

Victorian Abalone Aquaculture Translocation Protocol

Version 2
August 2026

Version Control

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Greenlip abalone *Haliotis laevis*

Introduction

Objective

The objective in developing the abalone aquaculture translocation protocols is to preserve the natural and farmed stocks of Victorian abalone, and to ensure that any abalone translocations do not adversely impact the Victorian marine environment and the abalone farms. A risk assessment has been used to guide the development of the protocol as part of the implementation of the Guidelines for the translocation of live aquatic organisms in Victoria. (Department of Primary Industries, 2003). The protocol documents the risk assessment process undertaken in relation to the translocation of abalone in Victoria and the subsequent controls recommended for translocation activities associated with the abalone aquaculture industry. The controls presented in this protocol are adaptive and represent minimum standards that are designed to mitigate risks. However, it is advisable and recommended that translocators consider additional measures to further protect their financial exposure to risks associated with translocations.

This updated version of the protocol introduces the Abalone Health Accreditation Program (AHAP), a nationally endorsed accreditation program relating to the disease abalone viral ganglioneuritis (AVG).

Scope

This protocol deals only with the translocation activities into and within Victoria associated with the abalone aquaculture industry. The type of translocations that may be undertaken by the Victorian abalone aquaculture industry and thus considered within the scope of this protocol are detailed in Table 1 and Figure 1. To facilitate use of this document, Table 1 groups translocations according to their geographic range (within Victoria or into Victoria) and by the source of the translocation. It is recognised that translocations from the same source to different destinations may involve different risks and additional control measures have been developed to address those risks.

Table 1. Potential translocation activities undertaken by the Victorian abalone aquaculture industry.

Translocation source:		Translocation destination:	
Within Victoria:			
1.	Translocation of wild broodstock from Victorian waters.	Licensed Victorian land-based aquaculture site.	
2.	Translocation of wild broodstock from licensed Victorian fish receiver/processor.	Licensed Victorian land-based aquaculture site.	
3.	Translocation of domesticated broodstock from licensed Victorian land-based aquaculture site.	Licensed Victorian land-based aquaculture site.	
4.	Translocation of abalone from licensed Victorian land-based aquaculture site.	a)	Licensed Victorian land-based aquaculture site
		b)	Licensed Victorian offshore aquaculture site.
5.	Translocation of abalone from licensed Victorian offshore aquaculture site.	a)	Licensed Victorian land-based aquaculture site
		b)	Licensed Victorian offshore aquaculture site.
6.	Inadvertent translocation of abalone, marine pests or disease agents from licensed Victorian land-based aquaculture site.	Victorian marine waters.	
7.	Inadvertent translocation of abalone, marine pests or disease agents from licensed Victorian offshore aquaculture site.	Victorian marine waters.	
Into Victoria:			
8.	Translocation of wild broodstock from interstate waters.	Licensed Victorian land-based aquaculture site.	
9.	Translocation of wild broodstock from licensed interstate fish receiver/processor.	Licensed Victorian land-based aquaculture site.	
10.	Translocation of domesticated abalone from licensed interstate land-based aquaculture site.	a)	Licensed Victorian land-based aquaculture site.
		b)	Licensed Victorian offshore aquaculture site.
11.	Translocation of domesticated abalone from licensed offshore interstate aquaculture site.	a)	Licensed Victorian land-based aquaculture site .
		b)	Licensed Victorian offshore aquaculture site.

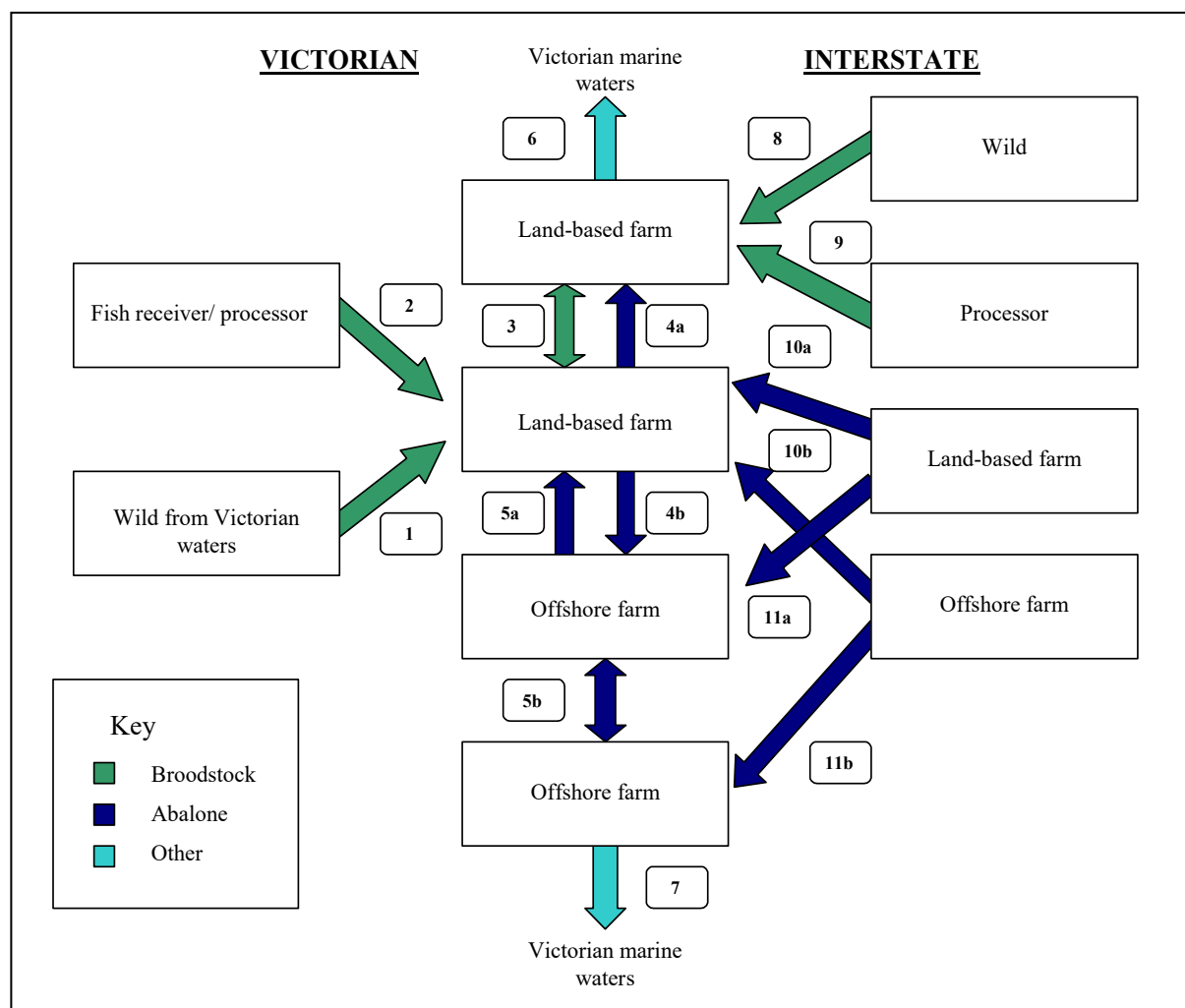


Figure 1. Translocation activities managed by this protocol in relation to the abalone aquaculture industry.

Background

Abalone (genus *Haliotis*) are highly prized marine gastropods some species of which are endemic to southern Australia. Abalone are defined in the *Fisheries Act 1995* to mean blacklip (*H. rubra*) and greenlip (*H. laevis*) and include all other species, forms, races and hybrids of abalone and form the basis of Victoria's most important and valuable fishery. Specifically, this document relates to abalone aquaculture producers who are authorised to operate by the *Fisheries Act 1995*, either through the granting of an Aquaculture Licence or General Permit by the Victorian Fisheries Authority (VFA). It applies to the translocation of live abalone into and within Victoria (including all stages of the organism's lifecycle) and aims to specify the conditions under which the organism can be moved. All translocations that involve inputs to, and outputs from, abalone farms are covered with the exception of translocations related to wholesale or retail sale of the product.

