

Pacific Oyster Mortality Syndrome (POMS)

Management Options Discussion Paper

for

Oysters Tasmania Board

PURPOSE

The purpose of this paper is to discuss options for the management of POMS in Tasmania. Since the initial outbreak in 2016 and resultant biosecurity response, the industry has adapted and evolved to survive successfully. It is now timely to consider options for the future management of POMS.

Enquiries from growers, hatchery managers and Oysters Tasmania has prompted this paper for the Oysters Tasmania Board to begin discussions. This paper outlines a full range of options including that in the Oysters Tasmania Biosecurity Committee - *Biosecurity Movement Protocol -Draft Discussion Paper 2019*.

EXECUTIVE SUMMARY

Two issues for POMS management have emerged for discussion but it is acknowledged that there may be other issues to consider.

- 1) Bay status (particularly intermediate status) is restricting some Tasmanian growers who may wish to move grower stock between status areas. Determination of the true POMS status of bay areas is problematic and is discussed in more detail further on in this paper.**
- 2) The double testing of spat for POMS prior to movement from hatcheries with an approved biosecurity programs is an additional cost to oyster production for little benefit.**

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POMS BACKGROUND

POMS is caused by an oyster-specific herpes virus - ostreid herpes virus microvariant 1 (OsHV-1) that was first detected in Tasmania when it caused a high level of mortalities at an oyster lease in late January 2016. However, tests on stored frozen oysters indicated that the virus has been present in the State since at least mid-December 2015. POMS was first seen in Australia in NSW in 2010. The terms 'POMS' and 'OsHV-1' are used interchangeably even though one refers to the disease and the other is the agent.

POMS was confirmed in five bays, including Gardners Bay near Cygnet by February 2016. On the 9th of February 2016, a Control Area was declared for the whole of Tasmania under the *Animal Health Act 1995* with a Section 40 Notice restricting the movement of all species of oysters and animal materials and conveyances used in the production of oysters. Movement of oysters for human consumption and for laboratory testing are not restricted. On the basis of POMS surveillance results the north of the state was declared free and remaining areas were a mixture of infected and intermediate status (Appendix 1).

Based on the information from the 2016 POMS testing program three areas of differing disease risk status (POMS Free, Intermediate Risk, and Infected Areas) were determined as a basis for issuing Movement Permits under the Animal Health Act 1995. Permits may only be issued by an Inspector appointed under that act.

Table 1. Current Zone / Bay Classification Definitions

Free	No virus detected by PCR, no signs of disease, geographically isolated from infected areas
Intermediate	Virus detected by PCR, no signs of disease and/or geographically close to infected area, risk of natural transfer
Infected	Evidence of disease and PCR test positive for virus.

The nature of the herpes virus family is to show prolonged latency where surviving mature oysters become long-term carriers. This means that once a feral population becomes infected – the virus will persist by horizontal transmission and is not known to die out whilst there are suitable hosts. The role of other shellfish to propagate virus is not known but is thought to be insignificant. Other shellfish species are included in the controls because of the risk that they may mechanically carry the virus filtered from the water column. Efforts to remove feral oyster populations have proven fruitless meaning that once infected – a bay is likely to remain infected. Annual confirmation of one case of POMS is undertaken in summer with most recent confirmation being in triploid growing stock in late 2022.

The biosecurity movement restrictions appear to be working to control spread. There have not been any further detections of POMS outside previously confirmed or intermediate sites identified in 2016. However, there has not been any structured surveillance in free or intermediate areas since 2019 and there has been a limited number of submissions to the animal health laboratory in this time. The only exception has been in 2021 a POMS intermediate status bay area was reclassified to infected status based on early 2019 feral oyster survey results.

ISSUE 1 – REVIEW OF POMS AREA CLASSIFICATIONS

OPTION 1 Status quo under a Group Permit

Movements of oysters and equipment are now covered under a Group Permit (GP) issued under the Biosecurity Act. All oyster growers have been corresponded with and Biosecurity Tasmania web pages updated. All declarations and notices under the *Animal Health Act 1995* will continue to be valid under the *Biosecurity Act 2019* and the 2023 GP when the former legislation is repealed (in 2023). Additional information is at the end of this options paper in appendix 1.

