Government of **Western Australia**
Department of **Fisheries**

ABALONE AQUACULTURE IN WESTERN AUSTRALIA

POLICY

July 2013

CONTENTS

Definitions and Abbreviations

1999 Policy	Abalone Aquaculture in Western Australia – Policy Guideline. December 1999. Fisheries Management Paper No. 133.
2010 Policy	Abalone Aquaculture in Western Australia – Aquaculture Policy. June 2010. Fisheries Management Paper No. 242.
Abalone	In this Policy, unless referred to by species, "abalone" refers to all WA species of the genus *Haliotis*, namely: greenlip abalone (*Haliotis laevigata*); brownlip abalone (*Haliotis conicopora*); Roe's abalone (*Haliotis roei*); blacklip abalone (*Haliotis rubra*); tropical or donkey's ear abalone (*Haliotis asinina*); staircase abalone (*Haliotis scalaris*).
Abalone aquaculture	The keeping, breeding, hatching, culturing or harvesting of abalone under the authority of an aquaculture licence granted under s.92 of the FRMA. Marine farms authorised for abalone aquaculture will generally have tenure by way of an aquaculture lease granted under s.97 of the FRMA.
Abalone farm	A site or location with identified geographic boundaries licensed for the purpose of abalone aquaculture. Abalone farms may be either land-based or marine (refer to the respective definitions below under farm).
Aquaculture gear	Any equipment, implement, device, apparatus or other thing used or designed for use for, or in connection with, aquaculture, whether it contains fish or not and whether it is used for aquaculture or for navigational lighting or marking.
Biosecurity	Protection from the adverse effect an organism has or may have on a) another organism; or b) a human being; or c) the environment, or part of the environment; or d) agricultural activities, fishing or pearling activities, or related commercial activities carried on, or intended to be carried on, in the State or part of the State (per the Biosecurity and Agriculture Management Act 2007).
Broodstock	Adult abalone either collected from the wild (wild broodstock) or hatchery-bred adults (domesticated broodstock) retained for breeding purposes.
CEO	The Director General of the WA Department of Fisheries as Chief Executive Officer for the purposes of the FRMA.
Disease	A clinical or non-clinical infection affecting the body of an organism, often associated with specific symptoms and signs. Disease may be caused by external factors, such as infectious disease, or it may be caused by internal dysfunctions, such as autoimmune diseases.
Fish	An aquatic organism of any species, alive or dead, including (a) eggs, spat, spawn, seeds, spores, fry, larva or other source of reproduction or offspring of an aquatic organism; and (b) a part only of an aquatic organism (including the shell or tail); and (c) live rock and live sand, but does not include aquatic mammals, aquatic reptiles, aquatic birds, amphibians or pearl oysters (per the definition in the FRMA).
FRMA	Fish Resources Management Act 1994.
FRMR	Fish Resources Management Regulations 1995.
Grow-out	The culture or on-growing of juvenile fish, usually reared in a hatchery, in or on aquaculture gear located within a defined area authorised for that purpose and where private or corporate ownership of the fish is implied. Abalone stocked in grow-out systems are generally older than two years.
Hatchery production	The culture or rearing of mass quantities of juvenile fish to be used for purposes including aquaculture grow-out, stock enhancement or restocking. A hatchery usually encompasses separate facilities for spawning broodstock and rearing eggs, larval and early juvenile fish in hatchery and nursery facilities.
Hybrid	The usually-sterile offspring of genetically dissimilar parents or stock, especially the offspring produced by breeding animals of different varieties or species.

In-shell	Harvested abalone that remain in their shells and that have not been gutted or otherwise processed.
Infiltration gallery	A sea water disposal system designed and located to prevent any release of biological material and contaminants into the surrounding waters; for example, a system that discharges used sea water from a quarantine area or hatchery into an area of sand dune physically separated from the sea.
Interim Policy	Interim Abalone Aquaculture Policy, in effect from 1 November 2011 until the completion of the current policy.
Land-based farm	A farm located on land, generally in a coastal area. A land-based farm growing abalone will usually employ semi-closed or closed production systems and may include hatchery, nursery and grow-out facilities.
Marine farm	A farm located in the marine environment. A marine farm growing abalone will usually employ open or semi-open production systems and be restricted to grow-out activities.
MEMP	Management and Environmental Monitoring Plan.
Minister	Unless expressly stated otherwise, "Minister" refers to the Minister for Fisheries.
Out-of-zone stock	Abalone stocks obtained from outside the biosecurity management zone in which the hatchery or grow-out facility is located.
PCR	Polymerase chain reaction.
Productive reef area	A natural reef area that produced more than one per cent of the total annual commercial greenlip abalone harvest averaged over the three years preceding the date of receipt by the Department of a competent abalone aquaculture application, for which data are available.
Production systems	Open system – where there is no control of either stock movement or water flow; for example, abalone grown on sea-bed structures. Semi-open system – where there is control of stock movement but no control of water flow; for example, culture in barrels or cages suspended on longlines, sea cages and mollusc rack culture. Semi-closed system – where there is control of stock movement and some control of water flow; for example, land-based farms with tanks, ponds or raceways. Closed system – where there is good control of both stock movement and water flow; for example, recirculating land-based farms enclosed in a building.
Quarantine	Maintaining aquatic animals in isolation with no direct or indirect contact with other aquatic animals, to enable observation for a specified period and, if appropriate, testing and treatment, including proper treatment of the discharged waters from the isolated area; control and treatment of incoming water and equipment; and controlled access by personnel.
Ranching	The release of cultured juveniles into unenclosed environments for harvest at a larger size in "put-grow-and-take" operations, where the released animals are not expected to contribute to spawning biomass. In aquaculture, the term "ranching" is sometimes used and can be synonymous with "grow-out" where it describes the culture of fish carried out within an area authorised for that purpose and where private or corporate ownership of the fish is implied.
Restocking	The production and release of fish into wild populations where the species historically occurred naturally, to restore severely depleted spawning biomass to a level where it can once again provide regular yields or to restore self-sustaining populations in the wild.
Stock Enhancement	The production and release of fish into wild populations where the species historically occurred naturally, for the purpose of augmenting the natural supply of fish and optimising harvest or increasing catch rates.
Translocation	The transfer of live fish from one place to another by humans.
Triploid	An organism with three times the haploid number of chromosomes in the cell nucleus, as opposed to normal animals, which are diploids with two sets. Triploids are usually sterile and grow faster than haploids.