This document considers translocations of live aquatic organisms associated with the abalone aquaculture industry in Victoria. However, some consideration will also be given to issues related to commercial fishing for abalone as the two activities are linked through the use of wild broodstock by some parts of the abalone aquaculture industry. There is also recreational harvesting of both abalone species in Victoria; however, this is low compared with the commercial catch and it is considered an inappropriate translocation pathway for supplying broodstock. Illegal, unlicensed and unreported fishing activities are outside the scope of this document. The importation of aquaculture feed is managed under Federal legislation in accord with appropriate import risk assessment provisions.

With regard to the wild abalone stocks, only translocations between licence holders authorised to undertake abalone aquaculture and licensed fish receivers will be considered in this document. However, potential impacts on wild stocks from the inadvertent release of abalone, marine pests and diseases are covered by this document.

This document specifically does not cover the following translocations related to the wild catch and processing sector:

- abalone processing activities including disposal of processing wastes and effluent waters,
- abalone relocation and reseedling activities undertaken by the wild sector,
- wild abalone collected by commercial fishermen and delivered to licensed fish receivers,
- movement of abalone between licensed receivers, and
- the movement of wild abalone collection equipment.

Definitions

For the purposes of this protocol, a translocation is defined as “a process that has been approved by the CEO VFA or delegate for the deliberate human-assisted movement of a live aquatic organism to protected waters under the *Fisheries Act 1995*.”

Other relevant definitions include:

AFR: Aquaculture Fisheries Reserve.

AHAP: Abalone Health Accreditation Program. A nationally agreed program providing the technical requirements utilising OIE principles to approve farms as disease free compartments for abalone viral ganglioneuritis. The AHAP is provided as Appendix I.

Approved Laboratory: A laboratory approved by the Competent Authority to carry out diagnostic work on diseases.

Broodstock (domesticated): Hatchery-bred adult abalone retained for the purposes of breeding. This stock may be farm conditioned and may (or may not) be part of a selection program.

Broodstock (wild): Adult abalone collected from the natural marine environment and stocked for the purposes of breeding.

CEO VFA means the Chief Executive Officer of the Victorian Fisheries Authority.

Competent Authority: means the Veterinary Authority or other relevant Governmental Authority having the responsibility and competence for ensuring or supervising the implementation of animal health measures or veterinary health certification. This may include State, Territory or Commonwealth governments and their departments. (Derived from OIE, 2017).

Consequence: The outcomes of an event or situation expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain.

CVO: The Victorian Chief Veterinary Officer, the Department of Energy, Environment and Climate Action.

Disease: Clinical or non-clinical infection with one or more of the aetiological agents of the disease.

Department: means the Department of Energy Environment and Climate Action and its successors.

Domesticated abalone: One that has been bred and raised on farm. For the purposes of this protocol, domesticated abalone includes all life stages of farm bred abalone.

Endemic: Species restricted in distribution to a particular region.

Likelihood: Probability or frequency of a particular event or situation occurring.

Marine pest: Unwanted species that can be translocated with abalone (Listed in Hayes et al 2004).

OIE: The Office International des Epizooties (OIE). In 2003 the Office became the World Organization for Animal Health (WOAH)

Quarantine: Maintaining a group of aquatic animals in isolation with no direct or indirect contact with other aquatic animals, in order to undergo observation for a specified length of time and, if appropriate, testing and treatment, including proper treatment of the effluent waters and controlled access by personnel.

Ranching: Is the uncontained stocking of abalone, onto natural reef or created habitat not within an AFR, for the purpose of growth and exclusive harvest.

Risk: The chance of undesirable events, expressed as a function of the likelihood and consequence of such events.

Risk Assessment: Procedure where estimates of likelihood and consequence of an event are combined to arrive at a given level of risk. Control methods are then developed to rank and reduce the risks.

Supplier: Person or company who is licensed to hold or culture abalone and intends to consign live abalone for the purpose of aquaculture.

TEP: Translocation Evaluation Panel. An expertise-based evaluation panel set up to provide advice to the decision maker on the management of risks associated with the human assisted translocation and stocking of live aquatic organisms into and within Victoria.

Translocation Guidelines means the Guidelines for Assessing Translocations of Live Aquatic Organisms in Victoria 2014 as it may be amended from time to time. The Guidelines were first published in 2003 and updated in 2009 and 2014.

VFA means the Victorian Fisheries Authority

World Organisation for Animal Health: The World Organisation for Animal Health (WOAH) is an intergovernmental organisation that undertakes to collate and disseminate information on animal diseases globally. It has a mandate to safeguard world trade by publishing health standards for international trade in animals and animal products. Standards relevant to aquaculture include:

- *Aquatic Animal Health Code* (WOAH, 2023 or as updated; www.woah.org).
- *Manual of Diagnostic Tests for Aquatic Animals* (WOAH, 2021 or as updated; www.woah.org).

Need

Victorian Government legislation and policies drive the need for this protocol.

Legislation

Key Victorian legislation surrounding the translocation of abalone includes:

- The *Fisheries Act 1995*, which regulates the commercial abalone industries (including aquaculture) and establishes a number of objectives aimed at achieving ecologically sustainable development with reference to the maintenance of aquatic processes and genetic diversity.
- The *Flora and Fauna Guarantee Act 1988*, which provides for the protection and conservation of native flora and fauna.
- The *Livestock Disease Control Act 1994*, which is administered by the CVO of Victoria and aims to control the introduction and spread of disease in Victoria.
- All translocation activities described in this protocol must be authorised under the *Fisheries Act 1995* and are subject to the *Fisheries Regulations 2009*. Licences are subject to any conditions as specified by the CEO VFA or delegate. The VFA, has the lead role in developing a protocol for the translocation of abalone in Victoria.

Policy

The Translocation Guidelines for Assessing Translocations of Live Aquatic Organisms in Victoria (the Translocation Guidelines, 2014) provides the policy framework for developing a protocol for the translocation of abalone into and within Victoria. This protocol aims to mitigate the risks associated with the translocation of abalone for the purpose of aquaculture and in doing so it will facilitate the repeated translocation events in accordance with best practice. All translocation protocols are being developed to fulfil the requirements of the Translocation Guidelines.

The Victorian Abalone Fishery Management Plan (Fisheries Victoria, 2015) is another key policy instrument related to abalone. This document specifies a management plan for the wild catch abalone fishery.

The Victorian abalone aquaculture industry

Blacklip, greenlip and hybrid abalone are currently farmed in Victoria on farms spread across the state's coastline. The species selected by farmers will depend on the commercial objectives of the farmer and or site-specific criteria.

All production currently comes from land-based, flow-through culture systems.

Systems

Land-based aquaculture systems

Land-based abalone aquaculture systems are located along the coastline of Victoria. These systems require a substantial investment in infrastructure, access to a range of services and a supply of good quality seawater.

Grow-out systems culture abalone in tanks or raceways of various designs and materials and require a continuous exchange of seawater. The effluent seawater from each farm is regulated under license issued by EPA.

Longline or offshore cage culture systems

A variety of cage and barrel systems have been trialled by different farmers. These systems have equipment located on the sea floor or suspended in the water column that contain the abalone. In all cases, offshore abalone diets have involved feeding locally sourced live or processed seaweed.

Ranching

Abalone ranching in Victorian waters is not supported by the VFA.

Future developments in the aquaculture industry

Production from the abalone sector is expected to increase over the coming years.

Stock losses associated with a viral disease causing ganglioneuritis significantly impacted on production in 2006 and, considerable resources are now in place to manage risks associated with stock health.

Commercial abalone fishery

Australia has a valuable wild catch abalone fishery. Due to its high value the abalone fishery is intensively managed in most states to protect wild stocks and ensure the sustainability of the fishery. The commercial fishery in Victoria is dominated by the blacklip abalone (*H. rubra*) and is the third largest abalone fishery after South Australia and Tasmania. The fishery is regulated through gear restrictions, closures, legal minimum lengths, zonation of the fishery, fine scale spatial management, limited access and catch quotas. In Victoria, abalone are fished by divers operating on Abalone Fishery Access Licences and transported to licensed abalone processors.

General risks associated with translocation of aquatic organisms in Victoria

The translocation of an aquatic organism at its broadest definition encompasses any human assisted movement of that organism. The translocation of aquatic organisms is recognised as a potentially threatening process to the environment, particularly where such translocations occur outside the natural range of the species being translocated. As aquaculture and fisheries enhancement present opportunities to utilise a range of species within and outside their natural range in a variety of farming systems, it is important to identify and manage the risks associated with this activity. It is also suggested that the aquaculture and fishing industry sectors take an active role in managing this issue to ensure community confidence is maintained i.e. industry's development and embracing of AHAP and associated translocation protocols.

