



Great Sandy Regional Marine Aquaculture Plan



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The *Great Sandy Regional Marine Aquaculture Plan* has been prepared by Fisheries Queensland (part of the Department of Employment, Economic Development and Innovation). The project is overseen by an Inter-Agency Working Group and the Aquaculture Inter-Departmental Committee.

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Great Sandy Regional Marine Aquaculture Plan

Approved October 2010

Marine aquaculture—quick reference

For more details refer to Section 3.2.



Sea ranching

- no structures
- no addition of feed



Surface lines

- structures
- no addition of feed



Subsurface lines

- structures
- no addition of feed



Racks

- structures
- no addition of feed

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Summary

The *Great Sandy Regional Marine Aquaculture Plan* (GSRMAP) has been prepared by Fisheries Queensland, part of the Department of Employment, Economic Development and Innovation (DEEDI).

The GSRMAP is non-statutory and its provisions are implemented and enforced through the existing regulatory frameworks. It functions as a guideline for identifying suitable sites and management measures. Anyone wishing to conduct aquaculture will still need to obtain the necessary approvals under planning and fisheries legislation. The GSRMAP management framework links to the statutory approvals process by specifying (i) assessment criteria for new applications and (ii) conditions of statutory approvals. The plan's provisions are thus enforceable under the relevant approvals legislation.

The GSRMAP guides the development of non-intensive (i.e. no feed added) marine aquaculture in the Great Sandy region through a risk-based management framework that identifies appropriate sites and management controls.

The regulatory framework already in place achieves an appropriate level of control for environmentally sustainable development. However, the Productivity Commission's 2004 review of aquaculture regulation considered the current assessment processes for aquaculture to be inefficient, uncertain and inconsistent in implementation, and present significant obstacles to industry development without commensurate benefits to the environment. The intent of the GSRMAP is to improve efficiency and certainty in the assessment and approvals process, whilst retaining the existing level of controls.

The site selection process was done according to planning principles that were endorsed by a state government Inter-Agency Working Group. Sites were chosen so as to minimise the risk of adverse impacts to the environment and conflicts with other user groups. The GSRMAP is consistent with the entry and use provisions of the Great Sandy Marine Park.

The GSRMAP also contains management controls that are sufficient to reduce any residual risks associated with these aquaculture activities (i.e. risks not completely addressed by the planning principles used for site selection). Full details of management controls and prescriptive conditions of approval are contained within the *Implementation guide for the Great Sandy Regional Marine Aquaculture Plan (Implementation guide)*. Management controls for each site include development boundaries, infrastructure design specifications, the requirement for an environmental bond, monitoring and reporting mechanisms, as well as general biosecurity controls.

A related document is the *Policy for allocation of marine aquaculture authorities*, which introduces a flexible and transparent mechanism and criteria for the competitive allocation of marine aquaculture authorities. Individual proposals will be evaluated by the Allocation Panel and the proposal that is best able to address the management framework will be selected to proceed to the next stage, which is application for approvals. The competitive allocation process thus applies a selective pressure for continual improvement and innovation in meeting management outcomes.

Need for aquaculture planning in the Great Sandy region

Value of strategic planning to sustainable industry growth

Demand for seafood domestically and internationally continues to grow and it is expected that this will be met primarily through aquaculture. Opportunities exist in Australia for aquaculture to fulfil the predicted domestic market as well as providing opportunities to develop export markets for high-value products.

Aquaculture production is important to Queensland as an alternative source of seafood because it:

- provides great tasting, local seafood, of high and consistent quality
- helps meet local and global demand for seafood
- supports the message of health benefits from eating seafood
- increases seafood supply without increasing the pressure on wild fisheries stocks
- reduces the need to import seafood
- builds on Australia's clean, green and safe reputation.

The Queensland Government is working to reduce regulatory complexity, promote fast and effective assessment processes and provide clarity in the criteria for successful granting of approvals. This reflects the Productivity Commission's 2004 review of aquaculture regulation, and implements the requirement for sustainable industry growth. Potential investors as well as the broader community will have certainty about the future location and extent of marine aquaculture in Queensland with the pre-selection by government of suitable sites.

The purpose of the GSRMAP is to guide future aquaculture development so that it is suitably located and managed. In the absence of a regional plan for aquaculture, sites are selected on an individual, case-by-case basis. Such a system allows only minimal opportunities for stakeholders, including the public, to comment on proposed aquaculture development. A case-by-case basis for site selection does not allow a mechanism to consider the cumulative impacts or set an overall limit to development.

Policy context

The Queensland Government is committed to the continued, ecologically sustainable development of aquaculture and has identified aquaculture as a priority sector for the state.

The subject area for the GSRMAP includes all marine areas within the Great Sandy Marine Park boundaries—Rules Beach in the north to Double Island Point in the south, including 3 nautical miles (nm) around Fraser Island. The marine park is a multi-use region. The zoning plan protects valuable features through Green Zones, which are prohibited to aquaculture.

The Great Sandy region has been identified as a region that, subject to appropriate environmental safeguards, may be highly suitable for marine aquaculture, since there is a possibility for significant returns with low impact on the environment when appropriately managed. The Great Sandy region includes the desirable combination of relatively sheltered but deep waters, close proximity to service ports and domestic and international transport centres, and a regional skills base in the marine and seafood processing industries.

In recognition of the value to be gained from aquaculture planning, and complementary to the declaration and zoning of the Great Sandy Marine Park in 2006, the Queensland Government decided to prioritise a whole-of-government marine aquaculture planning program for the Great Sandy region.

Non-intensive aquaculture (which includes rack, line and sea ranching types of aquaculture) is consistent with the provisions of the Marine Parks (Great Sandy) Zoning Plan—ss. 10(c), 12(c) and 14(c)—administered by the Queensland Department of Environment and Resource Management (DERM). Several marine aquaculture operations are already taking place within the Great Sandy Marine Park, including scallop ranching, pearl lines, oyster racks and sea cucumber harvesting. Until now, however, there has been no strategic planning for future aquaculture development. Intensive aquaculture such as sea cages is specifically prohibited by the Great Sandy Marine Park Zoning Plan.

Process for plan development and consultation

Development of the GSRMAP involved a number of processes. Each stage considered social, economic and environmental values, and progressively refined the site locations and management controls.

- Stage 1. Recognition of the Great Sandy Marine Park Zoning Plan 2006 (administered by DERM): This provided guidance at broad scale about environmental values and appropriate uses.
- Stage 2. Desktop analysis: This provided more detailed guidance about environmental, social and physical features of the region for which spatial datasets were available. This stage produced a map of shortlisted ‘investigation areas’. Certain features could not be described using available spatial data, so they were addressed at later stages.
- Stage 3. Inter-Agency Working Group: This provided ongoing advice of policy positions relevant to the proposed activities, and lead agency advice on specific risks and management of risks, particularly where spatial information was not obtainable.

- Stage 4. Focus groups—valuing local knowledge: This provided specialist local knowledge to fine-tune the available spatial datasets, and provided advice of important features and processes for which no spatial data were available, for example, whale congregation and important fishing locations.
- Stage 5. Site characterisation study—technical report: Addressed specific knowledge gaps identified by previous stages and provided detailed information about the nature of the proposed aquaculture sites, focusing on water movement and benthic habitats.
- Stage 6. Public consultation—draft plan: This provided information on a wider range of values and potential risks than was possible at previous stages.
- Stage 7. Finalise GSRMAP: This document provides feedback to stakeholders by describing how the plan has been revised in response to the preliminary consultation stage.

Risk-based management framework

A risk-based assessment approach is the most effective and efficient method for evaluating and managing any potential impacts from aquaculture, and meets the requirements of the Primary Industries Ministerial Council’s 2005 *Best practice framework of regulatory arrangements for aquaculture in Australia*.¹ The GSRMAP management framework required identification of:

- all potential risks of impacts to environmental, social and economic values
- planning principles (for the most suitable location for the activity)
- management outcomes (for the most suitable design and operational features).

¹ *Best practice framework of regulatory arrangements for aquaculture in Australia* (Primary Industries Ministerial Council 2005) can be accessed on the Department of Agriculture, Fisheries and Forestry website at www.daff.gov.au

Potential risks

The GSRMAP management framework builds on the existing regulatory framework for aquaculture. Therefore, potential risks are considered in the context of the existing regulatory framework. Stringent measures are currently in place to help producers safeguard the industry and the environment. The risk assessment framework is based on the formal risk assessment process used in the national ecologically sustainable development reporting framework, developed under the *National strategy for ecologically sustainable development*.²

Marine aquaculture production is tightly linked to environmental health. Australia's key competitive advantage is the 'clean, green and safe' image. The industry has a clear incentive for good environmental stewardship, since their profits are directly linked to environmental management.

Planning controls (location of sites)

The GSRMAP places a limit on the extent of aquaculture development in the region. In the absence of a regional plan, a limit on the number of approvals is not defined up-front.

The GSRMAP identifies 24 new potential aquaculture sites in addition to the 13 previously approved, making a total of 37 sites that may be developed for aquaculture in 11 precincts. This includes approximately 280 ha of racks, 7500 ha of sea ranching and 8000 ha of lines. The new sites approximately double the area available for aquaculture compared to the previously approved area. The total area available for aquaculture under the GSRMAP (15 800 ha) is approximately 2.6% of the Great Sandy Marine Park area, which is approximately 6000 sq km (600 000 ha).

Management controls (design and operation of activity)

Management controls are intended to reduce residual risks (i.e. risks not completely addressed by the planning principles used for site selection) to acceptable levels.

Management outcomes for the GSRMAP have been defined firstly in broad terms, in order to communicate the desired objectives as well as the restrictions. Secondly, specific management controls in the form of (i) assessment criteria and (ii) conditions of approval have been defined to ensure that the management outcomes are met. Details of the specific management controls are provided in the *Implementation guide*. In addition to the standard conditions, some site-specific conditions are also proposed to address unique issues at certain sites.

Monitoring programs are an important component of the management framework. Since monitoring programs must be developed on an individual basis, the GSRMAP provides clear guidelines for ensuring that monitoring programs are capable of answering the relevant management questions and are commensurate with the level of risk.

The *Policy for allocation of marine aquaculture authorities* introduces a competitive pre-application process for aquaculture approvals under the GSRMAP. Prospective applicants are evaluated against allocation criteria that include environmental management and business plans. The controls detailed in the *Implementation guide* represent the *minimum* requirements to achieve GSRMAP management outcomes. It is possible for industry investors to exceed the minimum requirements and propose additional measures to better address or exceed the management outcomes so as to be more competitive. The aquaculture industry thus has a vested interest in not just meeting but exceeding management outcomes and continually improving on best environmental practice.

The combination of the GSRMAP and the *Policy for allocation of marine aquaculture authorities* provide three levels of control on future aquaculture development:

- Planning controls guide **where** the activity can be located.
- Management controls guide **how** the activity can be designed and operated.
- Competitive allocation of authorities guide **who** can conduct the activity.

² For more information, refer to the National Fisheries ESD website at www.fisheries-esd.com

Implementation and enforcement of plan framework

The GSRMAP is non-statutory, and will complement the existing legislative framework. The GSRMAP will not be applied retrospectively. Outcomes of the GSRMAP are implemented through guiding the assessment and issue of statutory approvals under relevant legislation, including the *Sustainable Planning Act 2009* (SP Act)—formerly the *Integrated Planning Act 1997*—and the *Fisheries Act 1994*.

Authorities for future aquaculture development in GSRMAP sites will be allocated by the Queensland Government via an expression of interest process, as detailed in the *Policy for allocation of marine aquaculture authorities*. Proposals are evaluated by an allocation panel, and the proposal that is best able to address the management framework is selected to proceed to the application stage (see below).

Planning controls are implemented by providing site-specific assessment criteria for approvals under the SP Act and Fisheries Act, as detailed in the *Implementation guide*. It is anticipated that approval would not be given for applications for aquaculture in areas that are within the GSRMAP boundaries, but are outside the designated aquaculture areas defined under the GSRMAP. The GSRMAP sites will be given formal recognition by their addition to the *Queensland coastal plan* as ‘Aquaculture Development Areas’.

Management controls are implemented by:

- providing specific assessment criteria for applications under the SP Act and Fisheries Act—applications that do not meet GSRMAP assessment criteria (detailed in the *Implementation guide*) as a minimum would not usually be supported
- providing specific conditions (detailed in the *Implementation guide*) that will be attached to relevant statutory approvals.

Any breach of approval conditions is enforceable under the relevant approving legislation (e.g. the SP Act, Fisheries Act etc.). Penalties may include fines, restoration orders and cancellation of authority.

The approvals framework also allows for adaptive management. It is possible for the Queensland Government to alter the conditions of an existing approval under the SP Act and the Fisheries Act to achieve the best management outcomes. This would only occur after due process, with substantial justification and consultation with the approval holder.

The GSRMAP also enables opportunities for red tape reduction:

- The adoption of the GSRMAP as a single, comprehensive assessment guide for all relevant assessment processes: A whole-of-government approach for aquaculture in the Great Sandy region includes integrated development assessment system (IDAS) concurrence agencies formally agreeing that assessment of development approvals for aquaculture in the Great Sandy region will be assessed against the GSRMAP and *Implementation guide*.
- Accreditation of DEEDI assessment processes under marine parks legislation, including those parts of marine parks legislation that are not to be integrated into IDAS, helps to streamline the assessment of marine aquaculture.
- A conservation agreement between the Queensland Government and the Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPAC), formerly the Department of the Environment, Water, Heritage and the Arts (DEWHA) is being negotiated to ensure a coordinated approach to assessment of activities under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and reduce duplicative processes.

The GSRMAP provides information of value to potential investors as well as assessment agencies. Note that the GSRMAP is based on the best available information, but applicants will need to individually assess the commercial risks, including risks associated with climate change, changes to surrounding land and water characteristics, and amendments to the regulatory and policy framework.

1 Need for aquaculture planning in the Great Sandy region

1.1 Overview of the Great Sandy region

The subject region includes all marine areas within the Great Sandy Marine Park boundaries³ (Rules Beach in the north to Double Island Point in the south, including 3 nm around Fraser Island). Refer to Appendix 1 for an overview map of the region.

The Great Sandy region has many nationally and internationally recognised exceptional natural attributes, including the Great Sandy Marine Park, the Fraser Island World Heritage area and internationally significant wetlands. The region has intrinsic environmental, cultural and commercial value and hosts a wide range of activities (including whale watching, diving and tourism ventures). The coastal and marine waters of the region are an important natural resource and are subject to high levels of commercial and recreational fishing and boating. The area also supports important farmland.

The Hervey Bay and Great Sandy regions currently support developments in sustainable aquaculture. These include three marine enterprises—pearling, scallop and sea cucumber (*bêche-de-mer*) ranching; and a hatchery operation.

The Australian Government Department of Infrastructure, Transport, Regional Development and Local Government has identified the Great Sandy region as a focus for regional economic development. The area is described as a disadvantaged region from a socio-economic viewpoint ('income poor/asset rich amenity based region'⁴) and is therefore a focus for promoting regional development.

³ For more information, refer to the DERM website at www.derm.qld.gov.au

⁴ S Baum, M Haynes, Y van Gellecum & J Hoon Han, *Considering regional socio-economic outcomes in non-metropolitan Australia: a typology building approach*, Papers in Regional Science, vol. 86, no. 2, 2007.

1.2 Marine aquaculture growth potential

The government supports marine aquaculture development that is well planned, well managed and optimally located, while the industry sees its clean, green and safe reputation as a marketing advantage and works hard to maintain the highest standards.

Global demand for seafood products is increasing. It is now internationally accepted that increased supplies of seafood cannot only come from wild-caught fish stocks. Wild catch supply of seafood is limited by sustainability concerns. Therefore, the increasing demand for seafood will need to be met primarily through aquaculture. Aquaculture has huge potential to supply consumers with great-tasting, high-value seafood without increasing the fishing pressure on wild fisheries stocks. Nations around the world are seeking alternative technologies to satisfy the growing demand for seafood, and aquaculture production is the only known way to fill the ever-increasing gap between wild fisheries harvests and consumer needs.

Aquaculture production is important to Queensland as an alternative source of seafood because it:

- provides great-tasting, high-quality local seafood
- has consistent quality
- helps meet local and global demand for seafood
- supports the message of health benefits from eating seafood
- reduces the need to import seafood
- builds on Australia's clean, green and safe reputation
- has the potential to create employment and economic development opportunities for Queensland, particularly in regional and remote areas.

Evidence suggests that seafood is an important source of essential nutrients necessary for maintaining a healthy body. Regular consumption of seafood is believed to reduce the incidence of diseases and illnesses such as coronary heart disease, stroke, depression and attention deficit hyperactivity disorder. Deficiency in marine triglyceride levels is now recognised as a potentially serious health problem, with some health and medical organisations recommending minimum intake levels of omega-3 fatty acids. The Queensland Government promotes healthy eating—a poor diet impacts on the health and wellbeing of our community.⁵

Growth in seafood demand is increasing globally as population rises and per capita consumption of animal protein rises with income growth. This trend is thought to be due to increasing wealth (i.e. disposable income) and a general awareness of the health benefits of the product.

1.3 Impediments to industry development

The Productivity Commission's 2004 review of the regulatory arrangements for aquaculture identified a number of impediments to the planned and ecologically sustainable development of the aquaculture industry in Queensland⁶:

- There is a shortage of sites available for aquaculture.
- Prospective aquaculturists face regulatory complexities.
- Current licensing requirements for marine aquaculture are complex and sites are selected on a case-by-case basis, leading to considerable uncertainty for investors and the community.
- Proponents identified aquaculture sites through individual site assessments on an ad hoc basis.
- There are potential cumulative impact issues.
- There is a lack of strategic planning for aquaculture industry development.

⁵ For more information, refer to *Eat well Queensland 2002–2012* on the Queensland Health website at www.health.qld.gov.au

⁶ *Assessing environmental regulatory arrangements for aquaculture* (Productivity Commission 2004) can be accessed on the Productivity Commission website at www.pc.gov.au

1.4 Need for strategic planning for aquaculture

Aquaculture is regarded by the Queensland Government as a valid use of coastal waters and an important boost to regional economies and employment. The Queensland Government has endorsed a strategic planning approach for the development of marine aquaculture.

Development of an overall policy for marine aquaculture throughout Queensland is being led by Fisheries Queensland. The *Marine aquaculture policy green paper*⁷ was a first step to developing a clear statement of the Queensland Government's intent and policy position on the development of a sustainable marine aquaculture industry. It was released for public consultation in January 2007. The Queensland Government is seeking to ensure an appropriate balance between the needs of the aquaculture industry and the existing users of the marine resource, and protecting the environment for a sustainable future. Strategic planning is seen as a key method of achieving this balance.

Strategic planning for aquaculture is regarded as best regulatory practice⁸ and a key method of providing for industry growth while achieving ecologically sustainable development outcomes⁹. Some Australian states have significant marine aquaculture industries. Aquaculture planning is undertaken through formal regional marine aquaculture planning programs that are either statutory (South Australia and Tasmania) or non-statutory (Western Australia). These states also have extensive marine protected areas and significant regional tourism industries based on natural scenic values and marine activities (including water sports, whale watching and fishing).

A summary of the benefits of this planned approach, as opposed to case-by-case selection of sites, is provided in Appendix 2. Key advantages of the planning process include the following:

⁷ Refer to the DEEDI website at www.deedi.qld.gov.au

⁸ Refer to *Best practice framework of regulatory arrangements for aquaculture in Australia* (Primary Industries Ministerial Council 2005) available on the Department of Agriculture, Fisheries and Forestry website at www.daff.gov.au

⁹ For more information, refer to *The national ESD framework: the 'how to' guide for aquaculture* on the National Fisheries ESD website at www.fisheries-esd.com

- Decisions are not made on individual sites in isolation.
- There will be a defined limit to the extent of aquaculture development in the region.
- Regional needs can be considered for each site.
- Guidelines ensure that only suitable development is approved.
- Stakeholders and the wider community are engaged and have input ‘up-front’ on aquaculture development in the region.
- a review of the ecological character description of the Great Sandy Strait Ramsar site (DERM)¹¹
- *Country to coast: a healthy sustainable future*—being developed (Burnett–Mary Regional Group)¹².

These plans manage a number of different types of development; however, there was a need for strategic planning to guide the future development of aquaculture.

The GSRMAP is the first strategic regional plan for aquaculture in Queensland. Where no strategic plans are in place, new aquaculture development sites are selected on a case-by-case basis, with limited opportunities for stakeholder input at an early stage.

1.5 Policy context for the region

The Great Sandy region was identified by the Queensland Government as a region that, subject to appropriate environmental safeguards, may be highly suitable for marine non-intensive aquaculture, which has a possibility for significant returns but low impact on the environment. The region has the combination of relatively sheltered but deep waters, an acceptable water quality, close proximity to service ports and domestic and international transport centres, and a regional skills base in the marine and seafood processing industries.

A number of strategic plans are in place or being undertaken to protect the region’s values and manage potential impacts, including:

- Marine Parks (Great Sandy) Zoning Plan (DERM).
- *Great Sandy region management plan 1994–2010*—revised September 2005 (DERM)
- *Inshore fin fish management plan* (DEEDI)
- *Wide Bay–Burnett regional plan 2006–2026*—being developed (Department of Infrastructure and Planning)¹⁰

The key statutory planning instrument for marine development in the Great Sandy region is the Marine Parks (Great Sandy) Zoning Plan, administered by DERM. The Great Sandy Marine Park is a multi-use marine park. The zoning plan protects valuable features through Green Zones that prohibit development such as aquaculture. The Queensland Government has provided for non-intensive aquaculture elsewhere within the marine park that is rack, line and sea ranching types of aquaculture (but not sea cages)¹³.

In recognition of the value to be gained from aquaculture planning, and complementary to the declaration and zoning of the Great Sandy Marine Park in 2006, the Queensland Government decided to prioritise a whole-of-government marine aquaculture planning program for the Great Sandy region. Initial approval to develop a regional marine aquaculture plan for the Hervey Bay and Great Sandy regions were announced on 31 May 2006.¹⁴

The GSRMAP is in keeping with existing policies and regulations, and is consistent with the entry and use provisions of the marine park. The purpose of the GSRMAP is to guide future aquaculture development within the marine park so that it is suitably located and managed.

10 For more information, refer to the Department of Infrastructure and Planning website at www.dip.qld.gov.au

11 For more information, refer to the Burnett–Mary Regional Group website at www.bmrg.org.au

12 For more information, refer to the DERM website at www.derm.qld.gov.au

13 Ministerial media statements can be accessed at <http://statements.cabinet.qld.gov.au>

14 Ministerial media statements can be accessed at <http://statements.cabinet.qld.gov.au>

1.6 Value of the plan to industry development

Queensland regional aquaculture plans are intended to remove—as far as possible—the impediments to development caused by unnecessary complexity and duplication of regulations, and to encourage further development of aquaculture in the state within a consistent, ecologically sustainable development framework¹⁵.

This strategic plan replaces the existing process where aquaculture applications are assessed individually on a site-by-site basis. The GSRMAP functions as a single, comprehensive assessment guideline to be used by all agencies involved in assessment of aquaculture development. This removes the uncertainty surrounding the requirements for aquaculture approvals.

The GSRMAP benefits industry by:

- identifying sites up front for aquaculture, subject to meeting relevant conditions
- providing a higher level of certainty to potential investors and the community regarding aquaculture development within the region
- setting consistent standards for selection of sites, assessment criteria and management controls
- providing opportunities for streamlining of assessment (refer to Section 5.7 for more details).

1.7 Value of the plan to the region

The GSRMAP benefits the Great Sandy region by providing a comprehensive and well-planned framework for aquaculture development with guidelines to ensure that only suitable development is approved. The plan will determine up-front which sites are suitable for aquaculture development and thus provide certainty about the type and scale of aquaculture development that will be allowed.

Aquaculture planning is a key method of achieving a balance in the allocation of resources between the aquaculture industry and other uses of the marine park, and promotes sustainable marine aquaculture development.

The GSRMAP provides greater opportunities for stakeholder involvement and enables wider community engagement. In addition it is able to consider cumulative impacts and set an overall aquaculture development limit in a way that is not achievable under a case-by-case site selection process.

The Great Sandy region has been identified nationally as a focus for regional development. A thriving marine aquaculture industry provides regional employment and training, offers opportunities for diversification of other seafood sectors such as harvest fishing, and enhances the seafood sector.

The benefits of a planned approach to aquaculture include the following:

- Decisions will not be made on individual sites in isolation:
 - A strategic approach is preferable to the existing case-by-case selection of sites.
 - Key environmental values are protected—cumulative impacts are considered.
- Regional needs can be considered for each site:
 - Planning identifies suitable sites that will support sustainable marine aquaculture development with minimal impact on existing planning areas, valuable assets and other resource users.
 - Planning allows stakeholders to have an input up-front.
 - Multiple users of the resource are considered.
 - Cumulative effects can be considered.
- Standards are consistent and set by government ‘up front’, including:
 - selection of sites
 - appropriate use of sites
 - assessment criteria
 - adequate site investigation
 - management controls (including monitoring)
 - allocation of authorities.

¹⁵ Refer to *Best practice framework of regulatory arrangements for aquaculture in Australia* (Primary Industries Ministerial Council 2005) on the Department of Agriculture, Fisheries and Forestry website at www.daff.gov.au

- Aquaculture development for the region is clearly defined:
 - There is greater certainty provided on where and how investors can develop industry projects.
 - Communities are able to contribute to decisions on where and how aquaculture will be located and managed in their region.

Developing sustainable marine aquaculture has many potential benefits to regional communities.

Marine aquaculture can:

- create employment and training for both skilled and unskilled labour
- provide an opportunity for skills development in marine industries and aquaculture
- create additional income sources for marine service industries, such as engineering and maintenance
- increase economic resilience of regional communities through diversification and development of supporting industries (such as pearl jewellery manufacturing and retail trade)
- support tourism by providing locally grown fresh seafood and creating opportunities for farm visits
- suffer less drought-related impacts than many primary industries, which makes it a viable industry/investment in times of drought
- enhance the seafood sector.

2 Process for plan development

Fisheries Queensland developed the GSRMAP in consultation with the Employment, Industry Development and Innovation group, also part of DEEDI. The GSRMAP was overseen by an Inter-Agency Working Group comprising relevant state agencies. Consultation with Commonwealth agencies, state agencies, local governments, peak stakeholder bodies and the community was an important component of the planning process.

2.1 The planning process

Development of the GSRMAP involved a number of processes. Each stage progressively refined the site locations and management controls. Social and environmental values and potential risks have been considered at each stage in the process. The main stages of the planning process are summarised in the flowchart below (Figure 1).

2.2 Consultation

Community and stakeholder participation and feedback has been vital for developing an acceptable and effective regional marine aquaculture plan. An aquaculture plan represents a long-term commitment to the development of Queensland’s aquaculture industry and regional communities. For the development of the GSRMAP, DEEDI consulted widely to capture as much relevant information as possible. This helped to deliver the best possible plan that balances the needs of the aquaculture industry with the needs of the community and the management of environmental values.



Figure 1. GSRMAP planning process

2.3 Shortlisting of investigation areas through desktop mapping (stages 1–3)

Stage 1 was recognition of the Marine Parks (Great Sandy) Zoning Plan, administered by DERM. DERM undertook extensive planning for the zoning plan so as to protect valuable environmental features. A number of areas of high conservation significance were captured as Marine National Park (Green) Zones where aquaculture development was prohibited. While all of the Great Sandy region contains environmental values to varying degrees, areas outside of Green Zones may be considered compatible with low impact, non-intensive aquaculture. Non-intensive aquaculture may be considered under permit in the remainder of the Great Sandy Marine Park. The zoning plan includes various zones and management areas which were considered in the context of aquaculture planning (see Section 4.2.2 for more detail). Stage 1 provided guidance at a broad scale about environmental values and appropriate uses within the region.

Stage 2 was a desktop analysis. DEEDI conducted a geographic information system (GIS) – based constraints/opportunities mapping exercise for the Great Sandy region. This allowed broad evaluation of the region for aquaculture and identification of some of the key planning issues. Spatial datasets and other information were obtained from state government agencies, current research projects and published literature, including:

- marine park datasets and additional analysis/ decision support from DERM
- environmental considerations including natural assets, significant habitats, matters of national environmental significance (NES) and social constraints
- commercial requirements of the aquaculture industry, determined through consultation with existing aquaculturists (e.g. depth, current, location)
- gap analysis to identify areas that required further investigation.

A table of the GIS databases used in this initial stage are provided on the DEEDI website.¹⁶

Environmental constraints were weighted according to a set of planning principles (included in the table of GIS databases). Overlay maps showing the spatial datasets compiled during this stage are provided in Appendix 1. The finalised GSRMAP sites are overlain on each of the spatial datasets for reference.

The desktop analysis identified a number of ‘investigation areas’ that:

- satisfied commercial requirements for rack, line or sea ranching aquaculture activities (e.g. distance from shore support, exposure to wind and wave action, depth of water, quality of water)
- were consistent with relevant management plans (e.g. Great Sandy Marine Park)
- considered known areas of high environmental value
- minimised impacts on high usage areas for commercial and recreational activities (e.g. whale watching, recreational fishing, trawling).

This phase also identified areas where aquaculture development is constrained by existing legislation and policy and existing values or activities.

Stage 2 provided more detailed guidance about environmental, social and physical features of the region for which spatial datasets were available. Knowledge gaps that were identified during the desktop mapping were included in the terms of reference of the characterisation study (refer to stage 5 described in Section 2.5). Certain features could not be addressed via the characterisation study (e.g. megafauna¹⁷ movement and behaviour), so they were addressed through specialist knowledge obtained in other stages.

¹⁶ A table of the GIS databases used in the initial desktop mapping can be downloaded from the DEEDI website at www.deedi.qld.gov.au

¹⁷ Marine mammals (whales, dolphins and dugongs), turtles and sharks

Whole-of-government consultation

An Inter-Agency Working Group was convened to provide specialist knowledge from relevant government agencies. The Inter-Agency Working Group consists of a range of Queensland Government departments, including DEEDI, DERM, the Department of the Premier and Cabinet, Tourism Queensland and the Department of Transport and Main Roads (DTMR). The Aquaculture Inter-Departmental Committee and other relevant state departments were also involved at this level of consultation. The Department of Sustainability, Environment, Water, Population and Communities (SEWPAC), formerly the Department of Environment, Water, Heritage and the Arts (DEWHA) were engaged at the same time.

The Inter-Agency Working Group provided input into and reviewed each stage of the planning process. Its key functions were to:

- oversee the development of the GSRMAP and to endorse key milestones and decisions
- establish a set of planning principles governing where aquaculture could be located to reduce resource usage conflicts
- agree on a due process for plan development.

Stage 3 was review of the desktop analysis by the Inter-Agency Working Group. The Inter-Agency Working Group also oversaw all subsequent stages. Stage 3 provided ongoing advice of policy positions relevant to the proposed activities, and lead agency advice on specific risks and management of risks, particularly where spatial information was not available.

2.4 Focus group consultation (stage 4)

DEEDI sought refinement of the 'investigation areas' from local organisations with specific knowledge of fisheries, aquaculture, environmental, social and cultural issues in the Hervey Bay/Great Sandy area in order to:

- inform local stakeholder groups of the planning process
- modify the desktop constraints/opportunities map using local knowledge

- provide advice of important features and processes for which no spatial data was available (e.g. whale congregation and behaviour and important fishing locations)
- refine the proposed 'investigation areas'
- provide a mechanism for feedback into the planning process.

A number of regional organisations were identified as key stakeholders with valuable local information on commercial and recreational activities, significant environmental areas or other resources, able to assist government in refining the proposed investigation sites. More than 200 stakeholder organisations were invited to participate in a series of focus group workshops hosted by DEEDI in March and April 2007 in Hervey Bay, Bundaberg, Maryborough and Brisbane.

The information DEEDI assembled includes:

- environmental values such as important plants, animals and habitats (e.g. wader bird roosting and nesting sites)
- megafauna (marine mammal, turtle and shark) characteristics such as species in the area, migration routes, peak times and likely rate of interaction with whales
- fishing and boating issues such as popular or important recreational fishing areas, bait collection areas, types of vessels used, species targeted and common fishing methods
- commercial issues such as popular tourist boat routes and valuable commercial fishing grounds
- cultural values such as areas of Traditional Owner or historical significance.

Records of the focus group meetings are available to download from the DEEDI website.¹⁸ From these consultations, the investigation sites were given support, refined, shifted or eliminated. Additional sites for investigation were also proposed by the focus groups.

¹⁸ A record of the focus group meetings can be downloaded from the DEEDI website at www.deedi.qld.gov.au

2.5 Characterisation study (stage 5)

Stage 5 provided technical information that could only be obtained by specialist investigations focusing on water movement and benthic habitats. A characterisation study was undertaken as a consultancy by Worley Parsons Services Pty Ltd, submitted February 2008. This report was made available as a separate document.¹⁹ As noted above, certain features could not be addressed via the characterisation study (e.g. megafauna movement and behaviour), so they were addressed through specialist knowledge obtained in other stages.

The purpose of the characterisation study was to:

- address specific knowledge gaps identified by previous stages and provide detailed information about the nature of the proposed aquaculture sites
- provide sufficient information to assess the sites' suitability for the specified purpose by identifying any incompatible features (e.g. the presence of significant benthic habitats such as soft coral beds, or areas of poor flushing)
- provide background data where available to assist the development of appropriate planning and ongoing management controls.

The following detailed and site-specific physical and biological data were collected.

