



# National Aquaculture Strategy

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SEPTEMBER 2017

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### Photo credits

Cone Bay Barramundi (Cover)

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# Foreword

Aquaculture is well positioned to play an ever more important role in the economies of hundreds of coastal and river communities across Australia.

With wild-catch fishery production plateauing, there exists an exciting opportunity for aquaculture to bridge the gap between supply and demand.

Growth in global food demand will require a 75 per cent increase in global food production by 2050 compared with 2007 levels.

Australia's domestic aquaculture industry has already experienced remarkable growth over the past 20 years.

We have developed a reputation for producing high quality, sustainable and safe products in an environmental setting that is the envy of many around the world.

Future development opportunities are almost endless.

The National Aquaculture Strategy articulates a national vision for unlocking the industry's potential, identifying priority areas for the industry and Australian governments to address and outlining a range of achievable actions.

This strategy fulfils an election commitment made in the Coalition's 2013 *Policy for a More Competitive and Sustainable Fisheries Sector*.

Priorities include reducing regulatory burden, pursuing research, development and extension, improving market access, strengthening biosecurity, boosting public perception, continuing to improve environmental performance, seeking investment and supporting education and training.

Through innovation, imagination and determination, the industry can continue to improve production techniques for existing products, identify new products, develop new markets and continue to expand.

By working collaboratively on the actions identified in the strategy, industry supported by government, can build a better future for Australian aquaculture.

With this work-plan, I am confident we can achieve the target of doubling the value of the aquaculture industry to \$2 billion by 2027.



**Senator the Hon. Anne Ruston**  
Assistant Minister for Agriculture  
and Water Resources

A handwritten signature in blue ink, appearing to read 'Anne Ruston', written over a light blue circular watermark.

**Senator Anne Ruston**  
Assistant Minister for Agriculture  
and Water Resources



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# National aquaculture target

The National Aquaculture Strategy aims to double the current value of Australia's aquaculture industry to \$2 billion per year by 2027.

This is consistent with the [National Marine Science Plan 2015–2025: driving the development of Australia's blue economy](#) (National Marine Science Committee 2015). The target will be achieved by encouraging development of new industry projects and growth of existing businesses.

This strategy identifies actions to achieve the target. Actions include streamlining the regulatory framework and enhancing research, development and extension (RD&E). To achieve this doubling of value in 10 years, Australian aquaculture production will have to grow by 7 per cent per year over this period. This will require concerted effort from industry and government. However, some sectors are planning significant expansion in the coming years, so this target could prove to be conservative.



# Introduction

## Global aquaculture

According to the United Nations Food and Agriculture Organization (FAO 2016), world seafood consumption has risen substantially over recent years and overall seafood production has increased to accommodate demand. However, wild-caught production worldwide has largely plateaued. This suggests that wild-catch fisheries are reaching their ecologically and/or economically sustainable potential and any substantial growth in seafood production will have to be driven by growth in aquaculture.

Worldwide, food sourced from aquaculture (inland and marine) has grown from 7 per cent of total seafood consumed in 1971 to 44 per cent in 2014. Aquaculture production is forecast to account for more than half the world's fish production by 2020–21 (FAO 2016). This highlights the crucial role that aquaculture will continue to play in meeting global seafood demand.

## Australian aquaculture

With the support of Australian and state and NT governments, the Australian aquaculture industry could provide significant economic returns to Australia by helping meet growing demand for seafood nationally and internationally.

Australia's aquaculture industry is small by global standards, accounting for less than 1 per cent of the estimated US\$160 billion global value of aquaculture production in 2014 (FAO 2016). However, Australia has a reputation for producing safe, sustainable, high-quality and high-value aquaculture products. The Australian aquaculture industry has many advantages over its competitors: the ability to culture a large number of species over a range of climatic zones; access to relatively inexpensive land and water; and freedom from many of the diseases that affect aquaculture in other countries.

Australian aquaculture is in a growth phase. Commercial production began in the late 1800s with oyster farming in New South Wales. In the 1950s the culturing of pearls in *Pinctada maxima* oysters resulted in modest growth. The industry expanded dramatically in the 1980s and 1990s, largely through the farming of southern bluefin tuna in South Australia and salmonids in Tasmania. Growth has continued with the farming of other finfish species, freshwater crayfish and prawns across Australia. Many species are commercially produced through aquaculture. The most valuable are salmonids, pearl oysters, southern bluefin tuna, pacific oysters, prawns, abalone, barramundi and yellowtail kingfish.

Aquaculture is significant for many rural and regional economies in Australia and is a key growth industry in Tasmania and South Australia (ABARES 2015). Together, the two states account for 74 per cent of Australia's aquaculture production value.

The volume of aquaculture production increased rapidly in Australia at an average of 9 per cent annually over the 20 years to 2013–14 (ABARES 2015). However, growth has recently plateaued. The average annual growth in aquaculture production by volume over the five years to 2013–14 has been less than 2 per cent per annum. In 2013–14 the value of aquaculture production was about \$1 billion, approximately 40 per cent of the gross value of Australia's seafood production (ABARES 2015). Wild-caught rock lobster is Australia's most valuable seafood product, closely followed by Tasmanian farmed salmonids. Technological developments that support husbandry practices, such as selective breeding of domesticated stock, will drive increased efficiency, production and quality. The emergence of new technologies, sectors and products will further diversify and grow the aquaculture industry.

Aboriginal and Torres Strait Islander peoples have managed Australia's aquatic resources and practised aquaculture for thousands of years. They want to participate across all areas of the growing aquaculture industry, including investment, training, employment and RD&E activities.

Australia's substantial expertise in aquaculture provides significant economic and trade benefits, including consulting, equipment and technology, marketing, and research and development in for example, restocking, feeds, disease diagnostics and aquaponics.

## Regulation of Australian aquaculture

Existing aquaculture operations are regulated by local, state and NT governments (the Australian Capital Territory has no aquaculture operations). Some states have aquaculture legislation, others regulate aquaculture under broader fisheries legislation. State and territory regulation covers licensing, land use and planning and food safety. The Australian Government has responsibility for regulating aquaculture in Commonwealth waters and plays an important national role in supporting aquaculture operations through national programmes for research, quarantine, aquatic animal health, export food safety, environmental management and market access and trade.

Responsibility for environmental regulation, including the approval of new aquaculture developments and ongoing monitoring and compliance, is generally a matter for state and NT governments. In some cases, the Australian Government Department of the Environment and Energy has a regulatory role. The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) sets out requirements for the export of regulated native species. Export of some aquaculture species may require permits or other approvals under the EPBC Act. The Department of the Environment and Energy also has a regulatory role where the operation is likely to affect a [matter of national environmental significance](#), such as the Great Barrier Reef. The Great Barrier Reef Marine Park Authority regulates aquaculture projects operating in or discharging directly into the Great Barrier Reef Marine Park.



## Development of the strategy

In the 2014 [National Aquaculture Statement](#) (Department of Agriculture 2014b), government and industry committed to developing the National Aquaculture Strategy.