1 INTRODUCTION

Abalone aquaculture comprises an important part of Western Australia's growing aquaculture industry. The intent of this Abalone Aquaculture Policy (Policy) is to provide for the growth of the abalone aquaculture sector under an effective management framework that focuses on biosecurity and to establish the management measures that will apply.

This Policy updates the 2010 Abalone Aquaculture Policy.[1]

This Policy applies to the aquaculture of all abalone species found in Western Australian waters.[2]

The objectives of the Policy are to:

- establish the management measures that will apply to the abalone aquaculture sector;
- provide clear guidance to applicants on key issues that will be considered in the assessment process for applications to grant or vary authorisations for abalone aquaculture licences and leases; and
- provide for the development and future growth of a sustainable abalone aquaculture industry in Western Australia.

This Policy applies to aquaculture, not to fisheries management activities such as restocking, stock enhancement, and ranching.[3] Some of these activities are closely related, so it can be difficult to distinguish between them; in these cases, the relevance of this Policy is determined according to the intended outcome of the activity. For example, where the intent is grow-out for harvest within an authorised aquaculture lease, this Policy applies; however, if the intent is recovery, maintenance or development of wild fisheries, the activity is considered fisheries management and consequently this Policy does not apply.

Best practice management measures for abalone aquaculture, including biosecurity, are likely to evolve with changes in knowledge and experience; accordingly, from time to time, this Policy may be reviewed to ensure its currency and relevance to changes in technology, biosecurity, farming practices and other matters.

Section 2 of the Policy elaborates its principles and Section 3 the specific policies and management that will be applied, consistent with the principles.

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[1] *Abalone Aquaculture in Western Australia – Aquaculture Policy.* June 2010. Fisheries Management Paper No. 242.

[2] Abalone species native to and with potential for aquaculture in Western Australia include greenlip abalone (*Haliotis laevigata*), brownlip abalone (*Haliotis conicopora*) and Roe's abalone (*Haliotis roei*). The brownlip abalone is often regarded as belonging to the same species as the blacklip abalone (*Haliotis rubra*) from the eastern states. There is also some interest in the culture of tropical or donkey's ear abalone (*Haliotis asinina*) and staircase abalone (*Haliotis scalaris*).

[3] The Department is developing a separate *Restocking and Stock Enhancement Policy* to provide guidance for proposals involving the release of hatchery-reared seed stocks of all fish species onto natural reefs in Western Australian waters. The *Restocking and Stock Enhancement Policy* includes the release of hatchery-reared abalone seed stocks onto natural reefs; consequently, it is cross-referenced with this Policy.

2 PRINCIPLES

The key principles applied to the Policy are consistent with the following Objects of the *Fish Resources Management Act 1994* (FRMA), to:

- develop fisheries and aquaculture in a sustainable way;
- ensure the impact of fishing and aquaculture on aquatic fauna and their habitats is ecologically sustainable and that the use of aquatic resources is carried out in a sustainable manner;
- enable the management of fishing, aquaculture, tourism and associated non-extractive activities that are reliant on fish and the aquatic environment; and
- foster the sustainable development of commercial and recreational fishing and aquaculture, including the establishment and management of aquaculture facilities for commercial purposes.

In its 2012 *Fisheries Policy Statement*, the Government recognised and supported aquaculture as a legitimate user of the State's land and aquatic resources and as a strategically important industry. The Department of Fisheries (Department) believes the abalone sector of the industry has the capacity to grow substantially and proposes to support that growth by providing an appropriate regulatory framework and a more transparent, effective and efficient approvals process.