It is worth noting that all oyster growers have a General Biosecurity Duty (GBD) under the *Biosecurity Act 2019*. The essential components of the GBD include; disease surveillance and reporting, record keeping, hygienic procedures, control of movement of people and things. Any unexplained incidence of unusual mortalities, pests or moribund stock should result in the immediate suspension of stock movement by the affected lessee and notification to the CVO, OT, surrounding growers, and any business that has recently received stock from the area, pending further veterinary investigation. The GBD applies regardless of any option chosen for POMS management.

OPTION 2 Biosecurity Program

The creation of an 'Oyster Industry Biosecurity Program' is the most comprehensive approach possible to existing POMS management. This program is declared by the Minister will provide a clear vehicle for improving and maintaining biosecurity standards in the industry based on existing POMS controls. A biosecurity program has been implemented for salmon¹ and there are a number of similarities and differences between industries. Such a program could require zone and bay area biosecurity programs and require businesses to be audited as currently happens in the shellfish hatcheries. The development of a biosecurity program requires public (and industry) consultation and potentially a Regulation Impact Statement (economic justification).

The benefits to the Tasmanian oyster industry of a program might be somewhat intangible and given the complex nature of ownership in the industry the additional administrative effort might not be justified. It is difficult to see a current market advantage and the benefits are likely to be defensive in nature.

Any support for a program will require industry wide consultation. Any further agreed change to biosecurity requirements could result in a revised GP.

OPTION 3 Bay status reclassification

Prior to February 2016 entry level biosecurity conditions for the Tasmanian Pacific oyster industry were primarily at a state border level and there was little biosecurity in practice at the individual bay level within Tasmania. Oysters were regularly moved around the state. There was significant data within the Tasmanian Oyster Health Surveillance Program, but this program was discontinued in 2016 and the data is not relevant when considering re-classification of POMS zones now.

The 2016 POMS survey data is able to provide some guidance to the level of statistical confidence achieved in bay area monitoring but the problem is the often singular and low-level PCR test positive results that were obtained despite no clinical disease being reported to date. The PCR test on whole

¹ [Salmonid Industry Biosecurity Program - Submissions | Department of Natural Resources and Environment Tasmania \(nre.tas.gov.au\)](https://www.nre.tas.gov.au/salmonid-industry-biosecurity-program-submissions)

chilled Pacific oysters or gill and mantle in ethanol is the gold standard for confirmation of POMS but like all tests - the results need to be interpreted in context.

Tasmania currently relies upon passive surveillance efforts in the oyster industry. This program is focused on excluding emergency and new diseases, reaching a diagnosis where possible and confirming the presence or absence of OsHV-1. There are generally one to two investigations per year. The desire that surveillance to verify the status of the free areas is conducted annually during the period when POMS is most likely to be detected, has not been done since 2016.

It is logical to address POMS status issues at the current bay area level because is an open water system of aquaculture in shared waters and the hydrodynamic and feral oyster population connectivity of leases in close proximity within these areas. Infected bays will remain so but the reclassification of intermediate bay status is a valid question for further investigation. The caveats are the unknown hydrological connectivity for adjacent areas and virus harbouring in feral oyster populations, both of which are difficult to know and require further research or surveillance to answer. The surveillance techniques that might be proposed are open for discussion.

The OIE Aquatic Code is not able to provide direct guidance on surveillance as OsHV-1 was removed from OIE listing some time ago. There are no conditions described for OsHV-1 within the code. The disease closest to POMS that is described within the code is herpesvirus of abalone (HaHV-1 or abalone viral Ganglioneuritis - AVG). Adhering to an agreed standard has technical merit and will be required if the bay freedom is the credible basis for intrastate, interstate or international trade. A bay area is equivalent to a compartment. The Tasmanian free area is equivalent to a zone.

