to Tasmania from interstate or overseas sources is managed by DPIPWE, and is not in the scope of this Program.

The Tasmanian state region is considered a 'disease free zone' for EUS and EHNW within Australia.

6.2 Marine zonation within Tasmania

Three marine biosecurity zones for salmonid aquaculture have been designated in the Tasmanian state region, in consultation with DPIPWE:

- Macquarie Harbour Marine Biosecurity Zone (Figure 6.2);
- South East Marine Biosecurity Zone (Figure 6.3); and
- Tamar Marine Biosecurity Zone (Figure 6.4).

Each of these zones is referenced for specific biosecurity management requirements in this Program.

The marine biosecurity zones encompass geographical areas within the Tasmanian region, and are not to be confused with Marine Farm Plan Areas prescribed by DPIPWE.

Figure 6.2 Macquarie Harbour Marine Biosecurity Zone (DPIPWE 2014).



Figure 6.3 South East Marine Biosecurity Zone (DPIPWE 2014).



Figure 6.4 Tamar Marine Biosecurity Zone (DPIPWE 2014).



6.3 Terrestrial biosecurity zone

Terrestrial biosecurity is implemented in single zone for: hatcheries; fish processors; waste management facilities; and research and laboratory facilities. The terrestrial biosecurity zone recognises compartments based on specific management and biosecurity practices in each industry facility.

6.3.1 Hatchery compartments

Each hatchery is represented in this Program as a separate hatchery compartment for managing biosecurity requirements.

Each hatchery compartment is designated to be an individual hatchery property, and must include land that is used for the discharge of process water through irrigation. Hatchery compartments are to be adequately segregated through biosecurity practices relevant to flow-through and recirculation hatchery systems.

Stormwater runoff is to be managed such that it is segregated from process water used in hatchery operations.

6.3.2 Fish processing compartments

Each salmonid processing centre is represented in this Program as a separate fish processing compartment.

Fish processing compartments are managed to ensure that disease agents are adequately controlled to prevent translocation of biosecurity threats beyond the facility boundary.

6.3.3 Waste management compartments

Each salmonid waste management facility is represented in this Program as a separate waste management compartment. Waste management compartments include facilities such as rendering plants and burial sites for fish waste from aquaculture operations.

Development of fish waste processing or disposal facilities in proximity to, or upgradient from hatcheries must be assessed with regard to adequate segregation and control of biosecurity threats and vectors for disease.

Stormwater runoff is to be managed such that it is segregated from process water used in waste management facility operations.

6.3.4 Research and laboratory compartments

Each R&D facility and fish health laboratory which handles salmonids, including sample tissues, faecal material, live fish or mortalities; or which stores, develops, cultures or tests salmonid disease agents is represented in this Program as a separate research and laboratory compartment.

Research and laboratory compartments are managed to ensure that disease agents are adequately controlled to prevent translocation of biosecurity threats beyond the facility boundary.

Stormwater runoff is to be managed such that it is segregated from process water used in research and laboratory facility operations.

6.4 Endemic disease risks and distribution

A summary of disease agents present in the Tasmania state region is presented in Table 6.1 for reference. Endemic diseases are managed through preventive measures such as promotion of fish health and vaccination. Amoebic Gill Disease is treated by freshwater bathing regimes.

This list is not exhaustive, but highlights many of the major biosecurity threats to industry operations in the Tasmanian region.

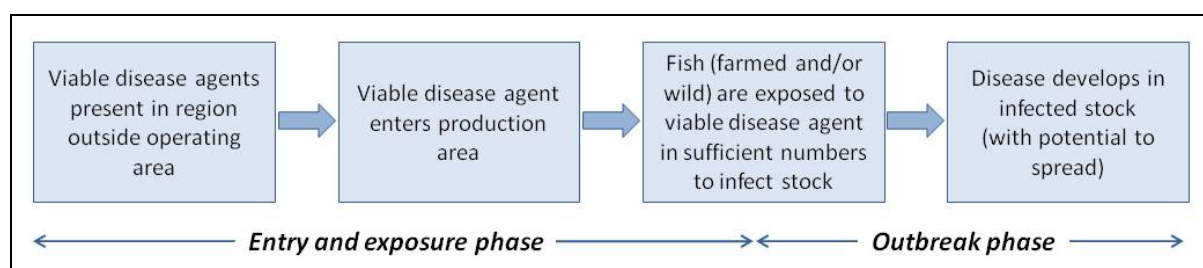
Table 6.1 Summary of endemic disease agents in the Tasmania state region.

Disease	Distribution (zones)	Potential impacts	Treatment
Amoebic Gill Disease (AGD)	Tamar and South East Marine Zones, but causative agent found in all zones.	Localised gill inflammation and hyperplasia.	Freshwater bathing.
Yersiniosis (<i>Yersinia ruckeri</i> —serotype O1b)	Freshwater Zone hatcheries and associated with smolt transfer to marine zones.	Septicaemia.	Yersinivac-B vaccine, or antibiotics in infected populations (rarely used).
Marine Aeromonas Disease (atypical <i>Aeromonas salmonicida</i> biovar Acheron)	Macquarie Harbour Marine Zone	High mortality rate without significant external lesions.	AnguiMonas vaccine.
Vibriosis (<i>Vibrio anguillarum</i> serotype O1)	Macquarie Harbour Marine Zone, but causative agent found in all zones.	Systemic bacterial infection with high mortality rate.	AnguiMonas vaccine.
Skin infections (<i>Tenacibaculum maritimum</i> and marine <i>Flavobacterium</i> spp.)	All zones.	Skin lesions/ulcers associated with primary trauma (predation, net damage).	Antibiotics in infected populations (occasionally used).
Tasmanian Aquareovirus	South-East Marine Zone and Freshwater Zone.	Not associated with clinical disease, but often detected in association with disease caused by other agents.	Preventive measures to promote fish health. Vaccine is under development with the FHU Laboratory.
Tasmanian <i>Rickettsia</i> -Like Organism (RLO) —three serotypes recognised in each of the three marine zones	South East Marine Zone, where the South-East serotype is associated with clinical disease. The other serotypes have not been observed to be a cause of disease.	Low level mortality.	Antibiotics in infected populations (rarely used). Corrovac vaccine for the South-East serotype in field trial.
Tasmanian Aquabirnavirus	Macquarie Harbour Marine Zone	Systemic viraemia in post-transfer smolt, with low level mortality.	Vaccine is under development with the FHU Laboratory.

7 Pathways for introduction and spread of disease

The key steps by which disease can develop through the introduction of a disease agent from a region outside of industry operations to farmed fish in hatcheries, marine farms or processing centres are shown in Figure 7.1. It is noted that based on experience to date, significant diseases occur as a result of endemic disease agents in the Tasmania region, rather than newly introduced exotic disease agents.

Figure 7.1 Key steps in establishment of disease.



Pathways which may enable the introduction of exotic diseases to salmonid farming activities, or cause the spread of endemic diseases between industry production sites include:

- Live fish movements, including the water in which they are transported. Live fish includes all life stages of salmonids (eggs, fry, smolt, broodstock and grow-out stocks).
- Infected fish products, post-harvest.
- Contaminated feed.
- Contaminated materials (eg. farm equipment including harvest and mortality bins, transport trucks, marine vessels).
- Staff, contractors and visitors (eg. vehicles, equipment, protective clothing).
- Wild aquatic organisms (eg. fish, crustaceans, zooplankton, algae), which may also be carrying diseases not previously introduced to farmed stock.
- Wildlife interactions (eg. seals, birds).
- Biofouling of vessels and marine equipment, and ballast water discharges from vessels.
- Recreational anglers and wild fishers (eg. contaminated tackle, vehicles, vessels, bait).

All pathways are confined to the region of Tasmania, but must consider movements of material between the marine biosecurity zones within Tasmania (refer to Section 6).

If a viable disease agent enters a production zone and infects fish, it will be very difficult to prevent the spread of that agent within the wider operating area (eg. Macquarie Harbour, D'Entrecasteux Channel, Tamar River). Hence prevention measures to minimise the risk of introduction are the first priority for this Biosecurity Program.

Disease agents can live and propagate within live fish. The potential for viable disease agents to enter a production zone in sufficient numbers to establish infection is highest when transferring live fish. Over time, the number of viable disease agents being carried with live fish will remain the same or potentially increase, particularly if fish are stressed during transport.

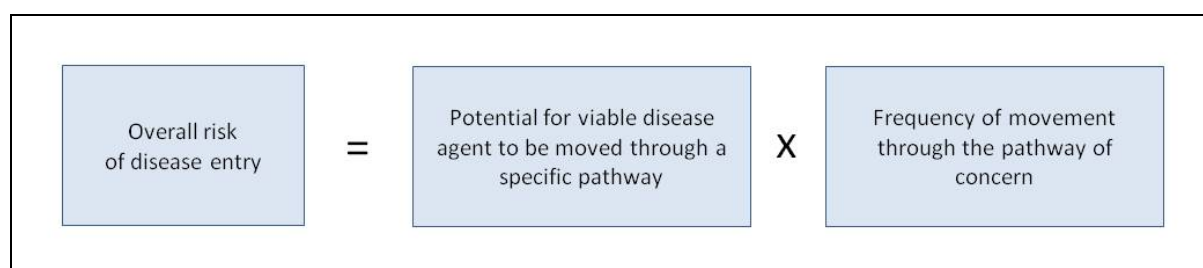
Once a disease agent is outside the host fish (eg. present on equipment or personnel, or in the water column) the viability of the disease agents will, in general, lessen with time. Equipment infected with disease agents (eg. harvest or mortality bins) may still transfer disease agents as a result of movement between facilities and marine zones if not disinfected after each use.

The potential for a disease agent to survive outside of host fish depends on the environmental conditions it faces. For example, disease agents are more likely to survive in a moist environment such as water or biofouling on nets than on the exposed surface of equipment.

In general, the more often a potential pathway enables the movement of disease agents, the more likely a disease agent will be introduced into an operating zone. Therefore, the potential risk is a function of two factors (Figure 7.2):

- The likelihood of the disease agent remaining viable during movement through a specific pathway; and
- How frequently the movement occurs.