2.1 Risk Based Approach

It is not possible to undertake new developments or activities that have no potential risks; therefore, where there are expected to be net community benefits from proposed activities, rather than avoid the risks altogether, governments will often assess the inherent environmental, social and financial risks and, where possible, identify and implement appropriate management or mitigation strategies to reduce the residual risk to acceptable levels. These management strategies generally identify an "appropriate level of protection" and an "acceptable level of risk", which is the amount of residual risk that will be accepted.

The acceptable level of risk can vary with the specific situation; once it has been determined for a particular proposal, it can be applied consistently using standard risk assessment methodology as the management tool to determine whether the proposal (including the associated set of management arrangements) is consistent with meeting the acceptable level of risk.

Recent examples of risk assessment with specific reference to the potential threat posed by the virus that causes abalone viral ganglioneuritis (AVG) can be found in Jones and Fletcher (2011) and Stevens (2012).[4,5] These risk assessments have been considered as part of the Policy development process.

In developing this Policy, the Department has adopted an approach based predominantly on risk and science, particularly in relation to disease and biosecurity matters, and is balancing a precautionary approach with opportunity for development of all sectors of the abalone

[4] Jones, J.B. and W.J. Fletcher. 2012. *Assessment of the risks associated with the release of abalone sourced from Abalone Hatcheries for enhancement or marine grow-out in the open ocean areas of WA*. Fisheries Research Report No. 227. 24p..

[5] Stevens, R., 2012. *Disease risk assessment for abalone stock enhancement.* Western Australian Fishing Industry Council.

industry. The assessment process for applications to grant or vary authorisations for abalone aquaculture will use similar principles, based on risk, science and the application of appropriate management and mitigation methods.

To provide a clear framework for effective management of risks, the Policy incorporates contemporary biosecurity management practices and practical measures to improve abalone health management based on sound epidemiological principles for disease prevention and control. These principles are consistent with those advocated internationally by the World Organisation for Animal Health (OIE) for the prevention and control of aquatic diseases.

2.2 Broodstock Collection

In relation to the supply of broodstock, as for all aquaculture species, the Department's preference is for abalone hatchery operators to acquire stocks from the commercial fishery. In some cases, however, the commercial fishery may not be able to provide abalone in the condition or size required by hatchery operators. The Policy therefore continues to allow the collection of abalone through other means, such as an exemption, noting that the effort made by the operators to acquire broodstock from the commercial fishery will be assessed in any applications.

2.3 Aquaculture Feeds

Abalone aquaculture production systems in Western Australia currently use commercial (manufactured) feeds or depend on the stock feeding on naturally-occurring macroalgae or seaweed. Generally, land-based systems use manufactured feeds and marine systems a combination of manufactured feed and seaweed, or seaweed only, depending on whether the culture units are cages or barrels suspended from longlines, or seabed structures.

To minimise the risk of disease transfer or outbreak arising from pathogens that may be present in them, commercial feeds used must be only those produced by manufacturers that comply with the requirements of specified quality standards and that have in place a defined quality and risk management system. Imported feeds must not be used unless approved by Biosecurity Australia and subject to a permit issued by the Australian Quarantine and Inspection Service. Feeds that contain abalone or abalone products and all unprocessed raw feeds will not be allowed for the purpose of abalone aquaculture.

Supplementary feeding will not be allowed in marine farms using an open production system.

Abalone production in open systems utilising seabed structures as culture units, which enable the abalone stocks to capture and consume naturally-occurring drifting seaweed, are generally considered low risk and may be permitted. The Department does not support the harvesting or collection of seaweed for use as feed in aquaculture production and any future consideration of seaweed harvesting would be subject to a comprehensive environmental study that demonstrates the sustainability of such a practice.

2.4 Compliance

The compliance measures provided in this Policy are intended to ensure traceability and differentiation of aquaculture product from wild fishery production. There is also an emphasis

on biosecurity within hatchery facilities, including site visits to ensure compliance with licence conditions and biosecurity plans.[6]

2.5 Spatial Separation between Sites and Reefs

The risk of disease agents being transported along various distances can be described as a continuum, in which the number of infectious particles drops steeply with distance from the source, with only a few infectious particles travelling relatively long distances. Although the likelihood of disease spread is reduced almost exponentially with distance from the source, extensive distances are required before the likelihood of infection approaches zero. Other factors that influence the level of risk are the number of infectious particles, host density and water currents.

Spatial separation between abalone farms can therefore be an important biosecurity tool. Maintaining minimum distances between abalone farms (land-based and marine) and between abalone farms and natural reefs that yield a significant proportion of the commercial abalone fishery production (defined in this Policy as "productive reef areas") provides a means of limiting the spread of pathogens.

This Policy adopts the principle that, to reduce the likelihood of disease spread, the distance between abalone farms, and between abalone farms and productive reef areas, should be five nautical miles, except in the case of a pre-existing authorisation.

Where a pre-existing abalone farm located within the specified distance of a productive reef area applies for a licence variation to expand, approval may be granted subject to the usual assessment process; however, the expansion would be subject to additional biosecurity requirements.

