Reflections and Learnings
2025 Salmon Mortality Event

Perspectives and insights gathered through a structured multi-agency and industry debrief process following the 2025 salmon mortality event in the D'Entrecasteaux Channel.

October 2025 | Version 1

Department of Natural Resource and Environment Tasmania

In Partnership with

Tasmanian Government

EPA TASMANIA
ENVIRONMENT PROTECTION AUTHORITY

Table of Contents

1. About this report

Firstly, it is important to note up front that the 2025 salmon mortality event was not a declared emergency under Tasmania's Emergency Management Act 2006.

Threshold triggers for an emergency declaration were not met. The event did however warrant considered review and analysis to inform future events (as would normally occur after any significant response incident), particularly if a future event were to escalate into a biosecurity or environmental pollution incident.

To undertake the analysis and to detail learnings for improvement, the Department of Natural Resources and Environment Tasmania (NRE Tas) and the Environment Protection Authority Tasmania (EPA) engaged an independent facilitator to conduct a series of consultations with relevant government agencies and salmon industry operators. The facilitator's role was to objectively gather, synthesise and document stakeholder reflections on the response to the event. This included identifying lessons learned, perceived strengths, operational challenges, and suggestions for future improvements, grouped around six pre-agreed strategic themes.

This report does not provide an assessment of individual actions, nor does it seek to determine accountability or verify factual accuracy. Rather, it offers a narrative synthesis of the circumstances that led to the event; the response; and the views and experiences expressed by participants during interviews, meetings and structured debriefs.

The purpose of the report is to support reflection, continuous improvement and strengthened coordination across all sectors ahead of future marine events.

This report does not offer a forensic or regulatory evaluation, and any specific data or operational details were provided by participants was not independently verified. Readers should interpret the findings as a thematic reflection of stakeholder experience rather than an official account of chronology or compliance.

2. Introduction and Background

During the months of January to April 2025, the Tasmanian Government agencies and salmon farmers in the southern D'Entrecasteaux Channel, were responding to a salmon mortality event of unprecedented scale. The root cause of the event is multifactorial, likely triggered by a summer warming event and compounded by the naturally occurring bacterium *Piscirickettsia salmonis* (*P. salmonis*) and other pathogens. The impacts of elevated fish deaths and an insufficient response to the event has, however, led to a number of other emerging issues, the most notable being the loss of containment of "mort balls" or fatty substances from the farms to public waters and nearby beaches, and scrutiny of the treatment of moribund fish and disposal of dead fish.

While the event directly impacted two companies (Huon Aquaculture Company Pty Ltd and Tassal Operations Pty Ltd), the industry and community have been impacted, with the event giving rise to a wide variety of concerns regarding the regulation and operation of this

aquaculture industry. Impacts and concerns arising from the event extend to stock loss; animal welfare; economic impact and brand damage; waste management and other matters largely related to community concerns around environmental harm (including antibiotic use), human health, and food safety. The incident attracted national media and political attention.

The Government agency involvement included the EPA, as the environmental regulator and lead agency (given that the event commenced as an environmental contamination event); NRE Tas regulators Biosecurity Tasmania and Marine Resources; the Department of Health; and the Commonwealth Department of Agriculture, Fisheries and Forestry. Several local government authorities in southern Tasmania were also impacted and involved with the response, particularly in terms of waste disposal and responding to public enquiries.

3. Purpose of the debrief

The purpose of the post-event debrief has been to analyse and review the regulator and industry responses, with the intent of identifying post-event insights, learnings and continuous improvement actions, in preparedness if a similar event were to occur in the future.

This event operational debrief was instigated and sponsored by NRE Tas and the EPA. 3P Advisory Director Kym Goodes was appointed to conduct the operational debrief and to assist in documenting the insights and learnings to ensure that any final debrief reflections are presented without bias. 3P Advisory has not been tasked with responsibility for recommending regulatory changes but rather to incorporate into the insights and learnings, potential commitments that will improve collective ability and capacity to prevent, prepare for, or respond to any future significant mortality or similar, marine related events.

Operational debriefs (like most other critical incident debrief processes) are focussed on the management of the event and to identify learnings and opportunities for future improvement. This is critically important and ensures all those involved in the debrief process fully engage respectfully and without fear or blame.

The process for the operational debrief was structured to take into account active investigations occurring in parallel to the operational debrief and that these investigations may impact some of the information and discussion due to the nature of the investigation.

4. Methodology and Process

4.1 Participants

The following entities have participated in the operational debrief.

- Environment Protection Authority Tasmania (EPA)
- Department of Natural Resources and Environment Tasmania (NRE Tas)
- Department of Health (DoH)

- Commonwealth Department of Agriculture, Fisheries and Forestry (DAFF)
- Salmon Tasmania (ST)
- Huon Aquaculture Company Pty Ltd (HAC)
- Tassal Operations Pty Ltd (Tassal)
- Petuna Aquaculture Pty Ltd (Petuna)

4.2 Process

This operational debrief was authorised and sponsored by the two lead agencies that regulate the salmon farming industry within Tasmania: the EPA and NRE Tas. The sponsors are:

a. Secretary of NRE Tas; and
b. Director of the EPA.

The operational debrief adopted a tiered debriefing structure with principal operational debriefs occurring individually and separately within NRE Tas, the EPA and DoH. This occurred prior to an overarching multi-agency debrief which was facilitated by 3P Advisory Director, Kym Goodes. The multi-agency debrief was then followed by targeted briefings with each company and ST participating in one-on-one interviews with Kym Goodes. Table 1 details the debrief end to end process. It should be noted that Petuna was not involved in the southern Tasmania mortality event but participated in the debrief to share their knowledge and approach relative to industry preparedness to possible future events.

The sponsors have determined information (in particular that which is deemed commercial in confidence) will remain confidential.

Table 1: Debrief end to end process

Step 1	Operation Debrief Planning (pre-independent facilitation)
Step 2	Principal Debriefs (pre-independent facilitation)
Step 3	Multi Agency Debrief (independently facilitated)
Step 4	Targeted Industry Briefings (independently facilitated)
Step 5	Debrief Learnings Summarised
Step 6	Summary Report Drafted
Step 8	Report Published

The principal operational debriefs conducted by each agency took place prior to the independent facilitation by 3P Advisory. These examined, cross checked and analysed a range of information that has relevance to the event. The information each agency examined was categorised into six key themes.

1. Government Response
2. Industry Regulatory Framework
3. Communication and Information
4. Industry Readiness and Preparedness
5. Industry Response
6. Risk Reduction

Each agency presented the outcomes of their principal debriefs at the multi-agency debrief.