Physical data—water quality

The data collected included:

- hydrodynamic characteristics of water movement flow (affects phytoplankton replenishment), which consists of:
 - current patterns, speed and direction
 - water depth
 - mixing
 - oceanic flushing (extent of water exchange between the ocean and bay).
- hydrological transport patterns (e.g. relevant for retention of scallop spat and larval transport for non-aquaculture species)

- characterisation in terms of accessibility/navigability (ability to locate gear, such as subsurface culture lines, below navigable depth).

Benthic data—physical

The data collected included:

- sediment redox potential (tests for possible oxygen depletion in sediments)
- sediment particle size (determines extent of potential shift in faunal assemblage)—may be used as baseline for monitoring—surrogate for infaunal/epifaunal impacts
- verification of degree of sandbar shift.

Benthic data—biological

The data collected included:

- video habitat surveys and analysis
- nature and extent of benthic flora and fauna
- surveys of the habitat within, and surrounding, proposed aquaculture sites
- characterisation of substratum
- presence of significant epifauna and flora assemblages.

Environmental data

The data collected included:

- the presence of significant fauna/flora communities/reserves (i.e. significant habitats)
- an analysis of the impact of habitat modification on special features (e.g. habitat for marine mammals and turtles, or stands of soft corals).

2.6 Stakeholder consultation on draft plan (stage 6)

A draft GSRMAP was released for public consultation between July and October 2008. In addition to selection of suitable sites, the draft GSRMAP:

¹⁹ The characterisation studies can be downloaded from the DEEDI website at www.deedi.qld.gov.au

- evaluated and addressed all potential impacts at local and regional scales, including consideration of cumulative impacts
- provided a management framework and defined management controls relating to design and operation
- specified the approvals process that will apply to regulate and manage aquaculture under the plan and ensured that the value of each site is maximised within sustainable limits.

A communication strategy was developed to ensure stakeholders and members of the community could provide comment on the draft GSRMAP. The communication strategy involved public notification, access to information, contact points for further information and a series of public meetings in the Great Sandy region and Brisbane over a 10-week period. Additional meetings were held with interested groups to follow up on concerns raised during the public meetings. Stage 6 provided information on a wider range of values and potential risks than was possible at previous stages.

DEEDI sought advice on:

- constraints not yet identified
- significance ratings of the various constraints
- opportunities for reducing risks with different management/planning controls
- other relevant issues.

DEEDI requested comments to be:

- as specific as possible
- justifiable (remember other stakeholders may also have an argument to put forward)
- sufficiently detailed to enable alterations to be made to the draft plans where necessary.

A summary of the responses received during public consultation will be available on the DEEDI website.

2.7 Revision and finalisation of plan (stage 7)

The draft GSRMAP was amended and refined considering the inputs from public consultation and further discussions with the Inter-Agency Working Group and SEWPAC.

An important step in SEWPAC's consideration of the plan was referral to an independent reviewer. This step provided expert input into values and risks relevant to the plan, particularly with regard to potential risks to marine megafauna.

This document provides feedback to stakeholders by describing how the plan was revised in response to the preliminary consultation stage. A summarised history of revisions to site locations at key stages of plan development is provided in Appendix 3. Some of the issues raised during the public consultation phase did not necessitate amendment to the site location because they are adequately addressed through management controls. Section 4 describes the values, interests and potential issues at each site that were raised during the planning process, and describes any site-specific management controls that will address them.

Factors considered in the development of the final GSRMAP include:

- spatial datasets (constraints layers)
- information from targeted stakeholder consultation (focus groups)
- Queensland and Commonwealth Government input (Inter-Agency Working Group, SEWPAC)
- characterisation studies (consultant)
- public consultation on the draft GSRMAP
- whole-of-government advice.

2.8 Review of the plan

The plan will be reviewed every 10 years, or earlier if deemed necessary. Circumstances that would necessitate earlier review of the plan include substantive amendments to any of the statutory regulations to which the plan is linked, for example the Marine Parks (Great Sandy) Zoning Plan.

3 Marine aquaculture in detail

3.1 Definitions

Marine aquaculture definitions are as follows:

1. Sea ranching (e.g. scallops, sea cucumbers) involves no structures or added feed.
2. Rack/line aquaculture (e.g. oysters, pearls) involves structures but no added feed.
3. Intensive aquaculture (e.g. sea cage aquaculture) involves both structures and addition of feed.

Note: **Feed-added aquaculture is not permitted in the GSRMAP** (refer to Marine Parks (Great Sandy) Zoning Plan—ss. 10(c), 12(c) and 14(c).

3.2 Types of systems

3.2.1 Sea ranching

Sea ranching involves:

- no structures
- no addition of feed.

Sea ranching is the culture of animals in the natural environment without containment structures. The environment provides the animals with everything they need. Sea ranching of sea cucumbers (*bêche-de-mer*) and scallops on the sea bed is already occurring in Hervey Bay. Sea ranching involves no structures. (Note: Each corner of the aquaculture site may need to be marked with a single buoy or post with a light attached.)

Ranching is only viable if the animals remain in the area until harvest and the area is closed to fishing while they grow. Harvesting is usually performed using wild fishery methods such as trawling, diving or hand harvesting.

For most seasons, little or no activity is required, as illustrated in Figure 2.

3.2.2 Surface lines

Surface lines (suspended bivalve culture) involve:

- structures
- no addition of feed.

Line culture is generally used to grow shellfish—such as pearl oysters, scallops and mussels—in panel-style baskets or on ropes, suspended below floating surface lines (Figure 3). Each species has a well-established method of culture.

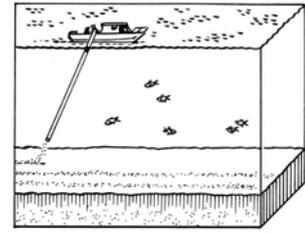
Line culture systems comprise a single rope or multiple ropes, with buoys at each end and intermediate floats. The ends of the main ‘backbone’ lines are then anchored to the substrate. Rows of lines and floats are visible on the surface. Baskets with cultured animals are suspended by short ‘dropper’ lines from the main backbone line.

The seabed area remains free of obstacles (except for anchor points) and natural processes can take place beneath the farm. Environmental impact from line culture is reduced through correct location to minimise benthic (bottom) disturbance.

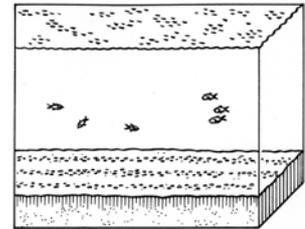
Line aquaculture is designed to minimise negative impacts to fauna. Both the horizontal ‘backbone’ line and the dropper lines from which panels are suspended are kept very taut, and backbone lines are well spaced to reduce risk of entanglement.

There is also an adjustable system where oysters can be cultured at different depths to allow different phytoplankton concentrations to be targeted at different times of the year, thereby improving growth of stock.

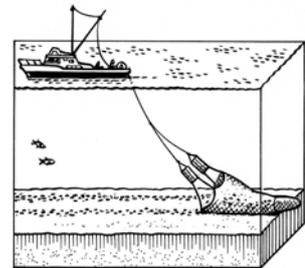
Box 1—Spat or juveniles are placed on the sea bed, usually in the form of a slurry delivered by a length of pipe or by hand.



Box 2—Most of time there is no activity. Spat or juveniles feed naturally with no input from the farmer.



Box 3—Some aquaculture products, such as scallops, are harvested by trawling. Others, such as sea cucumbers, are harvested by hand.



Box 4—The timing of harvesting activities can be scheduled to reduce conflict with other commercial activities. Trawling can be undertaken at different times to other commercial activities so there is no overlap (e.g. commercial whale watching).

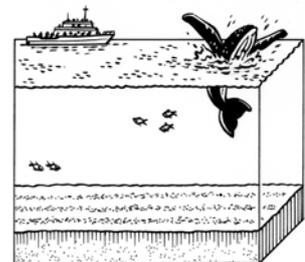


Figure 2. Sea ranching

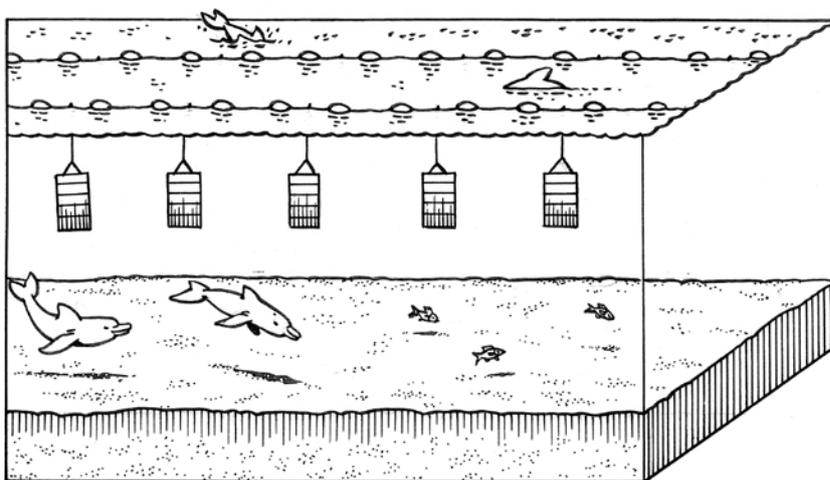


Figure 3. Surface lines

3.2.3 Subsurface lines

Subsurface lines involve:

- structures
- no addition of feed.

Subsurface line culture is similar to surface line culture except the lines (upon which culture bags or panels are suspended) are positioned several metres below the surface, allowing vessels to motor freely over the top of the farm (Figure 4). As lines are submerged, the only structures visible on the surface would be marker buoys at each corner of the aquaculture site and intermittent buoys marking the location of submerged lines. (Note: These are not pictured in Figure 4.)

Lines are positioned so that vessels can motor over the top without obstruction. A range of different structural configurations may be used for surface marker buoys.

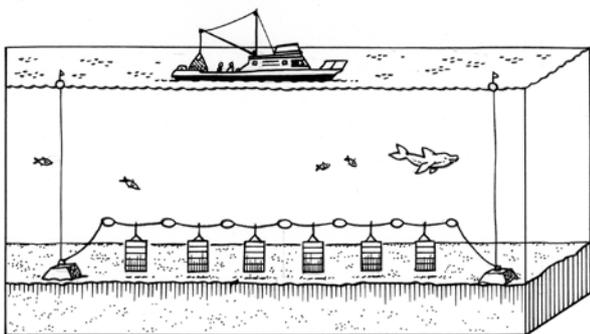


Figure 4. Subsurface lines

3.2.4 Racks

Racks involve:

- structures
- no addition of feed.

Rack culture is generally used to grow shellfish such as edible oysters. Each species has a well-established method of culture.

Oysters are suspended from small platform structures or post and line structures placed in the intertidal zone (Figure 5). Oyster racks are usually a combination of wood and plastic, and are approximately the width of a walkway. The industry standard is a system where oysters are enclosed in mesh bags hung from a line suspended between posts (i.e. post and line systems). Mesh is placed over the oysters to reduce predation and reduce the likelihood of them being displaced by wave action, and also to minimise debris falling to the sea floor.

There is minimal environmental impact from rack culture, but correct location is important to minimise benthic (bottom) disturbance. Oyster bags are suspended near the surface of the water, so natural processes can take place beneath. Impacts to seagrass or other benthic plants and animals are addressed by ensuring that structures are narrow and allow light to penetrate.

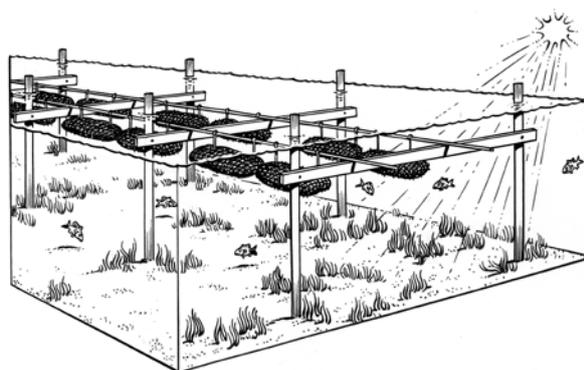


Figure 5. Racks

Measures to manage any environmental risks associated with the systems described above are addressed in Section 4.

4 Risk-based management framework

4.1 Risk-based management

A risk-based assessment approach is best practice management for evaluating and managing any potential impacts from aquaculture. The GSRMAP management framework requires identification of:

- all potential risks of impacts to environmental, social and economic values
- planning principles (the most suitable location for the activity)
- management outcomes (the most suitable design and operational features).

The details of the management framework are described in this section. Section 5 describes mechanisms to ensure this framework and desired outcomes are met.

4.2 Identifying potential risks

4.2.1 General considerations

Like all types of development, aquaculture has the potential to have negative impacts on the community and environment. These potential impacts are managed in a number of ways:

- Aquaculture is highly regulated and activities can only be undertaken if approvals are in place. Approvals are required under various Acts and Regulations (state and Australian Government).
- Conditions of approvals control day-to-day management of aquaculture operations.
- There are requirements for regular monitoring and reporting.
- Voluntary compliance with industry codes of practice is increasingly being adopted by industry.

The existing regulatory framework for aquaculture (detailed in Appendix 4) is comprehensive. This regulatory framework provides quality control and enables meeting the ‘triple bottom line’ (i.e. economic, social and environmental) objectives of ecologically sustainable development.

Queensland’s environmental standards are recognised as being among the highest in the world. These standards are advantageous when marketing seafood products to niche markets where there is a demand for greater sustainability and demonstrable environmental management.

Queensland has a well-deserved reputation for clean, green and safe aquaculture products. Australia’s geographic isolation, along with the absence of the world’s serious pests and diseases, offers Queensland’s industry an unparalleled opportunity to produce a premium product.

The GSRMAP builds on the existing regulatory framework for aquaculture. Therefore potential risks are considered in the context of the existing regulatory framework. It is integral for the protection, growth and sustainability of Queensland aquaculture that the industry is appropriately managed. With this in mind, DEEDI has put in place a number of measures to help producers safeguard their industry. These measures are usually implemented in the form of conditions of approval.

The risk assessment framework is based on the formal risk assessment process used in the national ecologically sustainable development reporting framework, developed under the *National strategy for ecologically sustainable development*.²⁰

²⁰ For more information, refer to the National Fisheries ESD website at www.fisheries-esd.com

When considering the potential risk from aquaculture development within the GSRMAP, the following should be noted:

- Commercialisation of all the sites within the GSRMAP is unlikely to be completed for several years, based on the current level of interest in new investment. The expected scenario is a gradual uptake of the available sites over a number of years.
- Multiple existing users currently operate in the Great Sandy region and provide locally relevant environmental information and a basis on which to assess the risk of new developments.
- Potential impacts from aquaculture also need to be considered in relation to the impacts from other users of the marine environment.

4.2.2 Legislative context

Appendix 4 contains a detailed description of all legislation relevant to marine aquaculture in Queensland. The key approvals are discussed below.

Development (i.e. infrastructure and operation)

Marine aquaculture development cannot commence without a Development Approval (DA) for material change of use for aquaculture, issued under the SP Act, formerly the *Integrated Planning Act 1997*. DAs are normally issued in perpetuity; however, for sites in marine waters a DA is not valid without a current Resource Allocation Authority (RAA) for the site (see below). Conditions of a DA are enforced under the SP Act.

There is no proposed change under the GSRMAP to the requirement to obtain a DA.

Resource allocation (i.e. permission to use state waters)

A person cannot commence aquaculture activities in marine areas without an RAA issued under the Fisheries Act, which allows access to, and use of, state waters. RAAs are normally issued for a specified period of time. RAAs are transferable. Conditions of an RAA are enforced under s. 79A of the Fisheries Act.

There is no proposed change under the GSRMAP to the requirement to obtain a RAA.

Environmental permits

Certain aquaculture activities may also trigger the requirement for approvals that are outside the SP Act process. There is scope under the GSRMAP to simplify the process for gaining these types of environmental approvals or identifying areas where such approvals may not be required. This is discussed further in Section 5.7.

A Marine Parks Permit authorises marine aquaculture activities in applicable zones within the boundaries of the Great Sandy Marine Park (refer to Appendix 4 for details).

Assessment under the EPBC Act may be required if actions are likely to have a significant impact on matters of national environmental significance. Such matters include World Heritage properties, national heritage places, wetlands of international importance (Ramsar wetlands), threatened species and ecological communities, migratory species, Commonwealth marine areas, the Great Barrier Reef Marine Park and nuclear matters, including uranium mines (refer to Appendix 4 for details).

Activities must comply with the general environmental duty of care under the *Environment Protection Act 1994* (EP Act) and with the *Environmental Protection (Water) Policy 2009*²¹ under the EP Act (refer to Appendix 4 for details).

²¹ For more information, refer to the DERM website at www.derm.qld.gov.au

4.3 Description of potential risks in context

4.3.1 Water quality impacts

Marine aquaculture may result either in localised increases or decreases in nutrient levels. Water quality impacts are expected to be minimal where no feed is introduced and where no discharge is involved. The main source of nutrient input into cultured areas from bivalve culture is faecal material from the cultured species. However, nutrients are also extracted from the system by filter-feeding bivalves so there is not necessarily a 'net' input of nutrients into the system. Filter-feeding bivalves ingest and extract nutrients from naturally occurring suspended organic particles. Some of these nutrients are utilised for growth and are ultimately removed from the system upon harvest of the crop. A portion of ingested nutrients is released as waste products that can be recycled by other organisms.

Legislative requirements include the following:

- An RAA under the Fisheries Act is required for access to, and use of, state marine waters (DEEDI).
- A DA under the SP Act is required for all aquaculture development (DERM and DEEDI are DA concurrence agencies).
- A Marine Parks Permit is required for marine aquaculture activities within the marine park (DERM).
- Activities must comply with the general environmental duty of care under the EP Act (DERM).
- Activities must comply with the Environmental Protection (Water) Policy²² under the EP Act. (DERM).

Also refer to Section 5 and Appendix 4.

Potential risks include the following:

- Faecal material may build up beneath shellfish farms.
- Cleaning fouling material from structures may temporarily increase turbidity and impact upon water quality.

- There may be competition for planktonic food with naturally occurring species.

Factors to consider include the following:

- There is no addition of feed.
- There are no discharges.
- There are limits on the extent of development.
- Shellfish are filter-feeders and remove nutrients from the water.
- Chemicals are generally not used, other than general use marine chemicals such as antifoulants, which are used as per standard restrictions on product label. Before an agricultural or veterinary chemical product can be used in Australia it must be registered by the Australian Pesticides and Veterinary Medicines Authority (APVMA). Refer to Appendix 4 for more detail.
- Shellfish are only located in areas of adequate current flow for sufficient planktonic food to be available and promote flushing of wastes.

Management requirements include the following:

- The nature of cleaning and antifouling activities are restricted by condition of approval. Conditions of approval may include screening of wastes prior to returning to the water where cleaning takes place on board a vessel or working platform.
- Activities must comply with the general environmental duty of care, and with the Environmental Protection (Water) Policy.²³

4.3.2 Wildlife interactions

Legislative requirements include the following:

- A RAA under the Fisheries Act is required for access to, and use of, state marine waters (DEEDI).
- A DA under the SP Act is required for all aquaculture development (DERM and DEEDI are DA concurrence agencies)
- A Marine Parks Permit is required for marine aquaculture activities within the marine park (DERM).

²² For more information, refer to the DERM website at www.derm.qld.gov.au

²³ For more information, refer to the DERM website at www.derm.qld.gov.au

- Boating activities within the marine park must comply with zoning restrictions.
- In some cases, activities may require assessment under the EPBC Act (SEWPAC).

Also refer to Section 5 and Appendix 4.

Potential risks include the following:

- The use of certain types of mooring lines may result in incidents involving marine megafauna (e.g. whales, dugongs, dolphins, turtles and sharks). Incidents may include collision with structures and entanglement in lines.
- Habitat access may become limited (fish spawning aggregation sites, breeding and foraging sites). The presence of structures may displace species that depend on inshore habitats, such as inshore dolphins (e.g. *Sousa chinensis*)²⁴, dugongs, turtles and other fauna.
- There may be indirect disturbance due to increased activity and noise in proximity to important breeding, nursing or feeding sites on species sensitive to disturbance.
- There may be changes to foraging patterns, migration pathways or displacement of migration patterns of native species.
- Structures and activity around rack and line aquaculture may displace wader birds and shorebirds from roosting/feeding habitats (of particular relevance within the Great Sandy Strait Ramsar area).
- Structures in the marine environment may act as fish aggregation devices, particularly if covered with algae and other biofouling organisms. Structures attract a variety of marine life (e.g. fish and seabirds) and may result in changes in the feeding and foraging behaviour of marine animals and seabirds.
- Aquaculture activities typically require motor vessels for service and support, although aquaculture would be a minor addition to the very large numbers of motor vessels already present in this area. Motor vessels have the potential to impact on megafauna in the following ways:

- Engine noise frequencies often coincide with whistles and broadband clicks used by the Sousa dolphin (*Sousa chinensis*) to communicate.²⁵
- Dugong and other fauna such as shorebirds and turtles are vulnerable to boat strike and disturbance.

Factors to consider include the following:

- Experiences from other areas suggest that the risk of entanglement is very low for rack, surface line and subsurface line types of aquaculture. Existing surface lines in the northern Great Sandy Strait are reported to experience frequent movement of dolphins through and within the farm area without incident. A number of oyster racks are present in Moreton Bay, which also has large dugong and turtle populations. There have been no reports of incidents in Queensland.
- Most reports of whale and dolphin interactions are anecdotal, and refer to incidents involving gear that is specifically intended to interact with marine animals (i.e. some types of fishing gear, shark nets). Different types of gear can differ substantially in terms of entanglement risk. Gear may include multiple lines (such as shark control nets or fishing nets), or untethered lines such as crayfish fishing pots or crab fishing pots. Fishing gear is placed in the water temporarily, whereas aquaculture structures are permanent or long term and are not constantly attended. Aquaculture lines are usually short, weighted lines such as dropper lines, or long and taut such as backbone lines (see Section 3.2.2). Marine aquaculture furniture²⁶, unlike fishing gear, is designed and placed so as to minimise interactions with fauna.
- Entanglement can be an issue where lines are slack or loose, for example, if lines were to break free in extreme weather events. Management conditions require maintenance of lines in a taut state at all times.

²⁴ GJB Ross, *Review of the conservation status of Australia's smaller whales and dolphins*, Report to the Australian Government Department of the Environment and Heritage, Canberra, 2006. Available from www.environment.gov.au

²⁵ As above, p. 124.

²⁶ Any structures used for marine aquaculture; for example, racks used in oyster culture. Furniture does not include working platforms, storage areas etc.

- Line aquaculture is not expected to affect dugongs travelling and feeding on the bottom where the lines remain taut and are adequately spaced.²⁷
- The Hervey Bay and the Great Sandy Strait regions are used by an extremely large number of motor vessels. Minimal additional boat traffic will be generated by aquaculture activities. The Marine Parks (Great Sandy) Zoning Plan provides rules and guidelines about operation of all motor vessels so as to minimise impact on marine megafauna.

Management requirements include the following:

- Risk of interaction impacts can be reduced by design and location of aquaculture structures (refer to Section 3.2).
- Lines must be kept taut, adequately spaced and frequently inspected so that fauna can move freely between lines
- An approved whale interaction and entanglement strategy must be developed to identify risks, management, reporting and corrective actions in relation to wildlife interactions.
- Important wader bird sites were identified and aquaculture is located well away from these areas.

4.3.3 Habitat disturbance

Legislative requirements include the following:

- An RAA under the Fisheries Act is required for access to, and use of, state marine waters (DEEDI).
- A DA under the SP Act is required for all aquaculture development (DERM and DEEDI are DA concurrence agencies).
- A Marine Parks Permit is required for marine aquaculture activities within the marine park (DERM).
- In some cases, activities may require assessment under the EPBC Act (SEWPAC).

Also refer to Section 5 and Appendix 4.

²⁷ JK Sheppard, AR Preen, H Marsh, IR Lawler, SD Whiting & RE Jones, *Movement heterogeneity of dugongs, Dugong dugong (Muller), over large spatial scales*, Journal of Experimental Marine Biology and Ecology, vol. 334, 2006, pp. 64–83.

Potential risks include the following:

- There may be direct disturbance of habitat due to placement of structures and anchor points etc.
- There may be seagrass dieback or species composition alteration due to shading from structures.
- The sediment, physico-chemical environment or benthic fauna population structure may be altered due to sediment enrichment from build-up of faecal material, deposition of shell litter and organic material (biofouling, mortalities and faecal material) on the seabed below structures.
- Habitat may be altered due to high concentrations of spat (ranching).
- There may be disturbances due to mechanical harvesting (e.g. trawling) or hand harvesting.
- If structures are located close to shore, there is minor potential for disruption to longshore transport of sediment (structures may act as groynes) or alterations of the hydrodynamics around the structure (disruption of near-bed flow). However this would only be of concern in narrow channels or gutters where the structure occupies a significant proportion of the channel width.

Factors to consider include the following:

- Appropriate location and design of structures will minimise impact.
- Deposition of material under the farms is not likely to be a significant issue, with any residual risk managed given the scale of the proposed systems.
- Research reports have concluded that line shellfish farming is having minimal benthic impact at the densities studied and suggest that extensive monitoring of line shellfish farms of this type would appear not to be necessary.²⁸

²⁸ C Crawford, CKA Macleod & IM Mitchell, *Effects of shellfish farming on the benthic environment*, Aquaculture, vol. 224: 2003, pp. 117–140.

- Studies in South Australia²⁹ indicate that impacts of rack culture on seagrass growth are generally limited to within 1 m of racks³⁰ and that no significant impact on temperate seagrass cover due to oyster post and line aquaculture (refer to Section 3.2.4) was evident
- Surface line culture with generous spacing between adjacent lines (e.g. 50 m) is expected to have insignificant shading impacts due to the use of lines and mesh rather than solid structures.
- Aquaculture lines will only have a very small localised disturbance at the anchor points.
- Commercial trawling currently takes place through much of Hervey Bay, including most of the proposed aquaculture sites. Trawling is unlikely to occur where aquaculture structures are present.

Management requirements include the following:

- Any disturbance due to mechanical harvest methods (e.g. trawling) is managed as a harvest fishery issue and is outside the scope of the GSRMAP.
- Location and design of aquaculture structures (refer to Section 3.2) is able to reduce impacts on habitats.
- Stocking densities are managed to ensure optimal conditions for the growth and health of stock.
- Appropriate buffers are provided between aquaculture and high environmental value areas.
- Monitoring and reporting requirements to assess environmental impacts will be included on DA conditions where appropriate.
- Any sea ranch harvesting must comply with the same permit conditions that are imposed on all fishers to ensure sustainable fishing (including the use of turtle exclusion devices).

4.3.4 Disease

Legislative requirements include the following:

²⁹ S Madigan, S Venema, K Haskard & S Clark, *Oyster environmental monitoring program (OEMP): small-scale seagrass health study*, South Australian Research and Development Institute Aquatic Sciences Report no. 185, Adelaide, South Australia, 2000.

³⁰ As above, pp. 1–18.

- A DA under the SP Act is required for all aquaculture development (DERM and DEEDI are DA concurrence agencies).
- Section 100 of the Fisheries Act requires that ‘a person who knows or reasonably suspects fisheries resources or a fish habitat is showing signs of disease, or knows or reasonably suspects disease may be in fisheries resources or a fish habitat, must immediately notify the chief executive or an inspector’.

Also refer to Section 5 and Appendix 4.

Potential risks include the following:

- Disease may be introduced into natural waters from hatchery-reared stock.
- Disease may occur in marine aquaculture systems through the introduction of diseases from non-endemic broodstock/seedstock, or the expression and enhancement of natural diseases present in wild populations.
- Close proximity of farms poses an increased risk of disease transfer between farms either through vectors (e.g. predatory birds) or the water-borne transfer of pathogens between farms.
- Some diseases are naturally endemic and not necessarily expressed clinically. Changes in the environment or health of the organism may lead to expression of disease.

Factors to consider include the following:

- Australia is geographically isolated and is free from most of the world’s serious pests and diseases.
- Disease risk is minimised where best practice husbandry is observed and an adequate emergency response protocol is in place.

Management requirements include the following:

- Standard conditions for all aquaculture DAs manage the risk of disease entering natural ecosystems.
- Approval conditions ensure that details of health status, farm of origin and the history of shipment comply with the aquatic animal health standards of Queensland before product is released.

- Strict translocation, health and quarantine protocols are in place.³¹ All live aquatic animals must receive approval from DEEDI prior to translocation into Queensland from interstate.
- DEEDI offers a free laboratory diagnostic service to producers as part of any investigation into a disease or mortality incident on a farm.
- Planning included consideration of the distance between neighbouring farms.
- Section 100 of the Fisheries Act requires notice to be given about diseased resources or habitat. Fisheries Queensland and Biosecurity Queensland (also part of DEEDI), together with any other relevant agencies, will then determine the best course of action.

4.3.5 Introduction of pest species

Legislative requirements include the following:

- A DA under the SP Act is required for all aquaculture development (DERM and DEEDI are DA concurrence agencies).
- Biosecurity Queensland are currently developing a Biosecurity Act.

Also refer to Section 5 and Appendix 4.

Potential risks include the following:

- Water that accompanies spat may have incidental species/larvae that are pests.
- Biofoulers may be present on equipment used to transport stock.

Management requirements include the following:

- The National Introduced Marine Pest Coordination Group is developing best practice guidelines for all medium- and high-risk marine farming practices in Australia.
- Strict translocation and quarantine protocols apply to movement of stock from interstate into Queensland to minimise any disease risk.³²

³¹ For more information, refer to the 'Aquaculture policies and guidelines' page on the DEEDI website at www.deedi.qld.gov.au

³² For more information, refer to oyster management policies on the 'Aquaculture policies and guidelines' page on the DEEDI website at www.deedi.qld.gov.au

- Specific biosecurity or quarantine standards are provided in the licensing standards to enhance the production of valuable species while maintaining appropriate protection against pests and disease at the farm level.

4.3.6 Introduction of non-endemic organisms

'Non-endemic' can mean a species or genetic strain that is not native to (i) the country, (ii) the state or (iii) the region.

Legislative requirements include the following:

- A DA under the SP Act is required for all aquaculture development (DERM and DEEDI are DA concurrence agencies).
- A General Fisheries Permit under the Fisheries Act for broodstock collection is required before stock can be taken from the wild.
- Translocation of stock from interstate requires approval to translocate live aquatic organisms.

Also refer to Section 5 and Appendix 4.

Potential risks include the following:

- Cultured species that are not endemic to the area could compete with native organisms.

Management requirements include the following:

- The aquaculture approval specifies the area from which stock can be sourced prior to being placed in the marine environment. The General Fisheries Permit specifies the area from which stock can be sourced. Conditions of approval apply to the collection and use of broodstock and to aquaculture activities that will ensure only endemic species and genetic strains are used.
- Strict translocation and quarantine protocols apply to movement of stock from interstate into Queensland.³³

³³ For more information refer to oyster management policies on the 'Aquaculture policies and guidelines' page on the Fishweb site: www2.dpi.qld.gov.au/fishweb/17803.htm

4.3.7 Impacts on natural genetic profile

Legislative requirements include the following:

- A DA under the SP Act is required for all aquaculture development (DERM and DEEDI are DA concurrence agencies).

Also refer to Section 5 and Appendix 4.

Potential risks include the following:

- Impacts on the natural genetic profile may result from introduction of hatchery-reared stock, which may have lower genetic diversity.
- If excessive numbers of the cultured organism are released into natural waters, or if they reproduce and release excessive amounts of larvae, the cultured genetic strains may compete with wild populations, leading to alterations of the genetics of the natural population.

Factors to consider include the following:

- Adult shellfish and sea cucumbers, which are most commonly used in sea ranching and rack and line aquaculture, are either sessile (attached at the base as with oysters) or have limited mobility (sea cucumbers and scallops). They are unlikely to be distributed beyond the approved aquaculture area except in extreme weather events, in which case they are unlikely to grow well without appropriate substrates.
- Larvae of cultured species are planktonic and may disperse widely; however, marine larvae are highly vulnerable to natural predation.

Management requirements include the following:

- Hatchery protocols, including controls on genetic diversity, must be submitted for assessment at the time of application. Only appropriate hatchery protocols will be approved.

4.3.8 Genetic engineering

Legislative requirements include the following:

- Genetic engineering is managed by the Federal Office of Gene Technology Regulator.

Also refer to Section 5 and Appendix 4.

There are presently no genetically modified organisms approved for use in Queensland aquaculture. Genetically modified organisms are organisms that have an external genotype introduced into their genetic profile. In the event of permission being given by the Federal Office of Gene Technology Regulator for use of genetically modified organisms for aquaculture in Australia, the use of any such modified organisms within Great Sandy Marine Park would be dependent on review by DEEDI and DERM.

4.3.9 Chemicals/therapeutics

Controlling and preventing diseases in aquaculture depend primarily on good husbandry and water quality control. In some instances, chemical treatments may be required to manage a disease; however, this would only occur under the appropriate controls. Queensland's aquaculture objective is to produce premium quality seafood that is safe and free from residues.

Legislative requirements include the following:

- Agricultural or veterinary chemical products must be registered by the Australian Pesticides and Veterinary Medicines Authority (APVMA) before they can be used in Australia (refer to Appendix 4).
- Activities must comply with the general environmental duty of care under the EP Act (DERM).
- Activities must comply with the Environmental Protection (Water) Policy³⁴ under the EP Act. (DERM).