2.6 Disease and Biosecurity

The main known diseases of concern to abalone in Australia, and that cause widespread mortalities and significant economic loss, are perkinsosis and abalone viral ganglioneuritis (AVG). Descriptions of these, together with other abalone diseases by Jones and Stephens (2005), are summarised below.[7]

- Perkinsosis

  Perkinsus parasites are responsible for causing perkinsosis in molluscs such as oysters, mussels, clams and abalone. *Perkinsus olseni*, the only species known to cause the disease in Australia, is responsible for perkinsosis in abalone, clams and pearl oysters.

  A reportable disease, perkinsosis is associated with clinical disease in abalone in South Australia and New South Wales, although the causative organism is also present in Western Australia and Victoria. Once introduced, *P. olensi* would be difficult to control or

[6] The policies outlined under *Compliance*, section 3.1.4 of this Policy have been updated but are generally consistent with those in the 2010 Policy. Other compliance requirements that may not necessarily be covered in this Policy will remain as licence conditions.

[7] Jones, B. and Stephens, F. (2005). *Aquatic Animal Health Sub-Program: Development of a National Translocation Policy Using Abalone and Prawns as templates for other aquatic species*. FRDC Draft Final report Project No 2004/080.

eradicate. Studies by Goggin and Lester (1995) suggest that disease caused by *P. olseni* will continue to be important in the management and future development of the abalone industry, particularly in aquaculture.[8]

- Abalone Viral Ganglioneuritis

  AVG is caused by a herpes-like virus that causes rapid mortality in abalone (Hooper *et al.*, 2007, Savin *et al.*, 2010; *cited in* Jones and Fletcher, 2012).[9] Abalone species known to be susceptible to the virus in Australia are greenlip abalone, blacklip abalone and hybrids of these two species. AVG disease outbreaks in Victorian abalone farms and the wild abalone fishery, and in Tasmanian live-holding processing facilities, have resulted in significant mortalities in wild and aquacultured stocks. The virus spreads through direct contact between abalone and through the water column; it can also be spread to healthy abalone by infected or contaminated offal, mucous, shells, fishing equipment and people who have been handling abalone (Crane *et al.*, 2009, cited in Jones and Fletcher, 2012).

  The known Australian distribution of the virus that causes AVG includes Victoria and Tasmania. The virus has not been found in naturally-occurring abalone populations in New South Wales, South Australia or Western Australia; however, because several strains of the virus have been identified in Victoria and Tasmania, there is a possibility, albeit low, that strains specific to Western Australia may exist undetected.

- Other Abalone Diseases

  Other abalone diseases are also caused by *Vibrio* spp., flavobacteria and non-specific fungal infections. *Vibrio* spp. are easily identified and treated, with impacts usually confined to individual farms, while the consequences of flavobacteria and non-specific fungal infections are not considered as serious.

It is likely there are other, as yet unknown, abalone diseases that will be of significance. The biosecurity principles on which this Policy is based have been developed to minimise and manage the risk of outbreak and spread of disease through the development and adoption of best-practice biosecurity procedures.

Key features of the Policy that provide a high level of biosecurity include the controls on the movement of live abalone (wild-caught broodstock, hatchery-reared juveniles and grow-out stocks) and other possible sources of contamination. Such controls are based on the requirement to demonstrate low risk through conducting comprehensive health testing prior to movements being permitted. This approach ensures a high level of confidence in the ability to detect disease agents.

More specifically, disease risks in the aquaculture sector are managed through biosecurity strategies that include:

- a requirement for abalone farms to maintain and implement approved biosecurity plans;
- an appropriate health testing and certification regime;

[8] Goggin, C. L. and R. J. G. Lester, 1995. Perkinsus*, a Protistan Parasite of Abalone in Australia: A Review*. Mar. Freshwater Res., 46, 639-46

[9] Jones, J.B. and W.J. Fletcher. 2012 *Assessment of the risks associated with the release of abalone sourced from Abalone Hatcheries for enhancement or marine grow-out in the open ocean areas of WA*. Fisheries Research Report No. 227. 24p.

- establishment of minimum separation distances between abalone farms; and
- establishment of minimum separation distances between abalone farms and productive reef areas.

The Department has several staff members who have undergone emergency response training. In the event of an outbreak of disease in abalone, the Department's emergency response would be consistent with that provided in the relevant Aquavetplan manual. The Aquavetplan manuals provide agreed management plans and sets of operational procedures that would be adopted in the event of an aquatic animal disease emergency. A draft Aquavetplan manual has been developed for AVG.[10]

2.7 Genetic Zones, Translocation and Selective Breeding

The risk of genetic impacts of abalone aquaculture, as it is practised in Western Australia, on wild stocks is considered negligible. This view is supported by recent long-term studies on the effect of deliberate mixing of genetic stocks in Japanese stock enhancement programs, which showed no detrimental impact on the genetic fitness of the stocks.[11]

The genetic zones provided in the Policy are consistent with those in the 2010 Policy, which identified genetic zones for abalone aquaculture for greenlip, brownlip and staircase abalone that occur off the south coast. Any movement of abalone between these genetic zones will be subject to the Department's translocation policy.[12]

Roe's abalone occurs naturally in WA from Shark Bay to the South Australian border. At this stage the Department has not determined a need to establish genetic zones for Roe's abalone.