The identified outcomes and actions from the multi-agency operational debrief then informed the targeted briefings with each of the salmon farming companies and industry body:

- ST
- HAC
- Tassal
- Petuna

Information examined within each theme:

Theme	Information to be examined
Government response	• Identify response processes that worked well and those that did not work well. • When were the main factors that contributed to the event in the lower D'Entrecasteaux Channel understood with confidence? Did this understanding change over the course of the event? • How well was the scale and likely duration of the event understood? What factors influenced this? • How was the government response to the event coordinated and how timely and effective was this? How could those coordination processes be furthered strengthened? • What aspects of the event were found to be operationally challenging? Why was that and how might those challenges be overcome in the future? • Adequacy of Government resources to respond.
Industry regulatory framework	• Industry compliance with existing regulatory requirements pre-event. • Preparation and analysis of a timeline of the event to identify any specific early warning signs or indicators for future preparedness. • Identify areas of regulatory duplication and/or specific areas where regulation could be enhanced within: • Environmental Standards for Tasmanian Marine Finfish Farming 2023; • Marine Farms Development Plans, Leases, License and permits requirements; • Biosecurity Program: Tasmanian Salmonid Industry; and • Tasmania and Commonwealth Food Safety Regulation Framework.

Communication and information	• Examine communication processes pre, during and post event and identify any potential improvements regarding:
	  • Information available to the community, public messaging and warnings);
	  • Communication processes between the EPA and departments;

Theme	Information to be examined
	• Communications with DAFF; • Industry notification to regulators; and • Communication with Industry. • Review the Salmon Portal with a view to examining what additional information and data links could be made available to improve the availability, transparency and frequency of data and information. • Examine current data holdings and identify any additional information that might be actively disclosed.
Industry readiness and preparedness	In the context of the event examine: • Industry pre-planning, surveillance and reporting, vaccination processes; antibiotic treatment processes; communications, emergency harvest and mortality waste planning for significant mortality events (e.g. prediction, detection, mort removal, transport, waste management chain capability). • Any current and future Research and Development requirements.
Industry response	• Public communication to address community concern. • The effectiveness of pre-incident prevention and mitigation activities. • The effectiveness of emergency management plans and procedures. • The effectiveness of the strategies and tactics used during the response. • The use, and effectiveness, of technology in detection and response and the risks to work health and safety from third party operators/contractors. • Adequacy of industry resources to respond. • The effectiveness of accurate and timely spatial data. • Animal management and welfare issues. • Any observations or capability gaps in industry identified by the review team during the Review.
Risk reduction	• Risk reduction activity and whether that activity was adequate (including beach cleanup activities). • Future vaccination efficacy. • Stocking density. • Biosecurity movements.

The following was explicitly out of scope for the debrief process:

1. The conduct or behavior of any individuals involved in terms of performance related matters (i.e. no blame approach).
2. Specific matters under active investigation, noting that the generalities of those investigations may be used to inform the debrief.

5. Overview of the Operational Debrief Discussions and Outcomes

The 2025 salmon mortality event in the D'Entrecasteaux Channel was one of the most complex and confronting environmental and fish health marine events faced by Tasmania's salmon industry, regulators and the community in recent memory.

The situation evolved into a coordinated, multi-regulator operation between NRE Tas, the EPA and DoH, including formal investigations by NRE Tas and the EPA.

Beyond the technical challenges of disease detection, waste logistics and multi-agency coordination, this event placed immense pressure on the people at the heart of the response—from a diverse range of government agency staff through to frontline aquaculture workers and the senior staff across companies and ST.

This de-brief process was a comprehensive reflection of the multi-agency government and industry response, informed by a cross-government operational debrief and in-depth interviews with the three major salmon companies: HAC, Tassal and Petuna. While the mortality event was largely driven by a pathogen (*P. salmonis*), it was the convergence of environmental conditions, waste management constraints, strained public trust, and absence of clear coordination mechanisms for a multi-factored event that made the response particularly challenging.

Despite these pressures, the response was characterised by significant dedication and professionalism. Government agency and industry staff worked extended hours, over several months including weekends, adapting rapidly to an evolving situation. Industry companies undertook difficult operational decisions, mobilising resources at scale to manage fish health, environmental compliance, and waste disposal. However, it became clear that the trigger point and a framework for a multi-agency and multi company co-ordinated response to manage the consequences of a marine event of this complexity and intensity, was not established prior to the event occurring.

The key insights and learnings are outlined in the report and are summarised as:

- **Leadership and Coordination:**
  A major learning from both government and industry was the impact due to the lack of a mass mortality response plan. In the absence of this plan, and what agencies described as a lack of accurate timely advice from industry, communication and event coordination by government had duplication, initial role confusion, and delayed critical decision-making. Through the debrief, a shared desire emerged for a pre-agreed Critical Event Preparedness, Communication and Co-ordination Management Framework to be developed and embedded into future critical marine events. An agreed framework will not replace the responsibilities of companies to have adequate emergency procedures in place to manage an incident involving high volumes of fish mortalities (a controlled waste).

- **Workforce Impact:**
  Staff across both sectors reported high levels of stress and operational fatigue. Government agency officers were often required to perform roles beyond their normal remit, while industry staff operated under the weight of operational pressure and intense public scrutiny. The event highlighted the need for surge capacity planning, shared staffing protocols, and embedded wellbeing support in emergency responses.

- **Waste Management and Infrastructure:**
  The required mortality retrieval exceeded the industry's mortality retrieval system capabilities. This was the root cause of the waste management issue. Waste disposal facilities, such as rendering and ensilage facilities, were in operation during the event. While there were some operating and compliance issues with these facilities, they provided capacity that ensured only 5% of the mortality waste during the peak month of February went to landfill. The event reinforced the importance of an industry wide understanding of the types and volumes of waste to be generated under all environmental conditions and scenarios. Such knowledge would ensure that opportunities for beneficial re-use can be identified and that the waste sector can plan for mortality events by establishing scalable waste management infrastructure that is focused on higher value-added products (i.e. rendering for the creation of fish oils and other products not for human consumption).

- **Communication and Public Confidence:**
  Government agencies reported that accurate and timely information regarding the build-up, scale and longevity of the mortality event was not provided. This generated a gap in coordinated public messaging undermining community trust. While some companies were proactive in public disclosure, there was a need for more relevant and timely information—particularly around response to food safety and public health concerns. The need for a central government agency voice during significant events was strongly endorsed by both sectors. Once the event moved into regulatory investigative phases, communication between government and industry became challenging. However, this did not limit the companies' ability to provide accurate and timely information to the community.

- **Future Preparedness:**
  Industry has already been investing in long-term strategies—such as vaccine development, selective breeding programs, effective antibiotic use for treating *P. salmonis*, new waste management technologies, and the development of waste management plans that are required under their Environmental Licences. All Government agencies agreed that the development of mortality event 'triggers' that would inform both industry and government of an evolving event are critical to develop and agree to. A consistent theme across industry interviews was a willingness to partner with government on reform, underpinned by a desire for clarity, fairness and mutual respect.