Risks associated with abalone translocations

Specific risks considered for abalone translocations were:

- disease and parasite introductions,
- genetic shift in wild populations,
- translocation of associated species (the most potentially harmful being marine pests that have been ranked highly as national priority pests (Hayes et al. 2004; Appendix H),
- environmental impacts from release of translocated species.

Protocols for abalone translocation in Victoria

Translocation of abalone within Victoria

These protocols deal with translocation of abalone into and within Victoria undertaken by the Victorian abalone aquaculture industry. As such these translocations apply only to licensees or permit holders authorised under the *Fisheries Act 1995*. It is recognised, that minimum standards specified in this protocol will equally apply to the interstate movement of abalone for the purposes of aquaculture.

These protocols have been developed in accordance with the Translocation Guidelines. The protocol provides administrative (reporting, licensing), design (biosecurity) and operational (surveillance and monitoring) standards that, combined, provide a heightened level of management control. Control measures have been developed to address risks associated with specific pathways.

Implementation of this protocol requires the establishment of conditions on authorities that enable compliance/enforcement in accordance with the provisions of the *Fisheries Act 1995* and *Fisheries Regulations 2009*. To enable adaptive management, this protocol will be reviewed periodically. Any proposed changes to the protocol will require consultation with affected industry parties and or relevant consultative bodies.

It is important to note that in addition to this protocol, a suite of other regulatory and policy arrangements (refer page 4) are also available that enable additional controls to be put in place at short notice including, powers under the *Livestock Disease Control Act 1994*. For example, the Secretary may declare an area or zone as an infected place, control area or restricted area. This may be used to prevent or control an outbreak of disease. Specific controls may also be established to regulate the introduction of aquatic animals into the state of Victoria. The risk assessment identified and prioritised high, significant and moderate risks associated with the translocation of abalone associated with aquaculture within and into Victoria. The highest risks were associated with the potential for disease transfer through translocations. Other important risks were associated with the transfer of marine pests and fouling organisms and the introduction of abalone species not endemic (e.g. *H. roei*) to Victoria.

It is important to recognise that while a single control measure may not cover all risks, the adoption of a range of control strategies is designed to achieve effective risk management.

A number of pathways are “not permitted within this protocol” on the basis of unacceptable risk and or limited ability to control that risk. Applications to translocate abalone in such pathways would be subject to a full risk assessment in accordance with the Translocation Guidelines and be considered by the Translocation Evaluation Panel (TEP) prior to any authority being issued.

Translocation of broodstock

Pathway #1: Translocation of wild broodstock from Victorian waters to licensed land-based aquaculture sites.

This translocation pathway of wild broodstock to a land-based farm accredited under the AHAP, unless under permanent approved quarantine, is not permitted and would void the farm's accreditation.

- 1.1 **General permit** - Abalone broodstock for the purposes of aquaculture may only be harvested from the wild under the authorisation of a General Permit and in accordance with permit conditions.
- 1.2 **Reporting** - Prior to collection of abalone the permit holder must observe the health status of abalone on the reef and report any unusual mortalities, signs of mortalities or disease to the VFA within 24 hours of observation.
- 1.3 **Infected reefs** - Abalone may not be collected from reefs where abalone are known or suspected to be infected with a notifiable disease as defined under the *Livestock Disease Control Act 1994*.
- 1.4 **Quarantine & biosecurity** - Comply with Appendix A. Broodstock quarantine and biosecurity standards.
- 1.5 **Abalone batch** - Broodstock collected over a seven-day period from the same reef code are considered a “batch”.
- 1.6 **Marine exotic inspection** - All abalone broodstock must be inspected on arrival for the presence of attached marine exotic organisms by hatchery staff familiar with the marine pests listed in Appendix H.
- 1.7 **Marine exotic reporting** - In the event of a suspect marine exotic organism (Appendix H) the licence holder must inform the VFA of the suspected marine exotic organism's presence within 24 hours, remove the suspect marine exotic(s) organism, preserve in formalin and make available on request to the VFA for identification purposes.
- 1.8 **Translocation restriction** - Wild broodstock may not be translocated from the original broodstock quarantine facility.
- 1.9 **Management of mortalities** - All wild caught abalone broodstock mortalities and non-retained broodstock must be bagged in lots of ten or less, frozen and labelled with the date and time of freezing and the number of abalone in the container and retained on the premises for collection by a Fisheries Officer at an agreed time.
- 1.10 **Annual auditing** - Comply with Appendix G. Compliance auditing.

Pathway #2: Translocation of wild broodstock from licensed Fish Receiver / processor to licensed Victorian land-based aquaculture site.

2.1 This translocation pathway is not permitted within this protocol and would be subject to a separate risk assessment in accordance with the Translocation Guidelines.

Pathway #3: Translocation of domesticated broodstock between licensed Victorian land-based aquaculture sites.

3.1 **AHAP Compliant** - Both the source and destination facilities are compliant with and accredited as AHAP compliant facilities by the Competent Authority (Appendix I), or

3.2 **Annual auditing** - Comply with Appendix G. Compliance auditing, and

3.3 **Farm biosecurity** - Comply with Appendix B. General land-based abalone farm bio-security standards, and

3.4 **Health Surveillance Plan** - Provide a certificate of compliance signed by the Competent Authority that declares the aquaculture facility is free of notifiable disease (*Livestock Disease Control Act 1994*) based on Appendix D. Health surveillance program for abalone farms, or

3.5 **Batch Testing** - Demonstrate that the abalone population proposed for consignment are declared free of notifiable diseases based on Appendix E. Batch certification requirements for abalone stock,

Translocation of abalone (non broodstock)

Pathway # 4a: Translocation of abalone (non broodstock) between licensed Victorian land-based aquaculture sites.

4a.1 **AHAP Compliant** - Both the source and destination facilities are compliant with and accredited as AHAP compliant facilities by the Competent Authority (Appendix I); or

4a.2 **Annual auditing** - Comply with Appendix G. Compliance auditing, and

4a.3 **Farm biosecurity** - Comply with Appendix B. General land-based abalone farm bio-security standards, and

4a.4 **Health Surveillance Program** (suitable for translocation of larvae)- Provide a certificate of compliance signed by the Competent Authority that declares the aquaculture facility is free of notifiable disease (*Livestock Disease Control Act 1994*) based on Appendix D. Health surveillance program for abalone farms; or

4a.5 **Batch Testing** - Demonstrate that the abalone population proposed for consignment are declared free of notifiable diseases based on Appendix E. Batch certification requirements for abalone stock.

Pathway # 4b: Translocation of abalone (non broodstock) from licensed Victorian land-based aquaculture site to licensed Victorian offshore aquaculture site.

4b.1 **AHAP Compliant** -The source land-based facility is compliant with and accredited as an AHAP compliant facility by the Competent Authority (Appendix I); or

4b.2 **Annual auditing** - Comply with Appendix G. Compliance auditing, and

4b.3 **Farm biosecurity** - Comply with Appendix B. General land-based abalone farm bio-security standards; and

4b.4 **Health Surveillance Program** - Provide a certificate of compliance signed by the Competent Authority that declares the aquaculture facility is free of notifiable disease (*Livestock Disease Control Act 1994*) based on Appendix D. Health surveillance program for abalone farms; or

4b.5 **Batch Testing** - Demonstrate that the abalone population proposed for consignment are declared free of notifiable diseases based on Appendix E. Batch certification requirements for abalone stock, and

4b.6 **Abalone parentage** -abalone, whose progeny is intended to be grown in offshore aquaculture facilities, must be sourced from within the same embayment or from a location approved by the VFA.

Pathway # 5a: Translocation of abalone from licensed Victorian offshore aquaculture site to licensed Victorian land-based aquaculture site.

5a.1 **Annual auditing** - Comply with Appendix G. Compliance auditing, and

5a.2 **Offshore farm biosecurity** - Comply with Appendix C. General offshore abalone farm bio-security standards; and

5a.3 **Health Surveillance Program** - Provide a certificate of compliance signed by the Competent Authority that declares the aquaculture facility is free of notifiable disease (*Livestock Disease Control Act 1994*) based on Appendix D. Health surveillance program for abalone farms; or

5a.4 **Batch Testing** - Demonstrate that the abalone population proposed for consignment are declared free of notifiable diseases based on Appendix E. Batch certification requirements for abalone stock.