The department consulted over 100 stakeholders during the development of the strategy, including state and NT governments, indigenous committees, research bodies, environmental non-government organisations and over 60 industry bodies and operators. Stakeholders identified several significant issues affecting the industry, including:

- overly complex and duplicate regulatory processes in many jurisdictions and variations between licence and lease arrangements across jurisdictions—these affect industry’s ability to gain approvals for new or existing operations
- lack of a clear regulatory framework for undertaking aquaculture in Commonwealth waters—industry requires a streamlined framework free of unnecessary regulation
- difficulty in accessing agricultural and veterinary chemicals for minor uses—stakeholders cited causes as a lack of sufficient demand or economic incentive for chemical and veterinary medicine producers to register products for aquaculture use in Australia; and operators not being allowed to use data supporting overseas registration for Australian registration
- need for a stronger level of recognition of the rights and interests of Aboriginal and Torres Strait Islander peoples in the management and development of aquaculture in Australia
- concerns about biosecurity risks associated with ballast water, biofouling and imported seafood products—for producers, maintaining water quality and disease-free status are essential to the success of their operations
- concerns about lack of community understanding of the Australian aquaculture industry’s environmental credentials—many aquaculture operators feel wrongly judged as ‘unsustainable’ because of poor practices overseas; this is despite being required to comply with world’s best practice environmental regulations and the initiatives of many operators to seek third-party accreditation such as Aquaculture Stewardship Council certification



- lack of high-quality infrastructure in some regional or remote areas, including roads, ports, electricity and freight logistics—the seafood industry relies on getting fresh product to markets quickly and (for some international markets) harvesting and freezing product as quickly as possible before export
- difficulties gaining domestic and international market access, including achieving necessary scale of operation, putting in place logistics to get product to markets, maintaining product quality and developing a recognised brand name—many stakeholders identified vertical integration as one successful business model for improving market access and protecting brand image
- placing greater focus on extension as part of the RD&E framework—stakeholders saw this as the missing link in implementing and adopting innovation and new technology on-farm.

## Aquaculture development priorities

In consultation with state and NT governments and industry, the department drafted eight priorities aimed at supporting the growth of a strong, competitive, resilient, profitable and ecologically sustainable aquaculture industry:

1. Promoting an efficient **regulatory framework** modelled on established best practice that is transparent and removes unnecessary burden on business.
2. Maximising the benefits of innovation in aquaculture through targeted **research, development and extension**.
3. Developing and improving **market access** for Australian aquaculture products domestically and internationally, capitalising on Australia's clean and green image.
4. Understanding and managing the **biosecurity** risks through a coordinated approach to protect the aquaculture industry and the Australian environment.
5. Improving **public perception** and understanding of Australian aquaculture as a sustainable industry producing safe and healthy products.
6. Continuing to improve the **environmental performance** of aquaculture, including identifying opportunities for optimising environmental performance through adoption of cost-effective strategies.
7. Encouraging and promoting **investment** in Australian aquaculture.
8. Improving **training and education** for the aquaculture workforce and ensuring future employment needs of the industry are met.

For each priority, the strategy identifies a desired outcome and presents actions required to realise each outcome. The actions were identified during consultation with stakeholders, including aquaculture operators, suppliers, regulators and environmental non-government organisations. Responsibility for implementing the actions is shared between industry and Australian, state and NT governments and assumes continuous industry engagement.

Where these actions are the responsibility of multiple jurisdictions, their implementation will be subject to each jurisdiction's relevant policy objectives, priorities and resources. Jurisdictions are not bound by these actions. Some actions may already be underway in some jurisdictions, including actions not assigned specifically to them.

Where industry is listed as an action partner, this may represent the whole industry or a subset of industry. The National Aquaculture Council is the national peak body representing the interests of the Australian aquaculture industry. The council will support industry as appropriate to achieve actions under the strategy. Industry will also pursue priorities and actions that sit outside of this national strategy.

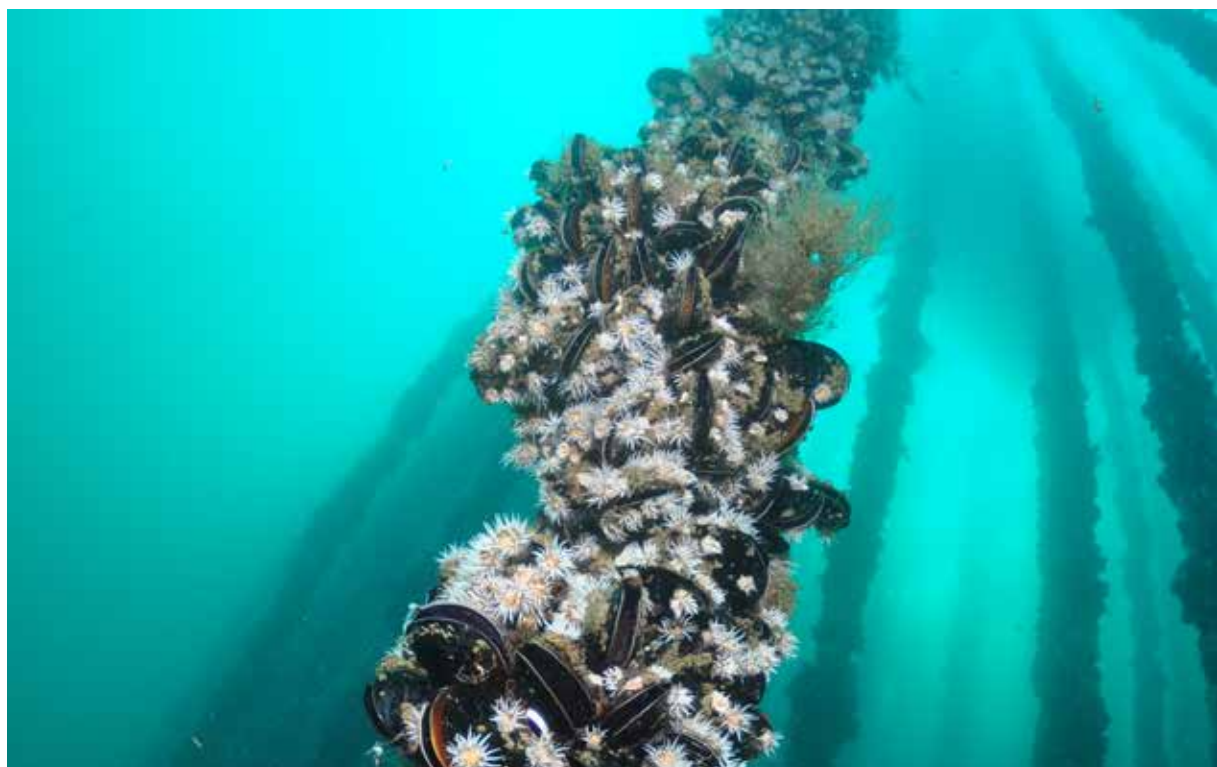
Actions are defined as:

- short-term—to be implemented within six months to two years
- medium-term—to be implemented within three to five years
- long-term—to be implemented within five to 10 years.

Some actions are identified as ongoing, meaning they are relevant for the life of the strategy.

Many of these actions are consistent with those found in other strategy documents and will also be implemented under those strategies. Examples include the [Success through innovation: the National Fishing and Aquaculture Research, Development and Extension Strategy](#) (FRDC 2016), [AQUAPLAN 2014–2019: Australia's National Strategic Plan for Aquatic Animal Health](#) (Department of Agriculture 2014a) and individual state and NT aquaculture strategies.

This strategy provides case studies that illustrate how the Australian aquaculture industry can capitalise on opportunities and overcome challenges.



