Report Supporting the Draft Aquaculture (Zones – Lower Eyre Peninsula) Policy 2023

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Government of South Australia
Department of Primary Industries and Regions

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1. INTRODUCTION

On a global scale, 46% of seafood produced was from aquaculture in 2018 (FAO, 2020). Future expectation is that by 2030, aquaculture will produce 53% of global seafood production to meet the ever-increasing global seafood demand (FAO, 2020). In Australia, aquaculture is the fastest growing primary industry (9% growth per year), expected to soon reach $2 billion per year (ABARES, 2022). South Australia is in a prime position to contribute to that growth as a world leader in the ecologically sustainable development of aquaculture. South Australia's total value of seafood production (landed) in 2021/22 was $435.1 million, of which aquaculture contributed more than half ($237.9m) with wild-catch fisheries making up the balance ($197.2m) (BDO EconSearch, 2023). South Australia produced 14% of Australia's total aquaculture production and 11% of the gross value of aquaculture production in 2020/21 (ABARES, 2022).

The aquaculture industry in South Australia has developed since the oyster industry began commercial production in the 1980s. South Australia is now home to the most diverse range of aquaculture sectors in Australia. In 2021/22, total aquaculture production was 20,737 tonnes. In aggregate, Tuna was the largest single sector in the State's aquaculture industry, accounting for almost 46 per cent of the State's gross value of aquaculture production in 2021/22. The other three main sectors were Oysters (20 per cent - highest value on record), Marine Finfish (17 per cent – highest value on record) and Abalone (7 per cent) (BDO EconSearch, 2023).

South Australia's aquaculture industry created an estimated 1,296 Full Time Equivalent (FTE) jobs (815 on-farm and 480 in downstream activities) through direct employment and 1,547 flow-on jobs, giving total employment of 2,843 FTE in 2021/22. Approximately 62% of these jobs were generated in regional South Australia (BDO EconSearch, 2023).

The *Aquaculture Act 2001* (the Act), provides a strong regulatory framework for aquaculture in South Australia, and is instrumental for supporting continued industry growth and sustainable development. The subordinate regulatory framework (i.e. aquaculture policies and regulations) must be periodically reviewed and amended to ensure it keeps pace with industry development, latest scientific information and emerging "best practice" production techniques and to tailor regulation to the unique challenges and emerging opportunities presented by the various industry sectors.

Section 11 of the Act allows the Minister responsible for the administration of the Act to make aquaculture policies for any purpose directed towards furthering the objectives of the Act:

a) to promote ecologically sustainable development of marine and inland aquaculture;

b) to maximise benefits to the community from the State's aquaculture resources; and

c) otherwise to ensure the efficient and effective regulation of the aquaculture industry.

The Aquaculture zone policies established under the Act, provide a multi-use spatial planning approach. They identify areas suitable for aquaculture development, while accommodating future innovation, including the species being farmed, the infrastructure and technology used, ecologically sustainable practices, and the markets into which products are sold. When used effectively, aquaculture zoning is a method of pro-active planning for sustainable growth and development of the aquaculture industry in a region. There are currently 12 aquaculture zone policies established around the State. Government and public consultation processes allow for the design of zones to consider proximity to coastal reserves and national parks, marine parks, shipping channels, State heritage and aboriginal heritage areas, important commercial and recreational fishing grounds and access for the boating community, among other considerations.

Section 12 of the Act prescribes the procedures for making aquaculture policies, including new aquaculture zone policies and amendment of existing aquaculture zone policies through review. The legislated process requires input from a range of stakeholders, including government agencies,

aquaculture industry sectors, other marine users, local councils, and the wider community. The *Aquaculture (Zones – Lower Eyre Peninsula) Policy 2013* (the Current Policy) was last amended on 30 January 2014. The Current Policy covers one of the most diverse and in demand aquaculture areas within State Waters. All established aquaculture sectors are licensed to be farmed within the Current Policy's aquaculture zone boundaries.