The salmon mortality event was not an emergency event defined under Tasmania's Emergency Management Act.

The Tasmanian Emergency Management Arrangements (TEMA) provides guidance on emergency management arrangements. Biosecurity incidents are defined as "incursions of diseases of aquatic animals where a biosecurity emergency response aims to prevent the spread of the pest or disease, identify areas of infection and eradicate the pest or disease, control, eradicate and prove freedom from the pest or disease." In this case, *P. salmonis* is a naturally occurring disease and not eradicable.

The disease *P. salmonis* was the predominant cause of fish deaths. *P. salmonis* is a fish pathogen and does not cause human or terrestrial animal disease, or any food safety risks and while an unacceptable nuisance, the presence of "mort balls" or fatty substances from salmon farms to public waters and beaches did not present any public health issues. It is noted that the scale and size of the mort balls claimed in media and other communications was potentially overstated. Mort balls observed by departmental staff were typically less than 10mm in diameter and scattered across extensive areas. Claims of beaches polluted with dead fish were not able to be evidenced in any assessments. It is noted that industry responded promptly to clean up beaches within hours of reports being received.

While the joint response achieved many of its aims, clearly there are failed key performance indicators, the most obvious being the unauthorised discharge of a controlled waste. This report identifies that 'business as usual' approaches will not be enough in the face of rising environmental volatility, heightened community scrutiny, and emerging marine disease threats.

A shared agreement of the triggers that define an emerging mass mortality need to be understood and communicated in advance, to inform a well organised and controlled response by industry and government rather than one that is assembled under pressure.

6. Key Insights and Learnings: Environmental Conditions and Disease Management

6.1 Cause of mass mortalities

The operational de-brief process concluded that it is not possible to identify a singular cause for the mass mortality event, hence it is referred to as a multi-factored event.

The operational de-brief process did seek to identify the possible casual factors that led to an unprecedented seasonal spike of mortalities, which includes:

- *P. salmonis* is a global phenomenon in all salmon farming and a major pathogen that causes fish mortalities. The pathogen is considered to be the predominant trigger to the salmon mortality event in the southern D'Entrecasteaux Channel;
- Mortality incidents are typically elevated during the summer months, when warmer waters and other pathogens are more likely to affect salmon health;

- Some algae, jellyfish and other marine organisms are a known irritant of salmon gills and may lead to increased mortalities. As illustrated in Figure 1 below, there were significant bio-luminescence events and jellyfish bloom events in February 2025;
- Marine heatwave conditions have occurred in waters immediately east of Tasmania over the past two summers and contribute to interannual variability - refer to Figure 2; and
- Marine waters off eastern Tasmania are warming nearly four times faster than the global average (Hobday et al., 2014).

NRE Tas and the EPA have engaged CSIRO to further build the capacity of modelling tools for evaluating impacts on marine ecosystems in Tasmania under the Tasmanian Coastal Modelling and Information System. This work will inform the development of state-of-the-art tools that can be used to investigate the contributing factors of events like those experienced over the past summer and to establish near-real-time modelling tools to foster understanding and support more informed decision making around policy, regulation, planning and incident response.

Figure 1: Climate and environmental context during Tasmania's largest ever salmon mortality event (early 2025)

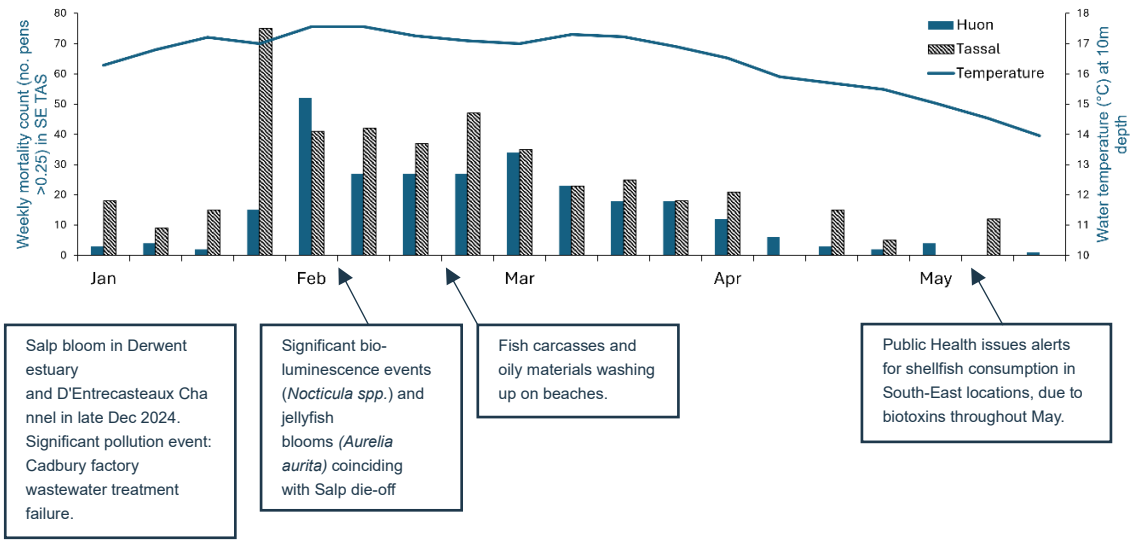


Fig 1. weekly mortality based on pens with >0.25% mortality (the SE TAS notification threshold) – note NRE does not have the total mortality volumes or numbers of fish (and hence this graph likely under-represents the mortality magnitude).

Figure 2: SST anomalies (ºC) December 2024 to April 2025 mean – relative to 1979 to 2025 (inclusive) seasonal climatology. Data: ERA5