Tropical abalone occurs naturally in the north of WA; therefore, any request to move tropical abalone outside the area to which it is endemic will be assessed through the translocation policy on a case-by-case basis.

Applications to translocate abalone from interstate will not be considered at present. Any application for translocation would only be considered following a comprehensive and transparent risk assessment.

Selective breeding programs aim to increase the frequency of individual abalone in farm stocks with desirable commercial characteristics, such as improved growth, survival, disease resistance, yield and quality. In Western Australia, selectively bred abalone may be grown out at marine farms in the vicinity of wild stocks in situations where any likelihood of mixing with wild populations is low.

[10] Department of Agriculture, Fisheries and Forestry (2012). Disease Strategy Manual: Abalone viral ganglioneuritis (Version 1.0). In: *Australian Aquatic Veterinary Emergency Plan (AQUAVETPLAN)*, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, ACT.
[11] Kitada *et al*., (2009). Genetic effects of long-term stock enhancement programs. *Aquaculture*. 290: 69-79
[12] *Policy for managing translocations of live fish into and within Western Australia*.

3 POLICY AND MANAGEMENT

In making a determination to grant, vary or transfer licences for abalone aquaculture and determining conditions of approval, the Chief Executive Officer of the Department of Fisheries (CEO) will consider the policies set out below.[13] The policies apply to abalone aquaculture in land-based farms and marine farms, using open, semi-open, semi-closed and closed production systems, employing culture units that include tanks, artificial substrate located on the seabed and cages and barrels suspended from longlines.

3.1 General Policies and Conditions

3.1.1 Broodstock Collection

The preferred option for abalone aquaculture licence holders to obtain broodstock is to acquire them directly from the commercial sector.

Abalone aquaculture licence holders may be authorised to collect broodstock directly from wild populations, by way of either:

- an Exemption granted under section 7(2)(e) of the FRMA; or
- authorisation under section 257(1)(bd) of the FRMA.

The assessment of an application to collect broodstock will consider the effort made by the operators to acquire broodstock from the commercial fishery.

3.1.2 Location of Aquaculture Gear in Marine Farms

Aquaculture gear in marine farms must only be located on areas of sea bed with a sandy or similar substrate, without being in direct contact with any natural reefs.

3.1.3 Feeds

All manufactured diets or commercial feeds used for abalone grow-out must be produced by manufacturers that comply with the requirements of the relevant Australian quality standard.

Imported feeds must not be used unless approved by Biosecurity Australia and imported subject to a permit issued by the Australian Quarantine and Inspection Service.

Unprocessed feeds, other than naturally-occurring seaweed, must not be used. In this context, unprocessed feeds include products such as raw fish and those that use abalone in any form.

Supplementary feeding using commercial feeds will be allowed in land-based farms and marine farms using semi-open production systems.

Supplementary feeding will not be allowed in marine farms using open systems.

[13] Aquaculture licences are granted, varied or transferred according to the relevant provisions of the FRMA; namely, s.92, s.142 and s.140 respectively. Applications for the grant or variation of an aquaculture licence are assessed according to Ministerial Policy Guideline No. 8: *Assessment of Applications for Authorisations for Aquaculture and Pearling in Coastal Waters of Western Australia*. Under s.92A of the FRMA, licence applications are required to include a Management and Environmental Monitoring Plan, which includes provision for biosecurity. Aquaculture leases are granted according to the provisions of s.97 of the FRMA.

3.1.4 Compliance

A person involved in the consignment of any abalone from a licensed site, for sale or processing, must ensure all abalone are accompanied by an accurate copy of a consignment note; and the consignment note must accompany all abalone during transportation.

The consignment note must include details of the number or weight, species and average size of abalone consigned. A duplicate copy of the consignment note must be forwarded to the local office of the Department within 24 hours of the consignment. The licence holder must retain the original copy of the consignment note at the site.

Abalone may be processed in an authorised processing facility at a licensed land-based abalone farm, before being moved to another authorised processor for further processing. On-site processing will be allowed on land-based farms, subject to meeting Biosecurity Plan conditions in relation to disposal of wastes, maintaining records and keeping of shell.

On-site or at-sea processing will not be allowed at marine farms. Abalone harvested from marine farms must only be processed at an authorised, land-based facility.

Routine site inspections will be conducted to ensure compliance by the licence holder with the legislation, licence conditions, biosecurity plans, other protocols and codes of practice.

3.2 Spatial Separation and Location of Sites

Abalone farms will be subject to minimum spatial separation rules between each other and, if involving grow-out in the marine environment, between the farm and a productive reef area. This Policy uses the term "productive reef area" to identify the location of commercially-fished reefs to which the spatial separation rule applies.

A "productive reef area" is defined as a natural reef area that produced more than one per cent of the total annual commercial greenlip abalone harvest averaged over the three years preceding the date of receipt by the Department of a competent abalone aquaculture application, for which data are available.