In 2019, PIRSA commenced a review of the Current Policy to consider opportunities to support the sustainable growth of aquaculture for both the existing established aquaculture sectors (i.e. Southern Bluefin Tuna (SBT), finfish, mussel and oysters) and the emerging sectors, such as algae (i.e. seaweed). The review process aimed to ensure the Current Policy's continued relevance which maximises benefits to the community from the State's aquaculture resources.

The outcomes of the review resulted in the Draft Aquaculture (Zones - Lower Eyre Peninsula) Policy 2023 (the Draft Policy), which contains proposed amendments to the Current Policy. This Report summarises and provides further detail on the proposed amendments under the Draft Policy.

2. AQUACULTURE POLICY SUPPORTING REPORT

This Report supports the Draft Policy for the purpose of public consultation and was prepared in accordance with Section 12 of the Act, and contains:

- An explanation of the purpose and effect of the Draft Policy;
- A summary of any background and issues relevant to the Draft Policy and of the analysis and reasoning applied in formulating the Draft Policy; and
- An assessment of the consistency of the Draft Policy with any relevant state planning policy or regional plan, and the Planning and Design Code, under the *Planning, Development and Infrastructure Act 2016*; any relevant environment protection policy under the *Environment Protection Act 1993*; and any other relevant instruments prescribed by regulation (note that no other relevant instruments have been prescribed by regulation) (Appendix D).

The Report was developed to inform and involve all stakeholders in the decision-making process for the zoning of marine resources for aquaculture purposes. The Draft Policy and Report were made publicly available for approximately two and a half months inviting feedback, pursuant to section 12(5) of the Act, and extended by a month to provide further opportunity for feedback at the request of stakeholders. These documents were referred to, and submissions invited from prescribed bodies and relevant public authorities, including regional stakeholders, local indigenous communities, Native Title claimant/holder groups, local government, and the aquaculture industry. Following the consultation period and further targeted meetings with key stakeholders, the content of the submissions received were considered, and where relevant consequential amendments to the Draft Policy and Report were made (see section Amendments Following Public Consultation Process). All stakeholders who made a submission through the period of statutory consultation will receive a response outlining how their feedback has been incorporated in the final Policy and Report.

As prescribed by the Act, the concurrence of the Minister responsible for specially protected areas (i.e. Marine Parks) has been obtained for the Draft Policy to apply within these areas. In addition, following approval of the Draft Policy by the Minister, the approved 2023 Policy will be referred to the Environment, Resources and Development Committee (ERDC) of Parliament. The ERDC may approve, seek amendments or object to the 2023 Policy.

AMENDMENTS FOLLOWING PUBLIC CONSULTATION PROCESS

The Draft Policy and Report were initially released for public consultation from 14 November 2022 until 29 January 2023. Two public briefings were held as part of the consultation process to assist the content of any submissions, one in Port Lincoln on 7 December 2022 and one in Adelaide on 13 December 2022. Additional key stakeholder briefings were also undertaken (see Table 6). At the request of some stakeholders and to provide further opportunity for feedback, PIRSA reopened the public consultation period for all stakeholders inviting feedback until 16 April 2023.

Through the public consultation process, PIRSA received valuable feedback from stakeholders with the majority in support of the Draft Policy. The following is a list of amendments that were made to the Draft Policy and Report as a result of feedback received during the public consultation process:

Draft Policy:

- To provide further ecosystem services and nutrient uptake, in particular nutrient offsets from supplementary fed classes of aquaculture (Barrett et al, 2022), additional hectares have been provided for algae aquaculture in certain aquaculture zones. These are the Boston Bay sector and Bickers Isles sector of the Boston Bay aquaculture zone and the Lincoln (inner) sector of the Lincoln aquaculture zone. This will also provide for further sustainable growth of the algae aquaculture sector. The specific amendments to clauses in the Draft Policy are as follows:
  - Boston Bay aquaculture zone
    - Boston Bay sector