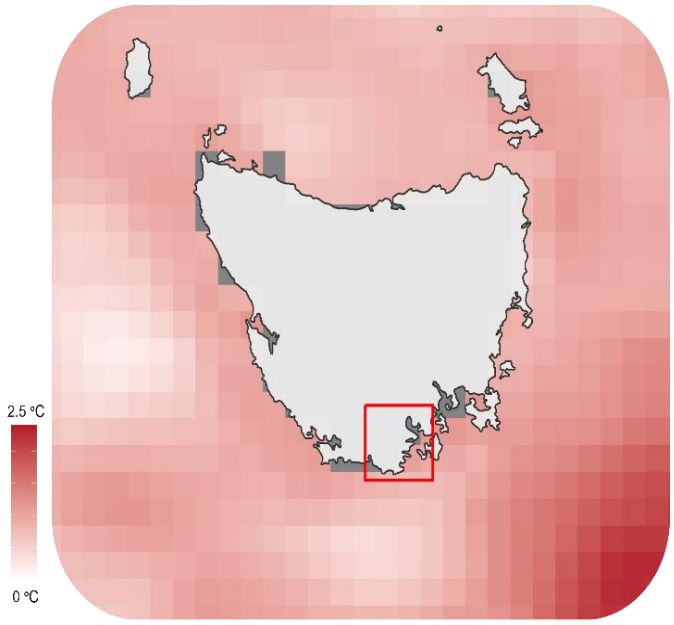
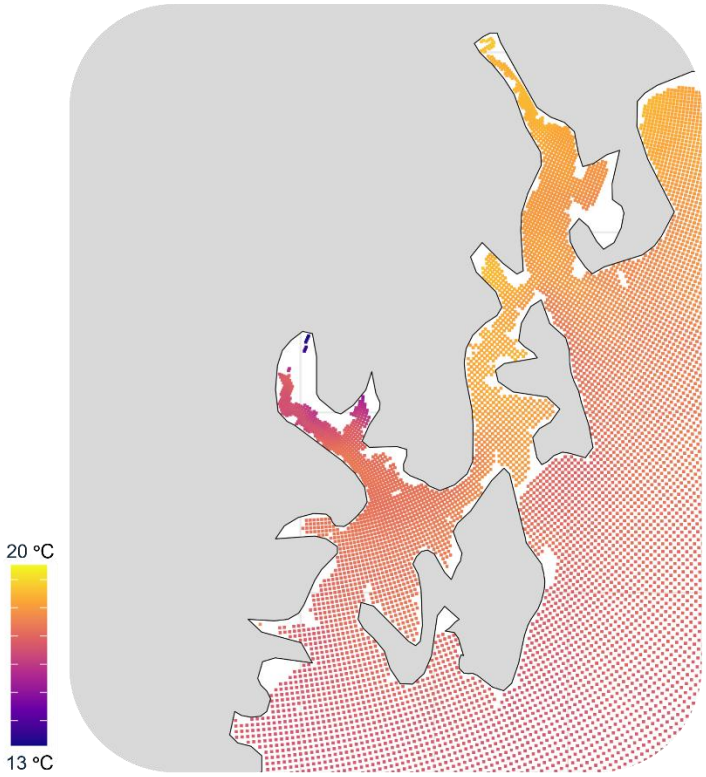


Figure 3: Water temperature mean (°C) February 2025 at 10m depth. Data: TASSE (model)



6.2 Diagnosing *P. salmonis*

Marine disease management issues are complex. *P. salmonis* is a bacterium of salmon that does not survive in water above 25°C; it does not survive in freshwater and based on advice from Public Health, is of no risk to humans or domestic animals.

Prior to the mass mortality event occurring, farmed salmonid fish in Tasmania have been susceptible to infection by Tasmanian *Rickettsia*-like organisms (TRLOs) for well over 20 years. TRLOs are Gram-negative bacteria that cause a disease in farmed Atlantic salmon known as Tasmanian salmonid rickettsiosis. These bacteria reside intracellularly within the fish's peripheral blood leukocytes and have, in the past, been responsible for mortalities in the salmon aquaculture industry.

The initial diagnosis of *P. salmonis* came from whole genome sequencing (WGS) in early 2024. WGS determines the complete DNA sequence of an organism. The WGS work was undertaken by NRE Tas's Centre for Aquatic Animal Health and Vaccines (CAAHV), supported by the Animal Health Laboratory (AHL). The CAAHV examined a collection of 41 TRLO isolates to determine their genetic relationships with closely related taxa. Once these connections were established, a specific molecular diagnostic assay commonly known as a real-time Polymerase Chain Reaction (PCR) was to be developed.

Collaboration then followed between the CAAHV and the Australian Centre for Disease Preparedness (CSIRO, Geelong) to facilitate advanced genomic analyses of the bacteria. This resulted in the TRLO East Coast strain being reclassified as *P. salmonis.* The remaining TRLO strains were linked to the *Piscirickettsia* genus but shown to be genetically different to *P. salmonis*.

This scientific work concluded that *P. salmonis* has been present in Tasmanian east coast waters since at least 2021 and in the south-east zone (the 'channel') since 2023 based on samples submitted at those times. This means the *P. salmonis* bacterium is naturally occurring in the east and south-east coastal waters.

All Marine Salmonid Biosecurity zones have been tested for *P. salmonis*, with the exception of the freshwater zone (hatcheries). The results confirm *P. salmonis* is not present in the Western Marine Salmonid Biosecurity Zone and Northern Marine Salmonid Biosecurity Zone.

6.3 Movement of *P. salmonis*

While genomic studies have demonstrated that it is the same bacterium, discussions through the operational de-brief process have not been able to identify an evidence base regarding the temporal nature of the disease, specifically how the bacterium travelled from the east coast waters to the south-east zone.

The operational de-brief was cognisant of the natural movement of marine currents, particularly at that time of year with the extension of both the Leeuwin and Eastern currents making it impossible to totally prevent the natural spread of the disease.

6.3.1 Vessel Movements

Infrastructure and vessel movement were examined as a potential contributing factor to the spread of the disease. The conclusion drawn is that existing controls under the Government Biosecurity Program - Tasmanian Salmonid Industry, were considered adequate because the standards:

- Prevent salmon companies moving live salmon from east to west zones;
- Require any equipment movements to be appropriately treated; and
- Place strict requirements on the discharge of waters of well boats.

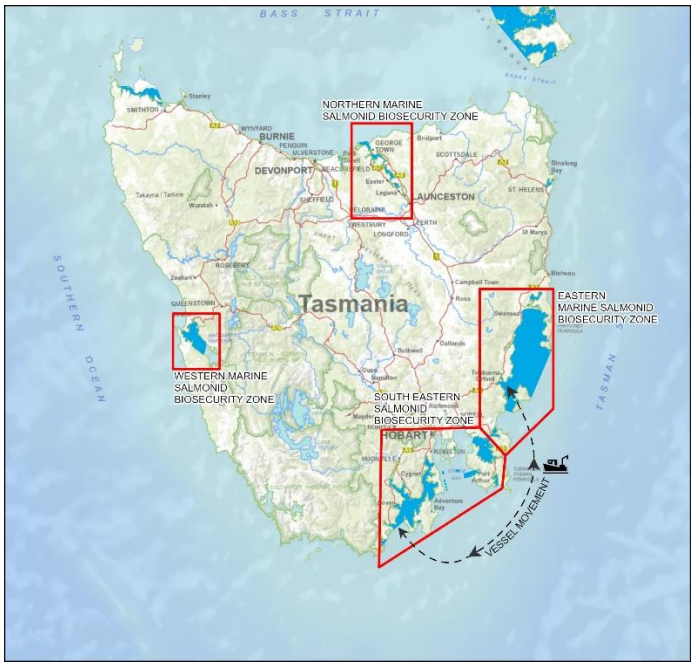
Given the endemic nature of the bacterium, the role of other commercial and recreation fishing vessel movements within the East Salmonid and Southern East Salmonid Biosecurity Zones cannot be discounted as a possible contributor for the movement of the bacterium.