Pathway # 5b: Translocation of abalone between licensed Victorian offshore aquaculture sites.

5b.1 **Annual auditing** - Comply with Appendix G. Compliance auditing, and

5b.2 **Offshore farm biosecurity** - Comply with Appendix C. General offshore abalone farm bio-security standards; and

5b.4 **Abalone parentage** - abalone, whose progeny is intended to be grown in offshore aquaculture facilities, must be sourced from within the same embayment or from a location approved by the VFA, and

5b.5 **Health Surveillance Program** - Provide a certificate of compliance signed by the Competent Authority that declares the aquaculture facility is free of notifiable disease (*Livestock Disease Control Act 1994*) based on Appendix D. Health surveillance program for abalone farms; or

5b.6 **Batch Testing** - Demonstrate that the abalone population proposed for consignment are declared free of notifiable diseases based on Appendix E. Batch certification requirements for abalone stock.

Inadvertent translocation of abalone, marine pests and disease agents

(Note: Pathway 6 applies to all land-based abalone farms; Pathway 7 applies to all offshore abalone farms.)

Pathway #6: Inadvertent translocation of abalone (marine pests or disease agents) from licensed Victorian land-based aquaculture site to Victorian marine waters.

6.1 **Annual auditing** - Comply with Appendix G. Compliance auditing, and

6.2 **Farm biosecurity** - Comply with Appendix B. General land-based abalone farm bio-security standards, and

6.3 **Wild stock monitoring** - The licence holder (or nominee) is required to monitor the health status of wild abalone (if present) and survey for marine exotics within a radius of 50 metres of the land-based wastewater discharge on a biannual basis or during a period of significant mortality using approved diving practices (refer Appendix F).

6.4 **Prohibited disposal** - The licence holder is prohibited from the disposing of live, dead or moribund abalone into the marine environment.

Pathway # 7: Inadvertent translocation of abalone (marine pests or disease agents) from licensed Victorian offshore aquaculture site to Victorian marine waters.

7.1 **Annual auditing** - Comply with Appendix G. Compliance auditing, and

7.2 **Offshore farm biosecurity** - Comply with Appendix C. General offshore abalone farm bio-security standards, and

7.3 **Wild stock monitoring** - The licence holder (or nominee) is required to monitor the health status of wild abalone (if present) and survey for marine exotics within a radius of 50 metres of aquaculture equipment on a biannual basis or during a period of significant mortality using approved diving practices (refer Appendix F).

7.4 **Prohibited disposal** - The licence holder is prohibited from the disposing of live, dead or moribund abalone into the marine environment.

7.5 **Seaworthy equipment** - The Licence holder is required to maintain all commercial aquaculture equipment to prevent escape of abalone and ensure that it always remains in seaworthy condition.

7.6 **Baseline & Ongoing Monitoring** – The licence holder is required to comply with the *Guidelines for Environmental Baseline Surveys and Ongoing Monitoring of Aquaculture Fisheries Reserves in Port Phillip and Western Port and the Supplement to the guidelines* (contact VFA for access 136 186).

Translocation of abalone from interstate to Victoria

Pathway # 8: Translocation of wild broodstock and larval progeny from interstate to licensed Victorian land-based aquaculture site.

8.1 This pathway is not permitted within this protocol and would be subject to a separate risk assessment in accordance with the Translocation Guidelines.

Pathway # 9: Translocation of wild broodstock from licensed interstate fish receiver/processor to either licensed Victorian land-based or offshore, aquaculture site.

9.1 This pathway is not permitted within this protocol and would be subject to a separate risk assessment in accordance with the Translocation Guidelines.

Pathway # 10a: Translocation of domesticated abalone from licensed land-based interstate aquaculture site to licensed Victorian land-based aquaculture site.

10a.1 **AHAP Compliant** - Both the source and destination facilities are compliant with and accredited as AHAP compliant facilities by the Competent Authority (Appendix I) and have undertaken any batch testing required as per Appendix E; or

10a.2 **Annual auditing** - Comply with Appendix G. Compliance auditing, and

10a.3 **Farm biosecurity** - Comply with Appendix B. General land-based abalone farm bio-security standards, and

10a.4 **Health Surveillance Program** - Provide a certificate of compliance signed by the Competent Authority that declares the aquaculture facility is free of notifiable disease (*Livestock Disease Control Act 1994*) based on Appendix D. Health surveillance program for abalone farms; or

10a.5 **Batch Testing** - Demonstrate that the abalone population proposed for consignment are declared free of notifiable diseases based on Appendix E. Batch certification requirements for abalone stock.

Pathway #10b: Translocation of domesticated abalone from licensed interstate land-based aquaculture site to licensed Victorian offshore aquaculture site.

10b.1 This pathway is not permitted within this protocol and would be subject to a separate risk assessment in accordance with the Translocation Guidelines.

Pathway # 11a: Translocation of domesticated abalone from licensed interstate offshore aquaculture site to licensed Victorian land-based aquaculture site.

11a.1 **Annual auditing** - Comply with Appendix G. Compliance auditing, and

11a.2 **Offshore farm biosecurity** - Comply with Appendix C. General offshore abalone farm bio-security standards, and

11a.3 **Health Surveillance Program** - Provide a certificate of compliance signed by the Competent Authority that declares the aquaculture facility is free of notifiable disease (*Livestock Disease Control Act 1994*) based on Appendix D. Health surveillance program for abalone farms; or

11a.4 **Batch Testing** - Demonstrate that the abalone population proposed for consignment are declared free of notifiable diseases based on Appendix E. Batch certification requirements for abalone stock.

Pathway # 11b: Translocation of domesticated abalone from licensed interstate offshore aquaculture site to licensed Victorian offshore aquaculture site.

11b.1 This pathway is not permitted within this protocol and would be subject to a separate risk assessment in accordance with the Translocation Guidelines.

Acknowledgements

This Protocol was developed by the Department with input from a range of industry and Government stakeholders. In the drafting of the document specific mention is warranted regarding the contributions of Fiona Gavine, John Mercer and Anthony Forster.

Version 2 of this document was revised by Dr Tracey Bradley and John Mercer. A review was undertaken by David Kramer and the Translocation Evaluation Panel prior to approval. Seafood Industry Victoria, VRFish, Futurefish Foundation, all commercial abalone representative bodies and all abalone aquaculture licence holders were consulted during the preparation of amendments.

Appendices

Appendix A. Wild broodstock quarantine and biosecurity standards

The following standards are required in addition to those described in Appendix B and will be assessed as forming part of an auditable biosecurity plan for all land-based farms including those accredited under the AHAP.

Wild broodstock holding facility

- A1. All wild abalone broodstock batches received at the land-based aquaculture site must be held in a fully enclosed and secure broodstock holding facility (lockable and vermin proof).
- A2. Each wild abalone broodstock batch delivered to the broodstock holding facility must be retained in labelled separate culture vessel(s) without commingling with other stock.
- A3. Foot baths will be located at all entry and exit points and maintained so as to provide for effective disinfection of footwear at all times.
- A4. Hand washing basins will be located at main entry and exit points.

Disinfection requirements

- A5. There will be zero discharge of untreated liquid effluent from the enclosed broodstock facility to the marine environment.
- A6. Liquid wastes, including water used to transport abalone, must be disinfected using methods listed in the OIE (World Organisation for Animal Health) manuals or an approved national biosecurity template.
- A7. All filtered residues, filters and other solid waste outputs will be disinfected in a manner listed in the OIE (World Organisation for Animal Health) manuals or an approved national biosecurity template.
- A8. A record of all wastewater treatment (disinfection) processes must be maintained and made available to VFA staff on request.

Staff movement

- A9. All staff are required to disinfect hands and footwear prior to entering and exiting the facility.

Broodstock monitoring

- A10. Staff must undertake daily monitoring of all wild broodstock for the presence of disease, morbidity and or any unusual behaviour which may indicate the presence of disease.
- A11. Daily monitoring must be recorded in a bound book with numbered pages.
- A12. Record books must be kept for a period of 3 years after the date of the last entry.