The definition is based on statutory commercial fisheries catch data submitted to the Department. Where relevant and applicable, other data may be used, such as those collected from recreational catch monitoring programs.

Generally, productive reef areas will be consistent with the 10 nautical mile grid areas for which commercial fisheries catch data are reported; however, if finer-scale spatial catch or habitat data are available, that information may be used in the consideration of applications for abalone farm sites on a case-by-case basis.[14]

[14] There are no official reports of catch at a finer scale than the 10 nautical mile grid; consequently, where they are available, spatial habitat data may enable a finer-scale decision to be made on separation between sites and productive reef areas. This allows abalone aquaculture proponents to undertake habitat and stock surveys, at their own cost, to support a case for a particular site that, for example, may lie within the 10 nautical mile grid but its boundaries are more than five nautical miles away from the productive reef area.

The policy for granting, varying and transferring abalone aquaculture licences, and for granting leases, with reference to the spatial separation and location of sites is set out in paragraphs 1 to 4 below.

Paragraphs 1 to 3 predominantly deal with abalone aquaculture activities authorised under an aquaculture licence issued under s.92 of the FRMA. Persons applying for the grant of an aquaculture licence are also required to have tenure over the area in which the authorised activities are to be conducted. For marine farms, tenure may be provided by way of an aquaculture lease granted under s.97 of the FRMA. Paragraph 4 sets out additional information in respect of these s.97 leases.

Applications for Roe's abalone will be assessed using the spatial separation rules applied to greenlip abalone.

All the specified distances are measured over water.

1. Grant or Variation of a Licence

(a) Where an application is made for the grant or variation of an abalone aquaculture licence under the FRMA, and any part of the boundary of the proposed site lies less than five nautical miles from any part of the boundary of any pre-existing authorised abalone farm, the application will be refused, unless the application is made by the same legal entity (or, in the case of an incorporated entity, by a corporation having the same ultimate ownership) holding the pre-existing licence.
(b) Where an application is made for the grant or variation of an abalone aquaculture licence under the FRMA, and any part of the boundary of the proposed site lies less than five nautical miles from a productive reef area, the application will be refused.
(c) The holder of an abalone aquaculture licence may apply to expand the site by way of variation; however, where such an application is made, if the proposed expansion is within five nautical miles of another abalone farm, the application will be refused, unless the application is made by the same legal entity holding the existing licence.
(d) Where an application is made by a holder of an abalone aquaculture licence to expand the site by way of a variation and the proposed expansion is within five nautical miles of a productive reef area, the application will be refused unless subject to the rules set out in paragraph 2 below.
(e) For biosecurity and fish health issues, the Department considers the activities of one company in one area to be one farm (for example, when applying the five nautical mile rule), because it is difficult to stop transfer of equipment staff and animals from one site to another nearby site within the operating area of a company.[15]
(f) For land-based aquaculture facilities, for the purpose of the rules set out in paragraph 1(b), the distance is measured from the water discharge point.

2. Pre-Existing Authorisations

(a) Pre-existing licences for abalone aquaculture at sites located less than five nautical miles from a productive reef area remain in effect, but will be subject to specific conditions requiring additional biosecurity controls.[16]

[15] The Department expects any transfer of equipment, staff and abalone from one site to another close site within the operating area of a company would be an issue that would be dealt with in the company's biosecurity plan.
[16] Refer to section 3.3.1.

(b) The holder of a pre-existing licence for abalone aquaculture may apply to expand (vary) the authorised site. Where such an application is made, the Department will determine the application on a case-by-case basis having regard to the FRMA, including whether approval of the application is in the better interests of the State and the community; and whether the activities to be conducted under the licence are likely to adversely affect other fish or the aquatic environment.[17]
(c) If an abalone aquaculture licence for a site located within five nautical miles of a productive reef area is cancelled, suspended or not renewed, any future application for an aquaculture licence for the site will be considered a new application and subject to paragraph 1(b) .

3. Applications to transfer aquaculture licences will be determined by the CEO having regard to the relevant provisions of the FRMA.

4. Applications for tenure over marine sites, by way of leases issued under s.97 of the FRMA, will be considered having regard to the relevant provisions of the FRMA and any relevant guidelines and policies.

3.3 Biosecurity

3.3.1 Biosecurity Plan

Under the provisions of section 92(A) of the FRMA, applications for an abalone aquaculture licence must be accompanied by a Management and Environmental Monitoring Plan (MEMP); and current licence holders will be required to prepare and lodge with the Department a MEMP. Provisions for biosecurity will be included in the MEMPs.[18]

Biosecurity plans will provide information and processes on matters that include, but may not be limited to:

- the assessment of biosecurity risks and protocols in relation to hatchery, nursery and grow-out areas (including quarantine); treatment of all incoming and discharge waters; and infrastructure, equipment and staff movements;
- disinfection and hygiene practices;
- stock monitoring and health assessment practices;
- methods and processes for the movement of hatchery-reared abalone to marine farms and their placement on the culture units;
- a requirement to immediately report unusual mortalities, noting that the biosecurity plan will specifically define “immediately” and “unusual mortalities”;
- record-keeping and reporting requirements; and
- emergency response plans.