Relevant Marine Operation Standards (MOS) under the Biosecurity Program – Tasmanian Salmonid Industry include MOS 42, MOS 32, 44 and MOS 45.

These are detailed below.

MOS 42. Movement of live fish in South Eastern and Eastern Marine Salmonid Biosecurity Zones. Refer to Figure 3

Figure 3:



A salmonid producer must ensure that movement of live fish from any marine farm to another marine farm within the South Eastern and Eastern Marine Salmonid Biosecurity Zones only occurs –

(a) via well boat; or

(b) between farms of the same producer, providing the movement can occur without fish of the salmonid producer being moved materially closer to a farm operated by another salmonid producer than already exists; or

(c) where conducted:

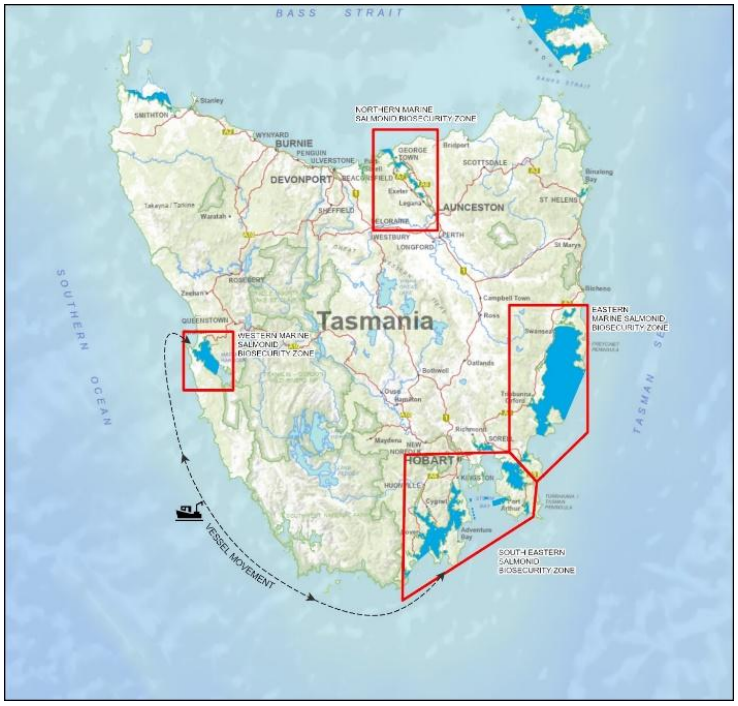
i. under a permit; or

ii. under the direction of an authorised officer; or

iii. in an emergency

MOS 32. Movement of vessels to or from Western Marine Salmonid Biosecurity Zone refer to Figure 4

Figure 4:



A salmonid producer moving any vessel **to or from** the Western Marine Salmonid Biosecurity Zone must ensure that –

(a) the vessel has a visibly clean hull before entering or leaving the Zone; and

(b) vessels are slipped for pressure washing and disinfection in accordance with any relevant recommendations of the Joint Salmonid Industry Health Group before being used on any marine farm in another marine salmonid biosecurity zone; and

(c) all vessels are otherwise cleaned and treated in order to prevent, eliminate or minimise so far as is reasonably practicable any biosecurity risk posed by the vessel before being moved to or from the Zone.

NRE Tas is notified of vessel movements.

MOS 44. Prohibition of movement between seawater biosecurity zones

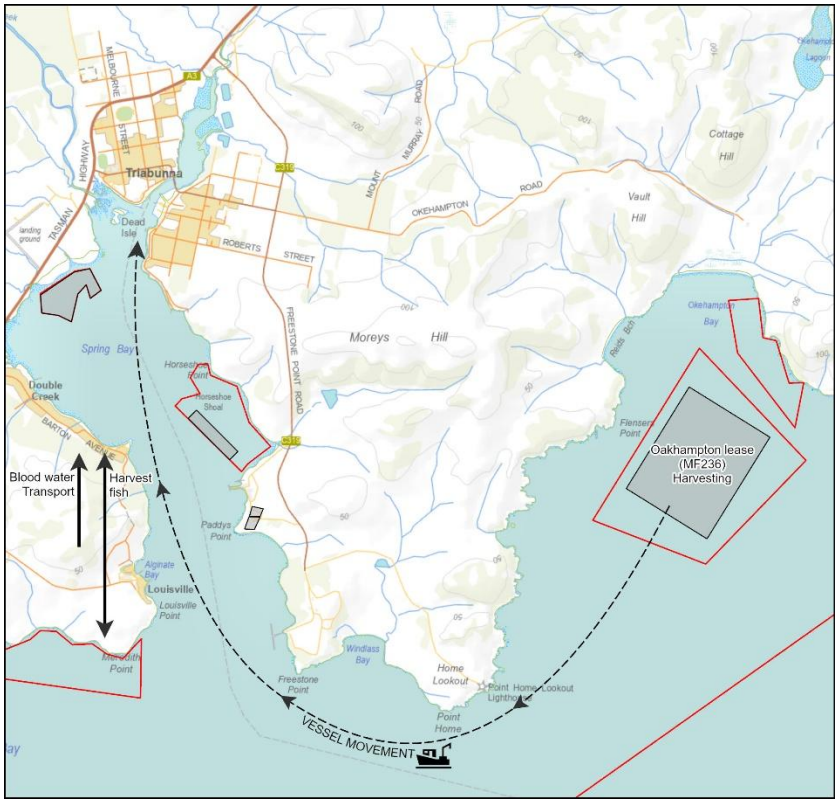
A salmonid producer must ensure that no salmonids are moved between marine farms in different salmonid biosecurity zones, except that salmonids may be moved from the South Eastern Marine Salmonid Biosecurity Zone to the Eastern Marine Salmonid Biosecurity Zone in that direction only, or where otherwise expressly authorised in writing by the Secretary.

MOS 45 Prohibits of movement between seawater and freshwater

A salmonid producer must ensure that no salmonids are returned to licenced inland fisheries freshwater premises from seawater farms. This ensures that *P. salmonis* is not transferred back to hatcheries via salmonid broodstock.

In regards to Okehampton Bay Harvest Operations, Eastern Biosecurity Zone refer to Figure 5:

Figure 5:



- Harvest vessel remains at Okehampton for duration of harvest of lease; before return to other regions, the vessel undergoes full topside and internal cleaning and disinfection.
- Harvest vessel has hull management program that maintains a clean hull scenario.

- Blood water offloaded at Okehampton and sent to Georgetown Seafoods via road for processing.
- Harvested fish are transferred from Triabunna via road tanker. All processing is in accordance with processing biosecurity management plans for the facilities involved.

6.4 Compliance Monitoring

At the time of preparing this report NRE Tas and the EPA have conducted 63 inspections of salmonid marine farming leases across the 2025 year. Of the 63 inspections 30 were related to marine farming lease inspections during the salmonid disease incident.