Also refer to Section 5 and Appendix 4.

Potential risks include the following:

- Chemicals may impact upon water quality or the ecosystem in a variety of ways depending on the type of chemical used.

³⁴ For more information, refer to the DERM website at www.derm.qld.gov.au

- Chemicals or therapeutics may adversely impact on native species.

Factors to consider include the following:

- Chemicals are rarely used in the Australian aquaculture industry.
- When necessary, chemicals used in the marine environment must comply with strict protocols.

Management requirements include the following:

- Queensland has strict regulations in place to manage the use of chemicals and antibiotics in agricultural industries (including aquaculture).³⁵
- Antifoulants may be used on boats and structures in accordance with normal restrictions.
- Chemical use regulations administered by APVMA and regulated by DEEDI in Queensland applies to all producers. These ensure that:
 - only registered chemicals are used where safety and efficacy standards apply
 - compliance with usage, disposal and withholding period instructions for chemicals is maintained
 - appropriate delivery and dosing is practiced under veterinary supervision.

4.3.10 Food safety

Most food safety outcomes are implemented at the processing and handling stage rather than the aquaculture production stage. Food processing is managed under various legislation, with seafood safety generally outside the scope of the plan. The exceptions include edible oysters because certain aspects of the production stage (e.g. relaying and temporary closures, as described below) are managed for food safety outcomes.

Legislative requirements include the following:

- Approvals may be required from Safe Food Queensland.
- Approvals may be required from Queensland Health.

³⁵ More information is available on the 'Controls over the use of agricultural and veterinary chemicals in the aquaculture industry' page on the DEEDI website at www.deedi.qld.gov.au

- A DA under the SP Act is required for all aquaculture development (DERM and DEEDI are DA concurrence agencies).

Also refer to Section 5 and Appendix 4.

Potential risks include the following:

- Human health issues may arise from uptake of pollutants, coliforms etc. by filter feeding shellfish, especially during periods of heavy run-off.
- There is a risk of contamination of product during processing and packaging.

Management requirements include the following:

- Commercial oyster culture is managed under strict environmental guidelines designed to ensure that oysters are only grown in sites that have appropriate water quality.
- In Queensland, all growers of edible oysters and other prescribed shellfish must comply with the Australian Shellfish Quality Assurance Program (ASQAP)³⁶, which means that before oysters can be harvested from a particular growing area, water quality and meat samples must be taken and strict standards must be met.³⁷
- DEEDI control relaying of oysters between sites. Different marine areas are appropriate for different stages in the shellfish production cycle. Some areas that are suitable for fattening, due to the high nutrient content in the water, are not suitable to harvest from for human consumption. Oyster growers often move (or 'relay') their stock to sites with higher water quality for a period of depuration prior to harvest.

³⁶ The *Australian shellfish quality assurance program (ASQAP) operations manual* can be downloaded from the Primary Industries and Resources SA website at www.pir.sa.gov.au

³⁷ For more information, refer to oyster management policies on the 'Aquaculture policies and guidelines' page on the DEEDI website at www.deedi.qld.gov.au

- DEEDI imposes temporary closures to harvesting for certain sites during and after heavy rainfall. Certain sites are subject to occasional high levels of nutrients and coliforms after heavy rainfall events, particularly sites that receive run-off from urbanised centres. Since these situations may present a risk to human health, temporary closures are imposed.
- In order to facilitate relaying of oyster stock and compliance with food safety requirements, DEEDI classifies growing areas for shellfish according to the ASQAP operations manual. Classifications include approved (for harvesting), conditionally approved, conditionally restricted and restricted. At present, only the Moreton Bay growing areas have been classified. DEEDI is in the process of classifying the potential growing areas in the Great Sandy region. (Note: Potential sites under the GSRMAP have been chosen to avoid areas that may be restricted to harvesting or subject to temporary closures.)

Other species (e.g. scallops, abalone, mussels and sea cucumbers) must also meet compliance with relevant legislation regarding food safety.

Compliance with usage, disposal and withholding period instructions for chemicals is maintained.

Seafood processing facilities must meet environmental health requirements of local councils.

4.3.11 Interactions with other users

Legislative requirements include the following:

- An RAA under the Fisheries Act is required for access to, and use of, state marine waters (DEEDI).
- A DA under the SP Act is required for all aquaculture development (DERM and DEEDI are DA concurrence agencies).
- A Marine Parks Permit is required for marine aquaculture activities within the marine park (DERM).
- In some cases, activities may require assessment under the EPBC Act (SEWPAC).

Also refer to Section 5 and Appendix 4.

Aquaculture operations may sometimes impact on other existing uses of the marine environment. These potential impacts are best addressed through planning controls (refer to Section 4.5).

4.3.12 Broodstock collection

Legislative requirements include the following:

- A General Fisheries Permit under the Fisheries Act for broodstock collection is required before stock can be taken from the wild (DEEDI).

Also refer to Section 5 and Appendix 4.

Collection of broodstock and culture stock for aquaculture is outside the scope of the plan.

The General Fisheries Permit specifies the area from which stock can be sourced. Collection of broodstock would need to comply with all relevant regulations relating to taking and possessing fish. One value of aquaculture is that it can remove some pressure on wild fisheries stocks.

4.3.13 Movement of stock

Legislative requirements include the following:

- A DA under the SP Act is required for all aquaculture development (DERM and DEEDI are DA concurrence agencies).
- Movement of aquaculture stock into Queensland from interstate is subject to DEEDI translocation protocols.³⁸

Also refer to Section 5 and Appendix 4.

Translocation protocols require (i) notification to DEEDI prior to translocation and (ii) certification by a registered veterinary officer against a checklist of investigation items.

4.3.14 Vessel usage and movement

Boating activities associated with aquaculture operations are largely outside the scope of this plan.

³⁸ Refer to the Fishweb site: www2.dpi.qld.gov.au/fishweb/17803

Legislative requirements include the following:

- Boating is managed by DTMR under the *Transport Infrastructure Act 1994*.
- An RAA under the Fisheries Act is required for access to, and use of, state marine waters (DEEDI).
- A DA under the SP Act is required for all aquaculture development (DERM and DEEDI are DA concurrence agencies).
- A Marine Parks Permit is required for marine aquaculture activities within the marine park (DERM).

Also refer to Section 5 and Appendix 4.

Hervey Bay and the Great Sandy Strait experience a very high level of boat traffic. Aquaculture activities would result in an increase in boat traffic (approximately 1–2 small vessels servicing each farm on an irregular basis).

Management requirements include the following:

- Standard conditions of an RAA require that an area approved for aquaculture must be marked with either buoys or posts as determined by the Regional Harbour Master (DTMR).
- Specific regulations relating to vessel speed and conduct will need to be adhered to under the Marine Parks (Great Sandy) Zoning Plan (e.g. 'Whale Management Areas' and 'Go Slow Areas').³⁹

4.3.15 Storm damage and exposure of equipment

Legislative requirements include the following:

- An RAA under the Fisheries Act is required for access to, and use of, state marine waters (DEEDI).
- A DA under the SP Act is required for all aquaculture development (DERM and DEEDI are DA concurrence agencies).

Also refer to Section 5 and Appendix 4.

Aquaculture farms are often located in relatively exposed seas (e.g. pearl lines off the coast of north-western Australia). Aquaculture infrastructure is appropriately designed and deployed to suit prevailing conditions and prevent risk of damage. Each proponent must make a commercial decision about the risks associated with a particular site and ensure that the construction and materials used are sufficiently robust, in addition to meeting other design criteria as detailed in other sections.

4.4 Summary of all potential risks

In order to appropriately manage risk, all sources of potential risk were identified and appropriate measures developed to address each.

Potential risks to be considered in the GSRMAP were described in Section 4.3. Table 1 identifies whether or not each of those risks is applicable to a particular activity. Where a risk is present, appropriate management controls must be implemented to reduce the risk.

The following sections discuss in detail how those risks identified in Table 1 are managed through both planning controls and management controls. The overall summary in Section 5.6 provides an overview of the various GSRMAP elements that combine to manage each risk.

³⁹ For more information on 'Go Slow Areas' and 'Whale Management Areas' in the Great Sandy Marine Park, refer to the DERM website at www.derm.qld.gov.au

Table 1. Summary of all potential risks associated with marine aquaculture

Potential risks (environmental, social and economic)		Rack	Line	Sea ranch
R1	General governance issues/record keeping—orderly, proper management	◊	◊	◊
R2	Cleaning fouling material from structures	◊	◊	‡
R3	Wastes/garbage—general domestic waste	◊	◊	‡
R4	Coastal hydraulics impacts	◊	‡	‡
R5	Direct disturbance of habitat due to placement of structures	◊	◊	‡
R6	Seagrass dieback due to shading	◊	◊	‡
R7	Sediment/water enrichment—faecal material	◊	◊	‡
R8	Habitat alteration due to high concentrations of spat—stock placement	‡	‡	◊
R9	Benthic impacts due to harvesting	‡	‡	◊
R10	Access—increased boat/human traffic	◊	◊	◊
R11	Entanglement of marine megafauna	‡	◊	‡
R12	Disruption of fauna foraging/migration patterns	◊	◊	◊
R13	Aggregation of fauna around structures	◊	◊	‡
R14	Non-endemic species/strains introduced into natural systems	◊	◊	◊
R15	Impacts on natural genetic profile from hatchery-reared stock	◊	◊	◊
R16	Incidental introduction of pest species	◊	◊	◊
R17	Disease	◊	◊	◊
R18	Phytoplankton depletion in vicinity of farm	◊	◊	◊
R19	Chemicals and therapeutics	‡	‡	‡
R20	Genetic engineering	‡	‡	‡
R21	Human health—uptake of pollutants especially during heavy run-off	◊	◊	◊
R22	Existing user interactions—commercial fishing	◊	◊	◊
R23	Existing user interactions—recreational fishing/angling	◊	◊	‡
R24	Existing user interactions—recreational boating	◊	◊	‡
R25	Existing user interactions—major transport/shipping	‡	◊	‡
R26	Existing user interactions—whale-watching activities	‡	◊	‡
R27	Existing user interactions—diving (recreational and commercial)	‡	◊	◊
R28	Amenity/viewscales	◊	◊	‡
R29	Native title	◊	◊	◊
R30	Indigenous cultural heritage	◊	◊	◊
R31	Failure to develop the site	◊	◊	◊
R32	Failure to properly clean up structures upon expiration of approval	◊	◊	‡
R33	Cumulative impacts	◊	◊	◊

‡ = Risk is not applicable to this activity.

◊ = Risk may be present, so appropriate management and planning controls will be implemented to reduce risk.

4.5 Planning controls (location of sites)

4.5.1 Planning principles

Planning principles specify in a broad sense where an aquaculture activity may be located. Planning principles may include provision of buffers around critical shorebird roosting areas or identification of certain resources as incompatible with the proposed types of aquaculture activities (e.g. marine park Green Zones). The planning principles are consistent with the entry and use provisions of the Great Sandy Marine Park.

Applications under the GSRMAP must be for areas within a designated aquaculture site as defined in the GSRMAP.

Full details of the planning principles adopted for the GSRMAP are available in the description of GIS databases used for the GSRMAP desktop mapping.⁴⁰ A summary of key planning principles that address specific risks is provided in Table 2. Refer also to the overlay plan in Appendix 1.

Different types of aquaculture were considered to have different constraints. For example, rack and line is not necessarily considered incompatible with dense seagrass, since these types of aquaculture have negligible impact on seagrass if structures are appropriately designed and managed.

⁴⁰ A table of the GIS databases used in the initial desktop mapping can be downloaded from the DEEDI website at www.deedi.qld.gov.au

Table 2. General planning principles adopted for the GSRMAP

General planning principles adopted for the GSRMAP	
P1	Located away from built-up/urbanised areas or known scenic lookout areas
P2	Located away from, or have regard to, areas of significant environmental value ⁴¹ —buffers between aquaculture and high environmental value areas/incompatible areas
P3	Located in good current flow—access to planktonic food
P4	Incompatible types of aquaculture located in areas that minimise the impact on whale high-use areas.
P5	Incompatible types of aquaculture located in areas that minimise the impact on commercial fishing areas
P6	Incompatible types of aquaculture located in areas that minimise the impact on high-use recreational fishing areas
P7	Incompatible types of aquaculture located in areas that minimise the impact on high-use recreational boating areas
P8	Incompatible types of aquaculture located in areas that minimise the impact on marked navigation channels and anchorages
P9	Incompatible types of aquaculture located in areas that minimise the impact on high-use diving areas
P10	Located away from critical shorebird areas
P11	Located only within marine park zones that do not prohibit the activity

⁴¹ Areas of significant environmental value and areas used by fauna were identified in consultation with DERM and SEWPAC.

4.5.2 Designated sites for aquaculture

The GSRMAP includes planning controls to ensure the appropriate location of aquaculture activities in the form of designated sites, which guide the location of future aquaculture development. The GSRMAP sites were chosen so as to avoid adverse impacts to the environment and conflicts with other user groups in accordance with planning principles that were endorsed by the state government Inter-Agency Working Group.

A total of 37 potential aquaculture sites in 11 precincts are now available, comprising approximately 280 ha of racks, 7500 ha of sea ranching and 8000 ha of lines (Table 3).

This includes 13 previously approved aquaculture areas. Under the plan, previously approved areas have been given the same recommended use as their previously approved use, except where it is considered that another type of aquaculture may also be appropriate for that site.

A total of 24 new sites were identified during the planning process, approximately doubling the area available for aquaculture compared to the previously approved area.

The total area now available for aquaculture (15 800 ha) is approximately 2.6% of the Great Sandy Marine Park area, which is approximately 6000 km² (600 000 ha).

Appendix 1 provides a plan of all designated aquaculture sites under the GSRMAP. A brief summary of each of the sites is provided in Table 4. For detailed descriptions, including aerial photographs and coordinates of each site, refer to Section 4.6.3.

Table 3. Summary of area covered by existing and new GSRMAP sites

	Existing sites area	New sites area	Total GSRMAP area
Racks	33.4 ha 0.5% of existing 0.01% of marine park	250 ha 3.0% of new 749% increase over existing 0.04% of marine park	283.4 ha 1.8% of total 0.05% of marine park
Sea ranching	7115.2 ha 96.8% of existing 1.19% of marine park	400 ha 4.7% of new 6% increase over existing 0.07% of marine park	7515.2 ha 47.6% of total 1.25% of marine park
Subsurface lines	0 ha 0.0% of existing 0.00% of marine park	2500 ha 29.6% of new 0.42% of marine park	2500 ha 15.8% of total 0.42% of marine park
Surface lines	201.6 ha 2.7% of existing 0.03% of marine park	5300 ha 62.7% of new 2629% increase over existing 0.88% of marine park	5501.6 ha 34.8% of total 0.92% of marine park
Totals	7350.2 ha 1.23% of marine park	8450 ha 115% increase over existing 1.41% of marine park	15800.2 ha 100% of total 2.63% of marine park

Table 4. Summary of sites for marine aquaculture under the GSRMAP

Precinct	System	Site	Description
Double Island Point	Surface lines	Site 1	Aquaculture site
Wide Bay Bar	Subsurface lines	Site 45	Aquaculture site
Wide Bay Bar	Subsurface lines	Site 33	Aquaculture site
Inskip Point	Sea ranching	AA 802	Previously approved area
Wide Bay Harbour	Surface lines	Site 34	Aquaculture site
Wide Bay Harbour	Surface lines	Sites 7a, 7b, 7c, 7d	Aquaculture sites
Wide Bay Harbour	Surface lines	Site 32	Aquaculture site
Tinnanbar	Rack	AA 834	Previously approved area
Tinnanbar	Rack	AA 889	Previously approved area
Tinnanbar	Rack	AA 874	Previously approved area
Tinnanbar	Rack	AA 875	Previously approved area
Tinnanbar	Rack	Site 41	Aquaculture site
Tinnanbar	Rack	Site 42	Aquaculture site
Tinnanbar	Rack	Site 31	Aquaculture site
Tinnanbar	Rack	Site 9	Aquaculture site
Tinnanbar	Rack	Site 10	Aquaculture site
Big Woody Island	Sea ranching	AA 815	Previously approved area
Big Woody Island	Sea ranching	AA 820	Previously approved area
Big Woody Island	Sea ranching	Site 12	Aquaculture site
Big Woody Island	Sea ranching	Site 14	Aquaculture site
Moon Point	Surface lines	AA 816	Previously approved area Slightly repositioned
Moon Point	Surface lines	AA 817	Previously approved area
Moon Point	Surface lines	AA 818	Previously approved area
Moon Point	Surface lines	AA 819	Previously approved area
Pearl Bank	Surface lines	Site 15	Aquaculture site
Pearl Bank	Surface lines	Site 16	Aquaculture site
Pearl Bank	Surface lines	Site 43	Aquaculture site
Pearl Bank	Surface lines	Site 44	Aquaculture site
Coongul Point	Subsurface lines	Site 18	Aquaculture site
Burnett coast	Surface lines	Site 39	Aquaculture site
Burnett coast	Surface lines	Site 47	Aquaculture site
Burnett coast	Surface lines	Site 48	Aquaculture site
Hervey Bay	Sea ranching/surface lines	AA 811	Previously approved area
Hervey Bay	Sea ranching	AA 812	Previously approved area

Note: the draft GSRMAP that was released in July 2008 referred to potential future development of the previously approved area AA811. Subsequently, the company that operated at this site changed ownership, so the potential expansion area is no longer relevant and is not considered as part of the GSRMAP.

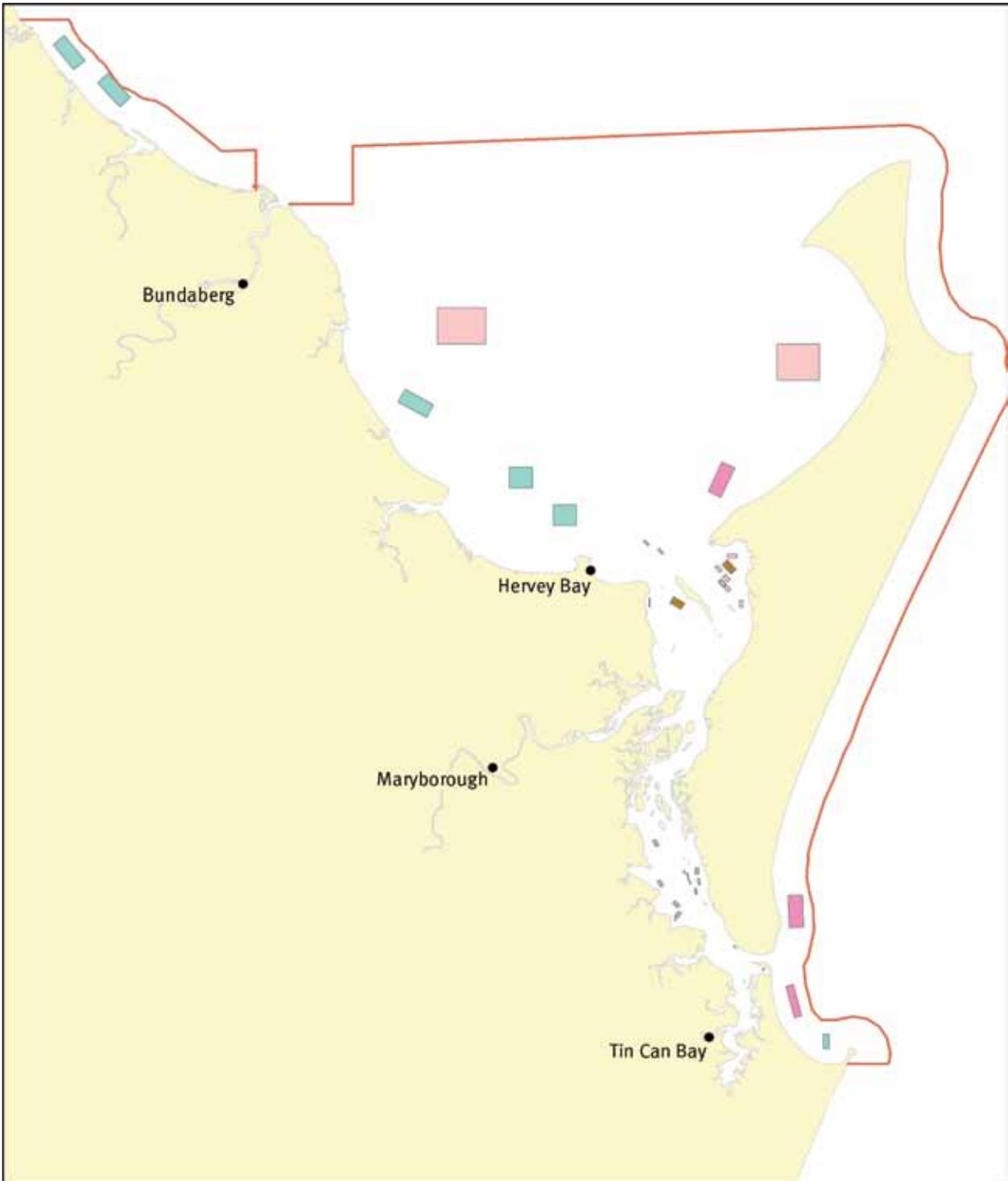


Figure 6. An overview of the potential and previously approved sites

4.6 Management controls (operational aspects)

Management controls concern the design, operation and monitoring of the activity.

4.6.1 Management outcomes

The best available knowledge was gathered during the development of the plan. The management options are as follows:

- Where risk is manageable and sustainable operation can be achieved, prescriptive controls are implemented (assessment criteria and conditions of approval).
- Where risk is believed to be manageable, but uncertainty exists because the activity is untested, prescriptive controls are implemented and the approval holder may also be required to undertake monitoring against specific threshold limits.
- Where risk is not considered manageable, the plan prohibits the activity.

It is also acknowledged that risk may change in the future. Necessary flexibility is built into the GSRMAP; however, it is also necessary to provide industry with certainty since the plan will place a cap on maximum development.

A number of broad management outcomes are identified under the GSRMAP to guide the ecologically sustainable development of aquaculture (Table 5). It is valuable to provide the industry with the desired objectives as well as the restrictions. The aquaculture industry is characterised by continual innovation and industry members have a vested interest in meeting goals and pursuing best environmental practice. Management of the industry requires a level of flexibility to enable the industry to grow and develop new techniques and best management practices that are compatible with the purpose and management of the Great Sandy Marine Park.

4.6.2 Management controls

Specific management controls in the form of (i) assessment criteria and (ii) conditions of approval have been identified to ensure that the management outcomes are met. Full details of management controls designed to achieve the management outcomes are provided in the *Implementation guide*.

These management controls are sufficient to reduce residual risks associated with these aquaculture activities (i.e. risks not completely addressed by the planning principles used for site selection). Management controls for each site include development boundaries, infrastructure design specifications, the requirement for an environmental bond, monitoring and reporting mechanisms, as well as general biosecurity controls.

The controls detailed in the *Implementation guide* represent the **minimum** requirements to achieve GSRMAP management outcomes. It is possible for industry investors to exceed this minimum level and propose additional measures to better address or even exceed the management outcomes. In order to apply a selective pressure for continual improvement and innovation in meeting management outcomes, a competitive allocation process will occur. The competitive allocation process (refer to the *Policy for allocation of marine aquaculture authorities*) ensures that the applicant who is **best** able to meet management outcomes will be preferentially selected (refer to Section 5.4).

Table 5. Management outcomes adopted for the GSRMAP

	Specific management outcomes	Responsible agency
M1	Size, extent and location of aquaculture activities are controlled.	DEEDI, DERM
M2	Pilot-scale activities ⁴² are undertaken on a trial basis and restricted to a pilot scope, with scaling up dependent upon performance results.	DEEDI, DERM
M3	The aquaculture area is maintained in good condition.	DEEDI
M4	No hazardous or inappropriate structures in the aquaculture area. Equipment should be to industry standard ⁴³ or better in terms of meeting management outcomes.	DEEDI
M5	The Queensland Government is indemnified.	DEEDI, DERM
M6	All structures and vessels associated with the aquaculture activity are clearly marked.	DEEDI
M7	Adequate records are kept and made available to the Queensland Government.	DEEDI, DERM
M8a	Any impacts to the surrounding ecosystem from disease resulting from aquaculture activities are minimised.	DEEDI
M8b	Any impacts to natural genetic stock resulting from introduction of non-endemic genetic stock or from release of hatchery-reared stock (which may have lowered genetic diversity) are minimised.	DEEDI
M9	Aquaculture activities are managed so as to minimise the risk of accidental introduction of pest species.	DEEDI, DERM
M10	Sediment removal or cleaning procedures (e.g. defouling of structures and stock) are undertaken so as to minimise impacts to water quality.	DERM
M11	Monitoring, incident reporting and/or assessment of potential impacts are undertaken where appropriate. ⁴⁴	DEEDI, DERM
M12	Structures are designed and maintained so as to minimise potential for impact on megafauna.	DEEDI, DERM
M13	Any product intended for human consumption is managed so as to avoid human health risks.	Safe Food Queensland, Queensland Health, local government, DEEDI
M14	The site is developed according to a Development Covenant/minimum production policy.	DEEDI
M15	Provision is made for sites to be rehabilitated if necessary.	DEEDI, DERM
M16	Sites are clean and tidy prior to transfer and all structures removed upon cessation, cancellation or surrender of the authority.	DEEDI, DERM
M17	The approval holder has taken all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage.	DA information
M18	Impacts to the seabed are minimised.	DEEDI

⁴² If an activity varies from industry standard and/or DEEDI considers that the risk could be higher than industry standard, the activity will be restricted to pilot-scale, with scaling-up dependent on performance during the trial phase.

⁴³ The term ‘industry standard structures’ means ‘aquaculture furniture that has industry acceptance and/or DEEDI authorisation’.

⁴⁴ For more detail, refer to Section 4.7.

4.6.3 Site-specific management controls

This section describes the special values, interests and potential issues specific to each site, and the **additional** site-based management controls designed to address them. This includes interests and concerns raised during all stages of the planning process, including public consultation and discussions with the Inter-Agency Working Group. Satellite images for each site are provided where available to assist interpretation of special features coordinates, in decimal degrees and GPS (degrees decimal minutes) format (refer to Appendix 5).

Note: This section must be read in conjunction with the previous Section 4.6.2 and the *Implementation guide*, which describe management controls specific to each activity that will apply across all sites. This section describes only those **additional** controls that are specific to certain locations.

Double Island Point—surface lines

This precinct contains a single site that may be developed for aquaculture.

Site	
Site 1	
Size (ha)	
200	
Depth (m)	
11–16.4	
Latitude/longitude (decimal degrees ⁴⁵)	
153.146984	-25.907716
153.155484	-25.907697
153.155529	-25.927697
153.147029	-25.927716
Description from characterisation study	
Bare sand substrate with no attached marine flora; some invertebrate burrows	
Summary—Suitable for use; additional design and engineering considerations due to exposure; access issues through the Wide Bay Bar	

⁴⁵ All coordinates are provided in decimal degrees. Refer to Appendix 5 for a conversion into GPS coordinates.

Precinct considerations

Precinct considerations include the following:

- This site is sheltered behind Double Island Point and has good water depth for surface lines.
- This site is within a General Use Zone in the Great Sandy Marine Park, which allows for aquaculture provided a permit is obtained.
- This site is located near a ship anchorage and is within a sheltered position used by various vessels to shelter from rough weather. It is considered that there is a sufficient area of sheltered water to accommodate both the aquaculture site and vessel anchorage.
- There is high visual amenity, although shark nets with floats are also present in this area. Line floatation systems are required to meet higher visual amenity objectives for this site.
- The site is relatively exposed to large seas and strong winds. Applicants will make a commercial decision about the overall risk.

Standard management controls (refer to the Implementation guide)

Note: The competitive allocation process will select applicants who can best meet the outcomes.

Standard management controls include:

- standard conditions for ‘lines’
- standard conditions for relevant species (e.g. pearls, scallops).

Specific controls for this precinct (in addition to all standard controls)

Specific controls include the following:

- Assessment Criteria AC16: ‘The proposed design and extent of the line floatation system must satisfy the requirement to minimise potential impacts on the visual amenity of the area.’
- Condition of Approval CA86: ‘The line floatation system must comply with the dimensions and specifications shown on the attached diagram labelled ___(diagrams will be specific to individual applications)___.’



Figure 7. Double Island Point—surface lines

Inskip Point—sea ranching

This precinct contains a single previously approved ranching (sea cucumbers) site in Pelican Bay, Inskip Point.

Site	
AA 802	
Size (ha)	
5.0	
Depth (m)	
~0–5	
Latitude/longitude (decimal degrees)	
153.063901	-25.816301
153.066501	-25.818701
153.065601	-25.819601
153.063101	-25.817223
Description from characterisation study	
Previously approved sea ranching site	

Precinct considerations

Precinct considerations include the following:

- This site is within the Conservation Park Zone in the Great Sandy Marine Park, which encompasses the entire Great Sandy Strait and allows for aquaculture provided a permit is obtained.
- The site is within the Dugong Protection Area.

Standard management controls (refer to the Implementation guide)

Standard management controls include:

- standard conditions for ‘ranching’
- standard conditions for relevant species (e.g. sea cucumbers) —these conditions require that any harvesting of sea cucumbers is by hand only.

Specific controls for this precinct (in addition to all standard controls)

Not applicable



Figure 8. Inskip Point—sea ranching

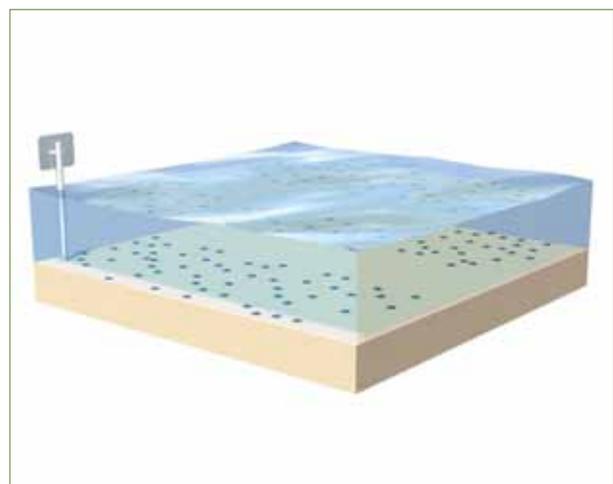


Figure 9. Example of sea ranching (hand harvest only—no structures)

Wide Bay Bar—subsurface lines

This precinct is relatively exposed to wind and wave action. There are two sites that may be developed for aquaculture.

Site	
Site 45	
Size (ha)	
500	
Depth (m)	
~ 10–15	
Latitude/longitude (decimal degrees)	
153.107527	-25.885029
153.095865	-25.841629
153.105840	-25.839042
153.117340	-25.882433
Description from characterisation study	
Description from former site 2 refers:	
<ul style="list-style-type: none"> Bare sand substrate with no attached marine flora; some invertebrate burrows 	
Summary—Suitable for use; additional design and engineering considerations due to exposure; access issues through the Wide Bay Bar	

Site	
Site 33	
Size (ha)	
1000	
Depth (m)	
6.7–26.3	
Latitude/longitude (decimal degrees)	
153.098724	-25.715356
153.118529	-25.714691
153.120010	-25.759556
153.100232	-25.760208
Description from characterisation study	
Bare oceanic sand with no attached marine flora	
Summary—Suitable for use; additional design and engineering considerations due to exposure; depth less than optimal throughout entire site but optimal depths do exist within it; access issues through the Wide Bay Bar	

Precinct considerations

Precinct consideration include the following:

- Site 33 is within a Habitat Protection Zone and site 45 is within a General Use Zone in the Great Sandy Marine Park, both of which allow for aquaculture provided a permit is obtained.
- Trawling takes place in this area. The trawling industry had specific input into the final location of site 45.
- Site 45 has some potential to have visual amenity concerns from the residential area on the hillside at Rainbow Beach.
- The sites are relatively exposed to large seas and strong winds. Applicants will make a commercial decision about the overall risk.

Standard management controls (refer to the Implementation guide)

Note: The competitive allocation process will select applicants who can best meet the outcomes.

Standard management controls include:

- standard conditions for ‘lines’
- standard conditions for relevant species (e.g. pearls, scallops).

Specific controls for this precinct (in addition to all standard controls)

Specific controls include the following:

- Assessment Criteria AC16: ‘The proposed design and extent of the line floatation system must satisfy the requirement to minimise potential impacts on the visual amenity of the area.’
- Condition of Approval CA86: ‘The line floatation system must comply with the dimensions and specifications shown on the attached diagram labelled ___(diagrams will be specific to individual applications)___.’



Figure 10. Wide Bay Bar—subsurface lines

Wide Bay Harbour—surface lines

Three sites that may be developed for aquaculture are in this precinct, in the southern end of the Great Sandy Strait.