Appendix B. General land-based abalone farm bio-security standards

The following standards will be assessed as forming part of an auditable biosecurity plan for all land-based farms including those accredited under the AHAP.

Disinfection / hygiene practices

- B1. All culture unit(s) used to hold abalone must be maintained to ensure that any build-up of organic matter such as faeces, uneaten feed, mortalities and fouling organisms does not compromise the health of the abalone and contribute to an increased risk of disease.
- B2. Culture units used to hold abalone must be exposed to fallowing, dry out and disinfection between consignments of stock.
- B3. All wastewater outlet channels and pipes must be regularly inspected, cleaned and when required, disinfected following a disease event or marine pest infestation.
- B4. Foot baths must be provided at key locations and maintained so as to provide effective disinfection of footwear at all times.
- B5. All dead and moribund abalone must be removed from the culture units as soon as practical but at least daily.
- B6. All mortalities must be disposed of in a manner approved of by the Victorian Environmental Protection Authority.

Staff movements

- B7. Any equipment, protective clothing or footwear brought on to the aquaculture site that will come into contact with abalone or water used to hold abalone must be cleaned prior to use.
- B8. Any equipment, protective clothing or footwear used on the aquaculture site must not be used on another aquaculture site unless it is cleaned and disinfected prior to use.
- B9. Use dedicated equipment and or protective clothing for specific areas (e.g. broodstock facility, nursery, growout etc.) of the aquaculture site.
- B10. Restrict staff movement to only those areas where they undertake regular duties.
- B11. Restrict public access and movement throughout the aquaculture site.

Stock monitoring

- B12. Undertake daily inspections of all abalone stock for the presence of disease, morbidity or any unusual behaviour which may indicate the presence of disease.

Record keeping

- B13. Retain accurate records of all inspections. Records will include the number (and species) of abalone held in each culture vessel, stocking rates, mortalities, incidence of significant stressors and other fish health observations.
- B14. Maintain an accurate record of all translocation movements onto and off the aquaculture site including the location and contact details of the supplier or receiver, date of supply and the numbers and species of abalone translocated.
- B15. Records must be kept for a period of 3 years after the date of the last entry.

Monitoring of marine exotic organisms

- B16. A subset (maximum of 150 or 2% or whichever is lesser) of all abalone stock must be inspected on arrival at the aquaculture site for the presence of attached marine exotic organisms and the results of these inspections recorded in a logbook.
- B17. In the event of a suspected marine exotic the licence holder must inform the VFA of the suspected marine exotic presence within 24 hours, removed the suspect marine exotic organism(s), preserve in formalin and make available to the VFA on request for identification purposes.

Reporting requirements

- B18. In the event of significant mortality or suspected disease the licence holder is required to inform the VFA within 24 hours.
- B19. On request, make available to the VFA the infected stock for the purpose of pathological examinations.

Post translocation quarantine (for stock not accredited under the AHAP)

- B20. On arrival, all batches of translocated abalone must be quarantined from other farm stock for a minimum period of 6 weeks. Quarantine involves separate sea water supply, feeding and cleaning systems; effective spatial or physical barriers to reduce cross contamination by splashing; and, arrangements for controlling access by personnel.

Appendix C. General offshore abalone farm bio-security standards

Note: The AHAP does not apply to offshore facilities.

Disinfection / hygiene practices

- C1. All culture unit(s) used to hold abalone must be maintained to ensure that any build-up of organic matter such as faeces, uneaten feed, mortalities and fouling organisms does not compromise the health of the abalone and contribute to an increased risk of disease.
- C2. Culture units used to hold abalone must be exposed to fallowing, dry out and disinfection between consignments of stock.
- C3. All dead and moribund abalone must be removed from the culture units immediately on inspection or as soon as practical thereafter on the day of inspection.
- C4. All mortalities must be disposed of in a manner approved by the Victorian Environmental Protection Authority.

Staff movements

- C5. Any equipment, protective clothing or footwear brought on to the aquaculture site that will come into contact with abalone must be cleaned prior to use.
- C6. Any equipment, protective clothing or footwear used on the aquaculture site must not be used on another aquaculture site unless it is cleaned and disinfected prior to use.
- C7. Restrict public access and movement throughout the aquaculture site.

Stock monitoring

- C8. Undertake daily inspections (weather permitting) of all abalone stock for the presence of disease, morbidity or any unusual behaviour which may indicate the presence of disease.

Record keeping

- C9. Retain accurate records of all inspections. Records will include the number (and species) of abalone held in each culture vessel, stocking rates, mortalities, incidence of significant stressors and other fish health observations.
- C10. Maintain an accurate record of all translocation movements onto and off the aquaculture site including the location and contact details of the supplier or receiver, date of supply and the numbers and species of abalone translocated.
- C11. Record books must be kept for a period of 3 years after the date of the last entry.

Monitoring of marine exotic organisms

- C12. A subset (maximum of 150 or 2% or whichever is lesser) of all abalone stock must be inspected on arrival at the aquaculture site for the presence of attached marine exotic organisms and the results of these inspections recorded in a log book.
- C13. In the event of a suspected marine exotic the licence holder must inform the VFA of the suspected marine exotic presence within 24 hours, remove the suspect marine exotic(s) organism, preserve in formalin and make available to the VFA on request for identification purposes.

Reporting requirements

- C14. In the event of significant mortality or suspected disease the licence holder is required to inform the VFA and the Competent Authority within 24 hours.
- C15. On request make available to the VFA or the Competent Authority the infected stock for the purpose of pathological examinations.

Pre-translocation quarantine

- C16. Prior to translocation of abalone to an offshore site, each batch must be quarantined for a minimum period of 6 weeks. Quarantine involves: separate sea water supply, feeding and cleaning systems; effective spatial or physical barriers to reduce cross contamination by splashing; and, arrangements for controlling access by personnel.
- C17. In the event of a stock health certification being withdrawn by the Competent Authority, the Competent Authority may recommend to the VFA an extension of the quarantine period or any other action to further assess the health status of quarantined abalone.
- C18. The recommendations of the Competent Authority in respect of C17, must be approved by the VFA prior to the issue of a new stock health certificate.

Appendix D. Health surveillance program for abalone farms

Notes to licence holders:

- D1. A well - structured active surveillance program is an internationally recognised means of demonstrating the health status of both stock and aquaculture facilities. If endorsed, such a program will:
- enable market access and trade,
 - facilitate translocation of live product,
 - improve farm productivity and husbandry responsiveness, and
 - reduce potential impacts to the environment.
- D2. All fish health surveillance program(s) referenced in this protocol refer to those that fulfil the requirements in the WOA (World Organisation for Animal Health) manuals including the AHAP (refer Appendix I).
- D3. It is recommended that licence holders wishing to prepare their own fish health surveillance program seek endorsement of their program from the VFA.
- D4. The World Organisation for Animal Health provides internationally recognised standards for developing and implementing targeted fish health surveillance programs for aquaculture businesses.
- D5. The VFA's criteria for assessing fish health surveillance programs will be drawn from the WOA (World Organisation for Animal Health) manuals. The technical elements of the AHAP were informed by WOA standards and as such have been accepted nationally and do not require further assessment.
- D6. Further testing to establish the absence of diseases of importance from the proposed consignment may be required under direction from the Victorian Government.

Appendix E. Batch certification requirements for abalone stock

Aquaculture licence holders must meet or exceed the following requirements to achieve required departmental standards for batch certification. These requirements do not apply where the movement is within Victoria, and the facility is accredited with the AHAP with respect to AVG. For other health risks such as *Perkinsus*, the Competent Authority will determine what other testing (if any) is required.