      - Clause 9(b)(i)

        - Leased area increased from 250 ha to 273 ha (i.e.23 ha increase)
    - Bickers Isles sector

      - Clause 9(d)(i)

        - Leased area increased from 60 ha to 80 ha (i.e. 20 ha increase)
  - Lincoln aquaculture zone
    - Lincoln (inner) sector

      - Clause 16(a)(i)

        - Leased area increased from 2000 ha to 2100 ha (i.e. 100 ha increase)

      - Clause 16(a)(ii)

        - Provision added to maintain the area for farming prescribed wild caught tuna at a maximum of 2000 ha or, some other amount specified by the Minster via Gazette notice. This other amount cannot exceed the overall leased area sector total of 2100 ha.

      - Clause 16(a)(iii)

        - Provision added to specify the area for farming algae must not exceed a maximum of 100 ha or, some other amount specified by the Minster via Gazette notice. This other amount cannot exceed the overall leased area sector total of 2100 ha.

Report:

- In section 7.2 (Carrying capacity and biomass limits), the wording has been strengthened to further clarify how the finer scale modelled nutrient outputs (converted to estimated biomass) within each flushing area will be used to refine and manage biomass limits within aquaculture zones and sectors. This will be achieved at the lease/licence application assessment level (e.g. spatial

allocation during lease movement applications within/between sectors, new lease/licence applications), like other site based risks, which is the current legislated application assessment process.

All stakeholders who made a submission through the period of statutory consultation will receive a response outlining how their feedback has been considered or incorporated into the Policy and Report.

3. AQUACULTURE ZONING FRAMEWORK

The 12 aquaculture zone policies prescribed in South Australia where aquaculture is either excluded or permitted occupy approximately 425,024 ha or 7% of State waters. This equates to approximately 0.2% of State waters currently available for aquaculture within aquaculture zones, of which 0.06% was held as aquaculture leases in 2020-21 (PIRSA, 2022).

3.1 Aquaculture Exclusion Zones

Aquaculture zone policies are a legislative instrument which can prohibit aquaculture from occurring within designated areas of State waters through prescribing aquaculture exclusion zones. This includes areas considered to be: of environmental significance (e.g. Marine Park Sanctuary Zones and Restricted Access Zones, National Parks); of cultural significance (e.g. sites with Aboriginal heritage, historical artefacts, historical shipwrecks); necessary to maintain access (e.g. shipping routes, recreational and commercial boating channels, significant recreational and commercial fishing grounds); or restrict access through authorities providing exclusive rights of occupation to the seabed; among other considerations. More than half (52%) of the area allocated to aquaculture zone policies in State waters is comprised of aquaculture exclusion zones (PIRSA, 2022).

3.2 Aquaculture Zones

An aquaculture zone policy can also identify a general area of State waters in which aquaculture has been deemed suitable to occur through prescribing aquaculture zones. Note that an aquaculture zone itself does not involve or propose the grant of any individual aquaculture lease and corresponding licence to undertake aquaculture within its boundaries, as it is a separate application assessment and approval process under the Act that is not part of the aquaculture zone policy development process. Approximately 48% of the area allocated to aquaculture zone policies in State waters is set aside to allow aquaculture production to occur within (i.e. aquaculture zones), however only between 5-15% of this area is generally leased for aquaculture at any one time (i.e. equating to approximately 0.2% of State waters; see section 3.5.1 for further details) (PIRSA, 2022).

Within each aquaculture zone, an aquaculture zone policy can designate whether new applications for aquaculture leases may only be made in accordance with a public call for applications (see section 3.3), what classes of aquaculture will be permitted to occur (refer to section 3.4), and prescribed criteria that apply in determining applications for individual aquaculture licences (refer to section 3.5).