7. Key Insights and Learnings International Research

7.1 Participation in Gill Health Initiative and P*. salmonis* Initiative Meetings

In late April 2025, Drs Richard Morrison and Andrew Bridle of the NRE Tas's CAAHV attended Gill Health Initiative and SRS (Salmon Rickettsial Septicaemia, also known as piscirickettsiosis or *P. salmonis*) Initiative meetings in Galway, Ireland.

The symposia were hosted by the Atlantic Technological University between 23 and 25 April.

Each meeting consisted of industry updates on relevant conditions/diseases delivered by representatives from Chile, Canada, Scotland, Ireland and Norway and key-note speakers and presentations by delegates from industry, allied industries, students and scientists.

Drs Morrison and Bridle have been key personnel in the isolation, identification and characterisation of RLOs from farmed salmonids in Tasmania, including *P. salmonis*. Dr Bridle has specialist expertise in genetic analysis of fish pathogens, while Dr Morrison developed vaccines designed to protect against the RLOs, including Corrovac® and the Tegovac® Plus range of vaccines.

Drs Morrison and Bridle identified the following key learnings for Tasmania from their participation in the symposia.

- *P. salmonis* outbreaks occur when seasonal water temperatures peak, irrespective of the actual temperature. If required, oral treatment with florfenicol (FFC) is the preferred method, while top coating feed with oxytetracycline (OTC) is not recommended. Fast and reliable generation of minimum inhibitory concentration (MIC) data is valuable as early treatment improves outcomes.
- The *Piscirickettsia* genus is currently composed of two species, *P. salmonis* and *P.litoralis*, the latter of which is not a pathogen of fish. Two similar fish pathogens

have recently been shown to be novel species of *Piscirickettsia* and further diversity within the genus may occur.

- Live attenuated vaccines offer significant long-term protection against *P. salmonis* in the laboratory environment. Encouragingly, the duration of protection is at least 15 months, which is in the vicinity of that required to protect fish throughout the marine phase in Tasmania. However, it appears that immunity diminishes when fish are subjected to repeated stressors that can occur within a commercial aquaculture setting. These may include sea lice infections, sea lice treatment (physical delousing or thermolicing), harmful algal blooms, jellyfish blooms, freshwater bathing for Amoebic Gill Disease (AGD), other co-infections (such as *Tenacibaculum* spp.) and/or cage splitting. Of these, it is important to note that salmonids grown in Tasmania are not susceptible to sea lice and there is no requirement to treat for this parasite, substantially reducing the range of potential stressors.
- To address *P. salmonis* in Tasmania for the long-term, the CAAHV recommends either access to LiVac (subject to commercial terms and relevant approvals) and/or investment in developing a custom live attenuated *P. salmonis* vaccine. The latter requires a broad Research and Development effort to hasten development in addition to close examination of a formal legal assessment to ensure that a live attenuated *P. salmonis* vaccine developed by the CAAHV does not infringe any existing third party Intellectual Property. In the short term, minor improvements to the current vaccine in Tegovac Plus-EC performance may be achieved and this work is underway.

7.2 Key insights and learnings from Chilean Visit to Tasmania

Representatives from the Chilean salmonid industry visited Tasmania in April 2025 to share their knowledge on *P. salmonis* management. The representatives conducted a survey of their industry prior to the visit to Tasmania to enable the key learnings to be presented at the workshop, attended by both government and the salmon industry. The key learnings for NRE Tas representatives included:

- *P. salmonis* can be distributed in multiple organs, but the liver is most reliable for diagnostic testing.
- Infection can be detected early in skin mucus and post-identification genotyping as there is genotype-specific sensitivity to antibiotics. If required, oral treatment with Florfenicol (FFC) is the preferred method. Top coating feed with OTC is not recommended however, OTC injection has been used, albeit rarely.
- Treatment can only begin after antibiotic sensitivity (minimum inhibitory concentration; MIC) testing on 15 *P. salmonis* isolates obtained in culture from fish in an affected pen. Fast and reliable generation of MIC data is valuable as early treatment improves outcomes.

- As an alternative, Chile has developed a PCR-based method as a proxy for MICs, which is considerably faster than traditional antibiotic sensitivity testing. Antibiotic usage is comparatively high (320-557 grams/tonne), indicating the Chilean industry is dependent on FFC to control SRS, noting that prophylactic use of antibiotics is prohibited.

In summary, *P. salmonis* is a complex disease that is challenging to manage. Chile is using (and recommends using) multiple measures to control the disease including vaccines, selective breeding, epidemiological surveillance, good on-farm practices, *P. salmonis* specific regulations, antibiotic treatment and functional foods.

While the development of vaccines and selective breeding are medium to long-term propositions, Tasmania will consider the immediate implementation of the other measures to minimise risks associated with *P. salmonis* to the Tasmanian salmonid aquaculture industry.

Two high priorities are the development of specific diagnostic assays for *Piscirickettsia* species in Tasmania (in progress at the CAAHV/AHL) and to ensure that there is sufficient capability and capacity at the AHL for regular MIC testing. Routine typing is not required, as CAAHV data have shown that the Tasmanian *P. salmonis* population is currently limited to one genotype.

What is currently being done in Chile

- Observation of fish behaviour in cages*...early detection of moribund fish*
- Daily removal of mortality according to current regulations... *by diving or lift up equipment*
- Classification of mortalities according to current regulations
- Daily necropsy of mortality... *to classify the probable cause of mortality*.
- Monitoring of daily feeding... *paying attention if there is a loss of appetite*.
- Monitoring of environmental parameters... *could generate stress and immunosuppression.*
- Tissue sampling from fresh mortality... *if it is P. salmonis suspected or part of a surveillance;*
- Rapid request for medicated feed (medical prescription)... *max 4 to 5 days*.
- *P. salmonis* outbreak: Regular removal of moribund fish with nets... *to reduce risks of spreading.*
- Analyse evolution of oral therapy... *to implement plan B (extend therapy; change to injection, etc)*
- Presence of co-occurring diseases (i.e.*Tenacibaculum*)... *to improve or reorient sanitary strategy.*

7.3 Relationship between Stocking Densities and *P. salmonis*

Stocking density limits are prescribed in Marine Farming Development Plans established under marine farming planning legislation. In Tasmania, the stocking density limits prescribe a range from 15-25kg per cubic metre (m3). It has been standard practice in Tasmania to farm well below the prescribed range. Reporting from one company during the mortality event indicates that pens in the vicinity of the primary event location were carrying stocking densities not exceeding 9.3kg/m3.

To increase the understanding of the relationship between stocking densities and the management of the *P. salmonis* disease outbreaks, NRE Tas examined the available practice research.