# Priorities

## 1 Regulatory framework

To continue to develop, the Australian aquaculture industry needs an efficient, effective and supportive regulatory environment that reflects best practice. According to the Productivity Commission [Marine fisheries and aquaculture, final report](#) (2016), regulation has not significantly impeded growth of the aquaculture industry in Australia except in the case of land-based prawn farming in North Queensland. However, the commission noted the benefits of spatial planning and the tensions for governments in regulating and promoting industry growth. Further, the aquaculture industry has raised concerns about the complexity of dealing with different regulatory requirements when operating in more than one jurisdiction.

Regulation of wild-capture fisheries focuses on the sustainability of the resource. In contrast, aquaculture regulation is generally implemented to mitigate industry's impact on the environment, provide access to publicly owned land and water and manage potential conflicts with other users of these resources. Challenges to future growth of the aquaculture industry include developing internationally competitive operations, competition for suitable sites and meeting an increasing number of environmental standards. In remote locations, access to skills and infrastructure are also issues.

In the past, aquaculture has operated in waters managed by state and NT governments. However, environmental and resource access benefits and improvements in technology are making aquaculture in Commonwealth waters feasible. The Australian Government believes this should be encouraged in the most efficient manner possible, which in most cases means enabling state and NT governments to extend their existing aquaculture legislation and management into Commonwealth waters adjacent to their jurisdictions. This will ensure operators are covered by consistent regulations in adjacent waters and may reduce unnecessary compliance and planning costs. Any activities which have a significant impact on a matter of national environmental significance will require approval under the *Environment Protection and Biodiversity Conservation Act 1999*. Approvals may also be required in relation to protected species and export of native specimens under the Act. The Australian Government may allow jurisdictions that are seeking accreditation to provide certain approvals on behalf of the Commonwealth—similar to the accreditation-granting process that operates for matters in state or territory waters.



A proven strategy for streamlining the regulatory pathway for business is the setting up of institutional arrangements that create a one-stop shop approach to servicing approvals, such as the system operated by the Australian Government Major Projects Facilitation Agency. This involves a single department or case officer taking applicants through the approval process and advising on the application process and associated timelines. In South Australia, the Department of Primary Industry and Regions operates a similar service, which includes formally referring individual applications to all relevant state government agencies for consideration.

Regulatory burden can be significantly reduced through the use of designated aquaculture zones (Case study 1). Designation of these zones will occur in consultation with all stakeholders and will include preliminary environmental and planning approvals where possible. The zones would enable industry to establish aquaculture operations without having to undergo lengthy, complex and expensive individual approval processes. This approach would enable governments to evaluate cumulative impacts, rather than assessing impacts case-by-case as applications are received or expansion occurs. For example, under the *Aquaculture Act 2001* (SA), South Australia has 12 dedicated aquaculture zones where aquaculture production leases can be established.

#### CASE STUDY 1

##### Declared aquaculture zones, Western Australia

The WA Government has provided \$1.85 million to establish two aquaculture development zones in the Kimberley and Mid West regions of Western Australia. In August 2014 the then WA Government Minister for Fisheries declared the [Kimberley Aquaculture Development Zone](#), an area of 2,000 hectares that has the capability to sustainably produce around 20,000 tonnes of marine fish per annum.

Sites within the Kimberley zone have been allocated: MPA Fish Farms Pty Ltd is authorised to produce 15,000 tonnes of barramundi per annum and Aarli Mayi Aquaculture Project 5,000 tonnes. Establishment of the Mid West Aquaculture Development Zone is nearing completion and is expected to be declared in 2017. The zone will occupy 3,000 hectares. Environmental modelling indicates the zone is likely to support production of around 48,000 tonnes of marine finfish per annum. Industry interest in the zone suggests that the water area will be oversubscribed.

The industry's peak body, the Aquaculture Council of Western Australia, welcomes the establishment of aquaculture development zones because they significantly reduce the time and costs associated with securing approvals for marine aquaculture.

The WA Government is also funding a project to identify additional aquaculture zones or areas off the south coast of WA. These zones will primarily be for the culture of marine shellfish such as edible oysters. The project aims to attract investment by providing investment-ready areas for large-scale shellfish production.

Development of aquaculture zones and expansion of aquaculture leases into Commonwealth waters must consider the rights and interests of Aboriginal and Torres Strait Islander peoples and potential opportunities for these communities (Case study 2). Jurisdictions should make any necessary amendments to their aquaculture legislation to ensure these issues are addressed.

## CASE STUDY 2

### Providing aquaculture opportunities for Aboriginal communities and promoting integrated multitrophic aquaculture

The SA Government has established 12 aquaculture zone policies for state waters since the *Aquaculture Act 2001* (SA) came into effect. The policies recognise the SA aquaculture industry as a legitimate user of the state's marine resources, provide guidance and clarity about access and prescribe the species, biomass and amount of area permitted for farming. Species farmed in these 12 zones include southern bluefin tuna, yellowtail kingfish, mussels, oysters and abalone.

Under the [Aquaculture \(Zones—Eastern Spencer Gulf\) Amendment Policy 2017](#), the SA Government created two intertidal aquaculture zones adjacent to Point Pearce on the Yorke Peninsula. The zones are the first of their kind in South Australia, providing aquaculture opportunities for the local Aboriginal community. Under the policy, applications for leases in these zones must have the support of local Aboriginal communities, take into account their interests and ensure their traditions (including fishing traditions) are preserved.

The policy also includes criteria that encourage the use of integrated multitrophic aquaculture within the Wallaroo (east) subtidal aquaculture zone. This refers to the farming of different aquaculture species together in a way that allows the waste from one species (for example, salmon) to be recycled as feed for another (for example, seaweed). This is another first for the state and extends the current species prescribed (including filter-feeding molluscs) within this zone to include finfish and algae aquaculture to encourage further investment in aquaculture in the Yorke Peninsula region.

The Australian Government remains committed to reducing unnecessary regulation, improving collaboration with states and territories and applying regulatory tools as efficiently and effectively as possible while maintaining high environmental standards. This will ensure a balance between economic development, social and environmental benefits and costs when securing long-term, sustainable growth for the Australian economy. As an example, food safety auditing requirements are designed to address domestic and international market requirements but can be duplicative and burdensome. It may be possible to streamline some of these requirements by ensuring they are complementary and consistent across jurisdictions.

Licence and lease arrangements vary between jurisdictions, the species farmed and the farming area or zone. These variations are sometimes necessary. However, variations in environmental management requirements between areas or zones can lead to differences in resource security and affect an operator's ability to attract finance. These variations can also be a disincentive for operators to expand or invest in their operations. In an attempt to address this, some jurisdictions have increased the duration of their leases.

Regulatory consistency should apply where possible, especially for businesses that operate in more than one jurisdiction. Ensuring ecologically sustainable development remains paramount. Jurisdictions may consider the past performance of individual operators when determining the length of a lease.

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### Desired outcome and actions

**Desired outcome:** To promote efficient and transparent regulatory practice across jurisdictions that minimises unnecessary burden on business and is consistent where possible.