In relation to HaHV-1, the conditions include:

- Any infected populations have been destroyed or removed from the infected zone by means that minimise the risk of further spread of the disease, and the appropriate disinfection procedures have been completed,
- Targeted surveillance, has been in place for at least the last two years without detection of infection,
- previously existing basic biosecurity conditions have been reviewed and modified as necessary and have continuously been in place since eradication of the disease, and
- there has not been any observed occurrence of the disease for at least the last ten years despite conditions that are conducive to its clinical expression.

The conditions outlined within the OIE code relate to a biosecure population in which there are established health management conditions for disease introduction pathways (entry level biosecurity). In reality, Tasmania did not have such conditions established until February 2016 and then there was no ongoing structured surveillance program.

Acknowledging this 2016 start date and using the OIE principles above; targeted surveillance for an isolated bay without an infected feral oyster population in 2024 and 2025 in the absence of any disease or confirmations of OsHV-1 – could credibly result in a conversion to free status for POMS. However the merit of a single free status bay adjacent to infected bays as might happen in south eastern Tasmania, is questionable.

Targeted surveillance program data could be used to estimate the probability of freedom for a bay as the basis for a status upgrade. This approach is described in a paper (Maloney et al in press 2023) describing 2011 national OsHV-1 monitoring efforts. Appendix 2 shows Tasmania data that generally

indicates around 95% confidence of freedom being achieved with 155 PCR tests. The sampling strategy was designed to detect 2% prevalence with 95% confidence. A positive result was defined as a Ct value < 35 and an inconclusive result (Ct > 35), these PCR values apply today.

There is no easy way to scientifically convert an intermediate status bay to free status without a scientifically sound surveillance program. In the absence of any other POMS data, an initial step would be to conduct surveillance on 30 mature feral Pacific oysters at an approximate cost of \$2,000. The absence of any feral Pacific oysters nearby to lease areas would be a positive indicator.

Whatever level of assurance is agreed it will require funds to pay for operational and testing costs which could be significant. Current AHL cost for the Ostreid Herpesvirus Type 1 (POMS, OsHV1) PCR is \$66.34 per test . The testing should be conducted by a NATA accredited laboratory such as AHL. Fee negotiation is possible, especially around sample collection and preparation aspects.

It would be preferable that there is general industry support and acceptance for this approach before any detailed plans are made.

OPTION 4 Split Intermediate classifications into two levels

An alternate system has been proposed in the draft OT paper. Essentially it asks for a refined appraisal of the intermediate status areas to split these into two classifications based on the presence of test positives (B) versus status by geographic association risk only (A). The 2016 test records have not been reviewed in detail and the idea may have merit. Industry has to be satisfied about the level of confidence in decision making for an individual bay ‘A’ status and any implications when oysters later move from the bay. The details of active surveillance need to be developed to provide this confidence. The surveillance program will involve a cost to the oyster industry, but this is unable to be quantified until the surveillance plan is developed.

Table 2. Zone Classification Definitions (separation of intermediate classification into two levels)

Free	No virus detected by PCR, no signs of disease, geographically isolated from infected areas
Intermediate A	No virus detected by PCR, no signs of disease but geographically close to infected area, risk of natural transfer
Intermediate B	Virus detected by PCR, no signs of disease
Infected	Evidence of disease and PCR test positive for virus.

Table 3. Recommended POMS Movement Matrix (separation of intermediate classification into two levels) ²

Source Zone Classification	Destination Zone Classification			
	Free	Intermediate A	Intermediate B	Infected
Free	OK	OK	OK	OK
Intermediate A	NO	OK*	OK*	OK
Intermediate B	NO	NO*	OK*	OK
Infected	NO	NO	NO	OK

² Biosecurity Movement Protocol -Draft Discussion Paper 2019. Ian Duthie, Oysters Tasmania.

Annual reviews will be problematic and create more permit allocation work.