- E1. Provide a declaration issued by the supplier that there has been no notifiable diseases (*Livestock Disease Control Act 1994*) or unexplained disease outbreak for the past 24 months.
- E2. Provide a certificate of stock health from the Competent Authority certifying that the proposed consignment of abalone(s) is free of notifiable diseases (*Livestock Disease Control Act 1994*). This certificate will be based on:
- i. A visit to the premises by the Competent Authority to inspect the health status of the stock for the presence of clinically abnormal abalone and a review of relevant farm records and farm biosecurity.
 - ii. Appropriate testing using PCR by the Competent Authority to provide satisfaction that there is an absence of abalone viral ganglioneuritis in the proposed consignment. Further testing to establish the absence of *Perkinsus sp* from the consignment is also desirable. Any testing regime undertaken must be collected by the Competent Authority at the time of the visit to the premises. Bias in the sampling should be made towards animals showing clinical signs of disease or showing signs of weakness when handled (e.g. failure to firmly adhere to substrate). For a single batch test, the sample numbers required for these default values (i.e. 95% confidence, 2% prevalence) are provided in Table 1 in Chapter 1.2 of the OIE Manual of Diagnostic Tests for Aquatic Animals (2012 or as updated), i.e. 150 animals for these parameters.
 - iii. Historical testing of populations can provide useful information and can be used as supportive evidence for certifying freedom from disease of abalone. How useful this information is will depend on a number of factors, including the biosecurity measures adopted at the premises during the relevant historical period and whether or not the abalone populations destined to be translocated were part of a formal health monitoring and surveillance program. The Competent Authority may elect to reduce the number of abalone sampled for pathological testing at the time of the visit based on the assessment of the historical information. Such a reduction in number is acceptable provided that the resulting level of confidence for freedom of notifiable disease in the abalone population is at least equivalent to the level of confidence provided by the single batch test default values. If a reduction of sample size occurs, appropriate justification, based on scientific grounds, must be provided in the certificate of stock health.

The certificate of stock health including testing details and results are to be provided to the VFA via email for information.

For interstate translocation, the above requirements as well as:

- E3. Provide a certificate from the Competent Authority of the state or territory certifying that notifiable diseases of abalone have not been reported over the past 24 months from the region in which the premises are located. Further testing to establish the absence of diseases of importance from the proposed consignment may be required under direction from the Victorian Government.
- Pre-consignment interstate hatchery accreditation:
- E4. In addition to the above requirements, all abalone including larvae to be translocated from licensed interstate aquaculture sites must be accompanied by a statement of compliance. This statement must explain the steps undertaken by the site to eliminate non-endemic abalone species from the proposed consignment and must be signed by the responsible licence holder or delegate.
- E5. A copy of a certificate of stock health must be provided to the Aquaculture Section of VFA at least two business days prior to the translocation.
- E6. The certificate of stock health will be valid for a maximum period of four weeks after the date of issue. The certificate will be invalidated if there is evidence of disease, significant or unexplained mortality or commingling with other stock that may compromise the health status of the batch or a breach of quarantine.

Appendix F. Diving practices and disinfection protocols

The following protocol applies to dive inspections of abalone on reef (natural or man-made) in close proximity to both licensed abalone farm discharges and licensed abalone offshore aquaculture sites.

Diving practices

- F1. All divers and support staff must meet all relevant diving and marine safety standards.
- F2. Divers are required to inspect reef habitat (water depth less than 20 metres) by diving and carefully observing and recording the presence of any dead, dying or moribund abalone and the presence of any unusual signs that may suggest a disease event in wild abalone stock.
- F3. Particular diligence and attention to detail is warranted to observe abalone and sufficient time should be allowed for this purpose. A minimum dive time of twenty (20) minutes should occur over known abalone habitats. Divers must inspect a minimum of 100 abalone (if present) and record the number of live, moribund and recently dead abalone.
- F4. The location of each diving activity (reef code description, GPS or other landmark or feature) must be accurately recorded in a logbook. The logbook must be made available to VFA authorised officers on request.
- F5. The licence holder is required to report any incidence of dead, dying or moribund abalone and the presence of any unusual signs that may suggest a disease event in wild abalone stock to VFA within 24 hours of observations.

Disinfection protocols

- F6. For the purposes of disinfecting wet suits, gloves, abalone irons and other associated diving equipment, there are a range of suitable disinfection techniques. Prior to any disinfection, organic material should be removed and appropriately disposed of before applying the disinfectant.
- F7. The common disinfectants are listed below.
 - i. A solution of Calcium hypochlorite $\text{Ca}(\text{OCl})_2$ prepared daily at a minimum active concentration of 7g/litre. When using Calcium hypochlorite or Virkon™ the exposure (contact time) shall exceed 10 minutes applied by immersion.
 - ii. Virkon™ powder at a concentration of 20g/litre or equivalent.
 - iii. Disinfection of equipment using commercially available cleaning products such as Truckwash™, Napisan™ or equivalent requires longer contact periods and product directions must be followed.

When to apply disinfection

- F8. Disinfection of gloves and abalone irons must occur between dives at the same location and complete gear disinfection must occur when moving between dive locations.

Marine exotics

- F9. Divers are required when inspecting reef habitat to record the presence of any marine exotics (Appendix H) and report any presence to the VFA.

Appendix G. Compliance auditing

Compliance auditing

Compliance auditing for all facilities will be undertaken by the Competent Authority annually or more frequently as required.

Conducting the audit

The Competent Authority will visit each aquaculture site; interview relevant aquaculture staff; review written records; observe culture facilities (including relevant broodstock quarantine arrangements); inspect stock; aquaculture equipment; disinfection methods; wastewater outlets; channels and associated infrastructure and where accredited to the AHAP will audit compliance with the AHAP.

Audit reporting framework

The VFA has guidelines for the auditing of abalone farms against the protocol including relevant check lists and reporting frameworks.

These audit guidelines allow for the integration of audit requirements within a farm accredited surveillance program such as the AHAP.

The Competent Authority will prepare a report that includes a systems audit of relevant control actions specified in the protocol in accordance with the audit guidelines. The report shall identify areas of compliance and non-compliance and any other observations that may pose an increased risk to the environment.

Reporting requirement

The Competent Authority is required to submit their audit report annually to the VFA.

Appendix H. Functional groups for marine pests

Key unwanted species are divided into functional groups. Modified from the functional group list developed for the Australia and New Zealand marine pest-monitoring manual: draft version 1. X = present in the functional group. Water (W) = Water transported in association with abalone adults (i.e. with closed shells), spat and associated gear. Sediment (S) = Soft substrate e.g. sand, Hard Surface (H) = hard substrate such as the gear (ropes, anchors) and themselves.

Key unwanted species	Functional Groups						Medium Water (W), Sediment (S), Hard Surfaces (H)
	Sessile Fouling (Hard)	Sessile Infauna (Soft)	Motile (soft)	Motile (hard)	Meroplanktonic	Holoplanktonic	
<i>Alexandrium minutum</i> ¹ (toxic dinoflagellate)		X				X	W, S
<i>Asterias amurensis</i> ² (North Pacific seastar)	X		X	X	X		W, H
<i>Vancorbula gibba</i> ² (European clam)		X			X		W, S
<i>Crassostrea gigas</i> ² (Pacific oyster)	X	X			X		W, S, H
<i>Gymnodinium catenatum</i> ¹ (toxic dinoflagellate)		X				X	W, S
<i>Mnemiopsis leidyi</i> (sea walnut)						X	W
<i>Potamocorbula amurensis</i> ¹ (Asian clam)		X			X		W, S
<i>Sabella spallanzanii</i> ² (giant fanworm)	X	X			X		W, S, H
<i>Undaria pinnatifida</i> ² (Japanese seaweed)	X				X		W, H
<i>Carcinus maenas</i> ² (European shore crab)			X	X	X		W, H
<i>Musculista senhousia</i> ² (bag abalone)	X	X			X		W, S, H

¹ Species with cysts can be transported in sediments.

² If the species has a broadcast spawning stage (meroplanktonic) or water borne stage, then water was considered a safe medium for its translocation

The above list is not a full list of unwanted marine species.

Appendix I. Abalone Health Accreditation Program (AHAP)

To promote safe translocation of abalone between jurisdictions, the abalone health accreditation program (AHAP) was established in 2014, and revised from time to time, to enable the abalone aquaculture industry to demonstrate compartment freedom from infection with HaHV-1.

The AHAP ensures that surveillance, biosecurity, auditing, and accreditation requirements are nationally consistent and transparent.

The AHAP is also consistent with the compartmentalisation standards for infection with HaHV-1 described in the World Organisation for Animal Health Aquatic Animal Health Code.

The AHAP was initiated by the Commonwealth Government's Department of Agriculture, Fisheries and Forestry (DAFF). The department coordinates programs to enhance Australia's aquatic animal health surveillance systems. It does this in collaboration with industry and state and territory governments.