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**TABLE 1** Actions for Priority 1: Regulatory framework

Task	Partners	Time
Amend the Commonwealth <i>Fisheries Management Act 1991</i> to allow individual jurisdictions to extend their existing aquaculture regulations to cover adjoining Commonwealth waters	Australian Government	Short term
Where appropriate, individual jurisdictions will investigate potential areas for designated aquaculture zones and establish streamlined approval processes for new aquaculture development in these areas	State and NT governments (in consultation with industry)	Short term
Jurisdictions (through the Aquaculture Committee of the Australian Fisheries Management Forum) will continue to discuss an approach to aquaculture regulation with the aim of promoting best regulation and planning practice nationally; may cover issues such as the allocation and length of aquaculture leases	State and NT governments (through the Aquaculture Committee)	Ongoing
Consider relevant findings and recommendations of Productivity Commission <a href="#">Inquiry into regulation of the marine fisheries and aquaculture, final report</a> (2016) and Australian Government <a href="#">White Paper on Developing Northern Australia</a> (2015), including those relating to recognising interests of Aboriginal and Torres Strait Islander peoples in new developments	Australian Government, state and NT governments	Short term





## 2 Research, development and extension

Most of the species grown in Australian aquaculture farms are high value and the production methods used generally involve advanced technologies. Aquaculture operators rely on innovative RD&E to drive development and productivity and improve competitiveness. Future growth in Australian aquaculture will rely on industry's ability to continue capitalising on growth opportunities, developing new products and increasing production and the productivity of existing operations.

Individual operators continue to be innovative on-farm. Publicly funded RD&E is needed to ensure the growth and efficiency of Australia's aquaculture industry, especially in areas such as emerging aquaculture species, animal health, biosecurity and sustainable industry development. The existing matching of industry contributions through the Fisheries Research and Development Corporation (FRDC) is efficient and timely and is strongly supported by industry. FRDC has an Indigenous Reference Group that helps ensure that fishing and aquaculture RD&E delivers improved economic, environmental and social benefits to Aboriginal and Torres Strait Islander peoples.

Research on aquaculture by industry and research organisations has increased. Operators in sectors such as Atlantic salmon, southern bluefin tuna, prawns, oysters and barramundi are taking greater stewardship in prioritising, planning and managing RD&E for their sectors. To ensure future research effort focuses on increasing opportunities across the entire sector, the FRDC has established the New and Emerging Aquaculture Opportunities subprogram (Case study 3). By 2020 the subprogram will commercialise RD&E opportunities for improved hatchery production technologies, breeding programmes, feeds and feeding systems, husbandry and health systems.

### CASE STUDY 3

#### Collaboration between producers, aquafeed companies and research institutions to improve feeding regimes for yellowtail kingfish

Yellowtail kingfish aquaculture represents an opportunity for industry development in the growing Australian white fish market. Production is already expanding in South Australia, New South Wales and Western Australia, but profitability will be crucial to continuing development. FRDC is managing a project through a Rural Research and Development for Profit programme. The project will develop more cost-effective and sustainable feeds, better feeding strategies and a greater understanding of fish health.

The FRDC project is a collaboration between Australian yellowtail kingfish producers, aquafeed companies and research institutions. Initial results from South Australia show that changes to feeding methods during winter enable fish to convert food more efficiently and gain weight and consequently profits. In contrast, previous winter feeding strategies resulted in fish losing weight in winter, reducing profit for operators. Clean Seas Seafood has adopted the strategy and estimates that it could increase its return from yellowtail kingfish aquaculture by \$2 million per year for a 2,000-tonne operation.

## Desired outcome and actions

**Desired outcome:** Maximise the benefits of innovation and continuous improvement in aquaculture through targeted RD&E.

**TABLE 2** Actions for Priority 2: Research, development and extension

Task	Partners	Time
Ensure industry participation in setting research priorities and allocating funding through FRDC, in line with existing planning and prioritising mechanisms to achieve right balance of investment across ecological, economic and social priorities	Australian Government, industry	Ongoing
Ensure participation of Aboriginal and Torres Strait Islander peoples in setting research priorities and allocating funding through FRDC and its Indigenous Reference Group to deliver improved economic, environmental and social benefits to Aboriginal and Torres Strait Islander peoples via aquaculture RD&E	Australian Government	Ongoing
Where appropriate, ensure greater emphasis on extension, leading to on-farm utilisation in research and development projects	Australian Government, state and NT governments, industry	Ongoing
Use and support FRDC's New and Emerging Aquaculture Opportunities subprogramme, in line with the Australian Government <a href="#">White Paper on Developing Northern Australia</a> (2015) to deliver outcomes for prawn, barramundi and cobia aquaculture in northern Australia	Australian Government, state and NT governments, industry	Ongoing

**FRDC** Fisheries Research and Development Corporation.

### 3 Market access

Australian seafood products are in demand and well regarded internationally. As global seafood demand increases, Australian exporters will have opportunities to expand into more diverse markets where demand for high-value products is greater than in the domestic market.

The Australian Government will continue to pursue trade agreements to further improve international market access and trade relationships for Australia. Access to these markets could be further developed through investment promotion, trade missions and dissemination of market information. The government runs several programmes that facilitate export to markets. For example, Austrade helps Australian companies grow their businesses in international markets through the Export Market Development Grants scheme and the TradeStart programme.

The Australian seafood industry faces challenges, including the issue of traceability of products and increasing public demand for third-party certification of environmental sustainability.

To protect their food safety, animal and plant health, most countries (including Australia) adopt technical measures based on the rules of the World Trade Organization or international standard-setting bodies. Nations are more aware of the risks to a trading partner's trading status that may result from poorly applied technical or non-tariff measures (NTMs) to goods that are being traded. NTMs may include inspection for and certification of treatments; demonstration of pest and disease status; and management to control pests and diseases. Increased awareness has led to stricter importing country technical requirements and export requirements.

Australia's regulatory requirements maintain standards of biosecurity and food safety that are equivalent to international standards and meet Australia's appropriate level of protection. For example, under Australian legislation, the export of bivalve molluscs requires a biotoxin risk assessment and biotoxin management plan. A biotoxin management plan ensures activities such as water monitoring, phytoplankton testing, flesh testing of the bivalve and environmental factors are considered by Australian Government authorities before they determine export eligibility and issue export certification for the product.

Industry incurs costs getting certification to meet exporting regulations and importing country requirements. However, certification protects the Australian seafood industry and Australia's clean and green image, helping attract premium prices for our seafood. Jurisdictions should facilitate and support industry to gain third-party accreditation where possible.

By preparing export strategies Australian aquaculture producers can improve their understanding of export markets and ensure their products meet our trading partners' export requirements. Export strategies provide information on potential markets, consumer preferences, costs and processes of entry into the market and the actions necessary to achieve entry. Strategies should also cover technical market access conditions such as food safety and animal health conditions and their management. Strategies require time and technical expertise to finalise. Trading partners may also impose non-technical NTMs such as quotas, registration of premises and other export costs. Domestic regulations of the trading partner may also restrict trade in certain species beyond those listed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Austrade and many state government trade and investment agencies have developed general trade guides on the market entry and import conditions, export costs and consumer preferences of major trading partners. The aquaculture industry could collaborate with Australian Government agencies such as Austrade and the FRDC to better position its products domestically and internationally. However, each exporter must consider their own business plan when exploring options to export Australia's aquaculture products.

Australia must maintain strong ongoing bilateral relationships. We cooperate with other countries in managing highly migratory, straddling and shared fisheries resources through our engagement in regional fisheries management organisations and agreements. Australia's involvement is underpinned by its obligations under UN conventions and agreements (United Nations 1982, 1995). Australia engages internationally through, for example, the United Nations Food and Agriculture Organization Committee on Fisheries and the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Regional and international engagement enhances and strengthens Australia's trade opportunities with other countries.

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## Desired outcome and actions

**Desired outcome:** Develop and improve access for Australian aquaculture products to domestic and international markets.