The review of literature indicates while stocking density has long been considered a risk factor for infectious disease outbreaks in aquaculture, no single density threshold reliably prevents *P. salmonis*. Large-scale epidemiological analyses have found that stocking density per se is not the dominant predictor of *P. salmonis* outbreaks. Rather, disease risk is mediated through complex interactions between biomass, environment and infection pressure.

Salmon do not distribute evenly throughout pens; fish aggregate at preferred depths, meaning the “effective density” experienced can be higher than calculated averages (Oppedal et al., 2011). This effect is compounded by water stratification, oxygen gradients, and farm operations (e.g., treatments, grading), which temporarily crowd fish. Thus, crowding events, rather than average density, are likely more relevant to *P. salmonis* susceptibility.

Research also indicates temperature is another critical factor. *P. salmonis* outbreaks frequently emerge after seawater transfer when temperatures are between 12–18 °C (Rozas & Enríquez, 2014). During these windows, crowding should be minimised and densities reduced to maintain welfare and reduce stress.

The literature indicates that stocking density, in isolation, is not a reliable predictor of *P. salmonis* outbreaks. While experimental studies confirm density-related stress can worsen *P. salmonis* infections, field data show that environmental conditions, temperature and area-based management exert greater influence.

8. Key Insights and Learnings: Vaccination

Vaccination is critical to disease management. The Tasmanian salmonid industry with support from NRE Tas’s CAAHV and the Fisheries Research Development Corporation (FRDC), has invested heavily in research to develop a vaccine against *P. salmonis* disease. Most fish are vaccinated by injection. At the time of vaccination, fish are gently sedated and then a tenth of a millilitre per vaccine (about the size of a drop of water) is injected into the body of the fish.

Fish are protected from diseases during the marine phase of production, they are immunised at freshwater hatcheries, at least 6-8 weeks prior to sea transfer. The Tasmanian salmonid industry has begun using a vaccine known as Tegovac® Plus-EC. Tegovac® Plus-EC was developed at the CAAHV. This vaccine protects Atlantic salmon against eight bacteria, including *P. salmonis* (TRLO-EC) and is expected to assist the Tasmanian salmon industry in mitigating against the immediate threat posed by *P. salmonis*. However, no vaccine can be regarded as being completely protective and there are a number of factors that may degrade vaccine immunity. Scientific studies continue into the characteristics of the bacterial isolates and their relevance for fish vaccines.

Importantly the formal diagnosis and emergence of *P. salmonis* in Tasmania have highlighted research and development limitations of NRE Tas's CAAHV facilities, namely the constraints of current disease challenge rooms, tank numbers and size, staffing and office space resources are barriers to fast tracking the development of new vaccines, including that of a live attenuated vaccine against *P. salmonis*, which would be the first of its kind in Australia and considered critical in the fight to control this emerging disease. At the time of finalising this report the CAAHV Steering Committee and the Tasmanian Salmonid Industry have identified and are progressing the opportunity to expand the capacity of the CAAHV.

9. Key Insights and Learnings: Antibiotic Treatment

Antibiotic is an important component of disease outbreak management. Ongoing discussion and a review of the research leading up to and during the operational de-brief process concluded there is global evidence across the salmon aquaculture industry to support and demonstrate the use of FFC as effective in the treatment of *P. salmonis.*

At the time of finalising this report:

- ST was completing a comprehensive literature review on FFC and a Risk Assessment Framework for the use of FFC.
- the salmon industry had applied for an Emergency Permit to use FFC from the Australian Pesticides and Veterinary Medicines Authority (APVMA) and are awaiting the outcome of the APVMA assessment.
- The EPA had reviewed and finalised a Florfenicol Residue Monitoring Program ahead of, and in readiness of the salmon industry veterinarians administering Florfenciol.
- NRE Tas's Analytical Services Tasmania is well advanced in developing a methodology for testing Florfenicol and its metabolites to ensure environmental standards are met and to provide assurances regarding residue levels in wild caught fish.
- DoH was well advanced in its deliberations regarding the formulation of public health advice ahead of, and in readiness of the salmon industry veterinarians administering FFC.

10. Key Insights and Learnings: Common Ground Across Government and Industry

A shared need for central coordination and clear leadership

Both government and industry parties agree that the absence of a clearly designated incident command hierarchy or lead agency created confusion during the mortality event. There is strong support for a defined structure or similar model to be activated in future events.

Recognition of fragmented communication and the importance of a singular spokesperson to the public

Both government and industry parties both acknowledge communication failures—particularly the lack of early, authoritative messaging to the public around food safety, animal welfare, and environmental concerns.

Desire for improved waste management preparedness and coordination

Both government and industry parties recognise the need for pre-approved regional waste solutions, increased rendering capacity, and a coordinated approach to contingency planning.

Transparency and timely data sharing Is critical—but industry requests safeguards

While all parties value transparency, there is agreement that mechanisms must protect operational integrity and foster trust. Industry cited concern about Right to Information (RTI) exposure impacting internal candour, relative to commercial in-confidence and investigative processes. Meanwhile, government acknowledged variability in data quality and timeliness from different companies.

Strengthening Sector Preparedness and Shared Standards

Both government and industry parties agree on the value of a consistent industry code of practice for emergency response and biosecurity. Both parties support the development of sector-wide standards, coordinated protocols, and improved readiness exercises.

The Role of Salmon Tasmania in Crisis Response Needs Clarification

There is aligned recognition that ST has an important coordination role but should not replace or duplicate government leadership during major events.

Innovation and Learning from Global Best Practice

Both government and industry parties support leveraging global experiences, such as Chile's response to similar fish health issues, and agree this knowledge is important to inform local strategy. There is shared recognition that climate and disease stressors will increase, requiring ongoing investment in innovation.

11. Key Insights and Learnings: Differences in Perspectives Between Government Agencies and Industry

Approach to emergency response culture and framing

Industry perceived the government's initial response as overly regulatory, with limited regard for industry and staff welfare or operational realities—unlike other biosecurity or animal health events (e.g. fruit fly,) where partnership and support are prioritised. Government, by contrast, focused on its regulatory obligations and risk mitigation, particularly in the absence of predefined roles.

Authority and confidence in public communication

Government agencies felt constrained in public messaging due to the evolving nature of the event, delayed data, advice and information from industry, and approval and clearance processes. Industry, however, believed government failed to provide authoritative reassurance on key concerns, particularly food safety and left industry exposed to increased public criticism.

Ownership and Role in Data Disclosure

Industry raised concerns about the volume and frequency of information requests, suggesting it limited internal communication and risked creating a need to withdraw from open, timely communications. Government agencies emphasised the need for more timely, complete, and coordinated data to support its response obligations and public transparency.

Regulatory review vs. implementation focus

Industry expressed concern that government may use the event to introduce additional regulatory controls, despite having only recently implemented a new biosecurity framework (2023). Government participants, however, raised questions about whether existing frameworks were robust or enforced enough, particularly in areas like waste management and antibiotic usage.