The latest version of the AHAP can be found here:

www.agriculture.gov.au/agriculture-land/animal/aquatic/reporting#abalone-health-accreditation-program-ahap

Appendix J. Risk assessment study of abalone translocation in Victoria

Methodology

A risk assessment was conducted according to the DPI Risk Management Strategic Framework and Process, which is based on the Australian/New Zealand Standard for Risk Management (AS/NZS 4360:1995). An expert panel was convened to cover knowledge of abalone translocations and the main areas of perceived risk. The panel included:

Dr Mehdi Doroudi. Director, Marine and Freshwater Systems, PIRVic (***Aquatic Animal Health***).

Dr Nick Robinson. Senior Scientist, Animal Sciences, PIRVic, (***Genetics***).

Dr Michaela Dommissie. Senior Scientist, Department of Sustainability and Environment. (***Marine pests / ecology***).

Mr Rodney Roberts. Abalone farmer. (***Abalone aquaculture industry***).

Mr Anthony Forster. Aquaculture Manager, Fisheries Victoria. (***Fisheries policy***).

Mr John Mercer. Policy Officer, Fisheries Victoria. (***Shellfish hatcheries / marine aquaculture***).

Mr Peter Lawson, Aquaculture Development Officer, Port Phillip Region (***Aquaculture Development and Compliance***).

Dr Paul Hardy-Smith, Consultant Veterinarian (***Aquatic Animal Health***).

Dr Martin Deveney, Project Officer, Fish Health, PIRSA, South Australia.

In addition to the above, Mr Vincent Gannon, Commercial abalone fishery advisor was appointed to the expert panel in July 2006.

The evaluation of specific risks associated with the translocation of abalone was undertaken using standard risk assessment criteria. Experts ranked risks on their likelihood and consequence. These rankings were added to give a risk rating as per the following tables.

Likelihood rating

Likelihood rating	Description	Likelihood of occurrence
1	Rare	Event may occur only in exceptional circumstances.
2	Unlikely	The event may occur at some time, say once in 10 years.
3	Moderate	The event should occur at some time, say once in three years.
4	Likely	The event will probably occur in most circumstances, say once a year.
5	Almost Certain	The event is expected to occur in most circumstances, say many times a month.

Consequence rating

Consequence rating	Description	Environmental
5	Catastrophic	Serious long-term or widespread environmental harm.
4	Major	Significant environmental harm with long-term recovery.
3	Moderate	Moderate harm with mid-term recovery.
2	Minor	Transient environmental harm.
1	Insignificant	Brief pollution with effective remediation.

Risk rating

Risk ranking	Score	Assessment
High	>8	Requires detailed research, planning and decision-making at senior levels of management.
Significant	7	Senior management attention and action needed.
Moderate	6	Management responsibility may be specified.
Low	<5	No major concern.

All identified “High” risks were associated with disease transfer. “Significant” and “Moderate” risks were associated with disease transfer, movement of marine pests and ecological impact of the introduction of non-endemic abalone species. Risks associated with potential genetic impact were evaluated as being generally low as were other environmental impacts of escapes.

Abalone disease

There are international and national protocols concerning identification and notification for molluscan diseases (WOAH, 2024). In addition, key disease hazards related to the translocation of abalone in Australia include:

- Abalone viral ganglioneuritis
- *Perkinsus olseni*
- *Vibrio* spp.
- Flavobacteria
- Non-specific fungal infections

Abalone viral ganglioneuritis: In December 2005, unusual mortalities were reported in two land-based and one offshore abalone farm. Following an investigation, a presumptive diagnosis that a herpes-like virus, not previously described in abalone in Australia, was the causative agent. It is believed the virus is spread by either direct contact between abalone (potentially via mucous material from infected stock), through the water column, potentially via other activities that involve human or equipment contact between infected and healthy abalone and by other marine species. A similar virus has been found in farmed abalone in Taiwan (Chang et al. 2003) and in wild and farmed abalone in Tasmania.

Perkinsus olseni is both nationally and internationally reportable. It is associated with clinical disease in South Australia, Tasmania and NSW (not Victoria). The causative organism is present in SA, WA, NSW and VIC (only detected in native oysters in Westernport). The study of *P. olseni* outbreaks is complicated by the uncertainties of parasite identity; however, a disease survey by Handlinger (2006) showed no signs of the disease in Victoria. *Perkinsus* organisms have been identified in Australia in at least eight mollusc species and many of them outside the known areas of abalone disease (Goggin et al., 1989). Given the survey results, uncertainties of parasite identity and potential for pathogenic strains there is potential for *Perkinsus olseni* being introduced into Victoria and causing major harm to the industry at a regional level. Once introduced to the region, the disease would be difficult to control or eradicate.

While this disease has caused only minor mortalities in interstate farmed stock (Goggin and Lester, 1995), the disease has caused significant mortalities in interstate wild stock. Therefore, it was considered unlikely that translocations between aquaculture sites would result in disease transfer, but the likelihood of disease transfer would be higher for movements from the wild to aquaculture sites.

***Vibrio* spp.** are ubiquitous in the marine environment, are present in Victorian farms and the disease, vibriosis, causing lesions and mortalities, has been reported from farms in SA, Tas, WA and Vic. Outbreaks of the disease are thought to be related to temperature and on farm practices. Organisms within the genus *Vibrio* can be easily identified and treated, and impacts are usually confined to individual farms. Vibriosis is very likely to occur on farms at some stage.

Flavobacteria are ubiquitous in the environment and so the likelihood of outbreaks in Victorian farms is high, but the consequences were not regarded as serious. Similar considerations were given to non-specific fungal infections.

Fouling organisms and marine pests

Organisms that are carried on or within abalone or their culture equipment could be translocated during stock movements.

Fouling organisms are those that live on and in the animal and include mud worms (*Boccardia knoxi* and *Polydora hoplura*). Mudworm infestations occur on farms in most states, but the seriousness of infestation is site specific. Mudworm can be transmitted from wild broodstock to aquaculture systems and from there back to the wild. If areas are free of mudworm, translocation of infected stock to the free area becomes an environmental issue. Abalone grown at sea in Tasmanian estuaries have incurred significant mortalities through mudworm infestations.

The translocation of marine pests has been recognised as a major threat to marine ecosystems throughout the world. The potential for marine pests to entrain in water, hard surfaces (ropes, cages, barrels and abalone), sediment and offshore gear was used to assess the risk of their translocation. Marine pests were considered in different functional groups that reflect their ability to be transported by a particular vector (Appendix H).

Key risks for abalone translocations

In applying the Risk Management Strategic Framework, 22 risks were identified and scored by the expert risk assessment panel. Of the risks analysed, three were rated as being “high” (requiring detailed research, planning and decision making at senior levels of management). Five risks were rated as being “significant” (requiring senior management attention and action) and a further five risks were rated as “moderate” (may require a specified management response).

“High” risks for abalone translocations

The high-risk issues were associated with the transfer of disease through abalone translocations either from interstate or within Victoria, including the temporary holding or transfer of abalone through processing facilities.

Key risk

- Transfer of disease to Victorian waters through the translocation of abalone from interstate (predominantly wild broodstock from states with a history of disease), other Victorian aquaculture sites (with a recent history of a notifiable disease or unexplained disease outbreak) or processing facilities (movement of broodstock).

“Significant” risks for abalone translocations

All of the significant risk issues were associated with the transfer of disease and unwanted species through abalone translocations either from interstate or within Victoria.

Key risks

- Transfer of disease to Victorian waters through translocation of any abalone from interstate and other Victorian aquaculture sites with a history (in the past two years) of notifiable diseases or unexplained disease outbreaks.
- Unwanted species translocated in abalone transport water; attached to abalone or gear to and from offshore sites.

“Moderate” risks for abalone translocations

All of the moderate risk issues were associated with the transfer of disease and unwanted species through abalone translocations either from interstate or within Victoria.

Key risks

- Transfer of disease to Victorian waters through translocation of broodstock from interstate and other Victoria aquaculture sites that have no notifiable or unexplained disease outbreaks over the past two years.
- Non-endemic abalone species mixed with endemic abalone from interstate hatchery will result in established new populations.

Note: Although risks of abalone aquaculture impacting on the genetic integrity of wild abalone were generally considered low (no major concern) by the expert panel, there was some qualification to this risk rating where large numbers of abalone not sourced locally, were grown at sea. In view of the above, control measures were specified to manage this risk (see Protocol control measure 4b.6).