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**TABLE 3** Actions for Priority 3: Market access

Task	Partners	Time
Increase awareness and uptake of government trade promotion and cooperation initiatives to help develop new trading relationships: Austrade's Export Market Development Grants scheme and TradeStart programme, and the Australia–China Agricultural Cooperation Agreement programme	Australian Government, industry	Ongoing
Develop aquaculture export strategy, including analysis of non-tariff measures that may affect ability of aquaculture industry to achieve its market access objectives	Industry (with support from the Australian Government and state and NT governments)	Ongoing



## 4 Biosecurity

Australia has a relative advantage through its freedom from many aquatic animal diseases that occur in other countries. Maintaining this status is important for the aquaculture industry to ensure growth and profitability is not jeopardised by exotic pathogens or the emergence of endemic pathogens.

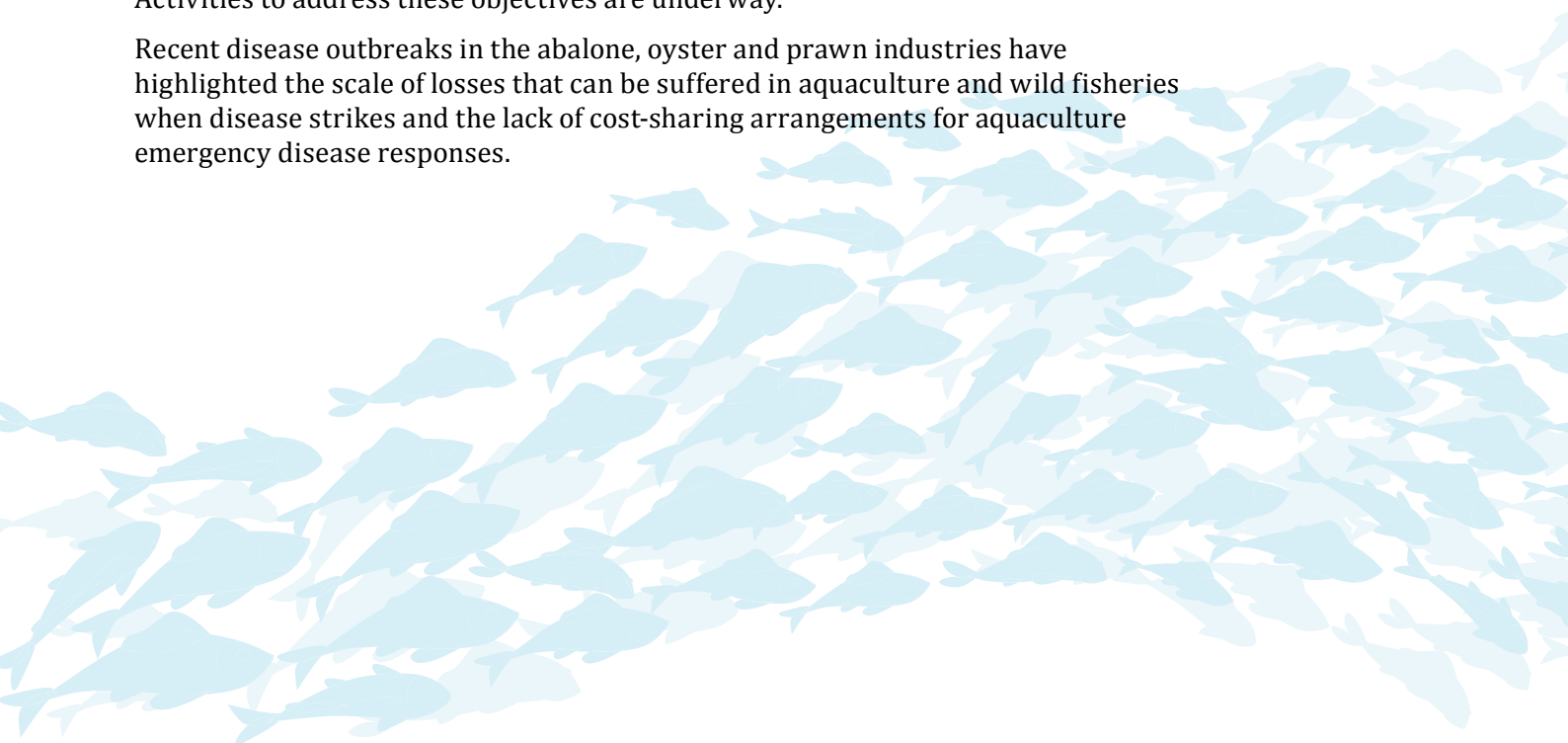
To protect the aquaculture industry and the natural environment, appropriate controls must be placed on the introduction and movement of aquatic organisms. Controls help us manage risks associated with disease incursions and emergence. Applying a robust risk-based approach to managing biosecurity for all industries is central to ensuring the biosecurity of Australia's aquaculture industry. All jurisdictions need to work with industry to manage risks associated with biofouling and ballast water for vessels entering Australian waters and to ensure we meet international obligations. This work will also focus on managing risks associated with importing ornamental fish.

AQUAPLAN is Australia's comprehensive national strategic plan for aquatic animal health. It outlines priorities for strengthening Australia's arrangements for managing aquatic animal health to support sustainability, productivity and market access. [AQUAPLAN 2014–2019](#) (Department of Agriculture 2014a) has five objectives:

1. To improve regional- and enterprise-level biosecurity
2. To strengthen emergency disease preparedness and response capability
3. To enhance surveillance and diagnostic services
4. To improve the availability of appropriate veterinary medicines
5. To improve education, training and awareness.

Activities to address these objectives are underway.

Recent disease outbreaks in the abalone, oyster and prawn industries have highlighted the scale of losses that can be suffered in aquaculture and wild fisheries when disease strikes and the lack of cost-sharing arrangements for aquaculture emergency disease responses.



Within Australia, the risks involved in movement of aquatic animals are recognised. Two relevant national guidelines are the National Policy for the Translocation of Live Aquatic Organisms: issues, principles and guidelines for implementation (Ministerial Council on Forestry, Fisheries and Aquaculture 1999) and the [National Policy Guidelines for Translocation of Domestic Bait and Berley](#) (Department of Agriculture 2015). Jurisdictions should facilitate effective implementation of these guidelines. Where appropriate, they should consider developing sector- or species-specific import protocols to ensure efficient and safe movement of aquatic animals.

Under AQUAPLAN 2014–2019 (Department of Agriculture 2014a), industry and governments have agreed to develop an emergency aquatic animal disease response arrangement. The arrangement is intended to enable quick responses to emergency aquatic animal disease incidents, provide incentives for early reporting of disease occurrence and engage beneficiaries in sharing the responsibilities and costs of emergency responses.

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### Desired outcome and actions

**Desired outcome:** Ensure the risks of disease outbreaks and introduced pests are understood and managed to safeguard the aquaculture industry and Australian environment.