Figure 7.2 Risk of disease entry is dependent on what is being moved and how often it is moved.



8 Biosecurity management—General measures

Risk-based assessment of industry operations results in management measures, or 'barriers', which reduce risk to acceptable levels.

Some management measures are not pathway-specific. Instead, they are 'general' or 'systematic' barriers to reduce the risk of disease through administrative procedures, disease monitoring, hygiene requirements, training of staff, supervision and accountability of biosecurity requirements, laboratory diagnostic services and contingency planning (Section 7.1).

A number of barriers to prevent the introduction and spread of disease are used throughout industry operations, common to all types of disease threats and pathways of infection.

8.1 Administrative procedures

Procedures have been developed for considering biosecurity requirements in the recruitment and selection of key personnel, in contract specifications, in legal agreements, in information technology systems, and in compliance and governance activities of industry companies.

Company development and review of their written Fish Health and Biosecurity Protocols promote a well thought through and comprehensive approach to fish health and biosecurity. The Protocols serve several functions:

- Enable broad participation in ensuring effective measures are in place;
- Provide an effective education resource for training staff; and
- Provide a clear reference on which internal or external auditing can be based. It is essential to ensure agreed measures are adhered to.

Protocols must aim to:

- Avoid the introduction of new or exotic diseases into any marine or freshwater zone;
- Minimise the spread and impact of diseases already present in particular marine and freshwater zones; and
- Avoid the spread of diseases present in any zone to other regions.

8.2 Monitoring for early detection of disease

General health monitoring on a regular basis is an essential part of effective fish health management to ensure that important or unusual conditions are detected as quickly as possible. Early recognition of a potential health issue increases the likelihood that mitigating actions will prevent the spread and/or reduce the impact of a disease.

Early recognition also allows for timely investigation and research into the condition to

determine its significance and possible control mechanisms.

Regular stock inspections are best incorporated into other farm activities such as mortality collection, weight checks and harvests. However, staff should be in the habit of assessing fish behaviour and appearance during all farm activities.

Besides general health monitoring, it is important to routinely conduct targeted monitoring that specifically checks for the presence (or absence) of specific diseases. General and targeted disease monitoring is also linked to the Tasmanian Fish Health Surveillance Program (TFHSP) which is a joint program between the Tasmanian Salmonid Industry and Tasmanian Government.

Key objectives of the TFHSP are:

- Demonstration of freedom from salmonid diseases which are considered exotic to Tasmania, but not necessarily Australia, in order to provide support for maintaining state border biosecurity regulations;
- Monitoring of significant endemic diseases and their causative agents in order to maintain regional biosecurity within Tasmania and within its marine and freshwater zones; and
- Investigation of significant or unusual disease events in a rapid and efficient manner.

Results of monitoring are communicated to responsible and interested parties (Sections 8.9 and 8.10), and to the TSGA BPC if necessary to resolve different views regarding the appropriate response to monitoring results (Section 2).

8.3 Hygiene requirements

Preventive measures are taken across all industry activities to prevent the introduction and spread of disease. These include the use of approved clothing and PPE at each work site and decontamination of work boots each time staff pass a foot bath location (strategically placed at each site). PPE worn at hatcheries, farm facilities and processing facilities must not be moved from one facility to another without being decontaminated under the approval of the site manager.

Persons who have attended a marine farm, hatchery or processing centre earlier on the same day must report to the site manager when visiting a different facility, and undertake decontamination or re-issuing of work clothes if directed to do so.

Persons who have attended a site which is known to be infected by a disease agent must not transfer clothing or PPE to another work site unless decontaminated beforehand.

Rodent control is undertaken at all facilities as part of pest management programs. Baiting and/or trapping of rodents is to be undertaken by pest control contractors and monitored for effectiveness. Evidence of any rodent activity is reported to the site manager to take appropriate response actions.

8.4 Site induction and training

All industry personnel, contractors and visitors receive awareness training of biosecurity threats, particularly for prevention of the introduction and spread of disease agents. Facility biosecurity requirements are included in site-specific induction and training programs, including the use of disinfectants (hand wash and foot baths) at designated locations and use of designated PPE that is free from contamination.

Personnel and contractors with biosecurity duties are given specific training relevant to their responsibilities. Biosecurity-related training subjects include (subject to specific work requirements):

- specific decontamination procedures for personnel, equipment, transport vehicles and marine vessels—as well as avoiding practices which could potentially spread disease;
- recognising signs of infection in potentially diseased fish (at all lifecycle stages) and taking appropriate action to quarantine diseased fish;
- recognising signs of equipment contamination;
- modes of disease transmission;
- collection of water and tissue samples for laboratory testing;
- handling and storage of mortalities by marine farm personnel and divers;
- bathing operations at marine farms to treat amoebic gill disease;
- net and cage cleaning operations; and
- other specialised tasks.

Company-appointed veterinarians and fish health managers are trained in the selection and application of vaccines and therapeutants, and support the training of personnel and contractors with technical information and advice as experts in fish health.

The ability of staff to recognise diseased fish is essential in the early detection of a disease. Staff awareness of biosecurity issues and protocols is critical in minimising the spread and impact of diseases. To ensure staff competency, regular general health monitoring and continuing education is required. Such education includes both in-house and external training, continued reinforcement of the importance of fish health and biosecurity issues by management, and ongoing feedback about fish health and biosecurity matters as they arise.

Technical staff needs to be aware of how to assess fish for the presence of disease and be familiar with:

- External and internal fish appearance and anatomy;
- Normal and unusual fish behaviour;

- Basic understanding of fish physiology (what each organ does);
- How to perform a post-mortem on a fish; and
- How to collect basic samples for bacteriological and histological assessment.

Training programs include workshops for personnel delivered by DPIPWE Fish Health Unit specialists.

8.5 Supervision and accountability for biosecurity requirements

Company-appointed veterinarians and fish health managers have primary accountability for biosecurity requirements, and are supported by site managers with responsibility for implementing biosecurity requirements among personnel, contractors and visitors.

Company-appointed veterinarians and fish health managers delegate responsibility for biosecurity tasks to appropriate persons who act on their behalf. At no time is any industry operation conducted without the availability of advice and monitoring of activities from the company-appointed veterinarian or assigned delegate.

The government Chief Veterinary Officer (CVO) has statutory powers to order disease control actions in the event of an outbreak of disease.

8.6 Monitoring of performance

Company personnel with responsibility for biosecurity performance routinely monitor and inspect compliance with biosecurity requirements to ensure that procedures are being correctly and effectively implemented.

Company audits may be undertaken to monitor business and regulatory compliance. Audits can be internal company activities, or may involve independent auditors or government authorities. Protocols for audits are developed by individual companies for the scope of audits and access to records and personnel.

Audits of biosecurity arrangements seek to confirm compliance with requirements and identify gaps where corrective action may be required. Responsibility and timeframes for corrective action are assigned to company personnel with responsibility for relevant biosecurity performance.

Audits may also identify opportunities for improvement, which can be considered during normal management review and planning processes, and implemented if cost effective and practical to do so.

8.7 Fish health and laboratory services

Effective disease investigation and response relies on experienced personnel. It is essential that each company appoints a fish veterinarian experienced in the diagnosis and control of aquatic animal diseases.

Disease monitoring and investigation is also reliant on an experienced and well-resourced laboratory service. Without such a service the capability to identify and respond to new and emerging disease issues is compromised.

The DPIPW FHU in Launceston provides an excellent primary diagnostic facility for the Tasmanian salmonid industry, including: microbiology, histology, molecular biology and other services. The Companies agree that the FHU is the primary diagnostic resource in Tasmania, and is supported by the Tasmanian Salmonid Health Surveillance Program (TSHSP). The FHU is well-supported by the CSIRO Australian Animal Health Laboratory (AAHL) in Geelong which provides mostly virological testing. On occasions where significant or notifiable infectious disease occurs, events may be referred to the DPIPW Animal Health Branch for investigation. In such cases, a government veterinary officer will work with the company-appointed veterinarian to investigate the issue.

8.8 Regulatory fish health requirements

The *Animal Health Act 1995* and *Inland Fisheries Act 1995* contain requirements for the biosecurity aspects of animal health (Section 4.2).

In the marine environment, to limit the spread and impact of disease, if an outbreak occurs:

- Any pens of fish due to be harvested within a three month period, exhibiting a 7-day mortality above 0.2 percent which has occurred for two consecutive weeks (or more) must be reported as soon as possible to an inspector appointed under the *Animal Health Act 1995*;
- Mortality exceeding 0.25 percent for three consecutive days in any pen will be reported as soon as possible to the Marine Farming Branch and other company-appointed veterinarians and fish health managers;
- All fish mortalities arising in connection with marine farming operations (where mortalities exceed the limits above) must be disposed of according to the relevant Act and local government regulations;
- Blood water from harvested fish in these circumstances must be fully contained and not released into the marine environment unless authorised by the CVO; and
- Any plastic liners and other disposable items used with harvest transport containers must be disposed of via deep burial, incineration, or other appropriate method approved in writing by an inspector appointed under the *Animal Health Act 1995*, and in compliance with relevant local government regulations.

Harvested fish must be transported in fully secured containers that do not leak or spill—whether or not an outbreak of disease has occurred.

An inspector appointed under the *Animal Health Act 1995* has the authority to issue movement permits to companies, which authorise the transfer of harvested stock to specific processing centres. Movement permits assist in the prevention of translocating endemic and exotic disease within the Tasmanian region. Movement permits are issued for a specified period (generally 12 months).

All sites must be aware of any movement restrictions currently in-place within Tasmania and comply with all conditions, including the agreed *Tasmanian Broodstock Movement Protocol* (DPIPWE 2008) (Appendix 3).

The *Inland Fisheries Act 1995* requires that companies must participate in the Tasmanian Salmonid Health Surveillance Program, and that licensed premises must maintain an approved enterprise biosecurity plan.

8.9 Communication and reporting protocols

Efficient and effective communication, both internally and externally, are critical to the function of the Biosecurity Program.