The key risks for abalone translocations have not changed since 2007. The possible pathways for translocation to land – based farms disallows (under the AHAP) movement of stock from the wild. Technologies for detection of diseases have advanced and knowledge of these diseases have allowed development of improved husbandry techniques. The enhancements to this protocol with the addition of the AHAP mitigates risks associated with these translocations.

Major risk category – Impact of abalone translocations on genetics of wild populations

NB: Like. = likelihood and Conseq. = consequence.

Risk Category	Specific Risk	Like.	Conseq.	Risk Rating	Comments
Genetic	Translocation of abalone to offshore culture systems will negatively impact on the genetic integrity of wild populations.	1	2	3 (LOW)	This risk includes both the farming of abalone at sea and the transportation of the abalone to offshore culture sites. The risk rating is low for at sea abalone growout given culture units are enclosed. The overall risk however may increase where large numbers of abalone are accidentally released to the environment where they may 'swamp' and out compete wild stock (if present). Aquaculture sites are typically located away from natural reefs.
Genetic	Translocation of abalone seed for ranching will negatively impact on the genetic integrity of wild populations.	2	2	4	This risk is considered low. The extent of the risk is proportionate to the numbers of abalone released and the extent to which those abalone may differ genetically from surrounding populations. Minor impacts could occur with long term recovery. If locally sourced broodstock were used it is likely that genetic traits that survive would be similar to those required by wild population. (Ranching is not supported by the VFA; refer Offshore Abalone Stocking Policy 2020).
Genetic	Return of abalone broodstock to the wild will negatively impact on the genetic integrity of wild populations.	1	1	2	The activity of returning aquaculture broodstock to the wild is not permitted, (refer Abalone Fishery Management Plan and licence conditions).
Genetic	Escape of domesticated abalone stock from land-based farms will negatively impact on wild stocks.	1	1 (Victoria) 2 (Interstate)	2-3	The main focus of selective breeding programs is to select for favourable growth rates under intensive farming conditions. It would follow that traits for selected stocks may be less competitive in the wild. Gene pools of genetically selected stock are generally rapidly diluted when bred with wild stocks. This risk predicates the escape of abalone from the land-based farm. At present, land-based farms actively manage the risk of escape of juvenile and adult abalone. The likelihood of individual escapees having impacts is low. The risk rating may increase where domesticated farmed abalone are sourced from distant geographic regions (presumably with increased genetic differences between local wild stock) and, with increased numbers of escapees.
Genetic	Land transportation of abalone between Victorian land-based sites will negatively impact on the genetic integrity of wild populations.	1	1	2	Land transportation of abalone reduces risk of genetic impacts. The transport of abalone larvae or other life stages between land-based farms can also result in accidental escapes. The probability of these escapes resulting in survival and effective competition with wild stock in terms of breeding, is extremely low, particularly where land-based transport is employed.
Genetic	Land transportation of abalone from Interstate land-based sites will negatively impact on the genetic integrity of wild populations.	1	1	2	Refer above. Land transportation of abalone reduces risk of genetic impacts.

Major risk category – Ecological impacts of abalone translocations

NB: Like. = likelihood and Conseq. = consequence.

Risk Category	Specific Risk	Like.	Conseq.	Risk Rating	Comments
Ecological impacts	Translocation of domesticated abalone seed to offshore culture systems will result in competition with, and displacement of, wild marine species populations.	2	2	4	Similar issues to ranching with lower risk profile given culture facilities are enclosed.
Ecological impacts	Escape of domesticated seed from land-based farms will result in competition with, and displacement of, wild marine species populations.	1	1	2	In order for significant impact on the genetic integrity of wild abalone stocks, the following scenarios would need to occur: The release/escape of large quantities of abalone (gametes, larvae, juveniles or adults) from growout tanks to the marine environment; survival of escapees to maturity; successful breeding of escapees and dominance of selectively bred traits (escapee abalone outnumbering wild stock). The probability of the above chain of events occurring is considered low for land-based farming. Should escape occur, it is likely that strong natural selective pressures will reduce the chance of impacts. Probability of individuals contributing to genetic shift is low.

Major risk category – Impact of translocations by industry on disease transfer

NB: Like. = likelihood and Conseq. = consequence.

Risk Category	Specific Risk	Like.	Conseq.	Risk Rating	Comments
Disease <i>Perkinsus</i>	Transfer of <i>P. olseni</i> to Victorian waters through translocation of farmed abalone seed and juveniles from states with a history of the disease.	3	4	7	While there is no evidence of this disease causing mortality in farmed stock, the disease has caused significant mortality in interstate wild stock and poses a threat to Victorian abalone. The risks are higher when abalone are translocated in untreated seawater that may harbour the disease agent.
	Transfer of <i>P. olseni</i> to Victorian waters through translocation of farmed, domesticated abalone broodstock from states with a history of the disease.	2	4	6	Refer above. This scenario is less likely as water is not generally used when transporting broodstock.
	Transfer of <i>P. olseni</i> to Victorian waters through translocation of wild abalone broodstock from states with a history of the disease to Victorian abalone farms.	5	4	9	This pathway presents significant risks to both aquaculture and farmed stock.
Disease Viruses	Transfer of herpes-like virus from infected premises or a recent history of disease through translocations.	5	4	9	This risk is significant and requires active management. The origin of this disease agent is unknown. It is possible that the virus was naturally present in wild populations in Tasmania and was imported into Victoria with live stock. A range of international surveillance and accreditation standards can be applied to manage this risk. Legislative controls may also be used if necessary. To protect farm stock, increased levels of farm biosecurity is warranted, and active surveillance as present in the AHAP.
	Transfer of herpes-like virus from a premises with a recent history (2 years) of disease through translocations.	3	4	7	Refer above. The risks are significantly lower following adoption of disinfection and other biosecurity standards.
Disease <i>Vibrio</i>	Transfer of <i>Vibrio</i> to Victorian waters through translocation of abalone.	3	1	4	Opportunistic disease-causing organisms typically associated with stress and poor husbandry.
Unknown diseases	Transfer of unknown diseases through movement of abalone broodstock to farms from the wild in Victorian waters.	2	4	6	This risk is generic in nature. Diligence in the adoption of biosecurity and translocation standards is required. Active surveillance programs, in particular, will improve knowledge of disease causing agents and enable rapid detection and appropriate response controls.
	Transfer of unknown diseases through movement of wild abalone broodstock from interstate.	3	4	7	Refer above. This risk is higher given the limited knowledge of wild abalone health status from other states. Disease free batch accreditation or other accreditation based on surveillance is unlikely for wild abalone as it is either too expensive (wild stock monitoring) or requires large numbers of highly valued broodstock (destructive sampling of 150 abalone) to achieve statistical significance.

Major risk category – Translocations of unwanted species

NB: Like. = likelihood and Conseq. = consequence.

Risk Category	Specific Risk	Like.	Conseq.	Risk Rating	Comments
Translocation of unwanted species	Unwanted species translocated in water to land-based sites. Only applies to abalone transported in water.	1	5	6	Key unwanted species refers to a host of undesirable aquatic pests of all life stages that may colonise the marine environment outside of their natural range e.g. Northern Pacific sea star. This likelihood is low given little water is used when translocating abalone.
	Unwanted species translocated in transport water to offshore sites	2	5	7	Refer above. This risk is higher because the transportation is typically across marine environments to reach aquaculture sites. The extent of the risk depends on the geographical distance travelled, the species of unwanted pest in question and, the current distribution of the unwanted pest e.g. it may be in one embayment but not another.
	Unwanted species translocated in or on hard surfaces (such as in gut, attached to shell or settlement plates) to land-based sites.	1	5	6	May arise when transporting abalone seed on plates or larger abalone. This includes mudworms or other borers and microscopic spores. Unwanted attached sessile species are generally noticeable and easier to spot and deal with at land-based sites.
	Unwanted species translocated in or on hard surfaces (such as in gut, attached to shell or culture equipment) to and from offshore sites.	2	5	7	This includes mudworms or other borers and microscopic spores. Important that affective screening / examination is undertaken.
	Non-endemic species mixed with endemic larvae/spat from interstate hatchery will result in established new populations (need to escape also).	1-2	4	5-6	This is relevant only to hatcheries holding other shellfish stock that are non-endemic to Victoria. Likelihood of cross contamination is low and easily managed.

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