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**TABLE 4** Actions for Priority 4: Biosecurity

Task	Partners	Time
Review <i>National Policy for the Translocation of Live Aquatic Organisms: issues, principles and guidelines for implementation</i> and facilitate implementation of finalised updated guidelines	All jurisdictions and sectoral committees through the Sub-Committee on Aquatic Animal Health	Short term
Continue to improve processes to manage risks associated with importation of ornamental fish and seafood products	Australian Government	Ongoing
Continue to support implementation of <a href="#">AQUAPLAN 2014–2019</a> , Australia's third national strategic plan for aquatic animal health	Australian Government, state and NT governments, industry	Short to medium term
Support the Sub-Committee on Aquatic Animal Health to improve availability of appropriate veterinary medicines by meeting objective 4, AQUAPLAN 2014–2019	Industry	Short to medium term
Finalise industry–government aquatic animal disease response arrangements under activity 2.1, AQUAPLAN 2014–2019	Australian Government, state and NT governments, industry	Medium term
Develop measures (including regulatory measures) to manage risks associated with ballast water and biofouling from vessels entering Australian waters	Australian Government	Short to medium term





## 5 Public perception

The aquaculture industry has a positive story to tell. Aquaculture farms are reliant on high-quality water. They have minimal environmental impact on this water when they operate under best practice guidelines. Protein production through aquaculture is more efficient than any other animal production system. Aquaculture is an important growth industry in many regional and rural communities. Promoting these positive aspects of aquaculture would improve public understanding and support for the industry and raise its profile (Case study 4). Aquaculture-related tourism activities with an educational component would also help change public perceptions of the industry.

### CASE STUDY 4

#### Adopt a beach programme

In March 2012 aquaculture industries in the Eyre Peninsula established an [Adopt a Beach](#) programme. The programme aims to address community concerns about aquaculture-related marine debris on peninsula beaches. Fourteen local aquaculture companies representing three aquaculture sectors (mussels, finfish and tuna) have committed to four beach clean-ups every year. To date, they have removed over 12,000 kilograms of debris along more than 155 kilometres of coastline.

The programme has resulted in a cleaner coastline and created a better understanding at industry and community level of the extent and nature of debris washing up on the coastline. The oyster industry has also established a coastal beach clean-up programme on the west coast of the Eyre Peninsula. Members of the public can report aquaculture- and fishing-related marine debris sightings to the SA Government.

Engagement, collaboration and communication are crucial in maintaining and improving community support (known as a ‘social licence to operate’) for the aquaculture industry (Case study 5). An industry with a focus on public trust is well placed to respond quickly to market signals and new opportunities. Factors that affect public perception of aquaculture domestically include global production stereotypes of aquaculture; past performance of some Australian operators; concerns about impacts on the benthic environment (anything associated with the seabed) and the rehabilitation of sites by operators when farming ceases; genetically modified products; and the use of fish meal and animal health products. The [Community attitudes towards Australian fisheries management](#) (Essence Communications 2015) market research report found that the industry is best placed to address public perceptions of its performance and value. This can be achieved at multiple levels, including at the farm level (for example, through the use of community engagement officers) and at a national level through an industry peak body and industry campaigns.

## CASE STUDY 5

### Aquaculture farm open days

Open days are an opportunity for aquaculture businesses to engage with the community, promote industry practices, educate attendees about aquaculture farming and showcase their product. According to industry representatives, people are more supportive of aquaculture once they have attended an open day.

In March 2014 the [Huon Aquaculture open day](#) attracted 5,000 people, 1,000 of whom participated in a free boat tour to the company's farms. Local food vendors were on site to provide local Huon dishes. The company took the opportunity to consult with visitors on proposed changes to its farms and investment strategies. Huon considered the event a success and conducted a follow-up survey that found that the majority of respondents were supportive of the proposed changes. Huon Aquaculture is a large-scale business, but community open days can be effective for businesses of any size.

Third-party certification (such as the Aquaculture Stewardship Council accreditation granted to some salmon companies in Tasmania) can help build consumer trust, but costs need to be weighed against benefits.

The Australian Government, with support from a range of industry partners, has funded a project to establish the national seafood industry peak body Seafood Industry Australia. This body has the potential to help the industry build its reputation as professional and world-class. By joining Seafood Industry Australia, the aquaculture industry would ensure its messaging is consistent with other areas of the seafood sector and improve public understanding and support for aquaculture.

## Desired outcome and actions

**Desired outcome:** Improve public understanding and perception of Australian aquaculture as a professional industry producing safe and healthy products.

**TABLE 5** Actions for Priority 5: Public perception

Task	Partners	Time
Engage with the community through programmes, including open days and beach clean-ups	Industry	Ongoing
Engage with Seafood Industry Australia to promote the aquaculture industry to the community and improve its social licence to operate	Industry	Ongoing
Promote value of the aquaculture industry to regional communities through community engagement officers and other strategies	Industry	Ongoing



## 6 Environmental performance

The relationship between the natural environment and aquaculture is critical because aquaculture relies on a clean and healthy environment. Aquaculture operations can adversely affect the local environment and ecology through reduced water quality, build-up of genetic material beneath farms, infrastructure waste and escape of stock. Environmental impacts can be prevented or minimised through careful planning and management, ongoing environmental approval processes and regular auditing and compliance checks. This combination of activities will enhance community confidence in the management of aquaculture environmental impacts.

The aquaculture industry is committed to continuous improvement in its environmental performance (Case study 6). The Australian and state and territory governments provide support to industry to achieve this goal. Operators have a range of tools available, such as:

- industry guidelines on best practice farming (including site use, species choice and waste control)
- codes of conduct for various practices
- third-party accreditation schemes
- effective and efficient regulation and monitoring.

Developing, applying and improving these tools should continue to be a priority for industry.

### CASE STUDY 6

#### Humpty Doo Barramundi farm—a research and development success story

Aquaculture farmers at [Humpty Doo Barramundi](#) in the Northern Territory have developed a unique production system that minimises water discharge. Farm production ponds operate in conjunction with a constructed wetland water treatment system that treats waste water discharged from the ponds and supplies clean water. The treatment system can recirculate water indefinitely. Clean treated water is drawn from the treatment ponds and pumped to a header pond, where it gravity feeds through the production ponds back into the treatment system. Vegetation is also planted in the wetland water treatment systems to aid absorption of nutrients from the production ponds and minimise erosion. The system provides for efficient production of premium-quality fish with minimal discharge of nutrients to receiving waters.



Compared with livestock production, the aquaculture industry's feed conversion rates are up to 10 times higher and its carbon footprint as much as 10 times lower. These figures continue to improve. However, some operators in the industry still rely on feeds sourced from wild-catch fisheries. Industry can further reduce its impact on the environment by ensuring fish meal is sourced from sustainable fisheries and by reducing the fish meal content of aquaculture feeds.

Of interest to the aquaculture industry and environmental groups is the use of aquaculture in the remediation of degraded marine environments. For example, using native shellfish to rebuild habitats that were lost due to historic overharvesting offers new commercial aquaculture development opportunities and contributes to the restoration of marine environments (Case study 7).

Another area of interest is the use of integrated multitrophic aquaculture. This refers to the combined farming of different aquaculture species in a way that allows the waste from one species (for example, salmon) to be recycled as feed for another (for example, seaweed).

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### Desired outcome and actions

**Desired outcome:** Ensuring the continued and improved environmental performance of aquaculture and identifying opportunities for optimal environmental performance through adoption of cost-effective strategies.

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**CASE STUDY 7****Industry–conservation partnerships supporting rehabilitation of native flat (*Ostrea angasi*) oyster habitats**

Shellfish reefs are living, three-dimensional reefs formed by high densities of oysters, mussels and other shellfish. Before European settlement these reefs were common along Australia's coastlines. During the 1800s and early 1900s thousands of tonnes of oysters were harvested from over 150 reefs across Australia each year. Overfishing, land clearing, pollution and disease resulted in extensive reef decline.

Today shellfish reefs are functionally extinct habitats and only a handful are still in existence. Modern aquaculture was developed partly as a result of the decline in natural shellfish reefs.