Each company's appointed veterinarian or fish health manager is routinely notified in a timely manner of significant issues in accordance with an agreed protocol, as well as the CVO when required (eg. signs of infectious disease, antibiotic treatment, and other important issues as outlined in Section 2.2 and the *Animal Health Act 1995*).

The CSIRO Animal Health Committee endorsed a *Policy for the Transfer of Biological Specimens to Overseas Laboratories for Infectious and Parasitic Disease Testing* (AHC 2010), which has been adopted by the TSGA. Samples for diagnostic investigation are not to be sent internationally without agreement of the Company veterinary group and consultation with the CVO.

Companies will consider how diagnostic and research relationships with other organisations will be communicated and managed, including the development and use of intellectual property.

Management of diagnostic samples and the obligations and expectations for confidentiality of reporting are addressed in the Tasmanian Salmonid Health Surveillance Program (TSHSP):

- All information provided for the purpose of laboratory submissions or information obtained by the Animal Health Laboratory in the course of its service provision is held to be confidential as required under the State Service Act (2000) unless required otherwise by law and remains the property of the submitter and/or representative. Reports will only be issued to the persons or practice nominated as the submitter on the specimen advice form.
- In the event a disease agent is detected that is on Australia's National List of Reportable Diseases of Aquatic Animals, or is a Tasmanian List A or List B organism as defined by the Animal Health Act 1995 (Tasmania), the Fish Health Unit will notify

the Tasmanian Chief Veterinary Officer of the finding. As appropriate, the CVO will advise the TSGA of the notifiable finding and, as circumstances require, the affected Company and lease may also be identified. The CVO is obliged to notify the Australian CVO of any disease agent that is on the National List of Reportable Diseases of Aquatic animals. The Minister for the Department of Primary Industries, Parks, Water & Environment, may instruct the CVO to provide information on animals and/or properties identified as carrying notifiable diseases and may also make this information available to people or groups other than the submitter, their representatives or Company which owns the affected stock.

- Test results and findings may be provided for approved purposes to authorised staff of DPIPWE for statistical, surveillance, extension, certification and regulatory purposes. DPIPWE retains the right to publish statistical data and survey results of importance to the salmonid industry or the community. In such circumstances, the data will be de-identified and will not take a form that unfairly affects the ability of a Company to operate their business in a normal manner or the status of the salmonid industry as a whole.
- Copyright in reports arising from the TSHSP and the data therein is held jointly and severally by the TSGA and DPIPWE. As reports and data may consist of commercial-in-confidence information, they will not be released to third parties without the written agreement of the Chief Executive Officer of the TSGA and the CVO of DPIPWE.
- Samples submitted and materials generated through laboratory processing and testing remain the property of DPIPWE. Some samples and materials such as fixed tissues and cultures may be held indefinitely for reference or research purposes but all other samples and materials will be discarded in line with the Animal Health Laboratory's normal retention times, which will be no more than 30 days.

In general, other than virology, the Animal Health Laboratory undertakes testing in-house. If materials are transmitted to a third party for testing, there is an expectation that the receiving laboratory treats the case as confidential, just as the Animal Health Laboratory does when receiving referred material from mainland laboratories. All laboratories must comply with binding obligations to report findings of disease agents on the national list of reportable diseases and as defined for specific jurisdictions (eg. in Tasmania, List B diseases).

8.10 Contingency planning

In the event that a serious new disease emerges in any industry hatchery, marine farm or processing centre, it is essential to have an agreed contingency plan in place that clearly outlines what processes and procedures will be undertaken to manage such an event.

A *disease outbreak emergency* exists when a population of aquatic animals is recognised as having undergone a severe mortality event or significantly decreased productivity; and the responsible State authority (CVO) believes that the cause may be an infectious agent. The CVO may also consider latent events as emergencies, for example where the presence of an infectious agent is confirmed but without any signs of disease.

Each State and Territory in Australia has operational responsibility for the surveillance, monitoring, control and eradication of aquatic animal diseases within its borders. In Tasmania, DPIPWE is the lead agency for management of animal disease emergency response. Such events are normally administered according to the State Special Emergency Plan: Biosecurity Emergencies, and under the direction of the Tasmanian CVO in consultation with industry.

The Australian CVO is responsible for Australia's international obligations, including reporting to the Office International des Epizooties (OIE, also known as the World Organisation for Animal Health).

Disease agents and hosts that may be involved in an emergency situation can be diverse. It is possible that little may be known of a disease agent, and a control strategy may need to be developed very quickly by fish veterinary experts.

There are three broad options to consider in the event that a serious disease emerges in any hatchery, marine farm or processing centre:

- *Eradication* – The scale of eradication will depend on the extent of the disease, but may include scenarios where fish must be destroyed and removed from an entire biosecurity zone or production area (eg. all of Macquarie Harbour, all of the D'Entrecasteux Channel, all of the Tamar River).
- *Containment, control and zoning* – These measures aim to exclude a disease through quarantine of infected stocks, to segregate them from healthy populations. Special quarantine zones may be established for this purpose with controlled access and decontamination procedures to prevent the spread of disease from the quarantined area.
- *Control and mitigation of disease* – These measures aim to manage the frequency and severity of disease episodes in infected populations, to keep them within acceptable levels.

Events will need to be assessed on a case by case basis. However, it is imperative that decisions and actions are implemented quickly under the guidance of fish veterinary experts.

8.11 Record-keeping and review

Data gathered from biosecurity activities under the Program will be retained by each company for a period of five years, and made available to the TSGA BPC when necessary (refer to Section 2.2). Data to be collected and retained by each company include, but are not limited to:

- Schedules of treatment, inspection and decontamination (Appendix 2);
- Laboratory reports of diagnostic investigations from the FHU and the AAHL; and
- Company records of hatchery, marine farm and processing centre operations relevant to biosecurity.

Routine reports from the TSHSP will be circulated to all companies and regulators without identifying the relationship of data to individual companies. The specific data to be collected in this manner is outlined in the TSHSP Project Agreement.

In order to facilitate further analysis of fish health trends, investigation of fish health issues, traceability and review it is essential that extensive and clear recording is undertaken on all aspects of each company's Fish Health and Biosecurity Protocols.

9 Biosecurity management—Production facility measures

Risk-based assessment of specific industry facilities and pathways results in management measures, or 'barriers' which reduce risk to acceptable levels.

Facility management measures address specific threats of introducing and spreading disease agents, and the control of endemic diseases at appropriate times and life stages with approved treatment protocols.

Facility planning and operations require specific biosecurity management measures beyond the general barriers described above (Section 8). The selected categories of facilities for salmonid production are hatcheries, marine farms and processors which are discussed in this Section.

9.1 Hatcheries

Biosecurity practices apply to all salmonid life cycle stages, starting with hatchery operations. A number of prescriptive barriers have been adopted for biosecurity practices within salmonid hatchery facilities:

- Disinfectant foot baths or chemical mats are required for personnel, contractors and visitors accessing hatchery facilities, to prevent the introduction and spread of infectious disease agents that may be present. Company-appointed veterinarians and fish health managers establish the locations for foot bath or chemical mat treatments.
- Vaccination of all juvenile salmon stock against infection from *Yersinia ruckerii*.
- Vaccination of all Rainbow trout against infection from *Vibrio anguillarum* at least six weeks prior to transfer to any marine zone.
- Vaccination of all Atlantic salmon destined for the Western Zone (Macquarie Harbour) against infection from *Aeromonas salmonicida* and *Vibrio anguillarum*, at least four weeks prior to transfer to the marine zone.
- Environmental monitoring of water quality parameters in recirculation hatcheries which may affect vulnerability of stock to disease, including: temperature, pH, dissolved oxygen, ammonia, nitrite and nitrate. In flow-through hatcheries, dissolved oxygen and temperature are routinely monitored.
- Veterinarians to confirm fish health, not more than four weeks prior to transfer between biosecurity zones.

Details of approved vaccines are presented in Appendix 4 for reference. The requirements for health checks and vaccination must be confirmed upon completion using agreed certificates (Appendix 2):

- ***Stock Health Certificate for Salmonids Transferred Between Biosecurity Zones***; and
- ***Veterinary Health Certificate for Salmonids Transferred between Biosecurity Zones***.

9.2 Marine farms

Marine farm operations and harvest practices require constant surveillance for signs of disease and management of biosecurity threats. Barriers to prevent and control disease are used continuously within marine farming operations and include:

- Appropriate entry/exit decontamination procedures which may include disinfectant foot baths are required for personnel, contractors and visitors accessing production facilities, to prevent the introduction and spread of infectious disease agents that may be present. Company-appointed veterinarians or fish health managers establish the locations for foot bath treatments, which will include locations to decontaminate footwear prior to boarding farm vessels.
- Environmental monitoring of water quality parameters which may affect vulnerability of stock to disease, including: temperature, dissolved oxygen, background phytoplankton and zooplankton, and net fouling. Salinity is monitored in the Western Zone, where Macquarie Harbour is subject to irregular influx of fresh water.
- Maintaining permissible stocking densities within agreed industry practices under the guidance of company-appointed veterinarians and fish health managers, and subject to marine farm license conditions.
- Ingestion of wild prey or non-pelleted food should be minimised through appropriate feeding regimes that satiate fish.
- Freshwater bathing of Atlantic salmon is required to control amoeba responsible for amoebic gill disease (AGD) on marine farms. The schedule and frequency of bathing operations is determined by site managers based on routine fish health surveillance and experience. If a well boat is used for bathing fish, the well water must be adequately disinfected using appropriate operating procedures developed in consultation with company veterinarians and fish health managers.
- *In-situ* cleaning of sea cage nets and structures is required to remove biofouling, which may become a substrate or host for the survival of disease agents. The schedule and frequency of in-water cleaning operations is determined by site managers.
- Onshore cleaning of materials, equipment, nets, bathing liners and vessels is required to remove biofouling and perform disinfection on a schedule determined by site managers. All material brought onshore for cleaning and maintenance is required to be held in designated areas, segregated to prevent cross-contamination of other equipment involved in on-water operations. Equipment must be decontaminated prior to redeployment.