Site	
Site 34	
Size (ha)	
5	
Depth (m)	
16–19	
Latitude/longitude (decimal degrees)	
153.026583	-25.788506
153.023378	-25.785388
153.023996	-25.784752
153.027201	-25.787870
Description from characterisation study	
Description from former sites 3 and 4 refers:	
<ul style="list-style-type: none"> Scoured sand substrate with some marine mud and scattered organic debris 	
Summary—Suitable for use; additional design and engineering due to current speed	

Site	
Site 7(a)	
Size (ha)	
5	
Depth (m)	
4–6	
Latitude/longitude (decimal degrees)	
152.973110	-25.711140
152.973387	-25.713141
152.971188	-25.713445
152.970912	-25.711445
Description from characterisation study	
Shelly, muddy sand with algal mat, scattered soft corals (alcyonarians and gorgonians), ascidians and bryozoans	
Summary—Depth sub-optimal for surface line; consider sea ranching; soft corals and sponges encountered infrequently	

Site	
Site 7(b)	
Size (ha)	
6	
Depth (m)	
4–6	
Latitude/longitude (decimal degrees)	
152.970911	-25.711444
152.970635	-25.709445
152.972834	-25.709140
152.973111	-25.711140
Description from characterisation study	
Shelly, muddy sand with algal mat, scattered soft corals (alcyonarians and gorgonians), ascidians and bryozoans	
Summary—Depth sub-optimal for surface line; consider sea ranching; soft corals and sponges encountered infrequently	

Site
Site 7(c)
Size (ha)
5
Depth (m)
4–6
Latitude/longitude (decimal degrees)
152.972557 -25.707140
152.972834 -25.709140
152.970635 -25.709445
152.970358 -25.707444
Description from characterisation study
Shelly, muddy sand with algal mat, scattered soft corals (alcyonarians and gorgonians), ascidians and bryozoans Summary—Depth sub-optimal for surface line; consider sea ranching; soft corals and sponges encountered infrequently

Site
Site 32
Size (ha)
25
Depth (m)
3–4
Latitude/longitude (decimal degrees)
152.975181 -25.700824
152.974369 -25.691822
152.976619 -25.691619
152.977432 -25.700621
Description from characterisation study
Coarse, shelly, sandy mud with collection of filter feeding organisms suited to higher current environment; soft corals, gorgonians, bryozoans, sponges and the macroalgae <i>Halimeda</i> Summary—Depth sub-optimal for surface line; consider sea ranching; additional design and engineering due to current speed; a sparse cover of soft corals (<i>Dendronephthya</i> sp.) and sponges occurs

Site
Site 7(d)
Size (ha)
5
Depth (m)
4–6
Latitude/longitude (decimal degrees)
152.970082 -25.705444
152.972280 -25.705139
152.972557 -25.707140
152.970358 -25.707444
Description from characterisation study
Shelly, muddy sand with algal mat, scattered soft corals (alcyonarians and gorgonians), ascidians and bryozoans Summary—Depth sub-optimal for surface line; consider sea ranching; soft corals and sponges encountered infrequently

Precinct considerations

Precinct considerations include the following:

- These sites are all within the Conservation Park Zone in the Great Sandy Marine Park, which encompasses the entire Great Sandy Strait and allows for aquaculture provided a permit is obtained.
- They are also within marine and estuarine high environmental value (HEV) waters.
- The site is within the Dugong Protection Area.

Considerations for site 7 include the following:

- Dolphin habitat overlaps these sites (refer to Map 4b). Aquaculture structures can be designed and maintained to minimise interactions with megafauna. Refer to Section 4.3.2, 'Wildlife interactions', and standard conditions for 'lines' in the *Implementation guide*.
- Scattered coral cover is present in the area. Conditions of approval will ensure that structures are not located on or significantly impact coral communities.

Standard management controls (refer to the Implementation guide)

Note: The competitive allocation process will select applicants who can best meet the outcomes.

Standard management controls include:

- standard conditions for ‘lines’
- standard conditions for relevant species (e.g. pearls, scallops).

Specific controls for this precinct (in addition to all standard controls)

Specific controls for site 7 and site 32 include the following:

- Condition of Approval CA87: ‘Where coral communities are present in the approved area, structures must be located so as to avoid damage to coral. DEEDI and DERM will assess the development plan including proposed location of structures.’



Figure 11. Wide Bay Harbour—surface lines

Tinnanbar—racks

Five sites that may be developed for rack aquaculture are in this precinct, in addition to the four previously approved rack sites.

Site
AA 834
Size (ha)
5.6
Depth (m)
~ 2–5
Latitude/longitude (decimal degrees)
152.943501 -25.750001
152.942351 -25.750098
152.942425 -25.746453
152.944065 -25.746562
Description from characterisation study
Previously approved rack aquaculture site

Site
AA 889
Size (ha)
7.9
Depth (m)
~ 2–5
Latitude/longitude (decimal degrees)
152.957601 -25.685201
152.957312 -25.685925
152.955906 -25.685401
152.954507 -25.680977
152.955597 -25.680832
Description from characterisation study
Previously approved rack aquaculture site

Site
AA 874
Size (ha)
11.4
Depth (m)
~ 2–5
Latitude/longitude (decimal degrees)
152.961401 -25.694701
152.961617 -25.692049
152.965399 -25.699695
152.963962 -25.700052
Description from characterisation study
Previously approved rack aquaculture site

Site
AA 875
Size (ha)
8.5
Depth (m)
~ 2–5
Latitude/longitude (decimal degrees)
152.961401 -25.694701
152.959524 -25.684613
152.960484 -25.684211
152.961623 -25.692038
Description from characterisation study
Previously approved rack aquaculture site

Site
Site 42
Size (ha)
50
Depth (m)
~ 0.5–6.0
Latitude/longitude (decimal degrees)
152.942359 -25.743994
152.948059 -25.737101
152.951907 -25.740281
152.946226 -25.747179
Description from characterisation study
Description from former site 6 refers:
<ul style="list-style-type: none"> • Shelly sand with areas of <i>H. uninervis</i> (50% cover) and bivalves in shallow water
Summary—Suitable for use

Site
Site 41
Size (ha)
50
Depth (m)
~ 0.8–6.0
Latitude/longitude (decimal degrees)
152.923312 -25.704109
152.918603 -25.696505
152.922847 -25.693876
152.927567 -25.701464
Description from characterisation study
Description from former site 8 refers:
<ul style="list-style-type: none"> • Shelly, muddy sand with filamentous algal mat, some patches of <i>H. uninervis</i> (20–70% cover), bivalves (<i>Pinna</i> sp.) and ascidians
Summary—Suitable for use; depth considerations in part of the site; although epibenthic fauna is present, the site is largely devoid of such cover

Site
Site 31
Size (ha)
50
Depth (m)
2.0–4.0
Latitude/longitude (decimal degrees)
152.939786 -25.726424
152.943240 -25.722819
152.949703 -25.728990
152.946244 -25.732614
Description from characterisation study
Shelly, muddy sand covered in an algal mat and with moderate occurrence of soft corals (alcyonarians) and sea squirts (ascidians)
Summary—Suitable for use, although depth less than optimal in part of the site; additional design and engineering due to current speed; sparse cover of soft corals (<i>Dendronephthya</i> sp.)

Site
Site 9
Size (ha)
50
Depth (m)
0.5–2.0
Latitude/longitude (decimal degrees)
152.970924 -25.676867
152.975916 -25.676876
152.975916 -25.685812
152.970907 -25.685812
Description from characterisation study
Shelly muddy sand with some patches of <i>H. uninervis</i> and <i>H. ovalis</i> generally covered in filamentous green algae; some occurrence of soft corals and ascidians; turbid
Summary—Suitable for use; although epibenthic fauna is present, the site is largely devoid of such cover

Site
Site 10
Size (ha)
50
Depth (m)
0.5–2.5
Latitude/longitude (decimal degrees)
152.912426 -25.639975
152.917045 -25.637912
152.920703 -25.646066
152.916132 -25.648116
Description from characterisation study
Sand (generally bare) with some sparse patches of <i>H. uninervis</i> and common occurrence of <i>Pinna</i> (razor shell) in shallow waters; turbid
Summary—Suitable for use; although epibenthic fauna is present, the site is largely devoid of such cover

Precinct considerations

Precinct considerations include the following:

- These sites are all within the Conservation Park Zone in the Great Sandy Marine Park, which encompasses the entire Great Sandy Strait and allows for aquaculture provided a permit is obtained.
- They are also within marine and estuarine HEV waters.
- Several sites are also within a Go Slow Area.
- The lower section of the Great Sandy Strait has been identified as inshore dolphin and dugong habitat (refer to Map 4b).
- Oyster racks are located among shallow, mostly bare sandbars.
- Some sparse coral cover is present. Conditions of approval will ensure that structures are not located on or significantly impact coral communities.
- The site is within the Dugong Protection Area.

- *Standard management controls (refer to the Implementation guide)*

Note: The competitive allocation process will select applicants who can best meet the outcomes.

Standard management controls include:

- standard conditions for ‘racks’
- standard conditions for relevant species (e.g. edible oysters).

Specific controls for this precinct (in addition to all standard controls)

Specific controls include the following:

- Condition of Approval CA87: ‘Where coral communities are present in the approved area, structures must be located so as to avoid damage to coral. DEEDI and DERM will assess the development plan including proposed location of structures.’

Additional controls for this precinct (outside the scope of the GSRMAP)

Additional controls include the following:

- The Marine Parks (Great Sandy) Zoning Plan provides rules and guidelines about operation of all motor vessels so as to minimise impact on marine megafauna. Movement of vessels within the Go Slow Area must comply with the restrictions relevant to this area.



Figure 12. Tinnanbar—racks

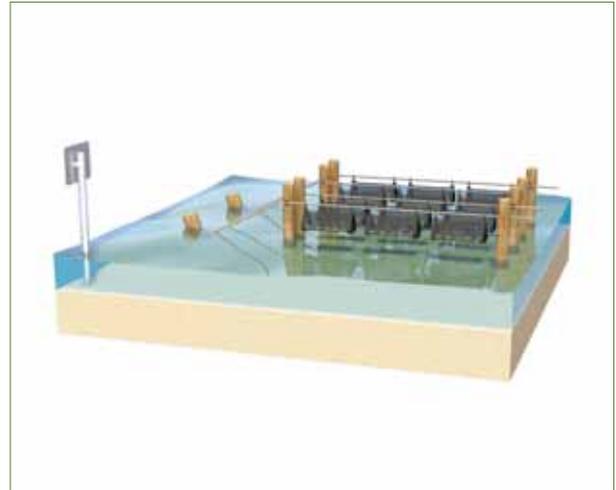


Figure 13. Example of rack aquaculture (oysters)

Big Woody Island—sea ranching

Two previously approved sites and two sites that may be developed for sea ranching comprise this precinct. Sea cucumber ranching would be appropriate in these sites. The shallow water depth would make them unsuitable for scallop ranching.

Site	
AA 815	
Size (ha)	
74.7	
Depth (m)	
~ 1	
Latitude/longitude (decimal degrees)	
153.015001	-25.241667
153.028301	-25.241667
153.028301	-25.246667
153.015001	-25.246667
Description from characterisation study	
Previously approved ranching site	

Site
AA 820
Size (ha)
14
Depth (m)
~ 1
Latitude/longitude (decimal degrees)
152.908666 -25.302501
152.908666 -25.315001
152.907666 -25.315001
152.907666 -25.302501
Description from characterisation study
Previously approved ranching site

Site
Site 12
Size (ha)
200
Depth (m)
1–4
Latitude/longitude (decimal degrees)
152.936080 -25.309415
152.941092 -25.300831
152.951598 -25.318476
152.956610 -25.309891
Description from characterisation study
Shelly muddy sand generally bare but with some occurrence of macroalgae (<i>Udotea</i> sp.)
Conspicuous number of seapens at one transect (4 m depth)
Summary—Suitable for use. Although epibenthic fauna is present, the site is largely devoid of such cover

Site
Site 14
Size (ha)
200
Depth (m)
1–5
Latitude/longitude (decimal degrees)
153.015274 -25.249913
153.007966 -25.256652
153.020149 -25.269862
153.027456 -25.263124
Description from characterisation study
Bare sand with sparse patches of the seagrass <i>Halophila uninervis</i>
Summary—Suitable for use. Depth considerations in part of the site

Precinct considerations

Precinct considerations include the following:

- These sites are all within the Conservation Park Zone in the Great Sandy Marine Park, which encompasses the entire Great Sandy Strait and allows for aquaculture provided a permit is obtained.
- They are also within marine and estuarine HEV waters.
- These sites are also within Go Slow Areas in the Great Sandy Marine Park.
- Seagrass beds are present around site 14 (see Map 4a). Hand harvesting only is permitted at sites in this precinct in order to avoid impacts to seagrass.
- Critical shorebird habitats have been identified in this vicinity. Buffers have been allocated between shorebird areas and aquaculture sites.
- These areas are popular recreational fishing areas; however, there are no structures to interfere with fishing and there will be no exclusion of access within these areas.
- Area may be subject to flood impacts from the Mary River and freshwater incursion from Fraser Island. Applicants will make a commercial decision about the overall risk.
- The site is within the Dugong Protection Area.

Standard management controls (refer to the Implementation guide)

Note: The competitive allocation process will select applicants who can best meet the outcomes.

Standard management controls include:

- standard conditions for ‘ranching’
- standard conditions for relevant species (e.g. sea cucumbers)—these conditions require that any harvesting of sea cucumbers is by hand only.

Additional controls for this precinct (outside the scope of the GSRMAP)

Additional controls include the following:

- The Marine Parks (Great Sandy) Zoning Plan provides rules and guidelines about operation of all motor vessels so as to minimise impact on marine megafauna. Movement of vessels within the Go Slow Area must comply with the restrictions relevant to this area.



Figure 14. Big Woody Island—sea ranching

Moon Point—surface lines

This precinct consists of previously approved surface line aquaculture.

Site
AA 816
Size (ha)
50.4
Depth (m)
~ 10–15
Latitude/longitude (decimal degrees)
153.0096 -25.2874
153.0134 -25.2845
153.0071 -25.2775
153.0033 -25.2804
Description from characterisation study
Previously approved line aquaculture site, slightly repositioned to reduce navigation impacts

Site
AA 817
Size (ha)
50.4
Depth (m)
~ 10–15
Latitude/longitude (decimal degrees)
153.008858 -25.273204
153.012686 -25.270328
153.019013 -25.277289
153.015185 -25.280165
Description from characterisation study
Previously approved line aquaculture site

Site
AA 818
Size (ha)
50.4
Depth (m)
~ 10–15
Latitude/longitude (decimal degrees)
153.009626 -25.287371
153.013477 -25.284519
153.019751 -25.291522
153.015899 -25.294373
Description from characterisation study
Previously approved line aquaculture site

Site
AA 819
Size (ha)
50.4
Depth (m)
~ 10–15
Latitude/longitude (decimal degrees)
153.031771 -25.305858
153.036738 -25.305857
153.036741 -25.314888
153.031773 -25.314889
Description from characterisation study
Previously approved line aquaculture site

Precinct considerations

Precinct considerations include the following:

- These sites are all within the Conservation Park Zone in the Great Sandy Marine Park, which encompasses the entire Great Sandy Strait and allows for aquaculture provided a permit is obtained.
- They are also within marine and estuarine HEV waters.
- All sites are previously approved areas.
- The site is within the Dugong Protection Area.

Standard management controls (refer to the Implementation guide)

Standard management controls include:

- standard conditions for ‘lines’
- standard conditions for relevant species (e.g. pearls, scallops).

Specific controls for this precinct (in addition to all standard controls)

Specific controls include the following:

- The Marine Parks (Great Sandy) Zoning Plan provides rules and guidelines about operation of all motor vessels so as to minimise impact on marine megafauna. Movement of vessels within the Go Slow Area must comply with the restrictions relevant to this area.



Figure 15. Moon Point—surface lines

Pearl Bank—surface lines

Four sites that may be developed for aquaculture are in this precinct.

Site	
Site 15	
Size (ha)	
25	
Depth (m)	
7–10	
Latitude/longitude (decimal degrees)	
152.919018	-25.235852
152.920766	-25.234042
152.927214	-25.240269
152.925466	-25.242079
Description from characterisation study	
Sand, generally bare with red algal mat and some patches of the seagrass <i>Halophila ovalis</i> and <i>H. spinulosa</i>	
Summary—Suitable for use; depth considerations in part of the site and additional design and engineering due to current speed; although epibenthic fauna is present, the site is largely devoid of such cover	

Site	
Site 16	
Size (ha)	
25	
Depth (m)	
7–10	
Latitude/longitude (decimal degrees)	
152.899444	-25.224215
152.901193	-25.222405
152.907641	-25.228632
152.905892	-25.230443
Description from characterisation study	
Sand, generally bare with red algal mat and some patches of <i>H. ovalis</i> and <i>H. spinulosa</i> (20–60% cover)	
Summary—Suitable for use; depth considerations in part of the site and additional design and engineering due to current speed	

Site	
Site 43	
Size (ha)	
1000	
Depth (m)	
~ 10–11.5	
Latitude/longitude (decimal degrees)	
152.715401	-25.149702
152.715401	-25.121329
152.746767	-25.121329
152.746767	-25.149702
Description from characterisation study	
Description from former site 22 refers:	
<ul style="list-style-type: none"> Sandy seabed with 20–40% cover of <i>H. ovalis</i> and <i>H. spinulosa</i> 	
Summary—Suitable for use; additional design and engineering considerations due to exposure; although epibenthic fauna is present, the site is largely devoid of such cover	

Site	
Site 44	
Size (ha)	
1000	
Depth (m)	
~ 6–10	
Latitude/longitude (decimal degrees)	
152.775952	-25.201724
152.775952	-25.173351
152.807318	-25.173351
152.807318	-25.201724
Description from characterisation study	
Descriptions from former site 23a and site 23b refers:	
<ul style="list-style-type: none"> Sand with a broad 40–60% cover of <i>H. ovalis</i> and <i>H. spinulosa</i>, and occasional occurrence of the marine algae <i>Caulerpa</i> (potentially <i>C. taxifolia</i>) 	
Summary—Suitable for use; although epibenthic fauna is present, the site is largely devoid of such cover	

Precinct considerations

Precinct considerations include the following:

- These sites are all within the General Use Zone in the Great Sandy Marine Park, which allows for aquaculture provided a permit is obtained.
- One site is within the Whale Management Area in the Great Sandy Marine Park.
- Trawling takes place in this area; however, the sites have been placed in low trawl areas.
- Several important transport routes are present in the vicinity. The sites have been located so as to avoid maritime safety issues. Site 43 is 3 nm from the Fairway Beacon, and site 44 is 1 nm from the navigation route between Point Vernon and Fairway Beacon.
- The site is a dolphin feeding area (sites 15 and 16) and there are medium dugong numbers (sites 43 and 44). Aquaculture structures can be designed and maintained to minimise interactions with megafauna. Refer to Section 4.3.2, 'Wildlife interactions', and standard conditions for 'lines' in the *Implementation guide*.
- Seagrass is present in these areas. Line aquaculture does not present a significant risk to seagrass. Refer to to Section 4.3.3, 'Habitat disturbance'. Note that this area is currently used by trawlers.
- The site is within the Dugong Protection Area.

Standard management controls (refer to the Implementation guide)

Note: The competitive allocation process will select applicants who can best meet the outcomes.

Standard management controls include:

- standard conditions for 'lines'
- standard conditions for relevant species (e.g. pearls, scallops).

Additional controls for this precinct (outside the scope of the GSRMAP)

Additional controls include the following:

- Movement of vessels within the Whale Management Area must comply with the restrictions relevant to this area.



Figure 16. Pearl Bank—surface lines

Coongul Point—subsurface lines

A single site that may be developed for aquaculture is in this precinct.

Site	
Site 18	
Size (ha)	
1000	
Depth (m)	
8–15	
Latitude/longitude (decimal degrees)	
153.007397	-25.114139
153.025367	-25.122492
153.006423	-25.163188
152.988482	-25.154836
Description from characterisation study	
Sandy seabed generally sparse or denuded of epibenthic biota	
Summary—Suitable for use; depth considerations in part of the site and additional design and engineering due to current speed; although epibenthic fauna is present, the site is largely devoid of such cover; one patch of the solitary hard coral <i>Cycloseris cyclolites</i> was encountered in the site	

Precinct considerations

Precinct considerations include the following:

- This site is within a General Use Zone in the Great Sandy Marine Park, which allows for aquaculture provided a permit is obtained.
- The site is within the Whale Management Area of the Great Sandy Marine Park, but is located in a shallow area surrounded by transit routes. Aquaculture equipment can be designed and managed to minimise risks to megafauna.
- This site is considered to be highly attractive from a commercial viewpoint.
- This site is also in an area of heavy vessel traffic. The site has been aligned to avoid maritime safety concerns. The site is in the vicinity of a sandbar which restricts transit.
- The site is within the Dugong Protection Area (SW corner of site 18).

Aquaculture structures can be designed and maintained to minimise interactions with megafauna. Refer to Section 4.3.2, 'Wildlife interactions', and standard conditions for 'lines' in the *Implementation guide*.

Standard management controls (refer to the Implementation guide)

Note: The competitive allocation process will select applicants who can best meet the outcomes.

Standard management controls include:

- standard conditions for 'lines'
- standard conditions for relevant species (e.g. pearls, scallops)

Specific controls for this precinct (in addition to all standard controls)

Due to the location of the site within the Whale Management Area, additional conditions are applied to reduce the risk of an adverse incident occurring.

Specific controls include the following:

- Assessment Criteria AC17: 'This site may not be used for any purpose other than the culture of high value product (pearl oysters), to maximise farm surveillance during whale season.'
- Conditions and criteria for 'pilot-scale' operations (M2)—DEEDI considers that the risk at this site could be higher than industry standard, so this activity will be restricted to pilot-scale, with scaling-up dependent on performance during the trial phase (refer to section 4.6.1). Assessment Criteria AC4 and AC5 and Conditions CA10 and CA11 of the *Implementation guide* apply.
- Condition of Approval CA90: 'Lines must not be stocked with aquaculture product during the first year of operation. Horizontal backbone lines must remain unstocked for a full whale season (July–October) before product can be introduced to the site.'

Additional controls for this precinct (outside the scope of the GSRMAP)

Additional controls include the following:

- Movement of vessels within the Whale Management Area must comply with the restrictions relevant to this area.



Figure 17. Coongul Point—subsurface lines

Burnett—surface lines

Three sites that may be developed for surface lines are in this precinct.

Site	
Site 39	
Size (ha)	
1000	
Depth (m)	
~ 6–11	
Latitude/longitude (decimal degrees)	
152.601722	-25.052369
152.562365	-25.030802
152.571891	-25.013424
152.611242	-25.035021
Description from characterisation study	
<p>Descriptions from former sites 24 and 25 refers:</p> <ul style="list-style-type: none"> Coarse sand and shell substrate with broad cover of 10–50% of the seagrass <i>Halophila ovalis</i> and <i>H. spinulosa</i> and a 5–20% occurrence of gelatinous epiphytic growth <p>Descriptions from former site 25 refers:</p> <ul style="list-style-type: none"> Coarse sand and shell substrate with broad cover of 10–40% <i>H. ovalis</i> and <i>H. spinulosa</i>, presence of <i>Halodule uninervis</i> and occasional of the marine algae <i>Caulerpa</i> <p>Summary—Suitable for use; although epibenthic fauna is present, the site is largely devoid of such cover</p>	

Site	
Site 48	
Size (ha)	
1000	
Depth (m)	
~ 6–10	
Latitude/longitude (decimal degrees)	
152.179157	-24.621325
152.148618	-24.588441
152.163139	-24.574956
152.193666	-24.607867
Description from characterisation study	
<p>Description from former sites 27 and 28 refers:</p> <ul style="list-style-type: none"> Coarse sand and shell substrate with sparse cover of macroalgae and invertebrates. Very sparse occurrence of the seagrasses <i>H. ovalis</i> and <i>H. spinulosa</i> <p>Summary—Suitable for use; additional design and engineering considerations due to exposure; depth considerations in part of the site; although epibenthic fauna is present, the site is largely devoid of such cover</p> <p>Description from former site 28 refers:</p> <ul style="list-style-type: none"> Coarse sand and shell substrate with sparse to broad cover of various macroalgae or algal mat and infrequent occurrence of the seagrasses <i>H. ovalis</i> and <i>H. spinulosa</i> <p>Summary—Suitable for use; additional design and engineering considerations due to exposure; although epibenthic fauna is present, the site is largely devoid of such cover</p>	

Site	
Site 47	
Size (ha)	
1000	
Depth (m)	
~ 6–10	
Latitude/longitude (decimal degrees)	
152.115764	-24.569742
152.087543	-24.534848
152.102952	-24.522387
152.131159	-24.557307
Description from characterisation study	
Description from former site 28 refers:	
<ul style="list-style-type: none"> Coarse sand and shell substrate with sparse to broad cover of various macroalgae or algal mat and infrequent occurrence of the seagrasses <i>H. ovalis</i> and <i>H. spinulosa</i> 	
Summary—Suitable for use; additional design and engineering considerations due to exposure; although epibenthic fauna is present, the site is largely devoid of such cover	

Precinct considerations

Precinct considerations include the following:

- Sites 47 and 48 are within the General Use Zone and site 39 is within the Habitat Protection Zone in the Great Sandy Marine Park, which allows for aquaculture provided a permit is obtained.
- Trawling for banana prawns takes place in this area. Site 39 has been located in the Habitat Protection Zone (closed to trawling) so as to minimise the impact on trawl activity.
- Sites 47 and 48 are near important commercial fishing grounds (net and trawl). Potentially affected fishers had specific input into the final locations.
- All sites are within the Dugong Protection Area.
- The sites are relatively exposed to large waves and strong winds. Applicants will make a commercial decision about the overall risk.
- A buffer of 3 km has been observed to the marine park Green Zone and to Four Mile Reef.

Standard management controls (refer to the Implementation guide)

Note: The competitive allocation process will select applicants who can best meet the outcomes.

Standard management controls include:

- standard conditions for 'lines'
- standard conditions for relevant species (e.g. pearls, scallops).

Additional controls for this precinct (outside the scope of the GSRMAP)

Additional controls include the following:

- Disturbance of marine plants is minimised and managed, for example by using the fish habitats management policy FHMOP002 as a guideline.⁴⁶



Figure 18. Burnett—surface lines

⁴⁶ The fish habitats management policy FHMOP002, Management of declared Fish Habitat Areas: departmental policy position, is available on the DEEDI website at www.deedi.qld.gov.au

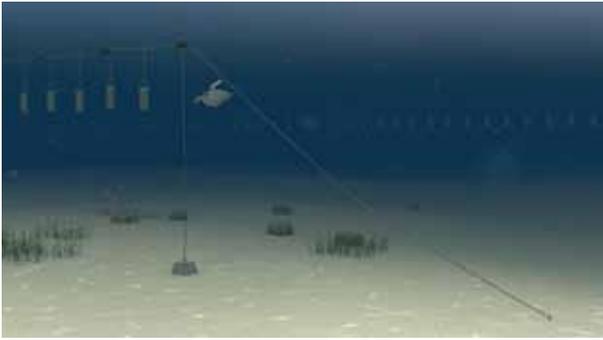


Figure 19. Example of line aquaculture (subsurface)

Hervey Bay—sea ranching/subsurface lines

Two previously approved sites are within this precinct.

Whilst these sites are currently approved for sea ranching of scallops, site AA 811 is also considered suitable for subsurface lines (but not site AA 812).

Site	
AA 811	
Size (ha)	
3744.8	
Depth (m)	
~ 18	
Latitude/longitude (decimal degrees)	
152.616666	-24.900001
152.683333	-24.900001
152.683333	-24.950001
152.616666	-24.950001
Description from characterisation study	
Previously approved aquaculture site—sea ranching Also considered suitable for subsurface lines	

Site	
AA 812	
Size (ha)	
3276.7	
Depth (m)	
~ 18	
Latitude/longitude (decimal degrees)	
153.083333	-24.950001
153.141666	-24.950001
153.141666	-25.000001
153.083333	-25.000001
Description from characterisation study	
Previously approved aquaculture site—sea ranching	

Precinct considerations

Precinct considerations include the following:

- Both sites are within a General Use Zone, while site AA 812 is also within a Whale Management Area in the Great Sandy Marine Park.
- The East Coast Trawl Fishery permits otter and beam trawling in Hervey Bay, and commercial trawling does take place in this vicinity. However, trawlers are not permitted to use their gear within site AA811 due to a specific fishery closure that is declared over the site. Only the aquaculturist is permitted to trawl within this site in order to harvest their product.

Considerations for site AA 811 include the following:

- If line structures are used, trawling will be physically prevented. However, trawling is already prohibited within the site other than by the aquaculture approval holders.
- Dense seagrass is present in this area. Line aquaculture is not expected to present a risk to seagrass based on the approved spacing and design of structures. Refer to Section 4.3.3, 'Habitat disturbance'.
- Ranching does not involve structures so has limited potential to interfere with fishing activities. Line aquaculture does not prevent fishing from small craft since aquaculture approvals do not confer exclusive access over the site. However, if structures are used they may interfere with fishing gear.

Considerations for site AA 812 include the following:

- Site AA 812 is within a high-use whale area in the Great Sandy Marine Park Whale Management Area. For this reason, aquaculture involving structures is not considered appropriate in this site.

Standard management controls (refer to the Implementation guide)

Note: The competitive allocation process will select applicants who can best meet the outcomes.

Standard management controls for site AA 811 include:

- standard conditions for ‘ranching’ or ‘lines’
- standard conditions for relevant species for ranching (e.g. scallops) or for lines (e.g. pearls, scallops).

Standard management controls for site AA 812 include:

- standard conditions for ‘ranching’ only
- standard conditions for relevant species for ranching (e.g. scallops) only.

Specific controls for this precinct (in addition to all standard controls)

Specific controls for site AA 812 include the following:

- Condition of Approval CA91: ‘Harvest of scallops by trawl must not be undertaken during the whale migration season (July–October).’

Additional controls for this precinct (outside the scope of the GSRMAP)

Additional controls for site AA 812 include the following:

- Movement of vessels within the Whale Management Area must comply with the restrictions relevant to this area.



Figure 20. Hervey Bay—sea ranching/subsurface lines

4.7 Monitoring and assessment

Environmental management of aquaculture operations requires a multi-layered approach. Monitoring and reporting programs are important components of the overall framework for environmental management. Key elements of the overall approach are:

Assessment stage prior to issue of approval:

1. evaluation of risk
2. risk management (management controls)

Operational stage:

1. process for early detection of any impact (reporting, monitoring, auditing)
2. improved understanding of risks and impacts (relevant scientific research)
3. ability to respond when appropriate (response strategies).

Management outcome M11 (section 4.6.1) states that ‘Monitoring, incident reporting, and/or assessment of potential impacts are undertaken where appropriate’. Assessment Criteria AC11 (see the *Implementation guide*) requires that ‘A monitoring program must be developed to the satisfaction of DEEDI and DERM’.

It is the responsibility of each proponent to develop an appropriate monitoring program.

Since each monitoring program must be developed on an individual basis and tailored to individual circumstances, this section provides clear guidelines for ensuring that programs are (i) appropriate to address the relevant management issues and (ii) commensurate with the level of risk.

Types of monitoring programs and their specific considerations are described below. The overall summary in Section 5.6 indicates how the various types of monitoring programs should be utilised to address each of the risks identified in Section 4.4.

The appropriateness of the proposed monitoring program will be decided by the Allocation Panel during the competitive allocation process (refer to Section 5.4). The Allocation Panel includes independent experts as well as relevant government agencies, so the proposed monitoring program (as well as the rest of the application) will receive a balanced review with the input of relevant expertise.

Monitoring programs must be able to meet the objectives of management outcome M11 and the principles outlined in this plan. Where detailed ecological studies are considered appropriate, the proposed program, including the proposed analysis and response options, should be peer reviewed to ensure it is scientifically valid. Refer to Appendix 6 for more information.

Management outcome M2 (Section 4.6.1) states that 'Pilot-scale activities⁴⁷ are undertaken on a trial basis and restricted to a pilot scope, with scaling up dependent upon performance results'.

Due to the difficulties of detecting impacts in the highly variable marine environment, particularly subtle impacts, the GSRMAP emphasises preventative management controls.

4.7.1 Evaluation of risk

The GSRMAP assesses the risks and potential impacts associated with rack, line and sea ranching aquaculture in the Great Sandy region (Section 4.3 and Section 4.4). At the time of assessment, concurrent agencies will consider the individual application against the risk management framework in the GSRMAP.

⁴⁷ If an activity varies from industry standard and/or DEEDI considers that the risk could be higher than industry standard, the activity will be restricted to pilot-scale, with scaling-up dependent on performance during the trial phase.

The GSRMAP therefore functions as an environmental impact statement for non-intensive aquaculture in the Great Sandy region. Where additional impact assessment is required, Section 4.7.3 outlines the principles that must be followed in formulating an impact assessment program.

4.7.2 Risk management

Section 4.6 describes management controls in detail. Management controls are implemented and enforced as conditions of approval (Section 5.3). Management controls include controls on the design and operation of the facility, and may include specific strategies (e.g. entanglement strategies), monitoring and reporting programs.

4.7.3 Reporting, monitoring, auditing

The approval process manages risk through stringent assessment criteria and conditions attached to approvals. However, since some residual risk may remain, a process for early detection of any impact is also necessary.

A number of different types of reporting, monitoring, and auditing programs apply under the GSRMAP. These programs are detailed below. The overall summary in Section 5.6 (final column) describes the role of each type of program in addressing the various types of risk identified under the GSRMAP.

(A) Annual production returns

All aquaculturists are required, as a standard condition of approval (CA30; see the *Implementation guide*) to submit an annual production return to DEEDI that includes:

- total weight of product (or number of individuals produced)
- types of product (e.g. full pearl, half pearl, scallop meat)
- value of product
- total area stocked

- amount sold overseas versus domestically
- hatchery production (weight or number of individuals)
- losses/mortalities (numbers and/or percentage loss)
- movement and introduction of stock
- number of persons employed and labour effort.