Australia's first shellfish reef restoration project was in 2014, in Port Phillip Bay, Victoria. Projects are being initiated across Australia, involving the aquaculture industry, recreational fishers, Aboriginal and Torres Strait Islander groups, government and not-for-profit groups, such as the [Australian Shellfish Reef Restoration Network](#). The first stage of establishing the largest of these was recently completed in the Yorke Peninsula, South Australia. Establishing these reefs around aquaculture zones can help offset impacts on existing benthic habitats (anything associated with the seabed) and reduce nitrogen and particulate organic matter.

In Georges Bay, Tasmania, conservationists and oyster and mussel growers are using oyster spat (baby oysters) from commercial hatcheries and oyster leases to kickstart natural reproduction and boost oyster numbers in local reefs. Hatcheries gain a commercial benefit, reducing the cost of producing Angasi spat for commercial growers. Such mutually beneficial partnerships could also be mobilised in the recovery of species such as the Sydney rock oyster.

**FIGURE 1** Native flat oyster (*Ostrea angasi*) reef, Georges Bay, Tasmania



Source: Detail from photograph by C Gillies, The Nature Conservancy

**TABLE 6** Actions for Priority 6: Environmental performance

Task	Partners	Time
<p>Pursue continuous improvement in environmental performance of the industry to reduce all potential impacts, including (as appropriate) through:</p> <ul style="list-style-type: none"> <li>• effective and efficient regulation, tailored to the needs of specific sectors</li> <li>• effective monitoring and reporting, tailored to the needs of specific sectors.</li> </ul> <p>Where necessary, developing industry-specific codes of conduct and best practice guidelines for managing environmental impacts for specific sectors and environments</p>	Aquaculture Committee of the Australian Fisheries Management Forum, industry	Short term
Explore the role of non-government environmental certification schemes in promoting and confirming industry best practice and sustainability	Industry	Short term
Work with environmental organisations to identify opportunities for using commercial aquaculture to improve degraded environments	Industry	Ongoing
Work with feed manufacturers to ensure quantity and sources of fish meal and oil in fish feed are sustainable	Industry	Ongoing
Support ongoing innovation by fish feed manufacturers to bring new, high-quality products to market	Australian Government, state and NT governments, industry	Ongoing
Work to reduce nutrient output from aquaculture operations (for example, by improving production technologies)	Australian Government (particularly support from FRDC), industry	Ongoing
Explore use of integrated multitrophic aquaculture to deliver economic and environmental benefits	Australian Government, state and NT governments, industry	Ongoing

**FRDC** Fisheries Research and Development Corporation.

## 7 Investment

A key Australian Government objective is to foster long-term productivity growth in the Australian economy. The Australian Government seeks to provide an open, transparent and internationally competitive business operating environment and encourage private sector investment in productive and sustainable aquaculture enterprises. Government also has a role to ensure environmentally responsible and orderly development across a wide range of areas, including foreign investment, immigration, quarantine, customs, petroleum exploration and production licensing.

Austrade has a mandate to promote Australia and attract foreign investment. One of the government's national investment priorities is agribusiness and food—investment is essential to build the productive capacity of our internationally competitive sectors and to create co-investment partnership models. Aquaculture is a sector with significant growth and diversification potential in Australia. Austrade is well positioned to introduce global investors to Australian opportunities—with planning, development and environmental approvals progressed—and to individual aquaculture operators who are investor ready. Even operators with strong technical knowledge need to develop their business management and planning skills to better attract and secure investment. Government can help operators locate business and financial training that will develop these skills.

The Australian Government recognises that its approval processes may add complexity to the planning and development of major project investment. To address this issue, the government offers a free major project facilitation (MPF) service to help ensure that Commonwealth approval processes over a certain size are coordinated with relevant state and territory government approval processes. An example of a project that has attained MPF status is the proposal by Seafarms Group Ltd to develop 10,000 hectares of land-based prawn farms at Legune Station in the Northern Territory. [Project Sea Dragon](#) aims to produce around 120,000 tonnes of black tiger prawns per annum, primarily for export to Asian markets.

A major attraction for international investors is Australia's global reputation as a supplier of safe, high-quality seafood produced using environmentally sustainable practices. However, the lack of infrastructure in some remote areas (especially in northern Australia) is a disincentive for domestic and international investors. The aquaculture industry could take advantage of initiatives under the Australian Government [White Paper on Developing Northern Australia](#) (2015) to develop infrastructure in that region. Initiatives include \$5 billion of concessional loans for construction of major roads, ports, rails, pipelines, electricity and water supply.