Feedback on this proposal to review intermediate bay status split is requested.

OPTION 5 Abolish intermediate status

This path would create a Free and Infected Zone classification, where the south of Tasmania is considered infected and the north considered free. This would eventually lead to the further spread of the virus in the south and would not open movements to the north. Once again, industry consultation is essential.

OPTION 6 Removing the control of oyster movements within Tasmania.

There has been solid progress by Australian Shellfish Industries at Taroona in the selection and breeding of OsHV-1 resistant Pacific oysters but conferred resistance is not absolute and triploid stock remains particularly susceptible. There are also valuable lines of non-resistant stock that have been selected for other characteristics. With this approach it is likely that the virus will spread to all areas with Pacific oysters. The exposure of feral Pacific oysters and additional marine environments to OsHV-1 does not create natural environment detriment.

An industry decision to remove POMS requirements can be done with appropriate consultation and evidence of industry support for a revocation of the Control Order, Section 40 Notice and the Group Permit. In this scenario, the industry would still need to understand and comply with the General Biosecurity Duty (GBD). Movements of shellfish would not be restricted by specific biosecurity requirements.

Agreement to pursue this option would require further discussions around consultation and timing.

ISSUE 2 - HATCHERY POMS TESTING OF SPAT.

The oyster industry is well served by five Tasmanian hatcheries that have approved biosecurity programs that are independently audited by third party auditors. Effectively these premises operate as a biosecure compartment with high levels of water inflow and effluent treatment and approved biosecurity procedures. There is no intention to vary these arrangements but there are issues for consideration.

Whilst not directly related, consideration is being given to assess the biosecurity requirements for the importation of breeding stock of Pacific and Sydney rock oysters and other shellfish for select breeding programs under the same hatchery biosecurity standards. This request from interstate reflects the trust in Tasmania's shellfish industry to meet the biosecurity requirements, and supply demand to the interstate and local markets. Compliance with Tasmania's Appropriate Level of Protection (ALOP) set at 'very low risk' is required by the Tasmanian Biosecurity Import Risk Analysis (BIRA). If approved after application and assessment, requirements will be formalised in a Special Authority / Individual Permit issued to the hatcheries concerned.

OPTION 1 Status quo

Hatchery testing requirement for POMS remains at 2 tests of 30 spat required as indicated in permits to date.

OPTION 2 Single movement test of spat

Adequate evidence is available that the approved biosecurity practices in the hatchery effectively prevent the vertical transmission of OsHV-1³. The CVO is considering the reduction in spat testing to a single pre-movement batch PCR test (NATA accredited) of the 2240 stage with a 21 day @ 21°C heat stress applied in the absence of any clinical signs or mortalities of note. This reduced requirement could be introduced through Individual permits for spat movements from hatcheries. There will be no appreciable increase in POMS risk with these tested spat movements to POMS free areas.

It should be noted that hatcheries and nurseries that operate with an exposed water component also need to comply with relevant biosecurity standards if POMS status and trading rights are to be maintained.

³ Case study of vertical transmission of ostreid herpesvirus-1 in Pacific oysters and biosecurity management based on epidemiological data from French, New Zealand and Australian hatchery-propagated seed. AJ Trotter et al *Aquaculture Research*. 2021;00:1–6.

SUMMARY

The implementation of the General Permit under the *Biosecurity Act 2019* means the status quo applies for POMS, with less administration burden.

Bay status review or the development of an Oyster Industry Biosecurity Program should require surveillance, additional resources and funding. Any of the options listed above could be implemented if there is unanimous support through consensus for a changed approach.

The decision to adoption a single pre-movement batch PCR test of spat should be a welcome efficiency for oyster production.

Consultation with industry members around the state is required to achieve an agreed result before any significant biosecurity decisions are made. A joint effort by NRE Tas and OT would be welcomed.

RECOMMENDATIONS:

1. That Oysters Tasmania considers the options above and provides feedback to CVO on preferred options.
2. That Oysters Tasmania provides feedback to the CVO on any other alternative options including a meeting to discuss options and next steps with the CVO as required.