A summary of this information is reported annually in *Report to farmers*, which is published on the DEEDI website.⁴⁸ Reporting of milestones in a Development Covenant is also a condition of approval (CA78; see the *Implementation guide*).

The purpose of this type of reporting is to contribute to the government’s statistical information on industry development. Information gathered from farmers feeds into ABARE’s data set as well as DEEDI’s, which contribute to decisions regarding future aquaculture development. Statistical return information provides an indication of the quantity produced and efficiency of production for individual farms, and can indicate trends and drivers affecting the industry sector as a whole.

(A)(i) Report against milestones of Development Covenant

Condition of approval (CA77; see the *Implementation guide*) states that ‘a ‘Development Covenant’ must be provided within six (6) months which contains clear, identifiable and succinct milestones’. DEEDI will audit these milestone reports to ensure that the site is being used for aquaculture rather than speculation. The milestone reports will also provide notice of any farm production issues that may require DEEDI involvement.

(B) Monitoring and maintenance of equipment by approval holder

A number of management outcomes and their associated conditions of approval (Section 4.6.1) require ongoing monitoring and maintenance of the farm equipment by the approval holder as part of general farm business. As well as the items discussed separately below, these include M3 (the aquaculture area is maintained in good condition), M9 (aquaculture activities are managed so as to minimise the risk of accidental introduction of pest species) and M12 (structures are designed and maintained so as to minimise potential for impact on megafauna).

(C) Monitoring for food safety programs

Management outcome M13 (Section 4.6.1) states that ‘any product intended for human consumption is managed so as to avoid human health risks’. Where aquacultured product is intended for human consumption, additional monitoring is generally required as part of a food safety program (e.g. water quality and meat sampling for oysters under the ASQAP).⁴⁹ Oyster growers are required to meet ASQAP requirements under separate legislation. Food safety requirements, as stated under ‘Food safety’ in Section 4.3.10, are generally outside the scope of the GSRMAP.

(D) Ecological studies

Ecological studies are appropriate if they are essential to:

- allow decision-making agencies to decide whether or not aquaculture should be allowed to commence/continue
- ensure that minimum environmental requirements are met
- inform adaptive management (refer to Section 5.5.4).

Ecological studies require very careful consideration. Poorly designed studies can waste considerable time and money without providing any benefit in terms of meeting environmental sustainability objectives.

⁴⁸ *Report to farmers* is available on the DEEDI website at www.deedi.qld.gov.au

⁴⁹ The *Australian shellfish quality assurance program (ASQAP) operations manual* can be downloaded from the Primary Industries and Resources SA website at www.pir.sa.gov.au

In recognition of this issue, the Australian Fisheries Management Forum's Aquaculture Sub-Committee is currently developing a set of guidelines for ecological studies and assessment programs for aquaculture. Once these guidelines are developed, DEEDI will investigate appropriate measures to ensure they are incorporated into the assessment and monitoring framework.

This section provides basic principles for the application of ecological studies. However, expert advice from a qualified ecologist should be sought prior to imposing the requirement for an ecological study as either a criteria for assessment or condition of approval under the GSRMAP.

The principles for ecological studies under the GSRMAP are as follows:

1. All impositions must be commensurate with the level of risk in order to justify the regulatory burden. The imposition must also be considered in the context of similar users of the area and the conditions placed upon them in order for them to operate.⁵⁰
2. The management question must be clearly stated. The purpose of the study is to answer a specific management question that cannot otherwise be answered. 'Is there any impact' is not a valid question for ecological assessment as it could be interpreted in a number of different ways, each of which would require a different sampling design. The ecological study must test a specific hypothesis, for example, 'The composition of the sediment at the impact site will be significantly different after the impact compared to before the impact, relative to natural variation as measured at control sites over that same time period'.
3. The sampling design and sampling sites must be scientifically valid and capable of answering the management question.

4. Environmental indicators (or performance indicators) should be causally linked to the potential source of risk, and be relatively easy and economical to measure. Data must be feasibly collectable within a reasonable amount of time. Fauna or flora that are sparse, highly mobile or patchily distributed in time and space are often impractical to use as indicators.
5. Primary indicators (readily measured by video or other rapid assessment techniques) may be investigated initially, and if necessary the investigation can be expanded to include secondary indicators that are more difficult or time consuming to measure.
6. Each ecological study must define triggers for response (e.g. a threshold limit is exceeded or a statistically significant impact is detected). A key purpose of the study is to provide triggers for adaptive management.
7. Each study must define response options up front.
8. The government is accountable for the data and reports provided. Data must be used for the purpose of adaptive management, including revision of policy where appropriate.
9. Data collected must be made available to the provider of the data.

Appendix 6 describes the purpose, limitations and interpretation of various ecological studies.

(D)(a) Monitoring against 'baseline' values

Rapid assessment methods, such as a series of video images along transects, can indicate changes over time. They cannot detect whether or not an impact has occurred, since any unusual result may be the result of natural variability unrelated to the aquaculture activity. However, an unusual result may trigger a management response in the form of a more detailed investigation.

⁵⁰ Conditions imposed under IDAS must be 'relevant to, but not an unreasonable imposition on, the development or use of premises as a consequence of the development; or be reasonably required in respect of the development or use of premises as a consequence of the development'.

(D)(b) Monitoring against agreed threshold limits

This type of study is appropriate when management controls are in place to address the risk, yet there is a concern about whether performance standards will continue to be met over time. This type of study provides a trigger for a response in the event that a potential problem is detected. It requires the definition of acceptable threshold limits and a feasible method of detecting whether or not the threshold limit has been exceeded.

(D)(c) MBACI impact assessment

The purpose of impact assessment is to determine whether an environmental impact will occur *where the potential for impact is unknown*. This will not generally apply to the types of aquaculture proposed under the GSRMAP, because the GSRMAP defines both the risks and management frameworks for marine non-intensive aquaculture in this region. Aquaculture methods and sites under the GSRMAP have been chosen on the basis that the risk of environmental impact is considered low.

Impact assessments should be based on multiple before–after control impact (MBACI)⁵¹ sampling designs to evaluate the effectiveness of the chosen management controls. MBACI designs allow a logically and statistically valid assessment of impact relative to natural background environmental variability. As its name implies, the MBACI design involves collecting multiple samples before (B) and after (A) an impact may potentially occur to determine the significance of any environmental change. It also involves collecting before (B) and after (A) samples at both control sites (C) and potential impact (I) sites.

Comparison of impact sites with control sites makes it possible to infer whether changes detected at an impact site are due to the activity under investigation or are simply the result of broader scale natural variations that exist in the environment and are unrelated to the activity. The use of multiple (M) control sites is important so as to take into account natural variation occurring at different times in different places. Erroneous conclusions may be drawn if only a single control site is used for comparison.

MBACI is the accepted standard for the sampling design of an impact assessment. However, the other components of the impact assessment should be peer reviewed to ensure scientific validity. The purpose of peer review is to ensure that proposed study is scientifically valid and defensible, and will meet the study objectives. If concerns are raised about the validity of the proposed program, the assessment agency can request peer review of the program by an independent expert in the field.

(D)(d) Modelling

Modelling is a desktop tool that enables testing of scenarios using available data. Models are only of value if the data input is sufficient, and marine environmental datasets available for this region are limited.

(E) Incident notification and reporting

There are statutory requirements to report certain incidents as and when they might occur. The purpose of this notification is to alert responsible agencies of the incident, and to trigger a management response where appropriate. Where reporting is a condition of approval, it is enforceable under the relevant legislation. Reporting of incidents can build up a database of the nature and regularity of incidents. However, it must be remembered that incident reporting collects information in an ad hoc manner that does not allow a statistically valid comparison.

(E)(i) Cetacean interactions

Reporting mechanisms for cetacean interactions are defined in Condition of Approval CA75.

⁵¹ AJ Underwood, *Beyond BACI: the detection of environmental impacts on populations in the real, but variable world*, Journal of Experimental Marine Biology and Ecology, vol. 161, 1992, pp. 145–78.

Any person who ‘undertakes an activity that results in the unintentional death, injury...moving, harassment, chasing...(or) marking a cetacean must notify the Secretary of SEWPAC within seven days of being aware of the results of the activity’.⁵²

Notifications should be sent to:

The Secretary
Department of the Sustainability, Environment,
Water, Population and Communities
GPO Box 787
Canberra ACT 2601

Hotline: 1800 803 772
Email: protected.species@environment.gov.au

Incidents such as ship strikes (whether causing death or not) and entanglements/strandings should be reported to the DERM wildlife hotline in the first instance. Any wildlife injured within the marine park as a result of aquaculture activities must be reported to DERM on 1300 130 372.

(E)(ii) Interactions with other fauna

Reporting mechanisms for wildlife interactions are defined in Condition of Approval CA75 “Procedures for Dealing with Injured Wildlife”. Any wildlife injured within the Marine Park as a result of aquaculture activities must be reported to the DERM Hotline ph. 1300 130 372”

Any interaction with fauna listed under the EPBC Act must be reported to the Secretary of SEWPAC (includes turtles, dugongs, cetaceans etc) within 7 days of being aware of the results of your activity.⁵³

Notifications should be sent to:

The Secretary
Department of Sustainability, Environment,
Water, Population and Communities
GPO Box 787
Canberra ACT 2601

Phone: +61 2 6274 1111
Fax: +61 2 6274 1666
Email: EPBC.Permits@environment.gov.au

(E)(iii) Disease notification

Management outcome M8a (Section 4.6.1) states that ‘any impacts to the surrounding ecosystem from disease resulting from aquaculture activities are minimised’. Section 100 of the Fisheries Act requires notice to be given about diseased fisheries resources or habitat—‘A person who knows or reasonably suspects fisheries resources or a fish habitat is showing signs of disease, or knows or reasonably suspects disease may be in fisheries resources or a fish habitat, must immediately notify the chief executive or an inspector’. Fisheries Queensland and Biosecurity Queensland, together with any other relevant agencies, will then determine the best course of action.

(F) Govt surveillance and audits/compliance monitoring

The purpose of this type of monitoring is to maintain ongoing compliance with management controls that reduce risk (i.e. conditions of statutory approvals).

Audits are undertaken regularly by compliance officers to ensure compliance with conditions of approval under the SP Act, the Fisheries Act, marine parks legislation, maritime safety legislation etc. by the relevant compliance officers, Queensland Boating and Fisheries Patrol, DEEDI policy officers, marine parks officers, or Maritime Safety Queensland (MSQ).

4.7.4 Value-adding to scientific research

Aquaculture, like any farm business, can only operate successfully through constant monitoring of parameters such as growth rates, stocking density, condition and health of the stock, and environmental conditions.

⁵² See the ‘Notification of activities affecting cetaceans’ page on the SEWPAC website at www.environment.gov.au

⁵³ See the ‘Notification of activities affecting listed species or ecological communities in or on a Commonwealth area’ page on the SEWPAC website at www.environment.gov.au

Because marine aquaculture involves direct contact with marine waters, the success of marine aquaculture is very closely linked to environmental health. Information gathered as part of the normal day-to-day operation of an aquaculture business provides important information on the condition of the surrounding environment. Filter-feeding marine species, as well as presenting minimal risk to water quality, are particularly valuable as indicators of the health of marine ecosystems. The health and growth rate of aquacultured animals is a good indicator of water quality and availability of planktonic food.

In addition to the monitoring programs required under legislation via condition of approval, several existing aquaculturists voluntarily contribute their data to regional research programs. The use of individual data to add value to wider monitoring programs is encouraged wherever possible. The Queensland Government can assist this process by developing a set of water quality monitoring guidelines and comprehensive criteria that can link into and inform larger scale water quality monitoring projects. Industry will continue to be encouraged to make use of such guidelines, on a voluntary basis, to enable better understanding of water quality issues on a regional basis.

Small-scale research is usually ineffective for answering ecological questions about open marine environments, particularly if the research subject ranges over very large areas (e.g. megafauna).

In order to provide meaningful information about wide-ranging subjects, studies performed at a farm scale can be embedded within larger studies at local or regional scale.

4.7.5 Response strategies

Effective management also requires the ability to respond when appropriate. Specific response strategies are provided below. Response options are summarised in the overall summary in Section 5.6. Refer also to Section 5.5.4 for broader adaptive management strategies under the GSRMAP.

Ecological studies

Any ecological study must specify the response measures that will be triggered if a threshold is met or exceeded for the primary indicator. The response measures must be developed on a case-by-case basis. Specific response strategies and contingency plans must be prescribed up front at the time of approval, in order to ensure effective adaptive management and a clearly articulated framework for industry to work within.

For each environmental indicator, the study must specify:

- the responsible agencies and contact officers to be notified if the agreed threshold levels are exceeded (e.g. impacts to benthic habitat that exceed threshold levels would be referred to the DERM Marine Parks and DEEDI Marine Habitat units)
- response measures, which may include (i) more detailed monitoring or (ii) intervention (e.g. where a threshold or limit is met or exceeded for the primary indicator, the monitoring program should be expanded to include investigation of secondary indicators to gain a more accurate understanding of the extent of impact—if the threshold or limit is met or exceeded for the secondary indicator, intervention is required)
- the timeframe for response, commencing from the time when the results become available (note that some monitoring programs may require lengthy analyses)
- a recommendation on how to proceed if an intervention is triggered—it must be drafted and submitted for peer review by a suitably qualified external adviser, and DEEDI and DERM will review it and supervise its implementation.

Note: Detection of a significant threshold or limit being met does not prove that the activity is unacceptable. Any significant impact must be considered in the context of impacts from other activities (such as jetties, recreational and commercial activities, trawling, natural disturbances etc.).

Where a monitoring program is required, the monitoring program and agreed response measures are detailed in the relevant condition of approval (CA72, *Implementation guide*) and are enforceable accordingly.

Interactions with cetaceans and other fauna managed under the EPBC Act

AC14 requires the development of an entanglement strategy. The assessment criteria describe the desired outcomes for which the acceptable solutions must be evaluated on an individual basis. The acceptable solutions, once agreed upon, can then be enforced as new non-standard conditions where necessary (see discussion on ‘Non-standard conditions’ on page 3 of the *Implementation guide*).

When developing an entanglement strategy, the following information should be considered:

- Refer to the information on entanglements on the SEWPAC website.⁵⁴
- Refer to the *Threat abatement plan* for the impacts of marine debris on vertebrate marine life available on the SEWPAC website.⁵⁵
- Research the most recent scientific information and policies available on the topic.

Increased regularity of incidents may prompt an investigation into whether or not there are any changes in the patterns of flora and fauna use of the area, and whether aquaculture is causing the observed changes.

4.8 Specific limits to future development

The combination of planning controls and management controls for the GSRMAP will result in a number of limitations to future aquaculture development in the Great Sandy region. Key limitations are summarised in Table 6.

⁵⁴ Refer to the ‘Entanglements’ page on the SEWPAC website at www.environment.gov.au

⁵⁵ The Threat abatement plan for the impacts of marine debris on vertebrate marine life is available on the SEWPAC website at www.environment.gov.au

Table 6. Specific limits to future development

Activity	GSRMAP policy position	Relevant control
Aquaculture located in an area that is not designated for aquaculture under the GSRMAP	No	<ul style="list-style-type: none"> Assessment criteria AC1 and AC2 (<i>Implementation guide</i>)
New species that requires the addition of feed by the farmer (e.g. reef fish)	No	<ul style="list-style-type: none"> Marine Parks (Great Sandy) Zoning Plan regulations, administered by DERM—ss. 10(c), 12(c), 14(c) (refer to Appendix 4)
New species that cannot be sourced from a local population—i.e. broodstock cannot be sourced from within the natural genetic range or 50 km away (not endemic species)	No	<ul style="list-style-type: none"> Assessment criteria AC9 and AC10 (<i>Implementation guide</i>)
New species that can be sourced from a local population (e.g. tropical abalone) Includes species that may be present naturally in the Great Sandy region, but are not currently aquacultured	Permit for broodstock collection assessed on its merits by Fisheries Queensland	<ul style="list-style-type: none"> Assessment criteria AC9 and AC10 (<i>Implementation guide</i>) Section 4.3.12, ‘Broodstock collection’
Movement of stock into and out of the Great Sandy region	Assessed against DEEDI aquaculture translocation protocols ⁵⁶	<ul style="list-style-type: none"> Condition of approval CA38-53 (<i>Implementation guide</i>)
Genetically modified organisms	No	<ul style="list-style-type: none"> Section 4.3.8, ‘Genetic engineering’
Novel aquaculture system/equipment that varies from current industry standard	Assessed on its individual merits against the criteria outlined in the <i>Implementation guide</i>	<ul style="list-style-type: none"> The GSRMAP provides for the consideration of alternative or innovative technology, provided it can be demonstrated that alternative equipment could better achieve the overall outcomes of the plan. Assessment criteria AC2 states ‘The activity must be the same as the site’s designation or better in terms of meeting management outcomes (for example, a modified design that presents less environmental impact)’. If the proposed equipment was deemed to have a greater impact than the designated equipment it would not be supported. This decision would be made on the merits of the individual application through the competitive allocation process (Section 5.4). Section 4.6.1—Regarding ‘pilot-scale’ activities: If an activity varies from industry standard and/or DEEDI considers that the risk could be higher than industry standard, the activity will be restricted to pilot-scale, with scaling-up dependent on performance during the trial phase.

⁵⁶ Refer to translocation policies and protocols on the DEEDI website at www.deedi.qld.gov.au

5 Implementation of the GSRMAP framework

The GSRMAP is not an approval instrument. The GSRMAP is non-statutory and its provisions are implemented and enforced through the existing regulatory frameworks. It functions as a guideline for identifying suitable sites and management measures. Anyone wishing to conduct aquaculture will still need to obtain the necessary approvals under planning and fisheries legislation. The GSRMAP management framework links to the statutory approvals process by specifying (i) assessment criteria for new applications and (ii) conditions of statutory approvals. The plan's provisions are thus enforceable under the relevant approvals legislation.

Ecologically sustainable development of aquaculture will be facilitated in the context of existing legislation. The regulatory framework already in place achieves an appropriate level of control for environmentally sustainable development. However, the Productivity Commission's 2004 review of aquaculture regulation considered the current assessment processes for aquaculture to be inefficient, uncertain and inconsistent in implementation, and presented significant obstacles to industry development without commensurate benefits to the environment. The intent is to improve efficiency and certainty in the process, whilst retaining the existing level of controls.

The GSRMAP is a Queensland Government policy position. Decision-makers, who are delegates of the chief executive, are required to apply the GSRMAP provisions in their decision-making (refer to Figure 21 for an overview of implementation).

The legislative context for marine aquaculture in Queensland was introduced in Section 4.2.2 and is detailed in Appendix 4. The GSRMAP will not change this legislative framework. All relevant approvals will still apply. However, the GSRMAP will provide a clear guideline for assessment of these approvals.

5.1 Application of the GSRMAP

Section 5 describes mechanisms to ensure that the framework and desired outcomes that were outlined in Section 4 are met. Management outcomes of the GSRMAP are implemented through guiding the assessment and issue of statutory approvals under the SP Act and the Fisheries Act.

The GSRMAP will apply to any application for marine aquaculture within the boundaries of the Great Sandy Marine Park, which triggers the requirement of:

- a DA for material change of use for aquaculture under the SP Act
- an RAA under the Fisheries Act to use state waters for the purpose of marine aquaculture
- a Marine Park Permit for permission to enter and use a marine park for the purposes of aquaculture as defined under the *Marine Parks Act 2004* or the Marine Parks (Great Sandy) Zoning Plan
- assessment against the EPBC Act
- an amendment to an existing approval in any of the categories above.

This plan will only consider aquaculture operations in the marine environment. Activities **outside the scope of this plan** are:

- land-based aquaculture operations, including hatcheries and coastal farms that intake from, and discharge to, marine waters
- land-based facilities (e.g. boat maintenance, processing facilities)
- collection of broodstock or culture stock from the wild
- harvest of ranched stock—use of commercial fishing apparatus (e.g. trawling) is controlled by management measures that are outside the scope of the GSRMAP

- boating and vessel use associated with aquaculture (other than marking requirements)
- marking sites to meet maritime safety requirements. Any sites that require markers must be marked and/or lit as required by MSQ to ensure maritime safety. There is no scope to alter the lighting requirements required by the Uniform Shipping Laws.

The GSRMAP will not be applied retrospectively.

Most food safety outcomes are implemented at the processing and handling stage rather than the aquaculture production stage. Food processing is managed under various pieces of legislation, so seafood safety is generally outside the scope of the plan. The exception is edible oysters, because certain aspects of the production stage are managed for food safety outcomes.

Where a proposal can demonstrate an acceptably low level of risk, the chief executive may consider a departure from this policy position. Any approved departure will be considered for an approved variation in this policy when it is next updated.

5.2 Implementation of planning controls

Details of planning controls and the preferred site locations for aquaculture are provided in Section 4.5.

Planning controls are implemented by guiding assessment of approvals under the SP Act and Fisheries Act. It is anticipated that approval would not be given for applications for aquaculture in areas that are within the GSRMAP boundaries but outside the designated aquaculture areas defined under the GSRMAP.

Sites identified under the GSRMAP will be attached to the *Queensland coastal plan* as 'Aquaculture Development Areas', in addition to existing approved aquaculture sites within the Queensland coastal zone. This will give formal recognition to the sites identified under the GSRMAP.

5.3 Implementation of management controls

Details of the preferred management controls for aquaculture operation are provided in Section 4.6.

Management controls are implemented through guiding the assessment and issue of existing statutory approvals (detailed in Appendix 4), namely:

- a DA for material change of use for aquaculture, issued under the SP Act—under s. 761 of the Fisheries Act it is appropriate to set reasonable and relevant conditions for DAs under the SP Act
- an RAA issued under the Fisheries Act, which allows access to, and use of, state waters—reasonable and relevant conditions can be added to an RAA for aquaculture.

The GSRMAP will function as a single, whole-of-government assessment guide for assessment of the DA and RAA. This will replace the previous situation where each concurrent agency assesses an application in isolation (refer to Figure 22). There is no change to the normal DA assessment by multiple concurrence agencies, except that the GSRMAP will be used as a single, standardised, consistent set of assessment criteria and prescribed conditions. For aquaculture in marine areas, DEEDI is most often the assessment manager or administrator of the DA assessment process, responsible for ensuring the correct procedure. This duty is prescribed under the SP Act.

Native title notification is a set process that is part of the normal DA assessment. Any additional conditions that might be required as a result of native title notification would be added to the DA by the assessment manager.

The *Implementation guide*, a separate document but considered part of the GSRMAP, has been prepared that specifies:

- criteria for assessment of applications
- standard conditions to be attached to an approval, should an approval be issued
- non-standard conditions for specific situations where necessary to achieve the management outcomes.

(i) Assessment criteria

Assessment criteria are examined prior to issue of an approval (to determine whether or not it is appropriate to issue a DA/RAA approval), whereas conditions of approval must be complied with after an approval is issued. Examples of considerations that determine whether or not an approval is issued include structural design of aquaculture furniture, size and scope of the activity, and the ability to obtain broodstock from appropriate areas etc.

(ii) Standard conditions

DEEDI is the lead agency for aquaculture approvals and can impose reasonable and relevant conditions on a DA or an RAA for aquaculture. DEEDI must assess the development application against the purposes of the Fisheries Act, which includes promoting ecologically sustainable development. The GSRMAP seeks to achieve Marine Parks Act and the EPBC Act outcomes in addition to Fisheries Act outcomes, so conditions relating to those pieces of legislation have been included.

Specific conditions for each of the identified management outcomes are detailed in the main table of the *Implementation guide*. These conditions have been derived from the following sources:

- Conditions for the DA are imposed by DEEDI for aquaculture relevant to the Great Sandy region.
- Conditions for the RAA are imposed by DEEDI for aquaculture relevant to the Great Sandy region.
- Conditions for the Marine Park Permit are imposed by DERM.
- Approvals are issued under the EPBC Act by SEWPAC.

RAAs for sites within the GSRMAP are able to be issued for up to 30 years to provide investors with sufficient security to successfully obtain financing.

(iii) Non-standard conditions

Special conditions are placed on an activity where they are necessary to adequately manage risk.

The standard conditions described in the main table of the *Implementation guide* cover the types of aquaculture currently being undertaken in Queensland. However, the aquaculture industry is characterised by continuous innovation, so it is expected that novel systems or new species may be attempted in the future, and these may require different conditions. The reasons for the addition of new conditions or alteration of standard conditions must be fully described and justified at the time of alteration.

The following are examples of non-standard circumstances:

- If an activity varies from industry standard and/or DEEDI considers that the risk could be higher than industry standard, the activity will be restricted to pilot-scale, with scaling-up dependent on performance during the pilot-scale phase. The maximum term for 'pilot-scale' activities under the GSRMAP will be three years.
- Certain activities may also trigger the requirement for a Marine Parks Permit or an assessment under the EPBC Act. DEEDI will attach relevant conditions to the DA or the RAA, as appropriate, to ensure that marine parks and DEEDI objectives are met and EPBC Act objectives are taken into account.

Exceeding the minimum requirements

The assessment criteria and conditions of approval that are detailed in the *Implementation guide* represent the **minimum** requirements to achieve GSRMAP management outcomes. It is possible for industry investors to exceed this minimum level and propose additional measures to better address or even exceed the management outcomes.

In order to apply a selective pressure for continual improvement and innovation in meeting management outcomes, a competitive allocation process will occur. The competitive allocation process (refer to the *Policy for allocation of marine aquaculture authorities*) will ensure that the applicant who is **best** able to meet management outcomes will be preferentially selected.

5.4 Competitive allocation of sites

The *Policy for allocation of marine aquaculture authorities* is separate to the GSRMAP but is an integral part of the assessment process under the GSRMAP. The policy has been developed to ensure that sites are made available to industry in an equitable and transparent way. It also establishes a flexible and transparent mechanism and criteria for the allocation of marine aquaculture authorities and is an important component of strategic planning for aquaculture development.

The *Policy for allocation of marine aquaculture authorities* specifies the allocation mechanism of marine aquaculture authorities for:

- new applications for sites identified in regional aquaculture plans
- new applications for sites outside of regional aquaculture plans
- new applications for sites where a regional aquaculture plan has been announced to be developed
- the reallocation of previously approved aquaculture sites that have been abandoned, surrendered or cancelled.

This mechanism will satisfy expectations that aquaculture sites are being used—and will continue to be used—responsibly, they are ecologically sustainable, production is maximised and that they will provide an attractive and secure investment environment.

The competitive allocation of sites will occur prior to assessment of the RAA and the DA by way of an expression of interest process. Proponents interested in a particular site have to submit specific proposals demonstrating how they can meet, as a **minimum**, all the relevant management outcomes as detailed in the GSRMAP and the *Implementation guide*. These individual proposals will be evaluated by the Allocation Panel and the proposal that is best able to address the management framework will be selected to proceed to the next stage.

DEEDI and DERM, both of which are represented on the Allocation Panel, are also concurrence agencies for the DA. A DA is only issued if all concurrence agencies agree to issue it. Therefore the Allocation Panel outcome, like the DA assessment outcome, will require a negotiated position to be reached.

An example of a detail that might vary considerably between applications for line aquaculture is the system of line floatation. There are a number of possible variations—the number of floats, size of floats, spacing between floats, colour etc.—that are able to meet all the necessary engineering, environmental and visual amenity outcomes (for details of outcomes for line aquaculture refer to Section 4.6). The Allocation Panel will consider each application and score each design according to how well it meets the GSRMAP management outcomes. This same process will be followed for all other details of the application. At the end of the evaluation process, the application that in the opinion of the Allocation Panel is best able to meet the GSRMAP objectives will be selected to proceed to the next stage.

Management of business risks

The GSRMAP is based on the best available information, but applicants will need to individually assess the commercial risks. A sound business operator will factor risk into their business model, including the following:

- Extreme weather—The subtropical marine environment may occasionally be affected by extreme weather events. Management controls (Section 4.6) require the aquaculturist to ensure that equipment is maintained and does not cause impacts to the environment. However, extreme weather events also represent a business risk to individual aquaculturists due to loss of stock and equipment. Business risks are the responsibility of the individual aquaculturist to manage. Any expression of interest documents released by DEEDI would clearly note the risk of catastrophic events occurring in the subtropical marine environment, and advise that proponents invest at their own risk.

- Water quality available to the aquaculture operation—The characterisation study (see Section 2.5) provides details of the hydrological characteristics of the Great Sandy region and the potential for future changes.
- Policy change—The GSRMAP is a non-statutory document and is subject to periodic review. Therefore, the potential for policy change is a business risk to be taken into account.
- The potential for theft and/or interference with aquaculture areas should be considered.

The combination of the GSRMAP management framework and the *Policy for allocation of marine aquaculture authorities* will provide three levels of controls on future aquaculture development:

- Planning controls guide **where** the activity can be located.
- Management controls guide **how** the activity can be designed and operated.
- Competitive allocation of authorities guide **who** can conduct the activity.

5.5 Post-approval management of aquaculture

A summary of the management measures that may be taken during the operational phase (i.e. after an approval has been issued) are described below and summarised in the overall summary in Section 5.6.

5.5.1 Enforcement of management controls

The Queensland Boating and Fisheries Patrol are in charge of enforcement of aquaculture activities under the Fisheries Act. They monitor compliance with all approval conditions.

Conditions of an RAA are enforced under s. 79A of the Fisheries Act. Conditions of a DA are enforced under s. 4, part 3, s. 4.3.3 of the SP Act.

Penalties may apply if the GSRMAP conditions are breached, including the following:

- Cancel the RAA. Activities authorised under a DA cannot lawfully be carried out unless a corresponding RAA is in place to authorise use of state waters. Therefore, cancellation of a RAA renders the DA inactive.
- Reallocate the cancelled site through an expression of interest and competitive allocation process (refer to the *Policy for allocation of marine aquaculture authorities*).
- Where necessary, the bond that is required as a condition of approval (CA80, *Implementation guide*) may be used to fund any clean-up and/or rehabilitation of the site. Refer to fish habitat management operational policy FHMOP 009⁵⁷ for further information about rehabilitation.
- If it is considered to be in the best interest of fisheries management, it is possible for DEEDI to alter, add or delete any condition of approval via a ‘show cause’ process (see below).

The ‘show cause’ process

DEEDI can alter any conditions on a DA/RAA through a ‘show cause’ process, giving the proponent 28 days to provide a reason why the condition should not be changed. This process is also appealable.

⁵⁷ The fish habitats management policy FHMOP009, *Restoration notices for fish habitats—formulation and implementation*, is available on the DEEDI website at www.deedi.qld.gov.au

Fisheries Act 1994, Subdivision 4 Amendment, 63 Amendment of authority

(1) If the chief executive considers an authority (including the conditions stated in it) should be amended, the chief executive must give the holder of the authority a written notice (the ***show cause notice***) that—

- (a) states the proposed amendment; and
- (b) states the reasons for the proposed amendment; and
- (c) outlines the facts and circumstances forming the basis of the reasons; and
- (d) invites the holder to show, within a stated time of at least 28 days, why the authority should not be amended.

(2) The chief executive may amend the authority if, after considering all representations made within the stated time, the chief executive still considers the authority should be amended—

- (a) in the way mentioned in the show cause notice; or
- (b) in another way, having regard to the representations.

(3) If the chief executive decides to amend the authority, the chief executive must give the holder of the authority an information notice for the decision.

(4) Subsections (1) to (3) do not apply if the authority is amended only—

- (a) by omitting a condition if the omission does not adversely affect the holder's interests; or
- (b) for a formal or clerical reason; or
- (c) in another way that does not adversely affect the holder's interests; or
- (d) at the holder's request; or
- (e) by changing a quota for the authority.

(5) The chief executive may make an amendment of a type mentioned in subsection (4) by written notice given to the holder.

(6) To remove any doubt, any condition that may be imposed on an authority when it is issued may be imposed on the authority by amendment.

(7) Compensation is not payable if an authority is amended, or anything previously permitted under the authority is prohibited or regulated.

(8) However, subsection (7) does not prevent a regulation or management plan providing for payment of compensation.

5.5.2 Amendment of previously issued approval

If an approval holder wishes to change the nature of the approved aquaculture activity through changing their technique or species, they would need to apply for new approvals because the conditions of approval are tied to a specific activity and specific species.

If DEEDI considers that the risk could be higher than industry standard, the activity will be restricted to pilot-scale, with scaling-up dependent on performance during the pilot-scale phase. The maximum term for 'pilot-scale' activities under the GSRMAP will be three years, so the new approval would be issued (assuming a successful application) for only three years. If an aquaculturist with an existing approval wished to trial new technology or species on a small portion of their area it is conceivable that sites may be partitioned so that different approvals apply to different areas of the site.

5.5.3 Response to reportable incidents

Refer to Section 4.7.3 for specific response measures associated with incident reporting and notification.

5.5.4 Adaptive management

Adaptive management is the review by government, and where necessary amendment, of management arrangements after an approval has been issued. The GSRMAP and *Implementation guide* manage risk using the best available information at the time of assessment. It is recognised that available information may change over time. For this reason, the GSRMAP provides for adaptive management, so that if circumstances change after an approval has been issued the management arrangements can also be changed.

New studies and new information become available all the time. However, additional information should not automatically translate into additional restrictions on industry. Any new restrictions must be extremely well justified:

- The GSRMAP is intended to provide increased certainty for environmental agencies (in the form of a maximum cap on development) but also to provide increased certainty for investors (in the form of rules that don't constantly shift around).
- A memorandum of understanding and agreement between agencies are intended to provide certainty for attraction of investment.
- There is provision to depart from the GSRMAP provisions and alter the GSRMAP conditions for a particular application if there is extremely good justification to do so.
- The competitive allocation process provides an opportunity to selectively choose applicants who exceed the minimum requirements. A competitive applicant should be aware of the latest information regarding risk and be able to factor this into their application.