- Dive teams generally remove morts from younger year class stocks before moving to older year class stocks. All dive gear should be decontaminated between year classes, leases, and after diving cages exhibiting evidence of disease—unless operational requirements dictate otherwise.
- Segregation of fish into year groups is recommended for managing the threat of disease, with the aspirational goal of single year class sites.
- In circumstances where treatment for bacterial infections is necessary for animal welfare, company-appointed veterinarians and fish health managers may prescribe antibiotics to be added to feed in compliance with State legislation (refer to Appendix 4).

Data to confirm the completion of these requirements must be held by each respective company for a period of not less than five years. Treatment of any stock with antibiotics requires notification of other companies.

9.3 Processing centres

The following barriers have been adopted at processing centres to control the potential introduction and spread of disease agents in harvested fish and equipment:

- Surveillance is undertaken at processing centres to monitor harvested fish for quality and signs of disease. Quality data includes observation of deformities and lesions, and general reporting of abnormal condition in harvested fish.
- All harvest bins are to have liners and securely fastened lids, which are to be removed only during decanting and washing/disinfection.
- Harvest bins will be decanted on-site into a bunded area to collect blood water in wastewater treatment systems.
- Harvest bins will be hot-washed with detergent and disinfected with an approved sanitising chemical (Appendix 4). New liners will be inserted into disinfected bins.
- Harvest bins arriving from different biosecurity zones will be colour-coded or otherwise marked for identification, and segregated in separate washdown and disinfection areas.
- All personnel entering or leaving the bunded unloading and washdown area will use a disinfectant footbath.

The following barriers apply to transport vehicles which deliver harvest bins or fish in tanks from marine farms:

- It is recommended that all trucks are disinfected at a designated location, or enter the processing site through a mat disinfection station.
- Tankers will have 'clean-in-place' (CIP) systems that will be activated after the tank is emptied of product. The purpose of CIP systems is to clean the internal surfaces of the tanker.
- Tankers will enter a wash station to clean the wheels and external truck surfaces.
- Drivers must use a disinfectant foot bath and wash hands with detergent when leaving the vehicle at the point of arrival. Drivers must again use a disinfectant foot bath prior to re-entering their vehicle to leave the site.
- Details of required decontamination actions must be recorded using the agreed ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** (refer to Appendix 2).

The following barriers have been adopted for wastewater treatment at processing centres:

- All bin tipping, bin washing and truck washing will be undertaken in a bunded area where water is collected in a wastewater treatment system.
- Bunded areas will be washed down with detergent using a high pressure hose after all bins have been off-loaded from trucks.
- Bunded areas and the corresponding wastewater holding tank will have sufficient storage capacity to ensure there is no overflow during storm events.
- All other wastewater from processing operations will be directed to the wastewater treatment system. The level of treatment will ensure disinfection prior to release to the environment under an EPA permit, or will be directed to a municipal waste water treatment plant under a trade waste agreement and in accordance with government requirements and licensing conditions (Council, EPA, CVO).

Pest control is managed through additional barriers:

- Rodent bait stations will be used around the transfer point from trucks to the processing centre and within the processing centre facilities to prevent the spread of infectious agents.
- Preventive measures will be implemented to keep birds away from fish and wastewater during bin decanting operations.
- The lids on harvest bins must be securely attached if personnel are not present so that wildlife cannot gain access to fish.

The design and implementation of these barriers at processing centres have been developed by each company.

10 Biosecurity management—Specific pathway measures

This section identifies barriers to manage the threats of disease on each of the pathways identified in Section 7. In the event that any evidence or suspicion of disease occurs, industry personnel should notify the company veterinary health officer and collect samples for diagnostic testing.

The pathways addressed in this Section of the Program are:

- Movement of stock between hatcheries (Section 10.1);
- Movement of smolt from hatcheries to marine zones (Section 10.2);
- Movement of fish within marine zones (Section 10.3);
- Movement of harvest fish to processors (Section 10.4);
- Movement of broodstock, gametes or ova from production sites to hatcheries (Section 10.5);
- Removal and handling of mortalities (Section 10.6);
- Entry of contaminated feed (Section 10.7);
- Personnel access to facilities (Section 10.8); and
- Plant and equipment movement between biosecurity zones (Section 10.9).

10.1 Movement of stock between hatcheries

For the movement of eggs, alevin, fry, parr, smolts or broodstock between hatcheries, the following barriers have been adopted to prevent the introduction and spread of disease:

- Only healthy populations of stock are to be selected for transport, approved by a company veterinary officer. Stock exhibiting evidence of infectious disease must not be transferred between hatcheries.
- Fry and parr must be vaccinated against *Yersinia ruckerii* at the time of transfer between hatcheries.
- Stress to stock must be minimised to prevent increased susceptibility to disease.
- All personnel undertaking stock transfer activities must wear clean clothing and PPE, including road transport drivers.
- Stock transfer equipment is to be disinfected before transfer operations.
- Trucks are to be disinfected prior to loading stock into transport vehicles. A ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** must be completed to confirm compliance.

All biosecurity management measures for hatcheries apply to this pathway and are required in addition to the requirements above (refer to Section 9.1).

It is acknowledged that there are private hatcheries which operate in Tasmania. When these hatcheries are supplying stock to TSGA member companies, the requirements of this section apply.

Details of approved vaccines are presented in Appendix 4 for reference. The requirements for health checks and vaccination must be confirmed upon completion using agreed certificates (Appendix 2):

- ***Stock Health Certificate for Salmonids Transferred Between Biosecurity Zones***; and
- ***Veterinary Health Certificate for Salmonids Transferred between Biosecurity Zones***.

Details of required decontamination actions must be recorded using the agreed ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles***.

10.2 Movement of smolt from hatcheries to marine zones

When smolt is ready to be transferred from a hatchery to a marine farm, the following barriers have been adopted to prevent the introduction and spread of disease:

- Only healthy populations of smolt are to be selected for transport, approved by a company-appointed veterinarian within four weeks of transfer. Smolt exhibiting evidence of an infectious disease of concern must not be transferred to the marine zone, unless a decision to proceed with transfer is supported by diagnostic testing. A

Veterinary Health Certificate for Salmonids Transferred between Biosecurity Zones (Appendix 2) is then issued which is valid for a period of a month. If there is any change in the health status of fish between the pre-transfer assessment and the time of transfer the hatchery must notify the company-appointed veterinarian.

- Stress to smolt must be minimised during transfer to decrease susceptibility to disease.
- Smolt must have current vaccination status prior to transfer to marine zones (refer to Section 9.1).
- All personnel undertaking smolt transfer activities must wear clean clothing and PPE, including road transport drivers.
- Smolt transfer equipment is to be disinfected before transfer operations.
- Trucks are to be disinfected prior to loading stock into transport vehicles. A ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** must be completed to confirm compliance.
- Segregate smolt into 'year groups' for marine farming activities, which facilitates on-water biosecurity measures (eg. diving operations to remove morts).
- All vehicles transferring fish from hatcheries to marine zones should have a written ***Transport Protocol*** detailing the method used to transfer these fish. This should include stocking levels and how water quality will be maintained during transfer. Records should be kept of every transfer in the truck logbook.
- Well boat vessels used for the on-water transport of live smolt to sea cages will disinfect well water to an appropriate standard, and implement appropriate procedural controls to prevent the spread of disease agents in consultation with company-appointed veterinarians and fish health managers.

The requirements for health checks and vaccination must be confirmed upon completion using agreed certificates (Appendix 2):

- ***Stock Health Certificate for Salmonids Transferred Between Biosecurity Zones***; and
- ***Veterinary Health Certificate for Salmonids Transferred between Biosecurity Zones***.

Details of required decontamination actions must be recorded using the agreed ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles***.

10.3 Movement of fish within marine zones

Movement of fish within marine zones occurs to manage the grow-out process from smolt to harvest-size fish. The principles adopted for the movement of healthy stocks are:

- Consider the proximity of sea cages and year groups within leases to prevent the spread of infection if it was to occur in a particular stock population.
- Designate lease locations, or parts of leases which will not be used for production during fallowing periods.
- Communicate with other companies prior to moving stock between leases. This includes planning to tow sea cages past other company's farms, or when planning to use a well boat to transfer fish between sea cages when the well boat must travel past other company's farms.

Movement of fish may also be required in the event of a disease outbreak, to quarantine infected fish away from healthy stocks. The barriers adopted under disease outbreak conditions are:

- Establish an Infected Area or Restricted Area under the direction of a company-appointed veterinarian, restricting access to prevent the spread of disease by personnel and equipment. Notify the CVO and Marine Farming Branch of DPIPWE.
- Notify other companies of the incident, to announce the need to move one or more sea cages to a designated area. Communicate the route for towing the infected sea cages to the area, and consult with other companies to agree on the preferred route to avoid transmission of disease agents to healthy fish.
- Treat infected stock in the designated Infected Area or Restricted Area, if appropriate, under the supervision of the company-appointed veterinarian.
- Undertake procedures to accelerate the removal of mortalities by dive teams. Decontaminate dive equipment prior to removing items from the area, under direction of a company-appointed veterinarian.
- Certain circumstances may lead the CVO to activate AQUAVETPLAN. Company-appointed veterinarians and fish health managers will support the CVO to undertake the appropriate response actions.

10.4 Movement of harvest fish to processors

Marketable fish are ethically harvested, then loaded into containers for transport to processing centres. The adopted barriers for transfer of harvest fish to processors are:

- Blood water that is not pumped into transport tankers must be contained in wastewater collection systems for approved treatment and disposal, and may not be released into the marine environment unless authorised by the CVO.
- All personnel undertaking stock transfer activities must wear clean clothing and PPE, including road transport drivers.
- Harvest fish tanks and road vehicles are to be disinfected before transfer operations.
- Trucks are to be disinfected prior to loading harvest fish into transport vehicles. A ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** must be completed to confirm compliance.

If a well boat must travel past another company's farm with harvest fish, it must communicate with the other company prior to moving harvest fish to shore-based facilities.

All of the biosecurity requirements of Section 9.2 apply for processing centres.

Where movement restrictions apply to a specific region (eg. Macquarie Harbour), specific product may only be removed from a Restricted Area according to conditions outlined on a Movement Permit issued under the *Animal Health Act 1995*. Movement restrictions may apply to live fish, gametes, fish products, mortalities or equipment. The items to which they apply will be identified within the original Gazettal Notice and the Permit. Industry should refer to existing Permits for specific movement restrictions in their areas of operation.