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7th March 2023

Appendix 1. Group Permit and Current POMS Requirements from NRE webpages.

Appendix 2. Extract from Maloney et al 2023 in press – 2011 OshV-1 Monitoring

Appendix 1. Group Permit and Current POMS Requirements from NRE webpages.

Biosecurity Tasmania currently issues approximately 60 POMS Movement Permits each year resulting in a significant administrative burden on the Animal Biosecurity and Welfare Branch which manages the POMS movement permit applications exclusively.

The basis for the permits is;

Movements are allowed under permit, both within a risk area and into another area where there is a higher risk of POMS presence. Movements are not allowed from an area of high risk to an area with a lower level of risk of POMS being present.

- Movement within bays is permitted.
- Movement between bays and zones is assessed as follows:

TO → FROM ↓	Infected	Intermediate	Test free
Infected	By permit	NO	NO
Intermediate	By permit	By permit	NO
Test free	By permit	By permit	By permit

Note: permits may apply conditions for the movement.

The Biosecurity Act 2019 (the Act) provides a way to reduce administrative burden, not only for staff but also for industry members who initiate the process by having to complete and correctly lodge an application form for lease-specific movements on an annual basis. The legal instrument is a Group Permit (GP) issued under section 100 (2) (b) of the Act.

Group Permits are granted to a group, or class, of persons specified in the permit and remain in force for a period of up to 5 years from the date of issue. Biosecurity Tasmania is proposing to issue a single GP to the Tasmanian oyster industry which will provide specific conditions for the movement of oysters and oyster farming equipment between growing areas based on disease risk and in accordance with the current oyster growing Area Classifications.

The issue of the GP will significantly reduce administrative burden for government and reduce red tape for industry without compromising the rigor of the current movement system. The currently applied requirements in the individual Movement Permits have been applied in the GP and are consistent with the Section 40 Notice.

The permitted movements between bay areas are as follows;

TO → FROM ↓	Infected	Intermediate	Test free
Infected	Yes	NO	NO
Intermediate	Yes	Yes	NO
Test free	Yes	Yes	Yes

Oysters and oyster spat from hatcheries are excluded and will still be required to apply for a movement permit from Biosecurity Tasmania. There are strict biosecurity management plans, auditing requirements, and disease testing programs that these facilities must comply with prior to movement being allowed. However, this affects only a small number of facilities (5). All hatcheries operate successfully adjacent to POMS infected waters and are discussed further on in this paper.

The issue of the GP will be in effect the status quo with a reinforcement of the shared general biosecurity duty (GBD) responsibility for oyster biosecurity standards. These requirements will better protect our industry, economy, and the environment from the threat of disease and pest incursions. Oyster farmers need to continue to embrace the biosecurity requirements as part of their daily operations. They will no longer need to seek a permit or advice unless they have an unusual or difficult situation that is not covered by the GP.

The essential components of the GBD⁴ include; disease surveillance and reporting, record keeping, hygienic procedures, control of movement of people and things. Any unexplained incidence of unusual mortalities, pests or moribund stock should result in the immediate suspension of stock movement by the affected lessee and notification to the CVO, OT, surrounding growers, and any business that has recently received stock from the area, pending further veterinary investigation.

This GP will be made by publication of the NRE website in the group permits part of the Biosecurity Compendium and the POMS pages on 8 March 2023. The Control Order and Section 40 notice will endure. Appropriate targeted communications will be conducted including individual correspondence to all oyster farmers.

Area Classification

Area classifications are designated according to the level of risk that the POMS virus is present in a bay and may change from time to time. The different areas that determine the basis for issuing a Movement Permit are:

- **POMS free** area across the north of Tasmania,
- **Intermediate risk** areas where there is little or no evidence of disease, but a risk of introduction of the disease; and
- **Infected areas** where POMS is known to occur.