Adaptive management measures includes the consideration of monitoring information during review of statutory plans and policies, and either increasing or decreasing the restrictions placed on a aquaculture to reflect increased understanding of risks.

Any adaptive management measures must be fully justified and documented. Consultation with all relevant agencies and with the aquaculturist is essential before any measures are undertaken.

Table 7 summarises adaptive management triggers and options under the GSRMAP. Triggers may be included in the monitoring undertaken by the aquaculturist (Section 4.7.3) as well as additional sources of information. Accordingly, some management responses can be detailed up front; however, the response to other emergent issues will require discussions between relevant government agencies and the aquaculturist to select the best course of action. Refer also to the overall summary in Section 5.6 for a description of the response options for each type of risk identified under the GSRMAP.

Table 7. Adaptive management triggers and options

Triggers for adaptive management	Means of detection	Government response options
Breach of condition of statutory approval	Routine surveillance by enforcement agencies (see Section 4.7.3)	<ul style="list-style-type: none"> • Compliance action (see Section 5.5.1): <ul style="list-style-type: none"> – Cancel the approval and reallocate the site. – Where necessary, retain the bond (CA8o) to fund any clean-up of the site. – Alter, add or delete any condition of approval via the ‘show cause’ process. • Bring forward review timeframe for GSRMAP (review every 10 years or earlier if required): <ul style="list-style-type: none"> – Alter GSRMAP map of potential sites so that latent sites (not yet allocated) are removed from the plan. – Alter GSRMAP provisions.
Incident occurs	Reporting and notification requirements (see Section 4.7.3) or Complaints received	<ul style="list-style-type: none"> • Refer to Section 4.7.3 for specific response measures associated with reportable incidents. • Discuss with the aquaculturist about voluntary measures to manage future incidents. • Discuss with relevant agencies about possible solutions (e.g. increased surveillance and communication) • Alter, add or delete any condition of approval via the ‘show cause’ process. This would only occur after a due process of evaluation, with substantial justification and consultation with the approval holder.
Monitoring thresholds exceeded	Monitoring against agreed threshold levels (see Section 4.7.3)	<ul style="list-style-type: none"> • It is a requirement that each monitoring program (see Section 4.7.3) defines response options in the event of thresholds being exceeded. • Discuss with the aquaculturist about voluntary measures to manage future incidents. • Alter, add or delete any condition of approval via the ‘show cause’ process. This would only occur after a due process of evaluation, with substantial justification and consultation with the approval holder. • Cancel the approval and reallocate the site. • Bring forward review timeframe for GSRMAP (review every 10 years or earlier if required): <ul style="list-style-type: none"> – Alter GSRMAP map of potential sites so that latent sites (not yet allocated) are removed from the plan. – Alter GSRMAP provisions.
Unforeseen event occurs resulting in a larger impact than anticipated, such as damage to equipment (extreme weather event, vandalism)	Local reports	<ul style="list-style-type: none"> • Ensure aquaculturist complies with all conditions of approval, particularly maintenance of equipment and clean-up of site (CA81–82). • Note that business risks and loss of stock are the responsibility of the individual aquaculturist to manage. • See also next item.

Table 7. Adaptive management triggers and options (continued)

Triggers for adaptive management	Means of detection	Government response options
The region undergoes substantial change that alters the level of risk (local or regional changes unrelated to aquaculture alter the environmental resilience and therefore alter the risk level)	Information provided by research institutions as part of ongoing ecological research (where applicable)	<ul style="list-style-type: none"> • Discuss with the aquaculturist about voluntary measures to manage future incidents. • Alter, add or delete any condition of approval via the ‘show cause’ process. This would only occur after a due process of evaluation, with substantial justification and consultation with the approval holder. • Bring forward review timeframe for GSRMAP (review every 10 years or earlier if required): <ul style="list-style-type: none"> –Alter GSRMAP map of potential sites so that latent sites (not yet allocated) are removed from the plan. –Alter GSRMAP provisions.
Independent research results identify emergent issues or change perception of the level of risk from the activity	Information provided by research institutions as part of ongoing ecological research (where applicable)	<ul style="list-style-type: none"> • Discuss with the aquaculturist about voluntary measures to manage future incidents. • Alter, add or delete any condition of approval via the ‘show cause’ process. This would only occur after a due process of evaluation, with substantial justification and consultation with the approval holder. • Bring forward review timeframe for GSRMAP (review every 10 years or earlier if required): <ul style="list-style-type: none"> –Alter GSRMAP map of potential sites so that latent sites (not yet allocated) are removed from the plan. –Alter GSRMAP provisions.

Assessment stage

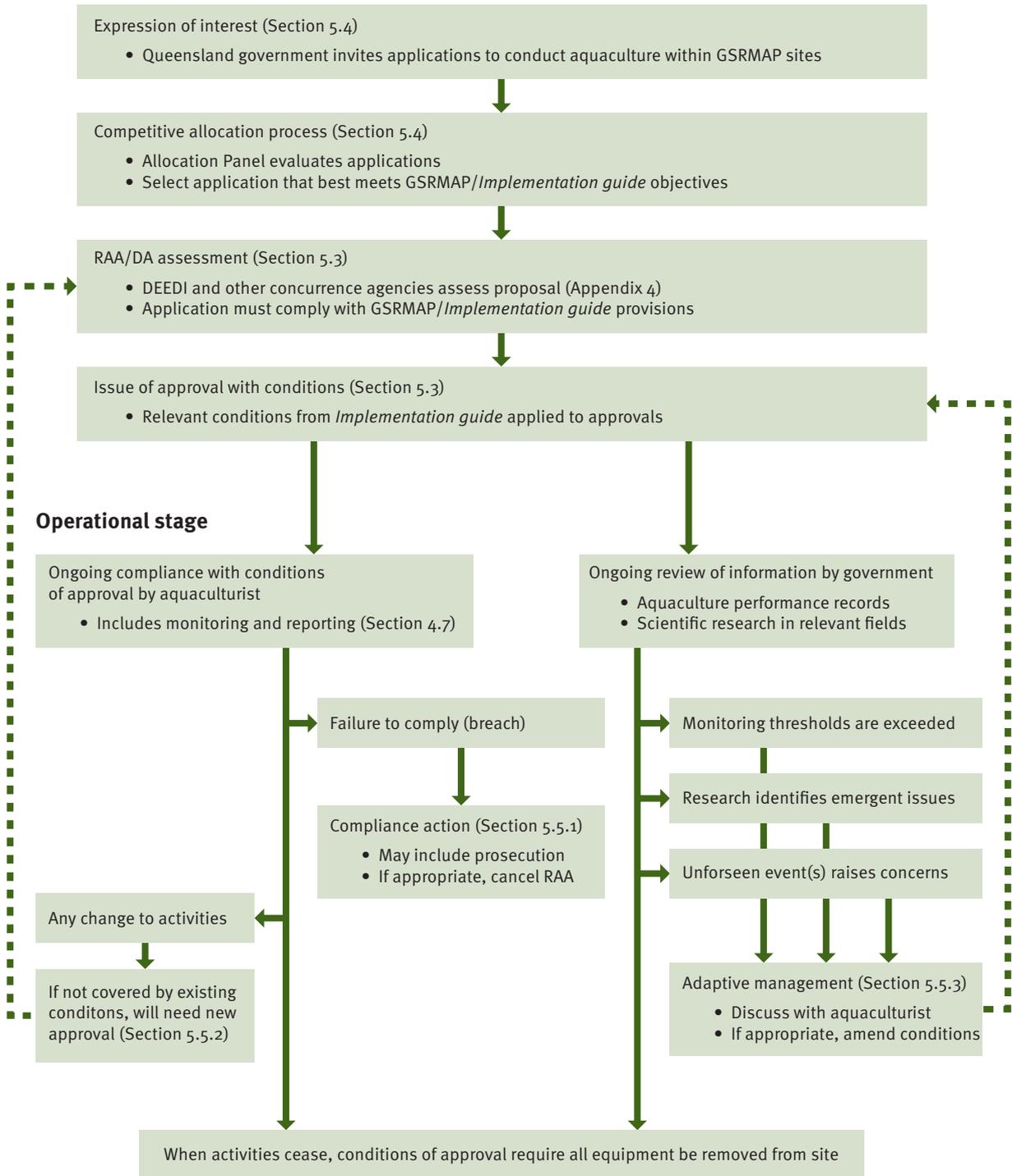


Figure 21. Summary of implementation

5.6 Overall summary of GSRMAP controls on aquaculture

Table 8 provides a general summary of all the potential sources of risk identified in Section 4.3 and Section 4.4, together with the planning controls (Section 4.5), management outcomes (Section 4.6) and monitoring and reporting (Section 4.7) that combine to address those risks.

Most risks are managed through a combination of both planning and management controls. Risks that are specific to how the facility is operated are managed solely by management controls (e.g. risk associated with cleaning up oyster racks). Risks that relate to the location of the activity are managed solely by planning controls (e.g. increase in traffic or activity that may impact on shorebird roosting sites).

The ‘management outcomes’ column gives broad summarised objectives only. For details of how these outcomes are achieved and enforced, Table 8 must be read in conjunction with the *Implementation guide*, which provides details of the specific management controls in the form of conditions that will be attached to approvals to conduct aquaculture in the GSRMAP area.

5.7 Streamlining of approval processes

Whole-of-government input into development of the GSRMAP, including consideration of matters of national environment significance (NES) under the EPBC Act, has occurred during the planning stage and will give greater certainty to the aquaculture industry as the plan is implemented.

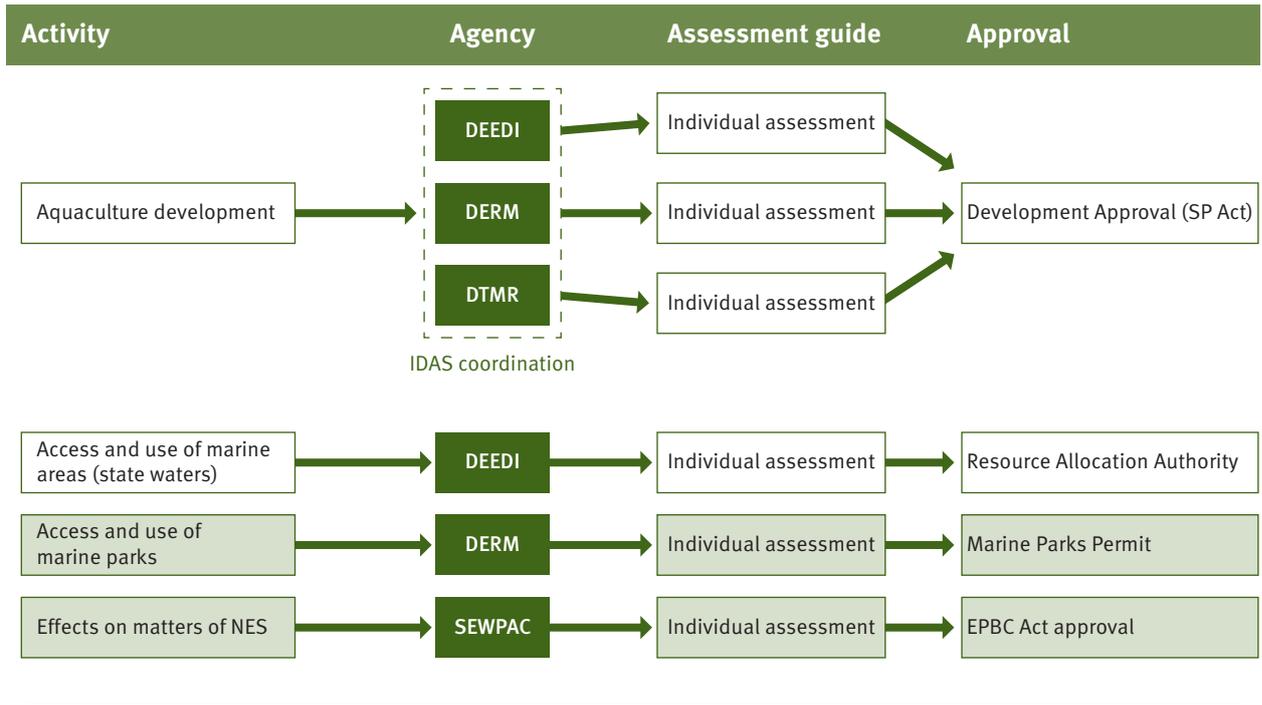
The GSRMAP enables further opportunities for red tape reduction:

- The adoption of the GSRMAP as a single, comprehensive assessment guide for all relevant assessment processes will increase consistency and efficiency. Assessment of aquaculture development in Queensland is coordinated through the integrated development assessment system (IDAS) under the SP Act. Therefore a whole-of-government approach for aquaculture in the Great Sandy region includes IDAS concurrence agencies formally agreeing that assessment of DAs for aquaculture in the Great Sandy region will be assessed against the GSRMAP and the *Implementation guide*.
- Inclusion of GSRMAP sites as ‘Aquaculture Development Areas’ in the *Queensland coastal plan* will provide formal recognition of the appropriateness of these sites for aquaculture development.
- Accreditation of DEEDI assessment processes under marine parks legislation, including those parts of marine parks legislation that are not to be integrated into IDAS, helps to streamline the assessment of marine aquaculture.
- The Queensland Government and SEWPAC have worked together to ensure that matters of NES have been considered and addressed during the development of the GSRMAP. A conservation agreement under the EPBC Act is being developed and, subject to agreement, will identify a range of actions that have been assessed as not requiring further approvals under the EPBC Act. It is proposed that the conservation agreement would consider the full range of activities under the GSRMAP.

Also refer to Appendix 4 and Figure 22.

If the activity proposed may have a higher level of impact than those defined in this plan on any matter protected under the EPBC Act, it should be referred to SEWPAC for consideration.

Former situation



New situation under the GSRMAP

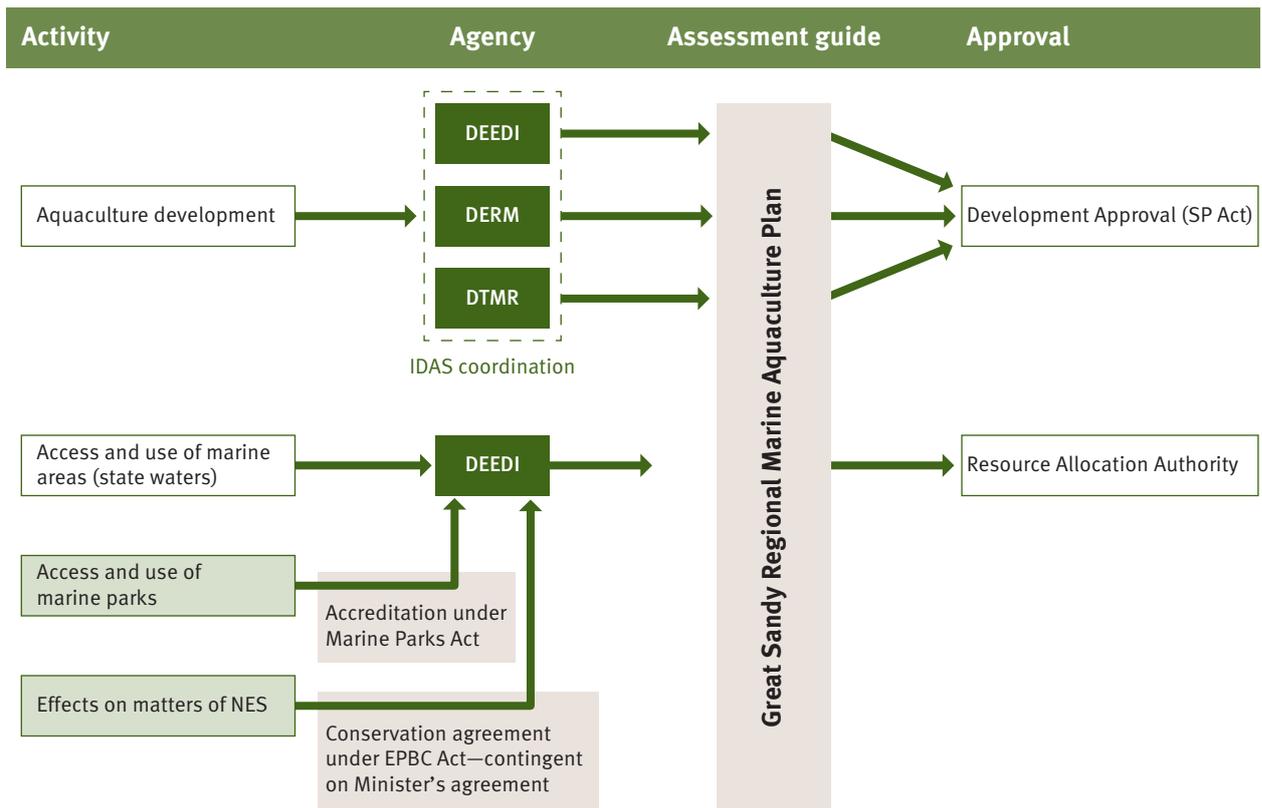


Figure 22. Summary of current and existing assessment processes

Table 8. Summary of the GSRMAP risk management framework

Summary of the GSRMAP risk management framework			
Risk (details in Section 4.3)	Planning considerations	GSRMAP planning controls (Section 4.5)	
(R1) General governance issues/ record keeping—orderly and proper management	Risk—low if appropriately managed	N/A	
(R2) Cleaning fouling material from structures	Risk—low if appropriately managed Not applicable to ranching	N/A	
(R3) Waste/garbage—general domestic waste	<ul style="list-style-type: none"> Oyster by-products and general domestic wastes can be disposed of as per normal council/DERM regulations Risk—low if appropriately managed	N/A	
(R4) Coastal hydraulic impacts	<ul style="list-style-type: none"> Only of concern in narrow channels or gutters where the structure occupies a significant proportion of the channel width Risk—low if appropriately located to avoid narrow gutters, and appropriately designed and managed Not applicable to ranching	(P2) Located away from, or have regard to, areas of significant environmental value (P11) Located only within marine park zones that do not prohibit the activity	
(R5) Direct disturbance/ displacement due to placement of structures (including moorings, working platforms)	Direct disturbance is only relevant during construction phase Risk—low if appropriately located, designed and managed Not applicable to ranching	(P2) Located away from, or have regard to, areas of significant environmental value (P11) Located only within marine park zones that do not prohibit the activity	

GSRMAP management outcomes (Section 4.6) (details in <i>Implementation guide</i>)	Monitoring and response options (Section 4.7, Section 5.5)
Operation of activities must comply with conditions of the DA (Fisheries Act provisions: DEEDI, <i>Queensland coastal plan</i> provisions: DERM, marine park provisions: DERM)	Breach of conditions enforceable under the SP Act (DA) and Fisheries Act (RAA); some conditions also enforceable under Marine Parks Act, EP Act and EPBC Act (matters of NES)
(M5) The Queensland Government is indemnified (M7) Adequate records are kept and made available to the Queensland Government (M14) The site is developed according to a Development Covenant/minimum production policy	Compliance monitoring by DEEDI policy officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA20, CA30–37, CA77–78).
(M1) Size, extent and location of aquaculture activities are controlled (M3) The aquaculture area is maintained in good condition (M4) No hazardous or inappropriate (i.e. non-industry standard) structures in aquaculture area (M10) Sediment removal or cleaning procedures (e.g. defouling of structures and stock) are undertaken so as to minimise impacts to water quality	Racks and lines: (B) Monitoring and maintenance of equipment by approval holder (F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA71)
(M3) The aquaculture area is maintained in good condition	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA12–19) Waste/rubbish removal must comply with council conditions. Standard DERM/council conditions require all general domestic waste to be disposed of in accordance with regulations
(M1) Size, extent and location of aquaculture activities are controlled (M3) The aquaculture area is maintained in good condition (M4) No hazardous or inappropriate (i.e. non-industry standard) structures in the aquaculture area	Racks and lines: (B) Monitoring and maintenance of equipment by approval holder (F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA2, CA12–24)
(M1) Size, extent and location of aquaculture activities are controlled (M3) The aquaculture area is maintained in good condition (M4) No hazardous or inappropriate (i.e. non-industry standard) structures in the aquaculture area	Racks and lines (construction phase): (F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA2, CA14, CA16–17, CA19, CA21, CA84)

Table 8. Summary of the GSRMAP risk management framework (continued)

Summary of the GSRMAP risk management framework			
Risk (details in Section 4.3)	Planning considerations	GSRMAP planning controls (Section 4.5)	
(R6) Seagrass dieback due to shading	<ul style="list-style-type: none"> • Reduce impacts through location and design • Impact of surface and subsurface line method of culture on seagrass is negligible • Impact of rack culture on seagrass low based on other areas • No shading due to ranching because no structures are used <p>Risk—low if appropriately located, designed and managed</p> <p>Shading impacts are minimal from line structures</p> <p>Not applicable to ranching</p>	<p>(P2) Located away from, or have regard to, areas of significant environmental value</p> <p>(P11) Located only within marine park zones that do not prohibit the activity</p>	
(R7) Sediment/water nutrient enrichment—faecal material build-up beneath farms	<ul style="list-style-type: none"> • No discharges • Permitted aquaculture does not allow the addition of feed • Nutrients are extracted from the system by filter-feeding bivalves so there is not necessarily a ‘net’ input of nutrients into the water column • Organic deposition due to mortalities is minimised because aquacultured animals are usually contained within mesh bags or panels <p>Risk—low if appropriately located to avoid areas of low current flow or low flushing, and appropriately designed and managed</p>	<p>(P2) Located away from, or have regard to, areas of significant environmental value</p> <p>(P3) Located in good current flow—access to planktonic food</p> <p>(P11) Located only within marine park zones that do not prohibit the activity</p>	

58 For more detail refer to Section 4.7.

<p>GSRMAP management outcomes (Section 4.6) (details in <i>Implementation guide</i>)</p> <p>Operation of activities must comply with conditions of the DA (Fisheries Act provisions: DEEDI, <i>Queensland coastal plan</i> provisions: DERM, marine park provisions: DERM)</p>	<p>Monitoring and response options (Section 4.7, Section 5.5)</p> <p>Breach of conditions enforceable under the SP Act (DA) and Fisheries Act (RAA); some conditions also enforceable under Marine Parks Act, EP Act and EPBC Act (matters of NES)</p>
<p>(M1) Size, extent and location of aquaculture activities are controlled</p> <p>(M3) The aquaculture area is maintained in good condition</p> <p>(M4) No hazardous or inappropriate (i.e. non-industry standard) structures in the aquaculture area</p>	<p>Racks and lines:</p> <p>(B) Monitoring and maintenance of equipment by approval holder</p> <p>(F) Compliance monitoring by government compliance officers</p> <p>Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA2, CA12–24).</p> <p>Existing rack operators are not required to monitor seagrass, because risk of impacts to seagrass is low</p>
<p>(M1) Size, extent and location of aquaculture activities are controlled</p> <p>(M10) Sediment removal or cleaning procedures (e.g. defouling of structures and stock) are undertaken so as to minimise impacts to water quality</p> <p>(M11) Monitoring, incident reporting, and/or assessment of potential impacts are undertaken where appropriate⁵⁸</p>	<p>(B) Monitoring and maintenance of equipment by approval holder</p> <p>(F) Compliance monitoring by government compliance officers</p> <p>Ensure compliance with relevant management conditions (see <i>Implementation guide</i> CA12–13, CA71).</p> <p>Cleaning activities must have regard to general duty of care under the EP Act (DERM)</p> <p>(D)(a/b) Rapid assessment by approval holder (lines only—where appropriate)</p> <p>Existing rack operators are not required to undertake benthic monitoring as risk of impacts is low</p> <p>Where relevant, the monitoring program and the agreed response measures are detailed as a condition of approval (CA72)</p> <p>If pre-determined thresholds are exceeded, DEEDI/DERM to review data and determine whether there is justification for more detailed investigation</p>

Table 8. Summary of the GSRMAP risk management framework (continued)

Summary of the GSRMAP risk management framework			
Risk (details in Section 4.3)	Planning considerations	GSRMAP planning controls (Section 4.5)	
(R8) Habitat alteration due to high concentrations of spat—stock placement (ranching)	<ul style="list-style-type: none"> Reduce impacts through location and design Risk—low if appropriately located, designed and managed	Location of activities must comply with conditions of the RAA (DEEDI) and marine park legislation (DERM) (P2) Located away from, or have regard to, areas of significant environmental value (P11) Located only within marine park zones that do not prohibit the activity	
(R9) Benthic impacts due to harvesting	<ul style="list-style-type: none"> Harvesting to take place as per existing fishing restrictions Trawling activities have occurred over a long period of time in Hervey Bay and these activities have not been considered inconsistent with national and international recognition of the significant environmental values of the region Any trawling for aquaculture will be less frequent than wild harvest trawling, because the area must remain undisturbed whilst the spat grows to maturity Risk—low if appropriately located, designed and managed	(P2) Located away from, or have regard to, areas of significant environmental value (P11) Located only within marine park zones that do not prohibit the activity	
(R10) Access—increased boat/human traffic	<ul style="list-style-type: none"> Little increase in traffic would result Negligible change in coastal infrastructure Risk—low if appropriately located, designed and managed	(P10) Located away from critical shorebird areas (P11) Located only within marine park zones that do not prohibit the activity	

59 Refer to the *Fisheries (East Coast Trawl) Management Plan 1999*, and other information on trawl fishing management, on the DEEDI website at www.deedi.qld.gov.au

60 For more detail refer to Section 4.7.

	GSRMAP management outcomes (Section 4.6) (details in <i>Implementation guide</i>) Operation of activities must comply with conditions of the DA (Fisheries Act provisions: DEEDI, <i>Queensland coastal plan</i> provisions: DERM, marine park provisions: DERM)	Monitoring and response options (Section 4.7, Section 5.5) Breach of conditions enforceable under the SP Act (DA) and Fisheries Act (RAA); some conditions also enforceable under Marine Parks Act, EP Act and EPBC Act (matters of NES)
	(M1) Size, extent and location of aquaculture activities are controlled	(B) Monitoring and maintenance of equipment by approval holder (F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA1, CA11–13). (D)(a/b) Rapid assessment by approval holder (lines only—where appropriate) Existing rack operators are not required to undertake benthic monitoring as risk of impacts is low Where relevant, the monitoring program and the agreed response measures are detailed as a condition of approval (CA72) If pre-determined thresholds are exceeded, DEEDI/DERM to review data and determine whether there is justification for more detailed investigation
	Harvesting by hand: (M18) Impacts to the seabed are minimised Mechanical harvesting (fishing) must obtain separate authority under the Fisheries Act (DEEDI) Trawling/harvesting activities must obtain separate Marine Park Permit (DERM) Harvesting by mechanical means: Use of commercial fishing apparatus (e.g. trawling) is controlled by management measures that are outside the scope of the GSRMAP ⁵⁹	Harvesting by hand: (F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA85) Trawl harvest: (F) Compliance monitoring by government compliance officers Commercial trawling currently takes place in Hervey Bay with no requirement for benthic monitoring Breach of conditions of fishing authority for trawling is enforceable under the Fisheries Act (outside the scope of the GSRMAP)
	(M1) Size, extent and location of aquaculture activities are controlled (M7) Adequate records are kept and made available to the Queensland Government (M11) Monitoring, incident reporting, and/or assessment of potential impacts are undertaken where appropriate ⁶⁰	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA1, CA2, CA75). Vessel use must adhere to marine park conditions relating to vessel movement, Go Slow Areas and Whale Management Areas

Table 8. Summary of the GSRMAP risk management framework (continued)

Summary of the GSRMAP risk management framework			
Risk (details in Section 4.3)	Planning considerations	GSRMAP planning controls (Section 4.5)	
(R11) Entanglement of marine megafauna	<ul style="list-style-type: none"> The risk of incident can be reduced through design Culture lines to be kept taut and adequately spaced Experiences from other areas suggest that the risk of entanglement is very low for these types of aquaculture where lines are kept taut <p>Risk—low if appropriately located, designed and managed</p> <p>Not applicable to ranching</p> <p>Low risk of entanglement in rack structures located in intertidal areas</p>	<p>Location of activities must comply with conditions of the RAA (DEEDI) and marine park legislation (DERM)</p> <p>(P2) Located away from, or have regard to, areas of significant environmental value</p> <p>(P4) Incompatible types of aquaculture located in areas that minimise the impact on whale high-use areas</p> <p>(P11) Located only within marine park zones that do not prohibit the activity</p>	
(R12) Disruptions to fauna foraging/migration patterns	<ul style="list-style-type: none"> Minimal additional boat traffic Large marine mammals/turtles interact regularly with oyster farms with no detected adverse effect No incidents involving oyster lines have been reported in 20 years of experience in Australia and New Zealand <p>Risk—low if appropriately located, designed and managed</p>	<p>(P2) Located away from, or have regard to, areas of significant environmental value</p> <p>(P4) Incompatible types of aquaculture located in areas that minimise the impact on whale high-use areas</p> <p>(P10) Located away from critical shorebird areas</p> <p>(P11) Located only within marine park zones that do not prohibit the activity</p>	
(R13) Aggregation of fauna around structures	<ul style="list-style-type: none"> Aquaculturists are required to minimise and routinely remove biological debris that could attract wildlife or predators Removal of fishing pressure from natural habitats Aggregation of fish may present benefits to recreational fishers <p>Risk—potential for aggregation of birds and fish, but low risk of harm if appropriately designed and managed</p>	<p>(P2) Located away from, or have regard to, areas of significant environmental value</p> <p>(P10) Located away from critical shorebird areas</p> <p>(P11) Located only within marine park zones that do not prohibit the activity</p>	

61 For more detail refer to Section 4.7.

<p>GSRMAP management outcomes (Section 4.6) (details in <i>Implementation guide</i>)</p> <p>Operation of activities must comply with conditions of the DA (Fisheries Act provisions: DEEDI, <i>Queensland coastal plan</i> provisions: DERM, marine park provisions: DERM)</p>	<p>Monitoring and response options (Section 4.7, Section 5.5)</p> <p>Breach of conditions enforceable under the SP Act (DA) and Fisheries Act (RAA); some conditions also enforceable under Marine Parks Act, EP Act and EPBC Act (matters of NES)</p>
<p>(M1) Size, extent and location of aquaculture activities are controlled</p> <p>(M4) No hazardous or inappropriate (i.e. non-industry standard) structures in aquaculture area</p> <p>(M7) Adequate records are kept and made available to the Queensland Government</p> <p>(M11) Monitoring, incident reporting, and/or assessment of potential impacts are undertaken where appropriate⁶¹</p> <p>(M12) Structures are designed and maintained so as to minimise potential for impact on megafauna</p>	<p>(B) Monitoring and maintenance of equipment by approval holder</p> <p>(F) Compliance monitoring by government compliance officers</p> <p>Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA12–20, CA73–75)</p> <p>(E)(i) Reporting of cetacean interactions by approval holder</p> <p>(E)(ii) Reporting of Interactions with other EPBC fauna</p> <p>Reporting of interactions is a condition of approval (see <i>Implementation guide</i> CA75)</p>
<p>(M1) Size, extent and location of aquaculture activities are controlled</p> <p>(M4) No hazardous or inappropriate (i.e. non-industry standard) structures in the aquaculture area</p> <p>(M12) Structures are designed and maintained so as to minimise potential for impact on megafauna</p>	<p>(B) Monitoring and maintenance of equipment by approval holder</p> <p>(F) Compliance monitoring by government compliance officers</p> <p>Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA12–20, CA73–75).</p> <p>(E)(i) Reporting of cetacean Interactions by approval holder</p> <p>(E)(ii) Reporting of Interactions with other fauna (under EPBC Act)</p> <p>Reporting of interactions is a condition of approval (see <i>Implementation guide</i> CA75)</p>
<p>(M1) Size, extent and location of aquaculture activities are controlled</p> <p>(M3) The aquaculture area is maintained in good condition</p> <p>(M4) No hazardous or inappropriate (i.e. non-industry standard) structures in the aquaculture area</p> <p>(M12) Structures are designed and maintained so as to minimise potential for impact on megafauna</p>	<p>(B) Monitoring and maintenance of equipment by approval holder</p> <p>(F) Compliance monitoring by government compliance officers</p> <p>Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA12–20, CA73–75).</p> <p>Lines and racks:</p> <p>(E)(i) Reporting of cetacean interactions by approval holder</p> <p>(E)(ii) Reporting of Interactions with other fauna (under EPBC Act)</p> <p>Reporting of interactions is a condition of approval (see <i>Implementation guide</i> CA75)</p>

Table 8. Summary of the GSRMAP risk management framework (continued)

Summary of the GSRMAP risk management framework			
Risk (details in Section 4.3)	Planning considerations	GSRMAP planning controls (Section 4.5)	
(R14) Non-endemic species/strains introduced into natural systems	<ul style="list-style-type: none"> Only endemic species and genetic strains will be permitted in the GSRMAP Risk—low if appropriately managed	Location of activities must comply with conditions of the RAA (DEEDI) and marine park legislation (DERM)	
(R15) Impacts on natural genetic profile from hatchery-reared stock	<ul style="list-style-type: none"> Spat are highly vulnerable to natural predation Most animals used in sea ranching and rack and line aquaculture are sessile (e.g. oysters) or have limited mobility (e.g. scallops) Risk—low if appropriately managed	N/A	
(R16) Incidental introduction of pest species	Risk—low if appropriately managed	N/A	