Details of required decontamination actions must be recorded using the agreed ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles***.

10.5 Movement of broodstock, gametes or ova from marine sites to hatcheries

In the unlikely event of movement of viable salmonid gametes, fertilised ova or live fish (hereafter referred to as 'stock') from marine sites to hatcheries is required, stock is transferred from a marine zone to the freshwater zone under a Movement Permit issued by the CVO (valid for 12 months). The adopted barriers for this type of transfer are described in the agreed *Tasmanian Broodstock Movement Protocol* (DPIPWE 2008) (Appendix 3). The requirements for movement of stock from marine sites to hatcheries include:

- Only healthy broodstock, gametes and ova are to be selected for transport. Broodstock must be segregated from other populations of farmed fish and monitored for disease for four weeks prior to transfer. Broodstock (or its gametes or ova) exhibiting evidence of disease must not be transferred to a hatchery.
- Stress to broodstock must be minimised to decrease susceptibility to disease.
- All personnel undertaking broodstock, gametes or ova transfer activities must wear clean clothing and PPE, including road transport drivers.
- Equipment used for broodstock, gamete or ova transfer is to be disinfected before transfer operations. A ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** must be completed to confirm compliance.
- Trucks are to be disinfected prior to loading broodstock, gametes or ova into transport vessels on vehicles. A ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** must be completed to confirm compliance.
- Broodstock, gametes and ova must be transported to hatcheries in freshwater tanks only. Seawater is prohibited from entry to hatcheries.
- Approval to transport stock from a marine site to a hatchery requires fish health testing. Two scenarios have been identified for the movement of stock between marine zones and hatcheries, each requiring appropriate biosecurity requirements (described below).

Details of required decontamination actions must be recorded using the agreed ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles***.

10.5.1 Scenario 1: Hatcheries supplying a single marine zone

A hatchery which interacts with a single marine zone to supply or receive stock is not required to undertake additional fish health testing beyond the requirements of the ongoing Tasmanian Salmonid Health Surveillance Program (TSHSP).

Transfer of stock from a Restricted Marine Area designated by the CVO to a hatchery requires a Movement Permit. The Movement Permit will identify conditions that must be satisfied for each transfer of stock from the Restricted Marine Area to the hatchery. Specific

consideration will be given by the CVO to the drainage catchment of the hatchery, to prevent potential infection of the catchment.

10.5.2 Scenario 2: Hatcheries interacting with other hatcheries and multiple marine zones

A hatchery which has previously interacted with a single marine zone, but wishes to supply or receive stock from any other hatchery or marine zone requires written approval of the CVO. Depending on the marine zone and the results of historical fish health testing of the hatchery, such approval may be granted subject to the condition of pre-movement health testing specified by the CVO to determine that biosecurity risk is acceptably low.

Where testing is required, it would only target specific diseases of concern that are known to be endemic to the region of origin. The existence of other diseases (not of particular concern) are informed by the TSHSP.

Where a hatchery has successfully undertaken testing and has been granted approval by the CVO to interact with other hatcheries or marine zones, all further movements of stock between the hatchery and marine zones will be subject to continued pre-movement health testing protocol developed by the CVO in collaboration with the hatchery operators. Testing would only target specific diseases of concern that are known to be endemic to the region of origin. The testing protocol would be tailored specifically for health checks of viable salmonid gametes, fertilised ova, or live fish. The testing protocol would utilise relevant scientific literature and expert opinion when assessing biosecurity risk.

10.6 Removal and handling of mortalities

10.6.1 Incidental mortalities from operations

When possible, sick or injured fish will be caught and removed from production, and humanely euthanized. No live fish should be left in air.

Under no circumstances should fish be bled and/or gutted directly into hatchery or marine waters.

10.6.2 Movement of mortalities out of marine zones

Mortalities are contained in secure bins with sealed covers for transport to reprocessing or disposal facilities. During normal operations, morts are transported to an approved rendering or disposal location.

Under no circumstances will farm staff take custody of morts or remove them from marine sites (eg. for cray pot bait).

The agreed barriers for the transport of morts include:

- No discharges are permitted from mort bins to roadways.
- All mort bins are to be sealed to prevent discharge and to prevent foraging by wildlife.
- All personnel undertaking mort removal activities must wear clean clothing and PPE, including road transport drivers.
- Equipment used for mort transfer is to be disinfected before transfer operations. A ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** must be completed to confirm compliance.
- Equipment used for mort transfer is to be disinfected upon completion of transfer operations. A ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** must be completed to confirm compliance.
- Trucks are to be disinfected prior to loading mort bins onto vehicles. A ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** must be completed to confirm compliance.

Details of required decontamination actions must be recorded using the agreed ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles***.

10.7 Integrity of fish feed

Cross contamination of feed is to be prevented during storage. Precautionary measures are to be taken to avoid exposure of feed to potential contamination sources during transport or storage (eg. water, waste).

Imported feed complies with AQIS sanitary standards for entry with required compliance documentation.

Fish must only be fed with pelleted feed manufactured by a licensed fish feed company (eg. Skretting, Riddleys, Biomar). It is acknowledged that from time to time it may be desirable to feed non-pelleted feed to optimise health (eg. the feeding of cooked mussels to stimulate feeding of smolt). In such rare occasions, the non-pelleted feed must be treated in such a manner as to ensure that no disease agents could remain viable within the feed.

10.8 Personnel access to facilities

Personnel will undertake normal disinfection procedures prior to leaving a production site, including disinfection of PPE. Upon arrival at another production site, personnel must disclose that they have attended another production site within the past 24 hours and undertake any additional disinfection procedures advised by company site managers.

Personal clothing soiled with fish material (eg. scales, blood, faeces, viscera) or feed must not be transferred to another production site unless it is disinfected or laundered.

10.8.1 Company personnel

Onshore personnel must receive safety and biosecurity inductions and specialised training. All personnel must follow disinfection procedures and wear only approved PPE that is kept at the production site.

10.8.2 Company dive teams

The following barriers have been adopted for dive teams:

- Dive teams generally remove morts from younger year class stocks before moving to older year class stocks. All dive gear should be decontaminated between year classes, leases, and after diving cages exhibiting evidence of disease—unless operational requirements dictate otherwise.
- If large quantities of morts must be removed from cages, air-lift vacuum equipment may be operated by divers.
- Use mort bags for recovery and transfer of morts to secure bins on the boat deck. Mort bags must be disinfected prior to moving to the next sea cage.
- Disinfect (spray) diver's suit and equipment between dives of different year classes, or after diving any sea cage where there is suspicion of infectious disease.
- Clean the boat deck with detergent and disinfect prior to moving to a different year class.
- Thoroughly clean boat decks and equipment with detergent and disinfectant at the end of each work day.
- Thoroughly clean, disinfect and dry all dive equipment at the end of each work day.
- Thoroughly clean mort bags at the end of each work day and soak in disinfectant overnight.
- Dive gear should not be transferred between biosecurity zones except in extraordinary circumstances. In circumstances which require the movement of dive gear between biosecurity zones (eg. emergency response), specific decontamination

procedures will be implemented under the supervision of the dive superintendent and the company-appointed veterinarian or fish health manager.

10.8.3 Non-company personnel

Appropriate signs are installed at company sites to direct contractors and visitors to the correct reception point and to disinfect vehicles and footwear as required. Visitors will be asked if they have visited any other aquaculture sites in the previous 24 hours.

Visitors are to sign-in to a logbook when entering any company site for traceability.

Visitors must receive safety and biosecurity inductions, wash hands with detergent, and use only PPE supplied by the company being visited. All visitors must be escorted and supervised by company representatives. Contractors must be supervised by company personnel.

10.8.4 Laboratory visitors

Biological laboratories in Tasmania undertake a range of activities including holding fish species through to those operating under bio secure conditions for handling infectious agents. Before company personnel visit a biological laboratory, the company veterinarian or fish health manager should assess the risk associated with such a visit and determine what risk mitigation strategy is appropriate for the type of laboratory to be visited. Consideration should be given to the type of laboratory PPE available, disinfection of footwear and the need, if any, for a stand-down period before company personnel return to a farm site.

10.8.5 Company visitors to the Fish Health Unit—Animal Health Laboratory

The Animal Health Laboratory operates at three risk levels:

- Public access;
- Low risk areas consisting of corridors, receival areas and offices; and
- High risk areas comprising diagnostic and research laboratories and post-mortem facilities (*FPG 005 Visitor access requirements to the Animal Health Laboratory*).

Samples may be delivered to the Animal Health Laboratory by company personnel. The laboratory's receival point is signposted on entry to the Mt Pleasant Laboratory complex. Access to the receival point is not subject to specific biosecurity requirements and company staff may deliver samples without restriction.

Access to low risk areas is permitted following a site induction. Visitors will be accompanied at all times. There is no requirement for PPE when visiting low risk areas. Company personnel can return to farm sites on the same day as visiting low risk areas of the Animal Health Laboratory.

If Company personnel wish to visit high risk areas of the laboratories, access, if granted is subject to specified conditions:

- Induction is required;
- Appropriate PPE is to be worn if laboratory procedures are undertaken;
- Staff will accompany visitors at all times;
- Footwear will be disinfected with Virkon before leaving the facility; and
- Removal of any materials (eg. equipment, diagnostic or research materials, fish, tissue samples) from laboratories is prohibited.

It is a condition of visiting high risk areas of the laboratory that a 12 hour stand-down time is observed, together with a requirement to shower and make a change of clothing before company personnel return to a farm site.

10.8.6 DPIPWE Fish Health Unit visitors to company sites

The Animal Health Laboratory has a biosecurity policy in respect of containment of infectious agents and how they are managed (*QMG-022 Laboratory Biosecurity*). All staff, including FHU staff, are required to comply with this policy.