No abalone may be moved from a hatchery except in accordance with a biosecurity plan approved by the Department.

[17] In respect of any likely adverse impact on other fish and the aquatic environment, the Department will consider the application having regard for, *inter alia*, biosecurity, disease risk and epidemiology.
[18] Prior to the implementation of a MEMP, abalone aquaculture licence holders have been required to develop and implement a biosecurity plan through a licence condition.

Authorised abalone aquaculture activities located less than five nautical miles from a productive reef area will be subject to additional biosecurity controls specified in the biosecurity section of the MEMP. The minimum additional biosecurity controls are set out below.

- Before being transported from the hatchery, abalone must be held for a minimum period of two weeks in a quarantine facility designed to prevent any contact with other hatchery stocks. The quarantine facility must be supplied by sea water treated using ozonisation or filtered to a nominal five micrometres then treated using ultra-violet irradiation. For quarantine facilities holding broodstock, water discharged from the facility must be directed to an infiltration gallery and not directly into the sea.

- Abalone held in the quarantine facility must undergo disease testing as specified by the Department.

- Abalone stocked in marine-based grow-out farms must be visually inspected according to an agreed inspection schedule specified in the Biosecurity Plan; a record must be maintained of all inspection times.

- All unusual mortalities and the associated circumstances must be recorded and records maintained and made available to the Department upon request.

An independent audit of compliance with the biosecurity plan must be undertaken annually or as specified by the CEO and at the expense of the licence holder.

The Department will undertake inspections annually, or more frequently if required, to confirm compliance with biosecurity plans. The level of compliance will be commensurate with risk and may need to include a contribution from the beneficiary.

3.3.2 Health Management and Certification

Biosecurity measures regulating the movement of abalone broodstock onto farms from the natural environment include the use of quarantine systems and health surveillance of newly-introduced broodstock abalone.

The highest biosecurity risk associated with abalone marine farms is movement of hatchery-reared stock onto the farms. Disease testing and health certification will therefore be required for all hatchery-reared abalone being moved to another licensed abalone aquaculture facility, before they leave the hatchery. This requirement does not apply to abalone being moved for the purpose of processing or sale.

At the time of submitting samples for testing, hatcheries will be required to provide a written report on the health status of their stocks, in particular in relation to any increase in mortalities or sick animals.

The number of abalone to be tested before being moved from a hatchery will be regularly reviewed by the Department's Supervising Scientist Biodiversity and Biosecurity (Supervising Scientist).[19] Current testing strategies are non-specific and may not improve the

[19] A reference to the Supervising Scientist Biodiversity and Biosecurity includes reference to an accredited pathologist or epidemiologist.

likelihood of detection of disease. The number of animals required to be tested and the specific tests to be used will be determined by the Supervising Scientist, taking into account the nature of specific diseases of interest, the characteristics of the tests available and the required confidence in the result as determined by risk assessment, not simply a predetermined, fixed figure.

For specific, high-priority diseases, the Supervising Scientist may require regular testing of hatchery stock, not just immediately prior to their movement.

Early clinical signs of disease will help guide the choice of testing strategies and reduce the risk of disease spread; accordingly, hatcheries will be required to report on the health status of their stock, in particular any increase in mortalities or sick animals, at the time of submitting animals for testing.

Disease testing and health certification will be required for all abalone being moved from a land-based facility to the marine environment, or from one marine farm to another, regardless of whether the movement is across or within genetic zones.

Licence holders may be required to submit additional animals for disease testing and, or, health certification at the discretion of the Supervising Scientist or according to provisions of the approved biosecurity plan.

For a land-based abalone hatchery or grow-out facility, if a highly virulent or novel infectious agent is suspected by the CEO: no water from the facility must be discharged; quarantine measures must be put into place as directed by the CEO or other authorised officer; and other measures enacted according to the affected facility's biosecurity plan or as directed by the Supervising Scientist.[20] Consideration is also to be given to an immediate shut down of the water supply.

For a marine-based abalone grow-out facility, aquaculture producers need to be aware that a possible response to a confirmed outbreak of disease may include total destocking of the affected farm according to guidelines and emergency management response plans.

There is currently no compensation scheme available for compulsory destocking of a farm.

3.4 Translocation and Grow-Out

3.4.1 Translocation and Genetic Zones

For the purpose of this Policy, the genetic zones for southern abalone species *H. laevigata, H. conicopora and H. scalaris* are:

Zone 1: South Australian Border to Point Culver
Zone 2: Point Culver to Shoal Cape
Zone 3: Shoal Cape to Busselton Jetty

Genetic zoning does not apply to the culture of *H. roei*.
Only one genetic zone exists for *H. asinina*.

[20] This can be done under existing legislation (Regulation 177(2) *Fish Resources Management Regulations 1995*), so there is no legislative impediment to limiting effects of a disease outbreak in a hatchery.

Figure 1 shows the genetic zones for southern species.