Incident command role and leadership expectations

While both government and industry parties agree on the need for a clear event coordination and leadership, it is important for both government and the industry to come together and look at the required roles and responsibilities to develop an appropriate approach.

Role of Salmon Tasmania in future events

ST sees itself as able to play a coordinated voice role where multiple companies are affected and has proposed a clearer role in future incident coordination. Some government feedback indicated uncertainty about ST's role in public messaging during crises and whether this would be considered 'independent' enough.

Interpretation of the role of drones and surveillance

Industry strongly objected to drone use during the event, citing workplace health and safety and operational privacy concerns. While private drone use has caused distress to industry operators, there are no immediate avenues to limit or restrict this use in public air space under existing CASA regulations, if carried out in accordance with current rules.

Government agencies viewed regulator surveillance as part of legitimate environmental oversight during a serious public concern event.

While there is broad alignment on many of the structural issues, the points of divergence between government and industry reflect different assumptions about authority, trust and purpose during significant events. These differences are not insurmountable but require:

- Shared protocol development,
- Joint training and simulations, and
- Stronger relationship-building and shared understanding of the roles and responsibilities across each party to enable better crisis performance during an event.

12. Key Actions

The following are the prescribed actions arising from the multi-agency operational de-brief process: Actions are not listed in priority order.

Action 1: Finalise and release of a Marine Heatwave and Event Response Plan.

Lead: Department of Natural Resources and Environment Tasmania

Marine heatwaves and events have significant negative effects on Tasmania's marine ecosystems, including loss of marine animal and plant life. They can also reduce the productivity, health and sustainability of Tasmania's industries and communities and they can be a major contributor to mortality events.

Marine heatwaves and events are forecast to increase in frequency, intensity and spatial extent in Tasmania in the face of climate change and rising sea temperatures. Tasmania's Government, industries and communities must be

aware and fully prepared to respond to marine heatwaves and events to reduce their negative impacts as much as possible.

A Tasmanian Marine Heatwave and Event Response Plan will guide Tasmania's decision making and coordination in response to marine critical marine events.

Action 2: Review of current regulation to identify and minimise duplication across regulators.

Lead: **Department of Natural Resources and Environment Tasmania and the Environment Protection Authority**

The review will include identifying duplication and discrepancies across the Biosecurity and Environmental Standards and licences as well as identifying the opportunity to streamline data and information sharing.

This will also include revamping the Marine Farming Development Plan management controls (*marine farming's default regulations*), overhauling the marine farming licensing (and permitting) administrative processes and amending / remaking the marine farming regulations intended to reduce red tape, remove duplication, streamline planning and approval processes and improve compliance outcomes.

Action 3: Examine a Combined Salmon Compliance and Audit Plan across regulators.

Lead: **Environment Protection Authority and Department of Natural Resources and Environment Tasmania**

Regulation activities would benefit from a shared approach to compliance audits and associated reporting. This would ensure that compliance activities are comprehensive and aligned across regulators and reduce duplication risks.

Action 4: Development of a Critical Event Preparedness, Communication and Co-ordination Management Framework.

Lead: **Department of Natural Resources and Environment Tasmania**

4.1 The framework will establish a central point of leadership to enable rapid clarification of regulator roles, reduce operational duplication, and provide a single government framework to the public and stakeholders and will be applied to critical marine related events. This framework will have regard to the TEMA.

4.2 The framework will include public communication facilitated via the NRE Tas website. A dedicated information platform will be established to provide a single point of reference for all communication. The platform will include links to other relevant websites such as the EPA, DoH's Public Health and Fishing Tasmania websites.

4.3 In the Tasmanian Fisheries White Paper, the Government committed to improving consultation and engagement across fisheries and aquaculture, by implementing a new consultation framework and directing the development of a Marine Resources Public Engagement and Consultation Policy https://fishing.tas.gov.au/Documents/Marine%20Resources%20Public%20Engagement%20and%20Consultation%20Policy.pdf. Salmon Aquaculture engagement has previously been separate to this policy and Marine Resource's consultation framework. Improvements in engagement and coordination could be achieved by bringing salmon aquaculture into the existing processes.

Action 5: Examine best practice regulatory reporting information requirements.

Lead: Department of Natural Resources and Environment Tasmania

5.1 Completion of an independent Literature Review on *P. salmonis;*

5.2 Detailed examination of the Chilean official *P. salmonis* disease regulatory control program considering the environmental similarities and differences between the Chilean and Tasmanian contexts; and

5.3 Consideration of General Biosecurity Direction under the *Biosecurity Act 2019* and whether any further refinements of the Salmonid Biosecurity Program are warranted.

Action 6: Industry Waste Management Plans

Lead: Salmon Tasmania and individual companies

Companies to develop and submit Waste Management Plans to the EPA Director as required under the Environmental Licenses to ensure a more coordinated approach to waste management by the producers of waste, including mortality waste. The EPA has notified the industry of the critical importance of these plans to demonstrate to the EPA and the community that plans, procedures and resources are in place to manage waste arising from marine farms. Industry to consider a role for ST, particularly as it relates to contingency planning for mass mortality events. Waste management plans will determine waste management volumes and pathways for disposal across varying mortality scenarios.

Action 7: Develop specific diagnostic assays for Piscirickettsia species

Lead: **Department of Natural Resources and Environment Tasmania**

While the development of vaccines and selective breeding are medium to long-term propositions, other measures to minimise risks associated with *P. salmonis* to the Tasmanian salmonid aquaculture industry are the development of specific diagnostic assays for *Piscirickettsia* species in Tasmania and to ensure that there is sufficient capability and capacity at the AHL for regular MIC testing.

Action 8: Expansion of the CAAHV Facility

Lead: **CAAHV Steering Committee**

Prioritise expansion of the CAAHV facility to fast-track research and development capacity of the Centre.

Action 9: Development of an Industry Code of Practice

Lead: **Salmon Tasmania and individual companies**

ST to consider the development of a Code of Practice for managing mortality events, aimed at providing a consistent and coordinated approach across industry. The Code could outline clear operational procedures for timely response and safe removal of mortalities, reinforce measures for preventing further spread of disease, and set standards for environmentally responsible waste management and beneficial reuse options.

Action 10: Literature Review and Risk Assessment Framework for Florfenicol

Lead: **Salmon Tasmania and individual companies**

Salmon Tasmania will coordinate a comprehensive literature review on the use of the antibiotic Florfenicol to treat *P. salmonis* infections in salmon. The review will look at international evidence from laboratory trials and real farm treatments from across the world.

The review will include a risk assessment framework for the use of florfenicol in the Tasmanian environment based on international studies and experience.

13. Reporting on Actions

A progress report detailing the status of implementation of the above actions will be published on the NRE Tas website in February 2026.

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