All equipment, materials and PPE required for field work by FHU laboratory staff are designated for this purpose and are stored separately within the Animal Health Laboratory. All equipment that can be steam sterilised is autoclaved. Heat-sensitive instruments, equipment and PPE are disinfected with Virkon. Management of field equipment and materials, together with laboratory staff stand-down requirements are codified in a standard operating procedure, *FPG-004 Biosecurity measures for salmonid farm visits*. The stand-down time for laboratory staff is the period of time off-site that must elapse before staff may visit a company farm site. Staff must have a minimum interval of 12 hours between working at the Animal Health Laboratory and making a site visit and must have a shower and a complete change of clothing and footwear.

Laboratory staff from DPIPWE's Fish Health Unit who undertake field work on company sites will make prior arrangements with the site manager or their delegate before visiting the site. DPIPWE staff will abide by the company's biosecurity requirements. Where available, DPIPWE staff will use Company PPE in preference to Fish Health Unit PPE.

10.9 Plant and equipment movement between biosecurity zones

Plant and equipment movement between facilities requires inspection and disinfection treatments as a precautionary measure to prevent the spread of infectious disease agents.

Details of approved decontamination treatments are presented in Appendix 4 for reference. The requirements for decontamination must be confirmed upon completion using the agreed ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** (Appendix 2).

10.9.1 Vehicles

Vehicles used to move stock between hatcheries, from hatcheries to marine zones, transfer stock between marine zones, or transfer harvest fish to processors are subject to the requirements of Sections 10.1 through 10.4.

The following prescriptive barriers have been adopted for third-party vehicles (eg. delivery trucks, contractor vehicles, feed delivery trucks, veterinary vehicles):

- Third-party deliveries which only access the visitor parking or delivery area without entering production areas undertake disinfection if required by the company site manager.
- If required by the site manager, all surfaces of transport vehicles are to be decontaminated under the direction of company personnel.
- Details of required decontamination actions must be recorded using the agreed ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** (refer to Appendix 2).

Decontamination of vehicles is to be undertaken with company-approved disinfectants (refer to Appendix 4).

10.9.2 Vessels

Consideration should be given to restricting the use of vessels to particular work sites, to avoid or eliminate the risk of translocating disease agents to healthy fish and other farm sites.

The following barriers have been adopted for company and contractor vessels working within a biosecurity zone:

- The decks and equipment of work vessels will be hosed off and sprayed with disinfectant at the end of each work day. The disinfectant will be left to dry.

- Decks and equipment will be hosed off and sprayed with disinfectant when a vessel is leaving a lease area to travel to a different lease area, or when returning to the operational shore base.
- Details of required decontamination actions for contractor and third-party vessels must be recorded using the agreed ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** (refer to Appendix 2).

The following barriers have been adopted for vessels (including contractor and third-party vessels) which are to be moved to a different biosecurity zone:

- Vessels must be slipped in dry-dock for hull cleaning and disinfection, including internal seawater pipework.
- All mooring ropes or other equipment which cannot be effectively disinfected must be removed and replaced.
- Non-essential equipment must not be transferred between zones.
- Well boats must disinfect well water prior to movement between zones.
- Bilge water must be disposed of and bilges decontaminated.
- Ballast water must be disposed of and ballast water tanks decontaminated
- Other companies must be notified of vessel movement between biosecurity zones.
- Details of required decontamination actions for contractor and third-party vessels must be recorded using the agreed ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** (refer to Appendix 2).
- Details of required decontamination actions for harvest vessels must be recorded when they are moved between biosecurity zones using the agreed ***Disinfection Protocol for Harvest Vessels*** (Tassal 2013, refer to Appendix 2).

Decontamination of contractor and third-party vessels is to be undertaken with company-approved disinfectants (refer to Appendix 4).

10.9.3 Pens and nets

Pens and nets are subject to cleaning and disinfection prior to movement to another production facility. Pens and nets brought to on-shore maintenance and treatment yards must be segregated from new or previously disinfected pens, nets and other production equipment.

Any material salvaged from pens and nets which is removed from the site or imported from elsewhere must be cleaned and disinfected prior to transport between biosecurity zones.

Details of required decontamination actions for pens and nets moved between marine biosecurity zones must be recorded using the agreed ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** (refer to Appendix 2).

10.9.4 Ancillary equipment

Any equipment used in operations must be cleaned and disinfected prior to transfer to another production site.

Details of required decontamination actions for all other ancillary equipment moved between marine biosecurity zones must be recorded using the agreed ***Decontamination Certificate for Equipment, Vessels and Road Transport Vehicles*** (refer to Appendix 2).

11 Waste management measures

Waste from operations is contained and processed to ensure that no infectious agents are released to the environment where they could infect healthy stock.

11.1 Farm and hatchery wastewater

Hatchery wastewater may be treated, used as irrigation water, or discharged under approval of local jurisdictions.

Wastewater from marine farming operations is contained in wastewater collection and treatment systems, and discharged or transported to licensed wastewater treatment plants under trade waste agreements.

11.2 Farm and hatchery solid waste

Solid waste from farms and hatcheries includes mortalities recovered from production and general waste from industry operations. The following barriers have been adopted for morts:

- Mortis are securely stored and contained against spillage, and transported to an approved waste processing or disposal facility.
- Mort bins will be hot-washed with detergent and disinfected with an approved sanitising chemical (Section 7.6.1), prior to being returned to production sites.

11.3 Processor wastewater

Processor wastewater is captured in an on-site wastewater management system for on-site treatment with approval from local jurisdictions and/or the EPA, or discharged to licensed wastewater treatment plants under trade waste agreements. Wastewater treated on-site is disinfected with approved procedures prior to discharge.

11.4 Processor solid waste

Solid waste from processing operations is contained and transported to an approved waste processing or disposal facility

12 Contractor biosecurity measures

The biosecurity measures relevant to contractors are identical to those required of company personnel. Companies impose these requirements as formal conditions of contracts.

13 Management review and management of change

13.1 Management review of this Program

This Program will be reviewed at least every second year by the TSGA and its member companies to ensure that it is fit for purpose and incorporates new information that may become available, or improvements to management measures that have been adopted by the industry.

In the event of any important changes in threats, treatments, controls, zonation or other elements of biosecurity management, the TSGA may review this Program on a more frequent basis.

All reviews will be undertaken in consultation with the DPIPW CVO to seek advice and comments on the content of the Program.

13.2 Management of change procedures

Circumstances which changes to the procedures contained in this Plan include:

- Proposed changes to operational procedures which could impact biosecurity.
- Identification of new threats or vectors for disease.
- Proposed changes to the content of this Plan.
- Proposed changes to the implementation of this Plan.
- Changes in legislation or regulations which require revision of this Plan.
- Changes to the management measures for prevention, detection and control of disease.
- Requirements for corrective action resulting from an audit of this Plan.

Proposed changes to the management of biosecurity by the industry will be documented, and require appropriate consultation with all stakeholders to ensure that the changes are feasible and do not impose unanticipated threats to other aspects of industry operations.

14 References

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Appendix 1

Terminology, Abbreviations and Definitions



Terminology, definitions and abbreviations used in this document are listed below. These align, to the extent possible, with terms and definitions used by Tasmanian and federal government biosecurity authorities.

Term	Meaning in the context of the TSGA Biosecurity Program
AAHL	Australian Animal Health Laboratory (CSIRO, Geelong)
AAHP	Aquatic Animal Health Program (federal Department of Agriculture).
AHC	Animal Health Committee (federal Department of Agriculture).
AqCCEAD	Aquatic Consultative Committee on Emergency Animal Diseases (federal Department of Agriculture).
AQIS	Australian Quarantine and Inspection Service.
AQUAPLAN	National Strategic Plan for Aquatic Animal Health.
AQUAVETPLAN	Aquatic Veterinary Emergency Plan.
AQIS	Australian Quarantine and Inspection Service
AS/NZS	Australian Standard / New Zealand Standard.
Australian National List of Reportable Diseases of Aquatic Animals	A list of nationally important diseases endorsed by the Animal Health Committee. The list includes specific reference to reportable diseases for finfish including salmonids.
Barrier	Any type of biosecurity management measure designed to prevent the occurrence and spread of infection.
Biosecurity	Protection of the economy, environment and human health from the negative impacts associated with introduction, establishment or spread of exotic pests and diseases in the aquatic environment; or Protection of the economy, environment and human health from the negative impacts associated with spread of endemic pests and diseases in the aquatic environment.
Biosecurity emergency	Circumstances in which an aquatic pest or disease poses a significant and immediate threat to the economic, environmental or social values of an industry activity or region.
Biosecurity incident	Detection of an infectious pathogen that threatens aquatic animal



Term	Meaning in the context of the TSGA Biosecurity Program
	health, whether it is exotic or endemic.
Contamination	Any evidence of infection, or the presence of organisms, biofilms, sediments or other material that can enable the survival and translocation of disease agents.
Control Area	An area of Tasmania in respect of which a declaration of control area under the <i>Animal Health Act 1995</i> is in force.
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CVO	Chief Veterinary Officer of DPIPWE.
DA	Commonwealth Department of Agriculture.
Decontamination	The treatment of materials, vehicles, vessels, equipment and personnel clothing to remove infectious disease agents. Treatments may include the appropriate use of chemical application, air drying (desiccation), ultraviolet light, washing with detergents, high pressure wash, hot water wash, or any other suitable method.
Disease	The expression of a pathological condition as a result of infection. Also used in the context of referring to the pathogens which are the source of aquatic disease.
Disinfection	Removal or destruction of infectious disease agents.
DPIPWE	Tasmanian Department of Primary Industries, Parks, Water and Environment.
Emerging disease	A disease or pathogen which is known to be present in Tasmania or mainland Australia, which is being monitored but does not require preventive measures to control its impact on animal health.
Endemic disease	A disease or pathogen which is known to be present in Tasmania and requires preventive measures to control its impact on animal health.
Eradicate	The complete removal of an infectious pathogen from the aquatic environment such that it cannot re-establish either by dispersal or through dormant propagules, with consideration of an appropriate time period for detection based on the biology of the pathogen.
Exotic disease	A disease or pathogen which is considered not to be present in Tasmania, even if it is present in other regions of Australia.