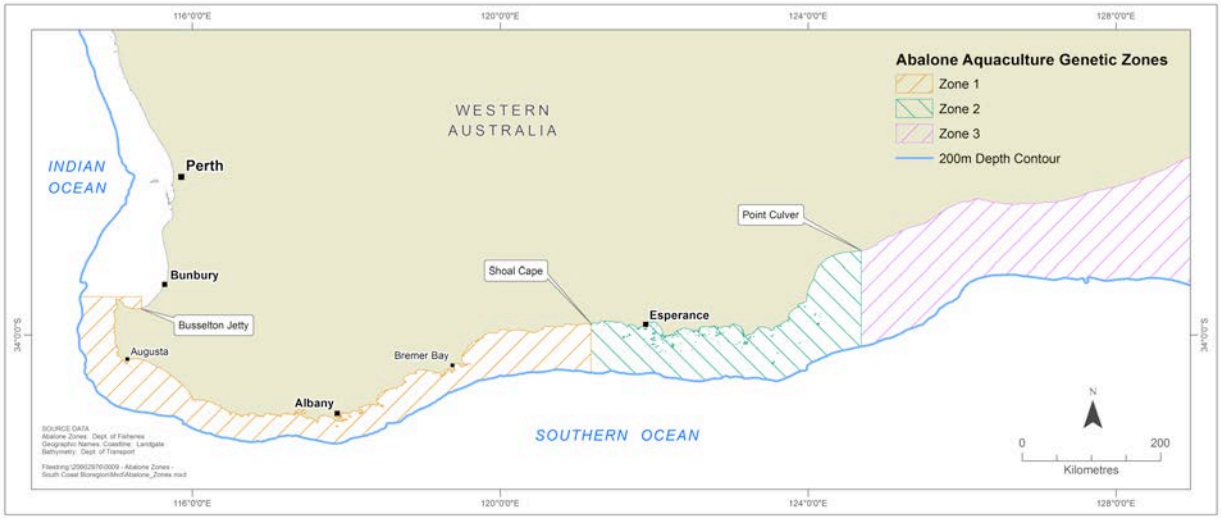

Figure 1 Genetic zones for abalone aquaculture (southern species)

Future circumstances, such as localised disease outbreaks or the introduction of pests or competitors that alter the status of current genetic zones, may necessitate a re-evaluation of their definition, or the establishment of biosecurity management zones. The CEO will determine when a re-evaluation of the definition is required.

Hatcheries operating under an aquaculture licence endorsed for greenlip, brownlip or Roe's abalone may keep wild broodstock collected from any genetic zone in Western Australia, provided that all broodstock collected from different zones are kept under quarantine conditions in a separate area of the hatchery with its own water supply and separate drainage to an infiltration gallery that does not allow water discharge to the open sea.

Abalone may only be stocked in a marine farm if they are sourced from broodstock lines originally obtained from within the same genetic zone in which the marine farm is located.

Hatcheries may maintain Roe's abalone stock from anywhere within Western Australia without the need for specific size filtration for discharge water, provided that the hatchery is located in an area in which Roe's abalone is endemic. If Roe's abalone is not endemic to the area in which the hatchery is located, the specific approval of the CEO is required.

3.4.2 Grow-Out and Selective Breeding

For this Policy, "selectively bred abalone" means abalone produced from successive generations of domesticated broodstock, which have been selected for their desirable commercial characteristics such as improved growth and survival.

For the purpose of this Policy, hybrid and triploid stocks are not considered "selectively bred".

Land-based abalone farms and hatcheries will be permitted to grow selectively bred and hybrid abalone produced from broodstock lines originating from the genetic zone in which the system is located, subject to other relevant approvals being granted.

Land-based abalone farms and hatcheries will be permitted to grow selectively bred and hybrid abalone produced from broodstock originating from any genetic zone, subject to other relevant approvals being granted and provided that the system uses a water treatment and discharge system with a mechanism to filter used water to a nominal 200 micrometres, to prevent the release of eggs or larvae into the wild.

Land-based abalone farms and hatcheries will be permitted to grow Roe's abalone originating from anywhere within Western Australia, provided that the facility is located in an area in which Roe's abalone is endemic. If Roe's abalone is not endemic to the area in which the facility is located, the specific approval of the CEO is required.

Marine abalone farms using open production systems must not be grown at densities that exceed a biomass of three kilograms per square metre.

Marine abalone farms will be permitted to grow selectively bred abalone produced from broodstock lines originating from the genetic zone in which the system is located, subject to other relevant approvals being granted.

Marine abalone farms will not be permitted to grow selectively bred abalone produced from broodstock lines originating from outside the genetic zone in which the system is located.

Marine abalone farms will not be permitted to grow hybrid or polyploid abalone.

Marine abalone farms growing Roe's abalone may use stock derived from broodstock from anywhere within Western Australia south of Moore River, provided that the abalone farm is located in an area in which Roe's abalone is endemic. Broodstock collection from areas to the north of Moore River may be permitted in the future, depending on the recovery of the stock following the significant mortality ensuing from the "marine heat wave" in 2011. If Roe's abalone is not endemic to the area in which the marine farm is located, the specific approval of the CEO is required.