The current list of three (3) areas of differing disease risk is:

POMS Free areas

This is all areas of Tasmania north of a line through Launceston.

- Sea Elephant Bay (King Island)
- Montague
- Duck Bay
- Big Bay

- Port Sorell
- Moulting Bay (Georges Bay)

Intermediate areas

This is the Huon-Channel area, Norfolk Bay and Great Oyster Bay.

- Great Oyster Bay
- Great Swanport
- King George Sound
- Eaglehawk Bay
- Garfish Bay
- Little Norfolk Bay
- Port Arthur
- Fluertys Point
- Great Bay
- Long Bay Reef
- Little Taylors Bay
- Cloudy Bay Lagoon
- Port Esperance
- Hastings Bay
- Recherche Bay
- Dunalley Bay

Infected areas

- Little Swanport
- Spring Bay
- Boomer (Blackman) Bay
- Pitt Water (including Island Inlet)
- Pipe Clay Lagoon
- Port Cygnet (including Gardners Bay and Deep Bay)

Movements are allowed under permit, both within a risk area and into another area where there is a higher risk of POMS presence. Movements will **not** be allowed from an area of high risk to an area with a lower level of risk of POMS being present.

[POMS_MovementRestrictions_FactSheet20160212.pdf \(nre.tas.gov.au\)](#)

To protect the Tasmanian oyster industry, a state-wide Control Area declaration is in place restricting the movement of oysters, animal materials and conveyances used in the production of oysters.

A general permit has been issued allowing oysters and associated equipment to be moved within individual production areas to allow for movement of boats to and from leases etc. All other movements will require a permit.

Movement Permits are required for any movements of live oysters or oyster equipment throughout Tasmania.

Appendix 2. Extract from Maloney et al 2023 in press – 2011 OsHV-1 Monitoring

Table 1: Numbers of Pacific Oysters sampled for each state and region.

State	Region	Location	Date sampled	No. tested PCR	No. positive
TAS	Area 1: North West	Smithton	12/04/2011	150	0
	Area 2: East Coast	Coles Bay	18/04/2011	155	0
	Area 2: East Coast	Little Swanport	19/04/2011	155	0
	Area 2: East Coast	St Helens (Georges Bay)	27/04/2011	155	0
	Area 3: South East	Blackman Bay	3/05/2011 & 14/05/2011	155	0
	Area 3: South East	Norfolk Bay/Peninsula	3/05/2011 & 14/05/2011	155	0
	Area 3: South East	Pipeclay	6/04/2011	150	0
	Area 3: South East	Pittwater	12/04/2011	150	0
	Area 4: D'Entrecasteaux Channel	Bruny Island/Channel	5/05/2011 & 11/05/2011	185	0
	Area 4: D'Entrecasteaux Channel	Southport/Dover	17/05/2011	125	0
TAS Summary		10 Farmed locations	Apr-May-2011	1535	0
Grand Total		23 locations	Jan-May 2011	4121	0

* Wild populations of Pacific oysters sampled in NSW only. All other samples were **farmed Pacific oysters**

Table 3: Probability of freedom from infection with POMS in all sampled regions

State	Location	PCR negative	Region sensitivity	Probability of freedom*
TAS	Blackman Bay	155	94.9%	95.2%
TAS	Bruny Island/Channel	185	97.1%	97.2%
TAS	Coles Bay	155	94.9%	95.2%
TAS	Little Swanport	155	94.9%	95.2%
TAS	Norfolk Bay/Peninsula	155	94.9%	95.2%
TAS	Pipeclay	150	94.4%	94.7%
TAS	Pittwater	150	94.4%	94.7%
TAS	Smithton	150	94.4%	94.7%
TAS	Southport/Dover	125	90.9%	91.7%
TAS	St Helens (Georges Bay)	155	94.9%	95.2%
Total outside NSW infected area		4121	95.6%	95.8%

* Prob of freedom = $(1 - \text{prior}) \div (1 - \text{prior} \times \text{region_sensitivity})$, where prior = 0.5