Term	Meaning in the context of the TSGA Biosecurity Program
FAO	Food and Agriculture Organization of the United Nations.
FHU	Fish Health Unit (DPIPWE, Launceston)
ICS	Incident Command System
Incursion	The establishment and spread of an infectious pathogen outside its initial point of arrival.
Infected Place	The whole or any part of any place in respect of which a declaration of infected place under the <i>Animal Health Act 1995</i> is in force.
Infection	<p>Presence of an infectious disease agent in an aquatic animal or other host, or contamination of material with an infectious disease agent (<i>noun</i>); or</p> <p>Spread of a disease agent between aquatic animals due to contact or proximity, or between an aquatic animal and material contaminated with a pathogen (<i>verb</i>).</p>
Introduction	The arrival of an infectious disease agent
ISO	International Organization for Standardization.
OIE	Office International des Epizooties, otherwise known as the International Office of Epizootics or the World Organisation for Animal Health.
Pathogen	Any bacterial or viral organism, or parasite which can infect an aquatic animal as a host for its life cycle requirements and reproduction, and spread to other aquatic animals.
Pest	A marine macro-organism which is not an endemic species and, if introduced or translocated to a new environment is likely to have significant adverse economic, environmental and social impacts to endemic species and natural resources.
ppm	Parts per million.
ppt	Parts per thousand.
Propagule	Propagating parts and life cycle stages of organisms, including zygotes, cysts, larvae, spores and other self-regenerative material.



Term	Meaning in the context of the TSGA Biosecurity Program
Protected Area	An area in respect of which a declaration of protected area under the <i>Animal Health Act 1995</i> is in force.
Quarantine	<p>A place of isolation in which aquatic animals or contaminated material that have been exposed to an infectious disease are placed (<i>noun</i>).; or</p> <p>The act of placing aquatic animals or contaminated material in a place of isolation to avoid the spread of infectious disease (<i>verb</i>).</p>
Quarantine Area	A place in respect of which a declaration under Section 11 of the <i>Animal Health Act 1995</i> is in force.
Restricted Area	A place in respect of which a declaration of restricted area under the <i>Animal Health Act 1995</i> is in force.
SEMC	State Emergency Management Committee.
TSGA	Tasmanian Salmonid Growers Association.
TSHSP	Tasmanian Salmonid Health Surveillance Program



Appendix 2

Biosecurity Inspection, Treatment and Clearance Forms



STOCK HEALTH CERTIFICATE FOR SALMONIDS TRANSFERRED FROM A HATCHERY TO THE MARINE ENVIRONMENT

this Stock Health Certificate is to be issued no earlier
than 24 hours before time of transfer

1 Completion of this Stock Health Certificate

Date:		Time:	
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2 Veterinary Health Certificate covering this Stock Health Certificate

Number of valid Veterinary Health Certificate:	
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3 Authorised person certifying stock under this Certificate

Name, position:	
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4 Hatchery details

Address:		
Phone:	Fax:	E-mail:

5 Populations of fish to be transferred

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6 Destination of transfer

Marine zone (South-East, North or MH):	Farm location:

7 Details of health checks

Visual examinations (percent of stock, observations made):	
Summary of diagnostic testing and laboratory reports:	
References to other health status documents:	
Unusual circumstances, or variations from normal procedures and requirements:	
Consultation with industry or government regarding the subject stock:	

8 Declaration

I, the undersigned authorized representative of HAC/Petuna/Tassal, certify that at the time of issue of this Stock Health Certificate there has been no evidence of infectious diseases of concern (as described in the TSGA Biosecurity Program) during the period covered by the Veterinary Health Certificate in these populations destined to be transferred to the marine environment based on my own knowledge of the populations and visual examination of the populations.

The Certificate is immediately invalidated if there is a Fish Health Incident requiring investigation prior to transfer of these populations.

Signature:	Date:
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VETERINARY HEALTH CERTIFICATE FOR SALMONIDS DESTINED FOR MACQUARIE HARBOUR

this Veterinary Health Certificate is valid for one month from date of issue

1 Completion of this Veterinary Health Certificate

Certificate Number:			
Date:		Time:	

2 Certifying Veterinarian

Name, position:	
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3 Hatchery details

Address:			
Phone:	Fax:	E-mail:	

4 Populations of fish covered under this Certificate

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5 Populations of fish specifically excluded under this Certificate

<i>(indicate 'NIL', or specific populations to be sampled and tested on the day of visit)</i>

6 Site visit to examine source farm and stock to be certified

Date:		Time:	
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7 Details of examinations performed

Visual examinations on day of visit (percent of stock, observations made):	
Sampling of fish for diagnostic testing and date when lab report is expected:	
Other testing conducted (stock, water or facility equipment):	<i>(eg. salt water challenge, water quality, equipment calibration)</i>
Laboratory reports and other documents relevant to this Certificate:	<i>(eg. hatchery biosecurity plan, mortality records)</i>
Other examinations performed:	

8 Other information considered relevant to this Certificate

<i>(describe any unusual circumstances, or variations from normal procedures and requirements)</i>
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8 Declaration

I, the undersigned Veterinarian for HAC/Petuna/Tassal, certify that at the time of the hatchery visit there was no evidence of infectious diseases of concern (as described in the TSGA Biosecurity Program) in the stocks specified above based on the clinical examination of specified fish stocks at this hatchery, examination of mortality records conducted at the time of the hatchery visit, knowledge of the biosecurity protocols and procedures in place at the hatchery and testing of fish as summarized above.

The Certificate is immediately invalidated if there is a Fish Health Incident requiring investigation following the date of issue.

Signature:	Date:
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DECONTAMINATION CERTIFICATE FOR EQUIPMENT, VESSELS AND ROAD TRANSPORT VEHICLES

this Decontamination Certificate is to be issued no earlier than 24 hours
before time of transfer if items are to be moved to another biosecurity zone

1 Completion of this Decontamination Certificate

Date:		Time:	
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2 Authorised person certifying decontamination under this Certificate

Name, position:			
Phone:	Fax:	E-mail:	

3 Description of items requiring decontamination

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4 Location where items were decontaminated and inspected for this Certificate

Name of facility:	
Address:	
Biosecurity Zone:	<i>(eg. Hatchery, Processor, Seafish Waste, SE Marine, North Marine or Macquarie Harbour)</i>

5 Destination of transfer (if items are to be removed from the present biosecurity zone)

Name of facility:	
Address:	
Biosecurity Zone:	<i>(eg. Hatchery, Processor, Seafish Waste, SE Marine, North Marine or Macquarie Harbour)</i>

6 Details of decontamination actions

Name of chemical or other agents used:	
Dosage:	
Duration of exposure to decontamination agent:	
Application method:	

7 Testing or verification of items to be free of infectious disease agents

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8 Note any unusual decontamination procedures, or relevant observations

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9 Declaration

I, the undersigned authorized representative of HAC/Petuna/Tassal, certify that at the time of issue of this Decontamination Certificate all relevant procedures and requirements have been complied with (as described in the TSGA Biosecurity Program). Items covered by this Certificate have been in my custody and control, and have been segregated from other equipment, vessels, transport vehicles and other hosts for infectious agents since the completion of decontamination actions described in this Certificate.

The Certificate is immediately invalidated if there is evidence of disease associated with the immediate location where the subject items are held, or if the subject items are exposed to disease agents.

Signature:	Date:
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DISINFECTION PROTOCOL FOR HARVEST VESSELS

(Tassal 2013)

the purpose of this protocol is to ensure harvest vessels are disinfected before relocating between marine zones

Step 1 Pre-requisites	
1.1	Completion of Induction process
1.2	Training and sign off of this operation procedure
1.3	Approval to perform this procedure issued by management
1.4	Fit the required PPE

Step 2 P.P.E. requirements	
2.1	Safety glasses (if required)
2.2	Gloves (if required)
2.3	Hi Visibility vest if required)

Step 3 General operating principles—Disinfection	
3.1	High risk areas are identified as any areas that have, or may have come in contact with harvested fish or bloodwater. These areas are: Harvest Pump and Pipework Deck Pump Deck area Harvest Table Protective Clothing Netting and Deck Ropes Fish Hold and Circulation System
3.2	Complete normal daily hygiene procedures, using Quatclean (mild alkali) as per MO-758 Cleaning – Harvest Vessels prior to commencing Disinfection Procedure
3.3	Remove and replace all Protective Clothing, Crowd Netting and Deck Ropes
3.4	Clean the intake filter screens in the RSW system chiller tubes and the raw water intake screens
3.5	Part fill fish hold with seawater (approx. 20,000-25,000 litres) and add Quatclean (30L -2x15L drum) Circulate this solution in both holding tanks through the pipe work for at least 30 minutes. Pump cleaning water to WWTP monitor for overflow. Flush system through with seawater

3.6	Part fill fish hold with seawater (approx. 20,000-25,000 litres) and add Dairychlor (Hypochlorite) to achieve a residual concentration of 5 mg/L, ie. At least 1.25 litres of 10% Dairychlor to be added. The residual concentration must be measured using a chlorine test kit. Circulate solution through harvest pump and pipework and back into fish holds for a minimum of 30 minutes. Circulate water through recirculation system for a minimum of 30 minutes. Circulate water through deck pump for a minimum of 30 minutes. Discharge to WWTP.
3.7	Pressure wash with a hot water pressure washer supplied with mains water the harvest table and external surfaces of all deck equipment , and deck surface, bulwarks and sides of vessel down to and including the waterline. Pay particular attention to waterline area where there may be a build-up of algae or slime
3.8	Apply 50ppm Dairychlor to Harvesting equipment, chutes, and fish hold surfaces through a hydro foaming unit. To achieve this dilute concentrated Dairychlor to 1:20 approximately with water in the hydro foaming unit, (0.5L of Dairychlor with 10L of water or 100mls of Dairychlor into 2L of water), and then use the pink fitting
3.9	Leave foam in contact with surfaces for 15 minutes and then rinse of thoroughly with mains freshwater. Pump waste water to WWTP
3.10	Spray all areas that have been pressure washed with Virkon (concentration 1%) and allow to dry. Spray fish holds with Virkon and allow to dry
3.11	Divers are to inspect the hull and remove any large accumulations of biofouling
3.12	Bilge must be pumped dry, pressure washed and pumped dry again before spray with Virkon
3.13	Tassal veterinarian must oversee the process and give final sign off

Step 4 Hazards and Risks associated with disinfection procedure		
	Hazards	Control
4.1	Chemical Hazards	Ensure staff are suitably briefed prior to operation, review MSDS's and Safety Measures and Emergency Procedures Restrict Access to Authorised Personnel Only Ensure Confined Spaces Permit is issued for work and observe the conditions of the Permit
4.2	Confined Spaces	Ensure Confined Spaces Permit is issued for work and observe the conditions of the Permit

Step 5 EMS – Controls For Potential Environmental Impacts Of This Activity	
5.1	Chemical waste – all chemical waste to be disposed via approved methods and/or disposal into waste water treatment plant (WWTP)
5.2	Water Quality Operations – follow approved chemical dilution rates and disposal methods
5.3	Water Quality Incidents – store chemicals in approved containers and storage areas. Refer to MSDS sheet for containment and clean-up methods.
5.4	Chemical usage – as above, only use, store and discard chemicals via approved methods

Appendix 3

Agreed Tasmanian Salmonid Broodstock Movement Protocol
2008, Version 1

Agreed Tasmanian Salmonid Broodstock Movement Protocol

Conditions relating to the movement of stock from marine farms to hatcheries

2008, Version 1

For movement of viable salmonid gametes, fertilised ova or live fish (hereafter referred to as 'stock') from marine farming sites to hatcheries, the following will apply:

Scenario 1

For hatcheries supplying a single marine growing region.