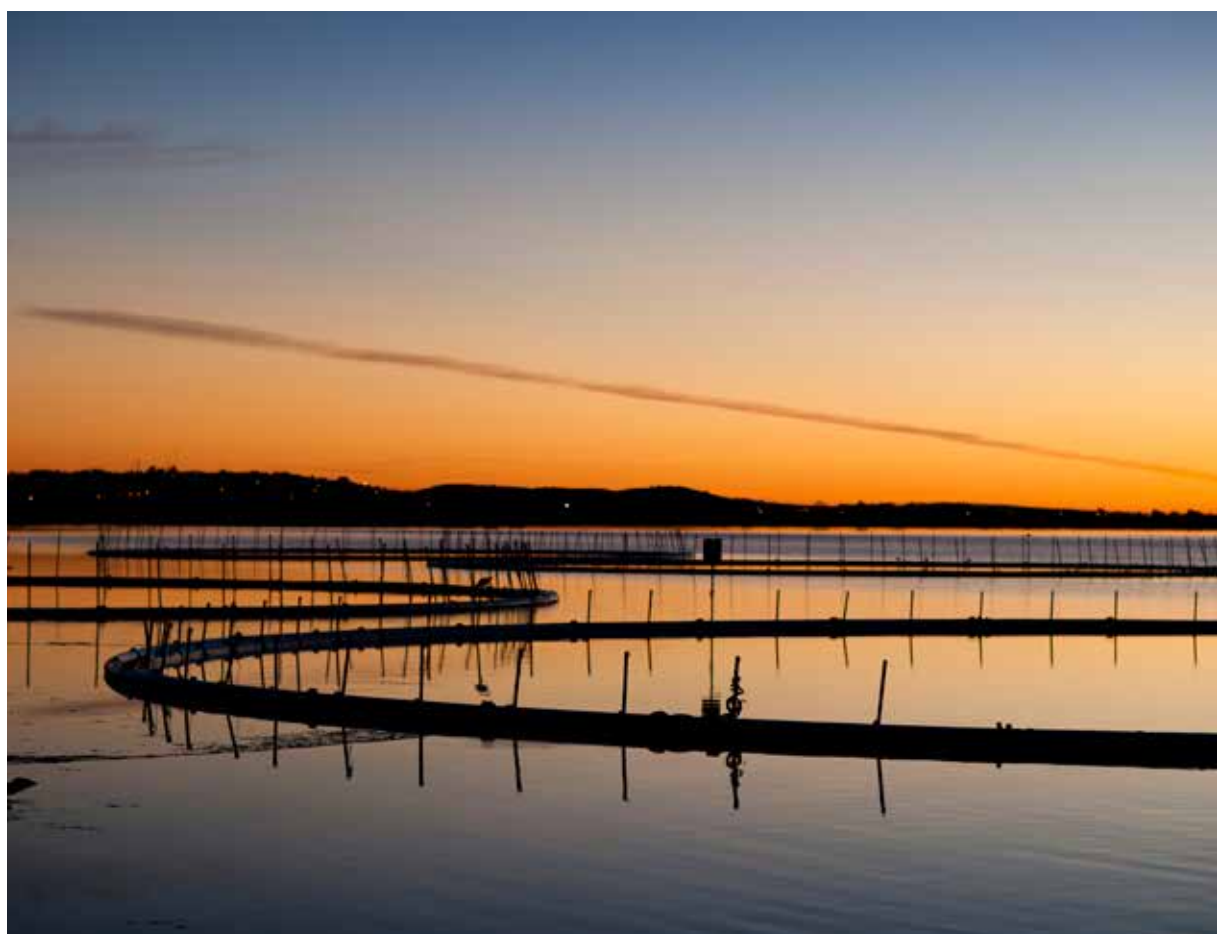


## Desired outcome and actions

**Desired outcome:** Encourage and promote responsible investment in Australian aquaculture.

**TABLE 7** Actions for Priority 7: Investment

Task	Partners	Time
Where appropriate, industry to apply for infrastructure funding to support aquaculture, including through the Australian Government <a href="#">White Paper on Developing Northern Australia</a> (2015)	Industry	Short to medium term
Identify business training opportunities to help operators manage their businesses and secure investment	Industry	Ongoing
Prepare a suite of value propositions for investment opportunities in aquaculture projects—providing commercially framed project information for potential Australian and international investors	Australian Government (in consultation with state and NT governments and industry)	Short to medium term



## 8 Training and education

Aquaculture requires a workforce with a variety of skills, including water quality specialists, engineers, oceanographic and marine experts, environmental scientists, animal health experts, business managers and marketers. The industry's ability to attract and retain a skilled workforce will be pivotal to its future expansion. This includes assuring tertiary and vocational students that work will be available when they complete their studies.

Establishing career paths from school through to senior management in aquaculture enterprises will only partly meet the demand for appropriately skilled staff. Industry's reliance on innovation and advanced technologies requires a highly skilled workforce trained at tertiary level. The development of strategic employment programmes can support progress through tertiary education into meaningful employment in the aquaculture industry.

Programmes to promote aquaculture in schools will be important, especially in regional areas where aquaculture is a significant employer. Concerns that aquaculture graduates do not have sufficient on-farm skills could be addressed by increasing work experience placements. A closer relationship between the aquaculture industry, training providers and state and NT aquaculture and education departments would ensure assumptions and teaching methods underpinning the design and implementation of work experience programmes are sound.

Participation by Australian aquaculture workers in study tours and fostering the exchange of information domestically and internationally helps ensure that Australian aquaculture operations reflect world's best practice. Australia's reputation globally for providing high-quality aquaculture training provides opportunities for selling our training and education services internationally.

Aquaculture can provide significant sustained employment opportunities, particularly for rural and regional economies (including Indigenous communities) (Case study 8). The Australian, state and NT governments will continue to support regional communities and jobs growth within these communities, in particular by harnessing training and employment opportunities for Aboriginal and Torres Strait Islander peoples.

Aquaculture operators in remote areas often have difficulty attracting experienced Australian staff to do seasonal work, relying instead on international workers on temporary visas. As aquaculture continues to grow, reliance on overseas labour may increase. Industry needs to identify the role of overseas labour in the aquaculture industry and assess the ability of current overseas worker schemes to meet future demand.

**CASE STUDY 8****Cowell Area School's Aquaculture Program**

Since 1992 the Cowell Area School on South Australia's Eyre Peninsula has been running a two-year [Oyster Lease and Aquaculture Program](#) that equips senior students for work in the aquaculture industry. The concept was suggested to the school by local oyster growers.

The curriculum was developed in consultation with local oyster, yabby, abalone and finfish growers, the Department of Education, TAFE, Australian Fisheries Academy and the South Australian Fishing Industry Training Council.

The school's trade training centre delivers vocational education and training for students, offering Certificate I and II in Aquaculture. Students learn to harvest and shuck oysters, set up an oyster farm and observe seaboard safety requirements. The school sells the oysters it grows. Students also learn transferable skills such as food handling practices and work health and safety.

Almost 100 per cent of Cowell's student trainees have been placed in local aquaculture jobs and many have found work in related sectors such as scientific research. The school has hosted school leaders and business executives from other countries who are interested in setting up similar courses and businesses.

The Australian Industry and Skills Committee is an industry-led body that advises on the implementation of national vocational education and training policies, and ensures that training packages meet the needs of industry. Each industry has an Industry Review Committee to ensure current and future skill needs are considered and defined in national training packages.

The [Aquaculture and Wild Catch Industry Reference Committee](#) is responsible for aquaculture. Membership includes representatives from a range of aquaculture sectors. The Australian Government funds the national skills service organisation Skills Impact to support the reference committee in developing occupational skills standards and qualifications for their industry. The aquaculture industry can work with the reference committee to identify its skills and training needs.

This will complement work by the Fisheries Research and Development Corporation and the Sub-Committee on Aquatic Animal Health. As part of AQUAPLAN 2014–2019 (Department of Agriculture 2014a), these bodies are assessing and developing curriculums and training material on aquatic animal health for animal health professionals and industry.

## Desired outcome and actions

**Desired outcome:** Improve the skills base and flexibility of the aquaculture workforce and ensure the future employment needs of the industry are met.

**TABLE 8** Actions for Priority 8: Training and education

Task	Partners	Time
Review the future workforce requirements of the aquaculture industry to: <ul style="list-style-type: none"> <li>• identify appropriate initiatives across jurisdictions</li> <li>• minimise skill shortages</li> <li>• secure long-term jobs growth (including for Aboriginal and Torres Strait Islander peoples and locally based seasonal workers)</li> </ul>	Australian Government, state and NT governments, industry	Short term
Develop strategic, employment-based education and training programmes to connect and support young people to complete their education and effectively transition to meaningful employment in the industry	Industry (engaging with Australian Industry and Skills Committee, state and NT governments and training providers as appropriate)	Ongoing
Identify the role of overseas labour for the aquaculture industry and whether overseas worker schemes will be sufficient to meet future seasonal worker demand	Industry	Medium term
Consider developing programmes (or promoting existing programmes) to promote aquaculture in schools, especially for roll-out in regional areas where the aquaculture industry is or might be a significant employer	State and NT governments, industry	Medium term
Industry to increase the number of work experience placements for aquaculture students to help provide realistic expectations of aquaculture workplaces	Industry (with support from state and NT governments as appropriate)	Medium term
Promote use of study tours and exchange of information and personnel to ensure Australian aquaculture regulators and farmers reflect world's best practice	Industry	Ongoing



# Conclusion

Actions described in this document set a blueprint for the Australian Government, state and NT governments and industry stakeholders to achieve the National Aquaculture Strategy target of doubling the value of the industry to \$2 billion by 2027. This will require action and commitment from all sectors.

The strategy outlines the Australian Government's role to help aquaculture grow to its potential. This includes regulating for aquaculture in Commonwealth waters, coordinating RD&E, supporting market access and investment in aquaculture through government programmes and ensuring best biosecurity practice.

States and the Northern Territory are the primary regulators of aquaculture. These governments should investigate the use of aquaculture zones to provide a more efficient aquaculture approvals process, support best practice regulation and provide appropriate education and training programmes.

Aquaculture industry stakeholders have a responsibility to continue to improve public perception of aquaculture in Australia. As part of this, the industry should address environmental concerns, secure investment and provide education and training.

For the aquaculture industry to meet its full potential, the National Aquaculture Strategy partners must continue to work collaboratively and cooperatively on priority areas identified. This strategy gives all partners a clear way forward for this work.



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