	GSRMAP management outcomes (Section 4.6) (details in <i>Implementation guide</i>) Operation of activities must comply with conditions of the DA (Fisheries Act provisions: DEEDI, <i>Queensland coastal plan</i> provisions: DERM, marine park provisions: DERM)	Monitoring and response options (Section 4.7, Section 5.5) Breach of conditions enforceable under the SP Act (DA) and Fisheries Act (RAA); some conditions also enforceable under Marine Parks Act, EP Act and EPBC Act (matters of NES)
	(M8b) Any impacts to natural genetic stock resulting from introduction of non-endemic genetic stock or from release of hatchery-reared stock are minimised Collection of broodstock from the wild must comply with a Fisheries Authority under the Fisheries Act (DEEDI), specifying the locations from which broodstock can be collected Translocation of stock from interstate requires an application to translocate live aquatic organisms (CA38–53)	(B) Monitoring and maintenance of equipment by approval holder (F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA38–67)
	(M1) Size, extent and location of aquaculture activities are controlled (M8b) Any impacts to natural genetic stock resulting from introduction of non-endemic genetic stock or from release of hatchery-reared stock are minimised Translocation of stock from interstate requires an application to translocate live aquatic organisms (CA38–53)	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> (CA38–67)
	(M9) Aquaculture activities are managed so as to minimise the accidental introduction of pest species	(B) Monitoring and maintenance of equipment by approval holder (F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA68–70) The National Introduced Marine Pest Coordination Group is developing best practice guidelines for all medium- and high-risk marine farming practices in Australia

Table 8. Summary of the GSRMAP risk management framework (continued)

Summary of the GSRMAP risk management framework			
Risk (details in Section 4.3)	Planning considerations	GSRMAP planning controls (Section 4.5)	
(R17) Disease —outbreaks impacting on ecosystem health	<ul style="list-style-type: none"> • Stock husbandry techniques are well developed • Strict translocation and quarantine protocols are in place to minimise any disease risk • Diseases should not be an issue if best practice husbandry is observed <p>Risk—low if appropriately managed</p>	N/A	
(R18) Phytoplankton depletion in vicinity of farm	<p>Addressed during development of overall plan</p> <ul style="list-style-type: none"> • Phytoplankton depletion is only an issue if filter feeding occurs at a rate greater than phytoplankton replenishment (i.e. exceeding carrying capacity of the area) • No reason to expect that carrying capacity would be exceeded in this region • Rack and line aquaculture has been successful in tropical areas where the productivity is lower than Hervey Bay • Monitoring of product size and growth rate by aquaculturist can be used as a surrogate for food depletion <p>Risk—low if appropriately located and managed</p>	(P3) Located in good current flow—access to planktonic food	

62 For more detail refer to Section 4.7.

	GSRMAP management outcomes (Section 4.6) (details in <i>Implementation guide</i>) Operation of activities must comply with conditions of the DA (Fisheries Act provisions: DEEDI, <i>Queensland coastal plan</i> provisions: DERM, marine park provisions: DERM)	Monitoring and response options (Section 4.7, Section 5.5) Breach of conditions enforceable under the SP Act (DA) and Fisheries Act (RAA); some conditions also enforceable under Marine Parks Act, EP Act and EPBC Act (matters of NES)
	(M8a) Any impacts to the surrounding ecosystem from disease resulting from aquaculture activities are minimised (M11) Monitoring, incident reporting, and/or assessment of potential impacts are undertaken where appropriate ⁶²	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA38–54) Translocation of stock must comply with translocation protocols (DEEDI) (E)(iii) Disease notification by approval holder Any disease outbreaks must be reported (s. 100 of the Fisheries Act) Upon notification of a disease outbreak, Fisheries Queensland and Biosecurity Queensland, together with any other relevant agencies, will determine the best course of action
	(M1) Size, extent and location of aquaculture activities are controlled	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA1, CA2)

Table 8. Summary of the GSRMAP risk management framework (continued)

Summary of the GSRMAP risk management framework			
Risk (details in Section 4.3)	Planning considerations	GSRMAP planning controls (Section 4.5)	
(R19) Chemicals/ therapeutics	<ul style="list-style-type: none"> Antifouling paints/chemicals may be used on boats and aquaculture structures in accordance with normal restrictions <p>Risk—low if appropriately managed</p>	N/A	
(R20) Genetic engineering	<ul style="list-style-type: none"> N/A—There are presently no genetically modified organisms approved for use in Australian aquaculture 	N/A	
(R21) Human health	<ul style="list-style-type: none"> Before shellfish can be harvested water quality and meat samples must be taken and strict standards must be met Shellfish are only grown in areas that have appropriate water quality (e.g. avoid outfalls) <p>Risk—low if appropriately managed</p>	(P1) Located away from built-up/urbanised areas or known scenic lookout areas	
(R22) Existing user interactions —commercial fishing	<ul style="list-style-type: none"> Sea ranching is low conflict All other culture systems are sited away from areas of high commercial fishing interest (e.g. major trawling areas) <p>Risk—low if appropriately located, designed and managed</p>	(P5) Incompatible types of aquaculture located in areas that minimise the impact on commercial fishing areas (P11) Located only within marine park zones that do not prohibit the activity	
(R23) Existing user interactions —recreational fishing/angling	<ul style="list-style-type: none"> All systems low conflict (except sports fishing, which may have conflict with structures) <p>Risk—low if appropriately located, designed and managed</p>	(P6) Incompatible types of aquaculture located in areas that minimise the impact on high-use recreational fishing areas (P11) Located only within marine park zones that do not prohibit the activity	

63 The Australian and New Zealand Environment Conservation Council published the revised *Australian and New Zealand guidelines for fresh and marine water quality* in 2000.

	GSRMAP management outcomes (Section 4.6) (details in <i>Implementation guide</i>) Operation of activities must comply with conditions of the DA (Fisheries Act provisions: DEEDI, <i>Queensland coastal plan</i> provisions: DERM, marine park provisions: DERM)	Monitoring and response options (Section 4.7, Section 5.5) Breach of conditions enforceable under the SP Act (DA) and Fisheries Act (RAA); some conditions also enforceable under Marine Parks Act, EP Act and EPBC Act (matters of NES)
	Controlled by management measures that are outside the scope of the GSRMAP Queensland has strict regulations in place to manage the use of chemicals and antibiotics in agricultural industries (including aquaculture)	Chemical use must comply with: Edible: <i>Food Act 2006</i> [Residues] (Food Standards Australia New Zealand) Non-edible: APVMA Chemical use (e.g. antifoulants) must comply with Australian and New Zealand Environment Conservation Council Code of Practice ⁶³
	Refer to Section 4.3.8	Use of genetically engineered organisms is regulated by the Australian Government Office of Gene Technology Regulator
	(M13) Any product intended for human consumption is managed so as to avoid human health risks	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA76) (C) Food safety monitoring by approval holder Product for human consumption must comply with the Queensland Shellfish Water Assurance Monitoring Program (DEEDI) Seafood processing facilities must meet environmental health requirements of local government authorities (council)
	(M1) Size, extent and location of aquaculture activities are controlled (M4) No hazardous or inappropriate (i.e. non-industry standard) structures in the aquaculture area (M6) All structures and vessels associated with the aquaculture activity are clearly marked	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA12–25, CA27–29)
	(M1) Size, extent and location of aquaculture activities are controlled (M4) No hazardous or inappropriate (i.e. non-industry standard) structures in the aquaculture area (M6) All structures and vessels associated with the aquaculture activity are clearly marked	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA12–25, CA27–29)

Table 8. Summary of the GSRMAP risk management framework (continued)

Summary of the GSRMAP risk management framework			
Risk (details in Section 4.3)	Planning considerations	GSRMAP planning controls (Section 4.5)	
(R24) Existing user interactions —recreational boating	<ul style="list-style-type: none"> All systems low conflict (except high-speed sports fishing, which may have conflict with structures) Risk—low if appropriately located, designed and managed	Location of activities must comply with conditions of the RAA (DEEDI) and marine park legislation (DERM)	
(R24) Existing user interactions —recreational boating	<ul style="list-style-type: none"> All systems low conflict (except high-speed sports fishing, which may have conflict with structures) Risk—low if appropriately located, designed and managed	(P7) Incompatible types of aquaculture located in areas that minimise the impact on high-use recreational boating areas (P11) Located only within marine park zones that do not prohibit the activity	
(R25) Existing user interactions —major transport and shipping	<ul style="list-style-type: none"> Ranching is low conflict since there are no structures within the aquaculture area Rack would also be low conflict because it is typically located in shallow/intertidal waters Risk—low if appropriately located, designed and managed	(P8) Incompatible types of aquaculture located in areas that minimise the impact on marked navigation channels and anchorages (P11) Located only within marine park zones that do not prohibit the activity	
(R26) Existing user interactions —whale-watching activities	<ul style="list-style-type: none"> Ranching is low conflict since there are no structures within the aquaculture area Rack would also be low conflict because it is typically located in shallow/intertidal waters. Surface and subsurface lines have the potential for conflict if not located and managed appropriately Risk—low if appropriately located, designed and managed	(P4) Incompatible types of aquaculture located in areas that minimise the impact on whale high-use areas (P11) Located only within marine park zones that do not prohibit the activity	
(R27) Existing user interactions —diving (recreational and commercial)	<ul style="list-style-type: none"> Ranching is low conflict Rack would also be low conflict because it is typically located in shallow/intertidal waters Risk—low if appropriately located, designed and managed	(P9) Incompatible types of aquaculture located in areas that minimise the impact on high-use diving areas (P11) Located only within marine park zones that do not prohibit the activity	
(R28) Amenity/ viewsapes	<ul style="list-style-type: none"> Ranching and subsurface lines are low conflict Surface lines and structures may change visual amenity in the immediate vicinity of the farm Risk—low if appropriately located, designed and managed	(P1) Located away from built-up/urbanised areas or known scenic lookout areas (P11) Located only within marine park zones that do not prohibit the activity	

	GSRMAP management outcomes (Section 4.6) (details in <i>Implementation guide</i>) Operation of activities must comply with conditions of the DA (Fisheries Act provisions: DEEDI, <i>Queensland coastal plan</i> provisions: DERM, marine park provisions: DERM)	Monitoring and response options (Section 4.7, Section 5.5) Breach of conditions enforceable under the SP Act (DA) and Fisheries Act (RAA); some conditions also enforceable under Marine Parks Act, EP Act and EPBC Act (matters of NES)
	(M1) Size, extent and location of aquaculture activities are controlled (M4) No hazardous or inappropriate (i.e. non-industry standard) structures in the aquaculture area (M6) All structures and vessels associated with the aquaculture activity are clearly marked	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA12–25, CA27–29)
	(M1) Size, extent and location of aquaculture activities are controlled (M4) No hazardous or inappropriate (i.e. non-industry standard) structures in the aquaculture area (M6) All structures and vessels associated with the aquaculture activity are clearly marked	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA12–25, CA27–29)
	(M1) Size, extent and location of aquaculture activities are controlled (M4) No hazardous or inappropriate (i.e. non-industry standard) structures in the aquaculture area (M6) All structures and vessels associated with the aquaculture activity are clearly marked	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA12–25, CA27–29)
	(M1) Size, extent and location of aquaculture activities are controlled (M4) No hazardous or inappropriate (i.e. non-industry standard) structures in the aquaculture area (M6) All structures and vessels associated with the aquaculture activity are clearly marked	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA12–25, CA27–29)
	(M1) Size, extent and location of aquaculture activities are controlled (M4) No hazardous or inappropriate (i.e. non-industry standard) structures in the aquaculture area	Lines and racks: (B) Monitoring and maintenance of equipment by approval holder All: (F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA12–25)

Table 8. Summary of the GSRMAP risk management framework (continued)

Summary of the GSRMAP risk management framework			
Risk (details in Section 4.3)	Planning considerations	GSRMAP planning controls (Section 4.5)	
(R29) Existing user —native title	Risk—low if appropriately managed	(P11) Located only within marine park zones that do not prohibit the activity	
(R30) Existing user —Indigenous cultural heritage	Risk—low if appropriately located and managed	(P11) Located only within marine park zones that do not prohibit the activity	
(R31) Failure to develop the site	<ul style="list-style-type: none"> • <i>Policy for allocation of marine aquaculture authorities</i> would include assessment of applicant suitability Risk—low if appropriately managed	N/A	
(R32) Failure to properly clean up structures upon expiration of approval	<ul style="list-style-type: none"> • <i>Policy for allocation of marine aquaculture authorities</i> would include assessment of applicant suitability Risk—low if appropriately managed	N/A	
(R33) Cumulative impacts	<ul style="list-style-type: none"> • The GSRMAP places a limit on the total area that may be developed for aquaculture Risk—low with a strategic planning approach	The strategic planning approach identifies a finite number of sites for the region	

	GSRMAP management outcomes (Section 4.6) (details in <i>Implementation guide</i>) Operation of activities must comply with conditions of the DA (Fisheries Act provisions: DEEDI, <i>Queensland coastal plan</i> provisions: DERM, marine park provisions: DERM)	Monitoring and response options (Section 4.7, Section 5.5) Breach of conditions enforceable under the SP Act (DA) and Fisheries Act (RAA); some conditions also enforceable under Marine Parks Act, EP Act and EPBC Act (matters of NES)
	(M1) Size, extent and location of aquaculture activities are controlled (M17) The approval holder has taken all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage	Native title notification is addressed at the assessment stage DA assessment process includes a statutory requirement for native title notification prior to finalisation of approval
	(M1) Size, extent and location of aquaculture activities are controlled (M17) The approval holder has taken all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA83)
	(M7) Adequate records are kept and made available to the Queensland Government (M14) The site is developed according to a Development Covenant/ minimum production policy	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA77–79) (A) Annual production returns Annual production returns are a condition of approval (CA30) Reporting of milestones in the Development Covenant is a condition of approval (CA78)
	(M15) Provision is made for sites to be rehabilitated, if necessary (M16) Sites are clean and tidy prior to transfer and all structures removed upon cessation, cancellation or surrender of the authority	(F) Compliance monitoring by government compliance officers Ensure compliance with relevant conditions (see <i>Implementation guide</i> CA81–82) Condition of Approval CA80 requires a bond to be submitted at the time of application The bond may be retained and used to clean up the site if any structures are left behind after cessation of activity
	(M1) Size, extent and location of aquaculture activities are controlled	N/A—Addressed during development of overall plan

Appendix 1—Overlay plans

The following maps reflect the spatial datasets considered during the shortlisting of aquaculture site locations (refer to section 2.3).

Study area

Refer to Map 1.

State management areas

Refer to Map 2a.

Commonwealth management areas

Refer to Map 2b.

Marine structures and activities

Refer to Map 3.

Environmental features: habitat/flora

Refer to Map 4a.

Environmental features: fauna

Refer to Map 4b.

Legislative prohibitions on aquaculture

Refer to Map 5.

Bathymetry

Refer to Map 7.

Plan of designated marine aquaculture sites

Refer to Map 6.

Appendix 2—Advantages of aquaculture planning

Issues	Existing situation (case-by-case approach to site selection)	Regional plans (strategic planning approach)
Appropriate sites for aquaculture defined for the region prior to development	<input checked="" type="checkbox"/> Sites selected on a case-by-case basis	<input checked="" type="checkbox"/>
Appropriate types of aquaculture (i.e. types of system permitted) defined for the region prior to development	<input checked="" type="checkbox"/> Use of sites determined on a case-by-case basis	<input checked="" type="checkbox"/>
Opportunities for communities to contribute to future aquaculture development	<input checked="" type="checkbox"/> Limited capacity for community input	<input checked="" type="checkbox"/> Consultation is an important part of the planning process
Balance and manage multiple users regional resource uses	<input checked="" type="checkbox"/> Assessment agencies limited to issues regulated by their legislation	<input checked="" type="checkbox"/> Planning principles reduce resource use conflicts
Cumulative impact issues considered	<input checked="" type="checkbox"/> Considered on a case-by-case basis with no capacity to assess cumulative impacts	<input checked="" type="checkbox"/> Future development for the region is considered on a strategic basis
Standardised assessment criteria and management controls defined prior to development, to maintain high environmental management standards	<input checked="" type="checkbox"/> Assessment criteria determined by each agency, may vary with each individual application	<input checked="" type="checkbox"/>
Site allocation to suitable applicants	<input checked="" type="checkbox"/> Sites allocated on a first come, first served basis	<input checked="" type="checkbox"/> <i>Policy for allocation of marine aquaculture authorities</i> will include standardised criteria for authorities allocation
Standardised procedure for determining bonds/covenants of agreement for use of public resource	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <i>Policy for allocation of marine aquaculture authorities</i> can include bonds/deeds of agreement as a criteria
Necessary decision-making information collected at regional scale by government	<input checked="" type="checkbox"/> Individual site information collected by applicant	<input checked="" type="checkbox"/> Government completes preliminary holistic investigation of sites identified by regional plans, applicant completes detailed local site assessment
Investor certainty with respect to aquaculture types, suitable sites, and management controls that will apply	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Clarity with respect to likelihood of approvals for aquaculture in appropriate areas	<input checked="" type="checkbox"/> Complexity of issues and process results in applicant uncertainty about successful approval to conduct aquaculture	<input checked="" type="checkbox"/> Resolution of key planning issues will reduce uncertainty
Streamlined assessment processes for new applications (i.e. reduce 'red tape')	<input checked="" type="checkbox"/> Multiple approval processes	<input checked="" type="checkbox"/> Reduce duplication using negotiated arrangements with other agencies based on regional plans

Appendix 3—History of revisions to aquaculture sites

This table summarises the history of revisions to site locations at key stages of plan development. Numerous other amendments also occurred during the early stages of plan development but are not detailed here. This table includes:

- amendments that were made after the focus group consultation (stage 4) and prior to public consultation on the draft GSRMAP (stage 6), which were described in the draft GSRMAP—this information is reiterated in the table below
- subsequent amendments that are provided in the final columns—the stage 7 column summarises those issues that required relocation of sites, where relevant, and the final outcome is detailed in the last column.

Note: Some of the issues associated with the sites that were raised during the public consultation phase did not necessitate amendment to site locations because they could be adequately addressed through management controls. For more details refer to:

- Section 4.3 for a description of potential risks from marine aquaculture and how they are addressed
- Section 4.6.3 for a description of the specific values, interests and potential issues at each site, and any additional site-specific management controls that are needed to address them—Section 4.6.3 includes key interests and concerns raised during the planning process.

Site number	Precinct	Production system	Issues from focus groups—March to April 2007 (stage 4)	
Site 1	Double Island Point	Surface lines	In prime anchorage/ shelter position	
Site 2 (deleted)	Wide Bay Bar	Subsurface lines	In the middle of trawling area (Note: There is a dark blue zone—closed to trawling—immediately to the north)	
Site 45 (replaces part of site 2)	Wide Bay Bar	Subsurface lines		
Site 33	Wide Bay Bar	Subsurface lines	New site	
AA 802	Inskip Point	Sea ranching	Previously approved area	
Site 3 (deleted)	Wide Bay Harbour	Surface lines	Near paths of high-use area for vessels—near anchorages at Elbow Point	
Site 4 a–d (deleted)	Wide Bay Harbour	Surface lines	Near paths of high-use area for vessels—near anchorages at Elbow Point	
Site 34 (replaces sites 3 and 4a–d)	Wide Bay Harbour	Surface lines		
Site 7 a–d	Wide Bay Harbour	Surface lines	No issues requiring revision at this time	
Site 32	Wide Bay Harbour	Surface lines	New site	
AA 834	Tinnanbar	Rack	Previously approved area	
AA 889	Tinnanbar	Rack	Previously approved area	
AA 874	Tinnanbar	Rack	Previously approved area	
AA 875	Tinnanbar	Rack	Previously approved area	

	Actions for draft plan (stage 6)	Outstanding issues from public consultation phase— July to October 2008 (stage 7)	Final plan
	<p>Note: Further information to be assessed following public consultation and discussions with commercial fishers</p> <p>Check extent of impacts to vessels</p>		No change to site (however note management controls)
	<p>Note: Further information to be assessed following public consultation and discussions with commercial fishers</p> <p>Check extent of impacts to trawlers</p>	Overlaps with prawn trawling area	Site removed and partially replaced with new site 45
			<p>New site that replaces half of old site 2</p> <ul style="list-style-type: none"> • The trawling industry had specific input into the final location • Site reduced in size from 1000 ha to 500 ha
	Potential investigation area that may replace site 2 subject to further consultation on site 2		No change to site (however note management controls)
			No change
	<p>Note: Further information to be assessed following public consultation and discussions with commercial fishers</p> <p>Check extent of impacts to recreational boating</p>	Maritime safety concerns in this area of high vessel traffic	Site removed and partially replaced with new site 34
	<p>Note: further information to be assessed following public consultation and discussions with commercial fishers</p> <p>Check extent of impacts to recreational boating</p>	Maritime safety concerns in this area of high vessel traffic	Site removed and partially replaced with new site 34
			<p>New site that merges old sites 3 and 4a-d</p> <ul style="list-style-type: none"> • The single smaller site (reduced from four 5 ha sites to one 5 ha site) reduces navigational hazard • Site is contained within the characterisation study area.
			No change
	New site identified during focus group consultation		No change
			No change

Site number	Precinct	Production system	Issues from focus groups—March to April 2007 (stage 4)	
Site 5 (deleted)	Tinnanbar	Rack	No issues requiring revision at this time	
Site 6 (deleted)	Tinnanbar	Rack	No issues requiring revision at this time	
Site 42 (replaces site 6)				
Site 8 (deleted)	Tinnanbar	Rack	No issues requiring revision at this time	
Site 41 (replaces site 8)				
Site 31	Tinnanbar	Rack	New site	
Site 9	Tinnanbar	Rack	No issues requiring revision at this time	
Site 10	Tinnanbar	Rack	No issues requiring revision at this time	
Site 11 a–d (deleted)	Duck Island	Surface lines	May be in path of traffic to Kingfisher Bay	
AA 815	Big Woody Island	Sea ranching	Previously approved area	
AA 820	Big Woody Island	Sea ranching	Previously approved area	
Site 12	Big Woody Island	Sea ranching	Query suitability for sea cucumber ranching (site not intended for scallop ranching) Lot of sand shift; no natural sea cucumber stocks	
Site 14	Big Woody Island	Sea ranching	No issues requiring revision at this time	

	Actions for draft plan (stage 6)	Outstanding issues from public consultation phase— July to October 2008 (stage 7)	Final plan
		Significant and unique area for recreational/charter fishing activities Unique congregation point for fly-fishing species due to the rare combination of sand flats abutting deep channels	Site removed No viable alternatives in area
		A portion of the site includes a deep channel, not appropriate for rack aquaculture	Site removed and replaced with new site 42
			New site that is a realignment of old site 6 <ul style="list-style-type: none"> • Site is located entirely within the intertidal area • Site partially overlaps the characterisation study area for the original site 6
		A portion of the site includes a deep channel, not appropriate for rack aquaculture	Site removed and replaced with new site 41
			New site that is a realignment of old site 8 <ul style="list-style-type: none"> • Site is located entirely within the intertidal area • Site is contained within the characterisation study area
	New site identified during focus group consultation		No change
			No change
			No change
	Site is located in navigation restricted area—no amendment required Check position regarding transit to Kingfisher Bay	Maritime safety concerns with the ferry transit route to Fraser Island Significant and unique area for recreational/charter fishing activities Unique congregation point for fly-fishing species due to the rare combination of sand flats abutting deep channels	Site removed No viable alternative in the area
			No change
			No change
	Note: Seek advice from aquaculturist Flag concerns with consultant		No change to site (however note management controls)
			No change

Site number	Precinct	Production system	Issues from focus groups—March to April 2007 (stage 4)	
Site 13 (deleted)	Little Woody Island	Rack	No issues requiring revision at this time	
AA 816	Moon Point	Surface lines	Previously approved area	
AA 817	Moon Point	Surface lines	Previously approved area	
AA 818	Moon Point	Surface lines	Previously approved area	
AA 819	Moon Point	Surface lines	Previously approved area	
AA 821 (approval was not renewed)	Moon Point	Surface lines	Previously approved area	
Site 15	Pearl Bank	Surface lines	No issues requiring revision at this time	
Site 16	Pearl Bank	Surface lines	No issues requiring revision at this time	
Site 21 (deleted)	Pearl Bank	Subsurface lines	Within high-use area for humpback whales Also within trawling area	
Site 22 (deleted)	Pearl Bank	Surface lines	Within trawling area	
Site 43 (replaces site 22)	Pearl Bank	Surface lines		
Site 23 (deleted)	Pearl Bank	Surface lines	No issues requiring revision at this time	
Site 23a (deleted)	Pearl Bank	Surface lines	New site	

	Actions for draft plan (stage 6)	Outstanding issues from public consultation phase— July to October 2008 (stage 7)	Final plan
		<p>Significant area for recreational/ charter fishing activities</p> <p>Unique congregation point for fly-fishing species due to the rare combination of sand flats abutting deep channels</p>	<p>Site removed</p> <p>No viable alternative in the area</p>
			<p>A slight repositioning of this site to avoid navigation issues in the channel</p>
			<p>No change</p>
			<p>No change</p>
			<p>No change</p>
		<p>Site was undeveloped and approvals have expired</p> <p>Partially within a Green Zone under the Marine Parks (Great Sandy) Zoning Plan, which is incompatible with aquaculture</p>	<p>RAA expired and not renewed</p> <p>Site removed from GSRMAP</p>
			<p>No change</p>
	<p>Relocated to within Habitat Protection Zone</p>	<p>Whale Management Area under the marine park</p>	<p>No change to site (however note management controls)</p>
	<p>Site removed and replaced by site 23b and site 30</p> <p>Consider downgrading to sea ranching rather than structures to reduce risks to whales</p>	<p>Site removed</p>	
	<p>Further information to be assessed following public consultation and discussions with commercial fishers</p> <p>Check extent of impacts to trawlers</p>	<p>Trawl fishery concerns</p> <p>Concern over cumulative impact of sites in the Whale Management Area under the Marine Parks (Great Sandy) Zoning Plan</p>	<p>Site removed and replaced with new site 43</p>
			<p>New site that replaces old site 22</p> <ul style="list-style-type: none"> • Site is outside the Whale Management Area under the Marine Parks (Great Sandy) Zoning Plan • Site is separated from the Fairway Beacon navigational feature by 3 nm • Site is in low-trawl area
	<p>Site removed and replaced with site 23a as part of overall plan revision</p>		
	<p>New site to offset removal of site 23</p>	<p>Maritime safety concerns with proximity to heavily trafficked navigation route between Point Vernon and Fairway Beacon</p>	<p>Site removed and partially replaced with new site 44</p>

Site number	Precinct	Production system	Issues from focus groups—March to April 2007 (stage 4)	
Site 23b (deleted)	Pearl Bank	Surface lines	New site	
Site 44 (replaces sites 23a and 23b)	Pearl Bank	Surface lines		
Site 30 (deleted)	Pearl Bank	Surface lines	New site	
Site 17 (deleted)	Coongul Point	Surface lines	May be in path of heavy boat traffic from Urangan harbour to Platypus Bay Also within high-use area for humpback whales	
Site 18	Coongul Point	Subsurface lines	Within high-use area for humpback whales	
Site 19 (deleted)	Platypus Bay	Subsurface lines	Deleted site	
Site 20 (deleted)	Platypus Bay	Subsurface lines	Deleted site	
Site 24 (deleted)	Burnett coast	Surface lines	Just outside of dark blue zone (closed to trawling)	
Site 25 (deleted)	Burnett coast	Surface lines	Just outside of dark blue zone (closed to trawling)	

	Actions for draft plan (stage 6)	Outstanding issues from public consultation phase— July to October 2008 (stage 7)	Final plan
	New site to offset removal of site 21	Maritime safety concerns with proximity to heavily trafficked navigation route between Point Vernon and Fairway Beacon	Site removed and partially replaced with new site 44
			New site that replaces old sites 23a, 23b <ul style="list-style-type: none"> • Site is separated from the navigation route between Point Vernon and Fairway Beacon by at least 1 nm
	New site to offset removal of site 21	Maritime safety concerns due to proximity to heavily trafficked navigation route between Urangan and Fairway Beacon	Site removed No viable alternative in the area
	Site 17 removed and replaced by relocated site 18 Check position relative to sandbanks—position so as to avoid navigable channels		
	Site 18 relocated to site 17 and aligned to ensure minimal impact on navigation routes Reposition alongside site 17		No change to site (however note management controls)
	Site deleted because it was in the main whale aggregation area		
	Site deleted because it was in the main whale aggregation area		
	Relocated to with Habitat Protection Zone and aligned to optimal depth range Reposition so it is within the dark blue zone to reduce impacts to trawling	Concerns with proximity to Green Zone under the Marine Parks (Great Sandy) Zoning Plan	Site removed and partially replaced with new site 39
	Relocated to with Habitat Protection Zone and aligned to optimal depth range Reposition so it is within the dark blue zone to reduce impacts to trawling	Concerns with proximity to Four Mile Reef, which is a key recreational fishing and diving feature	Site removed and partially replaced with new site 39

Site number	Precinct	Production system	Issues from focus groups—March to April 2007 (stage 4)	
Site 39 (replaces sites 24 and 25)	Burnett coast	Surface lines		
Site 26 (deleted)	Burnett coast	Surface lines	No issues requiring revision at this time	
Site 27 (deleted)	Burnett coast	Surface lines	Within banana prawn trawling area	
Site 48 (replaces site 27)	Burnett coast	Surface lines		
Site 28 (deleted)	Burnett coast	Surface lines		
Site 47 (replaces site 28)	Burnett coast	Surface lines		
AA 811	Hervey Bay	Sea ranching	Previously approved area	
AA 812	Hervey Bay	Sea ranching	Previously approved area	
Site 29 (no longer relevant)	Hervey Bay	Sea ranching	Expansion of previously approved area (indicative) See Section 4.6.3	

	Actions for draft plan (stage 6)	Outstanding issues from public consultation phase— July to October 2008 (stage 7)	Final plan
			<p>New site that merges old sites 24 and 25</p> <ul style="list-style-type: none"> • Site is within a Habitat Protection (dark blue) Zone under the Marine Parks (Great Sandy) Zoning Plan, which is closed to trawling and therefore will not impact on commercial trawl • Site is separated from the Green Zone by 3 km • Site is separated from Four Mile Reef by 3 km
		<p>Maritime safety concerns due to proximity to navigation route between Port of Bundaberg and Fairway Beacon.</p> <p>Overlaps with trawl grounds</p>	<p>Site removed</p> <p>No viable alternative in the area</p>
	<p>Note: Further information to be assessed following public consultation and discussions with commercial fishers</p> <p>Check extent of impacts to trawlers</p>	<p>Overlaps with important commercial net, line and trawl fishery grounds</p>	<p>Site removed and replaced with new site 48</p>
			<p>New site that replaces old site 27</p> <ul style="list-style-type: none"> • Potentially affected fishers had specific input into the final location
		<p>Overlaps with commercial trawl fishery grounds</p>	<p>Site removed and replaced with new site 47</p>
			<p>New site that is a reposition of old site 28</p> <ul style="list-style-type: none"> • Potentially affected fishers had specific input into the final location
	<p>Subsurface lines also considered appropriate in this location</p>		<p>No change</p>
		<p>The company has changed ownership so the indicative expansion is no longer relevant</p>	<p>No change</p>

Appendix 4—Description of relevant legislation

Legislation affecting marine aquaculture activities

State approvals

Marine aquaculture development in Queensland is subject to a range of regulatory mechanisms, policies, guidelines and protocols that are designed to manage the day-to-day operations of aquaculture developments. Policies currently in operation include procedures for reporting and managing disease, management of high-risk activities, water quality management and translocation of culture organisms.

As well as the usual range of business regulations, marine aquaculture facilities require a Resource Allocation Authority (RAA) under the *Fisheries Act 1994* and Development Approval (DA) under the *Sustainable Planning Act 2009* (formerly the *Integrated Planning Act 1997*).

Sustainable Planning Act 2009

The *Sustainable Planning Act 2009* (SP Act) is the primary planning and development assessment legislation in Queensland. The purpose of the legislation is to achieve ecological sustainability through coordinating and integrating planning and managing the effects of development on the environment. The integrated development assessment system (IDAS), the assessment and approval process within the SP Act, creates a single integrated system for state and local government approval processes. The SP Act requires that all development-related approvals under state legislation are assessed and issued through the IDAS process. Aquaculture approvals may thus be assessed by a number of agencies against the intent of the various relevant Acts, but a single approval is issued under the SP Act.

Issues addressed through the SP Act DAs may include the following:

- Management of tidal works and prescribed tidal work are covered under the *Coastal Protection and Management Act 1995* and IDAS code for development applications for prescribed tidal work under the *Coastal Protection and Management Regulation 2003*.
- State coastal management plan (SCMP) matters are covered under the *Coastal Protection and Management Act 1995* and relevant regional coastal management plans (e.g. protection of coastal resources (areas of state significance and natural resources) and areas of biodiversity significance, maintenance of water quality). Triggers include ‘tidal works’.
- Environmentally relevant activities under the *Environmental Protection Act 1994* (EP Act) will not apply since mollusc aquaculture is excluded (except for seafood ‘processing’ >100 tonne per year). Provisions of the *Environmental Protection (Water) Policy 2009* are considered in the provision of an approval under the EP Act, so these would also not apply to the types of aquaculture subject to the GSRMAP. Activities must comply with the general environmental duty of care, and comply with the Environmental Protection (Water) Policy⁶⁴ in particular, in marine and estuarine high environmental value waters, where the management intent is to protect current natural values.
- Aquaculture activities including biosecurity, genetics and disease issues are managed under the *Fisheries Act*.
- Disturbance of marine plants or declared Fish Habitat Areas are managed under the *Fisheries Act*.
- Transport matters are managed under the *Transport Infrastructure Act 1994*.