Where the movement of stock is from the marine farming site to the hatchery and the hatchery involved only moves juvenile salmonids back to the same marine growing region from which the stock was sourced, no additional health testing would be required above the standard level of testing as per the Tasmanian Salmonid Health Surveillance Program (TSHSP).

By doing this, the hatchery accepts that it would be precluded from moving stock to other hatcheries or other marine growing areas, unless and until the CVO determines what additional testing, if any, is required to mitigate biosecurity risk to an acceptable level.

Movement of stock from a Restricted marine area would still require a Movement Permit, which would outline specific conditions associated with each movement.

Prior to approving such movements, specific consideration will be given by the CVO to the drainage catchment in which the hatchery is located in order to ensure that watershed contamination does not occur.

Scenario 2 (transitional)

For hatcheries and/or marine farms wishing to change status from "single path" (Scenario 1) to "multiple path" (Scenario 3) movements.

Where a hatchery and/or marine farm which have hitherto maintained a single path movement (Scenario 1) wish to supply or receive stock from any other hatchery or marine growing region (Scenario 3), the CVO's approval in writing will be required. Depending on the region and on results of historical testing of the hatchery, such approval may be granted conditional on the outcome of specific pre-movement health testing as specified by the CVO as being adequate to mitigate biosecurity risk to an acceptable level.

Where testing is required, it would only target specific diseases of concern that are known to be endemic to the region of origin as the existence of other diseases is presumed to be detectable under the TSHSP.

Where a hatchery and/or marine farm has successfully changed status from "single path" to "multiple path" movement scenario, all future movements from those sites will be subject to conditions stipulated for Scenario 3 (below).

Scenario 3

For those hatcheries supplying a range of other hatcheries or marine growing areas, or where their catchment may compromise downstream locations.

Pre-movement health testing will be required to the satisfaction of the CVO for any movement of stock from marine farming site to the hatchery.

In this case a testing protocol would be developed by the CVO in collaboration with the hatchery operators. Testing would only target specific diseases of concern that are known to be endemic to the region of origin.

The testing protocol would also be tailored specifically to viable salmonid gametes, fertilised ova, or live fish, as applicable and would utilise, where available, relevant scientific literature and expert opinion in the assessment of risk.

Appendix 4

Treatments for Prevention and Control of Disease

Treatments for prevention and control of disease

All chemicals and medicines used for the prevention and control of disease are subject to any necessary regulatory approvals for their intended use, and must be used in accordance with the relevant Material Safety Data Sheet (MSDS) or clinical instructions.

1. Chemical disinfectants

Industry uses a variety of disinfectants to prevent the introduction and spread of disease, and to avoid cross-contamination between infected and disease-free stocks. A summary of disinfectants, dosages and application methods are presented in Table 1.

Table 1 Types of chemical disinfectants, dosages and application methods.

Product name (active ingredient)	Use	Dosage	Application method
Virkon (potassium monopersulfate and sodium chloride)	Disinfection of pre-cleaned surfaces (eg culture tanks, walls, floors, tables)	1:100 (freshwater only)	Wipe or spray at 300mL/m ²
	Disinfection of equipment (eg hand-held meters, refractometer, secchi disk, algae nets, aeration systems, weigh scales)	1:100 (freshwater only)	Wipe or spray at 300mL/m ² ; or Immerse in solution for 10 min, rinse clean with fresh water and air dry
	Foot baths and vehicle tyre baths	1:100 (freshwater only)	Fill baths with solution and replenish every 4 days or when moderately fouled
	General disinfection of farm equipment (eg boats, feed hoppers, feeding equipment)	1:200 (freshwater only)	Spray 300mL/m ² and air dry
Quad-hygelene (quarternary ammonium)	Disinfection of equipment	2 ppm; or 0.25:100 (fresh or saltwater)	Immerse in solution for 15 min, rinse clean with fresh or saltwater and air dry.
	Foot baths and vehicle tyre baths	10 ppm; or 1.25:100 (fresh or saltwater)	Fill baths with solution and replenish every 4 days or when moderately fouled

Table 1 Types of chemical disinfectants, dosages and application methods (concluded).

Product name (active ingredient)	Use	Dosage	Application method
Soaps and detergents	Cleaning and disinfection of personnel and equipment	As directed	Hand wash facilities for personnel. Wipe or spray equipment to remove discernible evidence of contamination or to clean surfaces prior to washdown.

2. Vaccines

The types of vaccines currently available to prevent infection in salmonids are listed in Table 2. All vaccines are used according to the relevant APVMA Minor Use Permit and Product Label instructions, and are administered under the direction of company veterinary officers. Company veterinary officers may vary instructions for the administration of vaccines if necessary.

Vaccination improves animal welfare and minimises the need for antibiotics. Research is in progress to expand the types of vaccines available for preventing infections from other disease threats.

Table 2 Vaccines for preventing infection from particular disease agents.

Target disease organisms	Vaccine	Salmonid species	Relevant biosecurity zone	Permit reference
<i>Yersinia ruckeri</i> —serotype B (Yersiniosis)	Yersinivac-B	Atlantic salmon, Rainbow trout	All zones	APVMA Permit 12549
<i>Vibrio anguillarum</i> —serotype C (Vibriosis)	Anguillvac-C	Rainbow trout	Western zone (Macquarie Harbour)	APVMA Permit 12233
<i>Aeromonas salmonicida</i> (biovar acheron) Marine Aeromonas Disease; and <i>Vibrio anguillarum</i> (Vibriosis)	AnguiMonas	Atlantic salmon	Western zone (Macquarie Harbour)	APVMA Permit 12623
Tasmanian Rickettsia-like Organism (RLO)	Corrovac	Atlantic salmon	South East zone (Huon Estuary and D'Entrecasteux Channel)	APVMA Research Permit

3. Freshwater bathing

Freshwater bathing is used to treat amoebic gill disease in stocks on marine farms. Enterprises have developed detailed procedures for transferring infected fish to freshwater baths, involving the use of liners in sea cages which are removed after treatment and disinfected at shore-based facilities.

4. Pharmaceuticals

The use of pharmaceuticals for animal welfare, particularly antibiotics to combat bacterial infections may be necessary. Antibiotics are not to be used as a prophylactic (preventive) treatment. Small quantities of antibiotics may be used based on sensitivity tests. Pharmaceuticals that may be used to treat bacterial infections are listed in Table 3.

Table 3 **Pharmaceuticals which may be used in small quantities to treat bacterial infections.**

Product name (active ingredient)	Dosage	Withdrawal period	Permit reference
Tetrafish (Oxytetracycline 100%)	100 mg/kg	1000 degree-days (domestic) 1600 degree-days (export)	APVMA Permit 9665
Trimethoprim (Trimethoprim 100%)	10 mg/kg in freshwater 20mg/kg in saltwater	1000 degree-days (domestic) 1600 degree-days (export)	Veterinary prescription off- label
Aquaflor (Florfenicol 50%)	???	1000 degree-days (domestic) 2000 degree-days (export)	APVMA Permit 9644

5. Other chemical applications

Chemical applications may be necessary for animal welfare, to treat bacterial gill disease and mould. Some of the common chemical treatments are listed in Table 4.

Table 4 Chemical applications to treat bacterial infections and moulds.

Product name (active ingredient)	Purpose	Dosage	Permit reference
Salt (Sodium chloride 100%)	Bacterial gill disease	10 ppt for 1 hour	APVMA Permit 9665
Chloramine T (Chloramine T 100%)	Bacterial gill disease, hatchery use only	10 ppm for 1 hour	Veterinary prescription off- label
Formalin (Formaldehyde 40%)	Saprolegnia infections (freshwater mould), hatchery use only	Eggs: 1000-2000 ppm for up to 15 min; or 220 ppm for up to 60 min Fish: 125-250 ppm bath; or 15-25 ppm constant flow	APVMA Permit 9644

6. Anaesthetics

Anaesthetics in the context of biosecurity are only used for the humane culling of diseased fish, in the event that other treatments are not effective. Anaesthetics used in 'overdose' dosages for euthanasia of fish are listed in Table 5 for reference, and administered under orders from company veterinary officers.

Anaesthetics may also be ordered by company veterinary officers to facilitate low stress handling of fish, and to humanely destroy fish for animal welfare reasons (eg. severe deformity, moribund individuals). General veterinary health use of anaesthetics is not in the scope of this Program.

Table 5 Types of anaesthetics used for humane culling of diseased fish.

Anaesthetic (active ingredient)	Biosecurity use	Dosage	Permit reference
Aqui-S (isoeugenol)	Euthanasia	175 mg/L	APVMA-registered
Benzocaine (benzocaine)	Euthanasia	100 mg/L	APVMA Permit 12212