64 For more information refer to the DERM website: www.DERM.qld.gov.au/

- Indigenous cultural heritage is managed under the *Aboriginal Cultural Heritage Act 2003*.
- Non-indigenous cultural heritage is managed under the *Queensland Heritage Act 1992*.

The legislation coordinated under SP Act is discussed in the following sections.

Fisheries Act 1994

- The Fisheries Act provides for:
 - management and protection of fish habitats, including protected marine plants and the declared Fish Habitat Area network
 - management of commercial, recreational and traditional fishing
 - prevention, control and eradication of disease in fish
 - management of aquaculture
 - managing the shark control program in waters adjacent to coastal swimming beaches.
- Aquaculture is defined under the Fisheries Act as ‘the cultivation of fisheries resources for sale’. All marine aquaculture activities require an RAA and a DA under the SP Act.
- The Fisheries Act also regulates other matters relevant to aquaculture, such as restrictions on possession and sale of regulated species, in-possession limits, take of fisheries resources, placement of fish into farm dams, and disturbance of protected marine plants or declared Fish Habitat Areas.
- DEEDI has published a number of policies providing guidance for decision-making for matters relating to aquaculture.⁶⁵
- An RAA under the Fisheries Act is required for interference with a declared Fish Habitat Area. The Fisheries Regulation 2008 limits the purposes for which an RAA may be granted.

- Under the Fisheries Regulation, tidal works (including fixed platforms) are not permitted to be undertaken within a Fish Habitat Management A Area. This includes the oyster growing areas at Moreton Island and Myora, and some oyster growing areas at Pimpama River and Pumicestone Passage. Construction of fixed platforms in Fish Habitat Management B Areas requires oyster growers to apply for an amendment to their RAA for interference with a declared Fish Habitat Area.

Coastal Protection and Management Act 1995

The Draft Queensland Coastal Management Plan was prepared in 2009 to address the findings of the review of the State Coastal Management Plan.

The Queensland Coastal Plan is expected to be finalised in the near future. Refer to the DERM website (http://www.derm.qld.gov.au/environmental_management/coast_and_oceans/coastal_management/index.html) for more information.

The purpose of the Queensland Coastal Plan will be to achieve the objectives of the *Coastal Protection and Management Act 1995*.

The new Queensland Coastal Plan will be separated into two main policy components:

- State Policy Coastal Management which will provide policy guidance for effective maintenance, rehabilitation and protection activities on coastal land
- State Planning Policy Coastal Protection which will address land-use planning and development assessment decision making within the coastal zone.

The State Policy Coastal Management is primarily aimed at local governments and other authorities or trustees responsible for managing and maintaining State coastal land.

⁶⁵ These policies are available on the DEEDI website: www.dpi.qld.gov.au

The State Planning Policy Coastal Protection (SPP) will ensure the objects of the Coastal Protection and Management Act are considered during development assessment and land-use planning within the coastal zone under IPA. A State Planning Policy must be taken into account:

- when planning instruments are being made or amended,
- when land is designated for community infrastructure, or
- when development applications are being assessed.

Coastal matters to be addressed by the SPP include:

- The effects of coastal hazards on people and property
- Conserving ecological values including protection of areas of high ecological significance
- Preserving opportunities for maritime development and aquaculture development
- Informing urban settlement patterns in the coastal zone
- Natural fluctuations of the coast, including as a result of sea level rise
- Maintaining physical coastal processes
- Preserving scenic amenity on the coast
- Maintaining public access to the coast
- Providing for public infrastructure development such as road and rail transport and ports.

The construction of any fixed platform is considered to be tidal works under the Coastal Protection and Management Act.

- Any fixed platform will require a DA to undertake tidal works under the provisions of SP Act.
 - Rack aquaculture with piling into the tidal land substrate would be tidal works (or prescribed tidal work within a Local Government Tidal Area).
 - However, sea ranching and line ranching with mooring anchors (as long as there are no working platforms or piling imbedded in the tidal land substrate) would not be tidal works or prescribed tidal work.

- Assessment of aquaculture tidal works by DERM is against DERM's building and engineering standards and state and regional coastal management plan policies.
- If the site is within a Local Government Tidal Area, the works are 'prescribed tidal works' and are assessed by local government against the IDAS code for prescribed tidal work (consistent with DERM's building and engineering standards) and DERM as concurrency agency against state and regional coastal management plan policies.

Environmental Protection Act 1994

Where an aquaculture facility cultivates or holds marine, estuarine or freshwater organisms (other than molluscs) in ponds or tanks or in enclosures in waters (impoundments) of greater than 5 ha or discharges waste, approval is required for an environmentally relevant activity under the *Environmental Protection Act 1994* (EP Act). Environmentally relevant activity approvals are issued and administered by the DERM.

Both rack and line and ranching aquaculture activities will not require assessment under the EP Act in regard to the aquaculture component of the activity.

The EP Act also places a general environmental duty on a person carrying out an activity that causes, or is likely to cause, environmental harm, to take all reasonable and practicable measures to prevent or minimise the harm. This duty applies to any proposed aquaculture activities. Activities related to cleaning or maintenance of aquaculture structures will have to comply with this general duty of care.

Associated activities such as fuel and chemical storage and aquaculture feed processing are 'environmentally relevant activities' that may require approval.

Transport Infrastructure Act 1994

This legislation deals with transport matters. Marine aquaculture activities (and all tidal works) may need to consider transport infrastructure matters if located near a port, marina etc.

Water Act 2000

This legislation deals with interference with fresh water. This is unlikely to affect aquaculture operations in tidal areas.

Aboriginal Cultural Heritage Act 2003

The Aboriginal Cultural Heritage Act is intended to provide effective recognition, protection and conservation of Aboriginal cultural heritage.

Under s. 23 of the Aboriginal Cultural Heritage Act, a person who carries out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage (the 'cultural heritage duty of care'). An activity will comply with the cultural heritage duty of care if it is undertaken in accordance with gazetted cultural heritage duty of care guidelines. An assessment of an activity against the duty of care guidelines will help determine whether, or to what extent, Aboriginal cultural heritage may be harmed by the activity. It will also help determine whether a search of the cultural heritage database and register needs to be undertaken.

Queensland Heritage Act 1992

This legislation deals with non-Indigenous cultural heritage.

Resource Allocation Approvals

Matters of resource allocation (i.e. approvals for the use of state resources) are not issued under the SP Act. Therefore a separate approval known as an RAA is required where developments involve the taking, or interfering with a state resource such as water, wild fisheries stock, or access to state land and/or waters. RAAs are issued under a number of Acts (e.g. Fisheries Act, Queensland coastal plan) and provide the state's consent as owner of the resource. For developments on unallocated tidal land in Queensland waters (such as rack, line and sea ranching types of aquaculture), an RAA under the Fisheries Act is required.

Marine Parks Act 2004

Marine parks are established under the Marine Parks Act over tidal lands and waters to protect their conservation values while allowing for planned use. Marine parks in Queensland are generally divided into zones, with the zoning plan defining access and use provisions for each zone. A Marine Parks Permit would be required to authorise marine aquaculture activities in applicable zones within the boundaries of a state marine park. Marine park assessments may consider issues such as impacts to the natural and cultural values, the management plan for the marine park, impacts to existing use and amenity. The *Marine Parks (Great Sandy) Zoning Plan 2006* commenced on the 31 August 2006.

Nature Conservation (Wildlife) Act 1994

The relevant regulations are:

- Nature Conservation (Protected Areas) Regulation 1994
- Nature Conservation (Dugong) Conservation Plan 1999
- Nature Conservation (Whales and Dolphins) Conservation Plan 1997
- Nature Conservation (Administration) Regulation 2006
- Nature Conservation (Protected Areas Management) Regulation 2006
- Nature Conservation (Wildlife Management) Regulation 2006

- Nature Conservation (Wildlife) Regulation 2006.

This legislation deals with rare and threatened species, and may be relevant for issuing of damage mitigation permits.⁶⁶

Transport Operations (Marine Safety) Act 1994

This legislation deals with maritime safety requirements for vessels operating in the marine environment.

Commonwealth

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) applies where an aquaculture proposal may significantly impact on matters of national environmental significance (NES).

There are eight matters of NES, including:

- World Heritage properties
- National Heritage places
- wetlands of international importance (Ramsar wetlands)
- threatened species and ecological communities
- migratory species
- Commonwealth marine areas
- nuclear matters (including uranium mining)
- the Great Barrier Reef Marine Park.

The Australian Government does not administer legislation to directly authorise or manage aquaculture

developments. However, for actions that may significantly impact on matters of NES, referral, assessment and approval under the EPBC Act may be required. Matters of NES within the Great Sandy region include the Fraser Island World Heritage area and the Great Sandy Strait Ramsar area, as well as all cetaceans, dugongs, migratory birds and turtles and other listed threatened and migratory species that visit the area.

There are a number of provisions under the EPBC Act that allow the state and Commonwealth governments to streamline environmental assessment processes while continuing to protect matters of NES. A conservation agreement can assist in doing this while ensuring any impacts of activities on matters of NES are mitigated. The agreement may do this by ‘controlling or prohibiting, in any place covered by the agreement, actions or processes that might adversely affect ... matters of NES’.

The agreement may also include a declaration that certain actions or classes of actions do not need approval under Part 9 if the Commonwealth Environment Minister is satisfied these actions are not likely to have a significant impact on a matter of NES. This means that if an action is undertaken in accordance with the terms of the conservation agreement it will not need to be referred to SEWPAC for assessment under the EPBC Act.

Any interaction with fauna listed under the EPBC Act will still need to be reported to SEWPAC within seven days of ‘being aware of the results of your activity’.

The proposed extension to the Fraser Island World Heritage area, submitted for consideration in early 2010, includes the Cooloola section of the Great Sandy National Park, the Breaksea Spit to the north of Fraser Island, Platypus Bay, the Great Sandy Strait/Tin Can Bay Ramsar area and the Wide Bay Military Reserve. It is anticipated that a decision on whether this proposal will be inscribed will take a number of years and will follow this plan taking effect.

⁶⁶ See websites below: (www.DERM.qld.gov.au/ecoaccess/plants_and_animals/land_management/native_animal_management) (www.DERM.qld.gov.au/publications/p00928aa.pdf/Damage_mitigation_permit.pdf)

Agricultural and Veterinary Chemicals Code Act 1994

The Agricultural and Veterinary Chemicals Code Act contains the Agvet Code, which sets out the requirements for the Australian Pesticides and Veterinary Medicines Authority (APVMA) to evaluate, approve or register and review active constituents and agricultural and veterinary chemical products (and their associated labels); issue permits and licences for the manufacture of chemical products; provide for controls to regulate the supply of chemical products; and ensure compliance with the Agvet Code.

Before an agricultural or veterinary chemical product can be legally imported, supplied, sold or used in Australia, it must be registered by the APVMA. The product registrant must establish to the APVMA that the product meets criteria of:

- product quality
- human and animal health and safety
- efficacy
- environmental safety
- not affecting international trade.

Summary of legislative framework for aquaculture under the GSRMAP

Assessable aquaculture development

Aquaculture is defined as ‘the cultivation of fisheries resources for sale’. All marine aquaculture developments require a DA under the SP Act, which may involve input from several agencies.

Activity	Approval type	Assessment agency	Assessment guide	Relevant legislation
Aquaculture operations: <ul style="list-style-type: none"> • biosecurity/genetics • disease 	DA under SP Act for Material Change Use	DEEDI	GSRMAP	<i>Fisheries Act 1994</i>
Tidal works (structures on tidal land outside council jurisdiction): <ul style="list-style-type: none"> • racks (oyster furniture) • fixed platforms (working areas) Note: Does <i>not</i> apply to: <ul style="list-style-type: none"> • sea ranching • line aquaculture on moorings • floating platforms on moorings 	DA under SP Act for Material Change Use	DERM	GSRMAP	<i>Queensland coastal plan</i>
Disturbance of marine plants or declared Fish Habitat Areas (outside scope of Self-Assessable Codes)	DA under SP Act for Operational Works	DEEDI	GSRMAP	<i>Fisheries Act 1994</i>
Activities that may affect transport matters (e.g. marking of structures)	DA conditions to accommodate DTMR interests	DEEDI (MSQ advice)	GSRMAP	<i>Transport Infrastructure Act 1994</i>
Activities that may affect Indigenous cultural heritage	DA conditions to accommodate Indigenous interests	Assessment Manager	GSRMAP	<i>Aboriginal Cultural Heritage Act 2003</i>
Activities that may affect non-Indigenous cultural heritage	DA conditions to accommodate cultural interests	Assessment Manager	GSRMAP	<i>Queensland Heritage Act 1992</i>
Future works in area over which there is a native title claim	Requirement for native title notification	Assessment Manager	GSRMAP	<i>Native Title (Queensland) Act 1993</i>

Non-development activities

The following activities may be relevant to carrying out aquaculture.

Activity	Approval type	Assessment agency	Assessment guide	Relevant legislation
Access/use of tidal land for aquaculture activities	RAA	DEEDI	GSRMAP	<i>Fisheries Act 1994</i>
Impacts on matters of national environmental significance	RAA (is consistent with EPBC Act requirements)	DEEDI	GSRMAP	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
Works in a marine park (fore and aft mooring configurations count as one mooring, so a Marine Parks Permit is not required to install the buoy moorings)	RAA (includes marine park issues)	DEEDI	GSRMAP	Marine parks legislation
Buoy moorings—if permanently moored	Approval to install such a buoy mooring	MSQ	GSRMAP	<i>Transport Operations (Marine Safety) Act 1994</i>
Platforms for working—over 16 m length	Must be registered	MSQ	GSRMAP	<i>Transport Operations (Marine Safety) Act 1994</i>
Activities related to cleaning or maintenance of aquaculture structures	N/A (duty of care)		GSRMAP	Must comply with duty of care under the <i>Environmental Protection Act 1994</i>

Assessable aquaculture development—outside the scope of the GSRMAP

Aquaculture is defined as ‘the cultivation of fisheries resources for sale’. All marine aquaculture developments require a DA under the SP Act, which may involve input from several agencies.

Activity	Approval type	Assessment agency	Assessment guide	Relevant legislation
Environmentally relevant activities: <ul style="list-style-type: none"> • Non-mollusc aquaculture (ranching) if enclosed and <5 ha <ul style="list-style-type: none"> –Seafood ‘processing’ >100 tonne per year 	DA under SP Act for Material Change Use	DERM	<i>Environmental Protection Act 1994</i>	<i>Fisheries Act 1994</i>
Land-based facilities (e.g. hatchery, storage sheds etc.)	DA under SP Act for Material Change Use	DEEDI, DERM, local government	Various Acts	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)

**Other activities associated with taking and moving aquaculture animals—
outside the scope of the GSRMAP**

Activity	Approval type	Assessment agency	Assessment guide	Relevant legislation
Collection, possession and sale of regulated species from the wild	Authority to take General Fisheries Permit	DEEDI	<i>Fisheries Act 1994</i>	<i>Fisheries Act 1994</i>
	Permit for take of or impact on protected species in or on a Commonwealth area	SEWPAC	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)	
	Permit for take of protected species	Great Barrier Reef Marine Park Authority	<i>Great Barrier Reef Marine Park Act 1975</i>	
Purchase of broodstock from licensed commercial fishers	Docket of sale may be required	DEEDI	<i>Fisheries Act 1994</i>	<i>Queensland coastal plan</i>
Translocation of aquatic animals into Queensland from other states	Translocation approval	DEEDI	<i>Fisheries Act 1994</i>	<i>Fisheries Act 1994</i>
Importation of aquatic animals from outside Australia	Import permit	Australian Quarantine and Inspection service	<i>Quarantine Act 1908</i> , etc.	<i>Transport Infrastructure Act 1994</i>
Food safety (if product is for human consumption)	Compliance with Food Safety Program	Safe Food Queensland, Queensland Health	<i>Food Act 2006</i> , <i>Food Production Safety Act 2000</i>	<i>Aboriginal Cultural Heritage Act 2003</i>
Maritime safety (vessels)	Vessel licensing	DTMR	<i>Transport Operations (Marine Safety) Act 1994</i>	<i>Queensland Heritage Act 1992</i>
Impacts on rare and threatened species (other than matters of national environmental significance ⁶⁷) Only relevant for predator control—unlikely to be relevant for rack, line and sea ranching aquaculture	Damage mitigation permit	DERM	<i>Nature Conservation (Wildlife) Act 1994</i>	<i>Native Title (Queensland) Act 1993</i>

⁶⁷ NES matters are those of National Environmental Significance under the EPBC Act.

Appendix 5—Site coordinates (decimal degrees and GPS)

Double Island Point—surface lines

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
Site 1	200	11–16.4	153.146984	-25.907716	153 8.81904	-25 54.46296
			153.155484	-25.907697	153 9.32904	-25 54.46182
			153.155529	-25.927697	153 9.33174	-25 55.66182
			153.147029	-25.927716	153 8.82174	-25 55.66296

Inskip Point—sea ranching

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
AA 802	5	~ 0–5m	153.063901	-25.816301	153 3.83406	-25 48.97806
			153.066501	-25.818701	153 3.99006	-25 49.12206
			153.065601	-25.819601	153 3.93606	-25 49.17606
			153.063101	-25.817223	153 3.78606	-25 49.03338

Wide Bay Bar—subsurface lines

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
Site 45	500	~ 10–15	153.107527	-25.885029	153 6.45162	-25 53.10174
			153.095865	-25.841629	153 5.75190	-25 50.49768
			153.105840	-25.839042	153 6.35034	-25 50.34252
			153.117340	-25.882433	153 7.04034	-25 52.94598
Site 33	1000	6.7–26.3	153.098724	-25.715356	153 5.92344	-25 42.92136
			153.118529	-25.714691	153 7.11174	-25 42.88146
			153.120010	-25.759556	153 7.20060	-25 45.57336
			153.100232	-25.760208	153 6.01392	-25 45.61248

Wide Bay Harbour—surface lines

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
Site 34	5	16–19	153.026583	-25.788506	153 1.594920	-25 47.310300
			153.023378	-25.785388	153 1.402620	-25 47.123220
			153.023996	-25.784752	153 1.439700	-25 47.085120
			153.027201	-25.787870	153 1.632000	-25 47.272200

Wide Bay Harbour—surface lines (continued)

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
Site 7(a)	5	4–6	152.973110	-25.711140	152 58.40322	-25 42.78846
			152.973387	-25.713141	152 58.27128	-25 42.8067
			152.971188	-25.713445	152 58.25472	-25 42.6867
			152.970912	-25.711445	152 58.35342	-25 42.4284
Site 7(b)	5	4–6	152.970911	-25.711444	152 58.38660	-25 42.6684
			152.970635	-25.709445	152 58.40322	-25 42.78846
			152.972834	-25.709140	152 58.27128	-25 42.8067
			152.973111	-25.711140	152 58.25472	-25 42.6867
Site 7(c)	5	4–6	152.972557	-25.707140	152 58.35342	-25 42.4284
			152.972834	-25.709140	152 58.37004	-25 42.5484
			152.970635	-25.709445	152 58.23810	-25 42.5667
			152.970358	-25.707444	152 58.22148	-25 42.44664
Site 7(d)	5	4–6	152.970082	-25.705444	152 58.20486	-25 42.32664
			152.972280	-25.705139	152 58.33686	-25 42.30834
			152.972557	-25.707140	152 58.35342	-25 42.42846
			152.970358	-25.707444	152 58.22148	-25 42.44664
Site 32	25	3–4	152.975181	-25.700824	152 58.51086	-25 42.04944
			152.974369	-25.691822	152 58.46214	-25 41.50932
			152.976619	-25.691619	152 58.59714	-25 41.49714
			152.977432	-25.700621	152 58.64592	-25 42.03726

Tinnanbar—racks

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
AA 834	5.6	~ 2–5	152.943501	-25.750001	152 56.61006	-25 45.00006
			152.942351	-25.750098	152 56.54106	-25 45.00588
			152.942425	-25.746453	152 56.54550	-25 44.78718
			152.944065	-25.746562	152 56.64390	-25 44.79372
AA 889	7.9	~ 2–5	152.957601	-25.685201	152 57.45606	-25 41.11206
			152.957312	-25.685925	152 57.43872	-25 41.1555
			152.955906	-25.685401	152 57.35436	-25 41.12406
			152.954507	-25.680977	152 57.27042	-25 40.85862
			152.955597	-25.680832	152 57.33582	-25 40.84992
AA 874	11.4	~ 2–5	152.961401	-25.694701	152 57.68406	-25 41.68206
			152.961617	-25.692049	152 57.69702	-25 41.52294
			152.965399	-25.699695	152 57.92394	-25 41.9817
			152.963962	-25.700052	152 57.83772	-25 42.00312
AA 875	8.5	~ 2–5	152.961401	-25.694701	152 57.68406	-25 41.68206
			152.959524	-25.684613	152 57.57144	-25 41.07678
			152.960484	-25.684211	152 57.62904	-25 41.05266
			152.961623	-25.692038	152 57.69738	-25 41.52228

Tinnanbar—racks (continued)

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
Site 42	50	~ 0.5–6.0	152.942359	-25.743994	152 56.54154	-25 44.63964
			152.948059	-25.737101	152 56.88354	-25 44.22606
			152.951907	-25.740281	152 57.11442	-25 44.41686
			152.946226	-25.747179	152 56.77356	-25 44.83074
Site 41	50	~ 0.8–6.0	152.923312	-25.704109	152 55.39872	-25 42.24654
			152.918603	-25.696505	152 55.11618	-25 41.7903
			152.922847	-25.693876	152 55.37082	-25 41.63256
			152.927567	-25.701464	152 55.65402	-25 42.08784
Site 31	50	2.0–4.0	152.939786	-25.726424	152 56.38716	-25 43.58544
			152.943240	-25.722819	152 56.59440	-25 43.36914
			152.949703	-25.728990	152 56.98218	-25 43.7394
			152.946244	-25.732614	152 56.77464	-25 43.95684
Site 9	50	0.5–2.0	152.970924	-25.676867	152 58.25544	-25 40.61202
			152.975916	-25.676876	152 58.55496	-25 40.61256
			152.975916	-25.685812	152 58.55496	-25 41.14872
			152.970907	-25.685812	152 58.25442	-25 41.14872
Site 10	50	0.5–2.5	152.912426	-25.639975	152 54.74556	-25 38.3985
			152.917045	-25.637912	152 55.02270	-25 38.27472
			152.920703	-25.646066	152 55.24218	-25 38.76396
			152.916132	-25.648116	152 54.96792	-25 38.88696

Big Woody Island—sea ranching

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
AA 815	74.7	~ 1	153.015001	-25.241667	153 0.90006	-25 14.50002
			153.028301	-25.241667	153 1.69806	-25 14.50002
			153.028301	-25.246667	153 1.69806	-25 14.80002
			153.015001	-25.246667	153 0.90006	-25 14.80002
AA 820	14	~ 1	152.908666	-25.302501	152 54.51996	-25 18.15006
			152.908666	-25.315001	152 54.51996	-25 18.90006
			152.907666	-25.315001	152 54.45996	-25 18.90006
			152.907666	-25.302501	152 54.45996	-25 18.15006
Site 12	200	1–4	152.936080	-25.309415	152 56.16480	-25 18.5649
			152.941092	-25.300831	152 56.46552	-25 18.04986
			152.951598	-25.318476	152 57.09588	-25 19.10856
			152.956610	-25.309891	152 57.39660	-25 18.59346
Site 14	200	1–5	153.015274	-25.249913	153 0.91644	-25 14.99478
			153.007966	-25.256652	153 0.47796	-25 15.39912
			153.020149	-25.269862	153 1.20894	-25 16.19172
			153.027456	-25.263124	153 1.64736	-25 15.78744

Moon Point—surface lines

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
AA 816	50.4	~ 10–15	153.0096	-25.2874	153 0.57600	-25 17.24400
			153.0134	-25.2845	153 0.80399	-25 17.07000
			153.0071	-25.2775	153 0.42600	-25 16.64999
			153.0033	-25.2804	153 0.19799	-25 16.82400
AA 817	50.4	~ 10–15	153.008858	-25.273204	153 0.53148	-25 16.39224
			153.012686	-25.270328	153 0.76116	-25 16.21968
			153.019013	-25.277289	153 1.14078	-25 16.63734
			153.015185	-25.280165	153 0.91110	-25 16.8099
AA 818	50.4	~ 10–15	153.009626	-25.287371	153 0.57756	-25 17.24226
			153.013477	-25.284519	153 0.80862	-25 17.07114
			153.019751	-25.291522	153 1.18506	-25 17.49132
			153.015899	-25.294373	153 0.95394	-25 17.66238
AA 819	50.4	~ 10–15	153.031771	-25.305858	153 1.90626	-25 18.35148
			153.036738	-25.305857	153 2.20428	-25 18.35142
			153.036741	-25.314888	153 2.20446	-25 18.89328
			153.031773	-25.314889	153 1.90638	-25 18.89334

Pearl Bank—surface lines

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
Site 15	25	7–10	152.919018	-25.235852	152 55.14108	-25 14.15112
			152.920766	-25.234042	152 55.24596	-25 14.04252
			152.927214	-25.240269	152 55.63284	-25 14.41614
			152.925466	-25.242079	152 55.52796	-25 14.52474
Site 16	25	7–10	152.899444	-25.224215	152 53.96664	-25 13.4529
			152.901193	-25.222405	152 54.07158	-25 13.3443
			152.907641	-25.228632	152 54.45846	-25 13.71792
			152.905892	-25.230443	152 54.35352	-25 13.82658
Site 43	1000	~ 10–11.5	152.715401	-25.149702	152 42.92406	-25 8.98212
			152.715401	-25.121329	152 42.92406	-25 7.27974
			152.746767	-25.121329	152 44.80602	-25 7.27974
			152.746767	-25.149702	152 44.80602	-25 8.98212
Site 44	1000	~ 6–10	152.775952	-25.201724	152 46.55712	-25 12.10344
			152.775952	-25.173351	152 46.55712	-25 10.40106
			152.807318	-25.173351	152 48.43908	-25 10.40106
			152.807318	-25.201724	152 48.43908	-25 12.10344

Coongul Point—subsurface lines

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
Site 18	1000	8–15	153.007397	-25.114139	153 0.44382	-25 6.84834
			153.025367	-25.122492	153 1.52202	-25 7.34952
			153.006423	-25.163188	153 0.38538	-25 9.79128
			152.988482	-25.154836	152 59.30892	-25 9.29016

Burnett—surface lines

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
Site 39	1000	~ 6–11	152.601722	-25.052369	152 36.10332	-25 3.14214
			152.562365	-25.030802	152 33.74190	-25 1.84812
			152.571891	-25.013424	152 34.31346	-25 0.80544
			152.611242	-25.035021	152 36.67452	-25 2.10126
Site 47	1000	~ 6–10	152.115764	-24.569742	152 6.94584	-24 34.18452
			152.087543	-24.534848	152 5.25258	-24 32.09088
			152.102952	-24.522387	152 57.10290	-24 31.34322
			152.131159	-24.557307	152 7.86954	-24 33.43842
Site 48	1000	~ 6–10	152.179157	-24.621325	152 10.74942	-24 37.2795
			152.148618	-24.588441	152 8.91708	-24 35.30646
			152.163139	-24.574956	152 9.78834	-24 34.49736
			152.193666	-24.607867	152 11.61996	-24 36.47202

Hervey Bay—sea ranching/subsurface lines

Site	Size (ha)	Depth (m)	Latitude/longitude (decimal degrees)		Latitude/longitude (GPS—degrees decimal minutes)	
AA 811	3744.8	~ 18	152.616666	-24.900001	152 36.99996	-24 54.00006
			152.683333	-24.900001	152 40.99998	-24 54.00006
			152.683333	-24.950001	152 40.99998	-24 57.00006
			152.616666	-24.950001	152 36.99996	-24 57.00006
AA 812	3276.7	~ 18	153.083333	-24.950001	153 4.99998	-24 57.00006
			153.141666	-24.950001	153 8.49996	-24 57.00006
			153.141666	-25.000001	153 8.49996	-25 0.00006
			153.083333	-25.000001	153 4.99998	-25 0.00006

Appendix 6—Considerations when undertaking ecological studies

Accurate assessment and monitoring of potential impacts from marine aquaculture is often difficult to achieve, because of the highly variable nature of coastal marine environments. The difficulties of detecting human impacts against the natural background variability place significant limitations on the ability to use environmental monitoring to achieve environmental management outcomes. The University of Sydney’s Centre for Research on Ecological Impacts of Coastal Cities highlights the difficulties in impact detection: ‘Predicting, measuring and interpreting impacts are hamstrung by poor sampling and analysis—often dictated by inadequate statutory requirements for Environmental Impact Statements. One major problem is that natural ecological assemblages of species vary enormously from time to time and place to place. Thus, even when undisturbed by people, ecological patterns are very different from place to place and change rapidly from time to time. Determining how best to identify, measure and interpret (and, ultimately, predict, manage and prevent) impacts requires intensive research effort.’⁶⁸

⁶⁸ For more information, visit the Centre for Research on Ecological Impacts of Coastal Cities website at <http://eicc.bio.usyd.edu.au>

	(a) Monitoring against ‘baseline’ values	(b) Monitoring against agreed threshold limits	
Purpose	To detect any departure from ‘baseline’ values	To detect whether values exceed previously agreed threshold limits.	
Limitations	‘Baseline’ values are usually a snapshot of the environment at an arbitrary point in time. This is not a true baseline because the marine inshore environment is extremely variable over time	Threshold limits must be defined up front based on the best available knowledge	
Advantages	Rapid assessments can be relatively simple to undertake and the cost is appropriate for a low level of risk. Any unusual results can trigger the need for a closer investigation	Rapid assessments can be relatively simple to undertake and the cost is appropriate for a low level of risk. Any unusual results can trigger the need for a closer investigation	
Requirements for the environmental indicator(s) to be measured	Capable of being sampled/ measured within a practical timeframe	Capable of being sampled/ measured within a practical timeframe	
Can a significant impact be detected?	No Any unusual results may simply reflect natural variability	No Any unusual results may simply reflect natural variability	
Can an impact caused by the aquaculture activity be distinguished from natural variability, or an unrelated source of impact?	No Any unusual results may simply reflect natural variability	No Any unusual results may simply reflect natural variability	
Can a detected impact be evaluated in terms of its effect on the environment?	No	No	

	(c) MBACI impact assessment	(d) Modelling
	To scientifically test whether an aquaculture activity causes a particular type of impact (as distinct from natural variability or impacts from unrelated sources)	To test scenarios, such as predicting the likely impact of a particular activity on a natural system
	To account for the large amount of natural variability in marine environments, a scientifically valid impact assessment is complex, lengthy and resource-intensive The environmental cost of taking large numbers of samples will need to be justified.	Models are only of value if the data input is sufficient Marine environmental datasets available for this region are limited Unlikely that meaningful models could be developed for any ecological values at this stage
	Provides a scientifically valid answer to the question of whether or not an activity causes a particular impact	Can be developed from desktop studies rather than field studies
	Capable of being sampled/ measured within a practical timeframe	Adequate datasets must be available
	Yes Properly designed impact assessments account for natural variability and can determine whether or not an impact has occurred, and if it is statistically significant	Ability to detect impacts depends on the robustness of the model and the available data
	Yes Properly designed impact assessments account for natural variability and can distinguish the impacts of an activity from natural variability or unrelated sources of impact	Ability to detect impacts depends on the robustness of the model and the available data
	No Impact assessment will only determine whether there is a statistical difference, not the environmental implications of that difference Interpretation by qualified ecologist is required	No Interpretation by a qualified ecologist is required to evaluate the implication of any results

Acronyms

APVMA	Australian Pesticides and Veterinary Medicines Authority	IDAS	Integrated development assessment system—the process for assessment of applications under the <i>Sustainable Planning Act 2009</i> (formerly the <i>Integrated Planning Act 1997</i>)
ASQAP	Australian Shellfish Quality Assurance Program	MBACI	Multiple before–after control impact
DA	Development Approval for material change of use (for aquaculture) issued under the <i>Sustainable Planning Act 2009</i> (formerly the <i>Integrated Planning Act 1997</i>)	MSQ	Maritime Safety Queensland (part of the Department of Transport and Main Roads)
DEEDI	Department of Employment, Economic Development and Innovation (Queensland)	NES	Matters of national environmental significance (under the EPBC Act)
DERM	Department of Environment and Resource Management (Queensland)	RAA	Resource Allocation Authority (issued for aquaculture purposes under the <i>Fisheries Act 1994</i>)
SEWPAC	Department of Sustainability, Environment, Water, Population and Communities (formerly the Department of the Environment, Water, Heritage and the Arts) (Commonwealth)	SCMP	State coastal management plan
DTMR	Department of Transport and Main Roads (Queensland)	SP Act	<i>Sustainable Planning Act 2009</i> (formerly the <i>Integrated Planning Act 1997</i>)
EP Act	<i>Environmental Protection Act 1994</i> (Queensland)		
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)		
GIS	Geographic information system		
GSRMAP	Great Sandy Regional Marine Aquaculture Plan		
HEV	High environmental value waters		