Note that aquaculture can occur outside of an aquaculture zone, but it must initially operate under an aquaculture pilot lease and corresponding licence, and after a period of three years, can be converted into a production lease. The approvals process is generally simpler and more cost effective inside aquaculture zones because of the prior regulatory and assessment processes that are undertaken during the development and approval of the aquaculture zone policy. Specifically, a number of legislated referrals to other agencies, and technical investigations to provide environmental information are conducted when an aquaculture zone policy is being developed or reviewed and is therefore not required to be duplicated for applications located inside an aquaculture zone. Therefore, there are benefits for the aquaculture industry in conducting aquaculture operations inside an aquaculture zone.

3.3 Public Call Area

As mentioned above, an aquaculture zone may be designated within an aquaculture zone policy as a public call area. A public call is an open publicised competitive process (separate to the aquaculture zone policy development process) to apply for aquaculture lease tenure within a specific aquaculture zone. In accordance with the Act it requires public notice to be made (i.e. in an approved website, newspaper, or other manner) inviting applications for new production leases under specific criteria relevant to each aquaculture zone and the Minister's assessment guidelines (e.g. maximum area, species, and farming system permitted). Applications can also be made at any time if an aquaculture zone is not designated as a public call area, however only a minority of aquaculture zones are designated as such. These applications are assessed by the Aquaculture Tenure Allocation Board (ATAB), who then make a recommendation to the Minister on which applications should proceed to the next phase of the assessment process (i.e. the licence assessment). The competitive allocation process ensures a fair and efficient means of allocating the State's marine aquaculture resources. The allocation process is used to determine which applicant will use the public resource at an optimum level in terms of the quality and quantity of output relative to the capacity of the environment.

3.4 Class of Permitted Aquaculture

An aquaculture zone policy may designate within an aquaculture zone what classes of aquaculture will be permitted to occur within its boundaries. Classes of permitted aquaculture relate to the feeding requirements of aquatic organisms i.e. whether the organisms are supplementary fed (e.g. SBT and other finfish species) or non-supplementary fed (e.g. algae and filter feeding organisms such as oysters, mussels, scallops, etc.) or are a combination of both (e.g. sea urchins, abalone and sea cucumbers that may or may not be supplementary fed). Grouping the classes of aquaculture based on feed inputs within an aquaculture zone policy takes into consideration the risks posed to the environment, in particular the amount of nutrients that are released into or removed from the environment. Using this system of classification also provides greater flexibility to adaptively manage aquaculture activity through the conditions placed on individual licences.

The classes of permitted aquaculture considered for the Draft Policy have been tailored for each aquaculture zone and include:

- the farming of all aquatic organisms;
- the farming of prescribed wild caught tuna (i.e. SBT);
- the farming of aquatic animals in a manner that involves supplementary feeding;
- the farming of bivalve molluscs;
- the farming of algae;
- the holding of unstocked farming structures; and
- aquaculture research, education and tourism.

Any change to the class of permitted aquaculture within aquaculture zones requires a review of the aquaculture zone policy and falls within the scope of the Current Policy review.

3.5 Aquaculture Zone Prescribed Criteria

Aquaculture zone policies also set out prescribed criteria that apply in determining applications for individual aquaculture licences within each aquaculture zone that consider the environmental (e.g. physical and biological characteristics), sociological or geographical characteristics of each aquaculture zone, and the biological requirements and typical farming infrastructure of the classes of permitted aquaculture for each aquaculture zone. Prescribed criteria include the maximum area in hectares that

can be developed for aquaculture and the maximum biomass in tonnes that can be farmed for a specific class of permitted aquaculture. These are described further in sections 3.5.1, 3.5.2 and 3.5.3 below.

3.5.1 Prescribed Area (Hectares) Within Aquaculture Zone

An aquaculture zone within an aquaculture zone policy specifies the outer boundaries of an area where the activity of aquaculture is permitted within. However, not all of the area within an aquaculture zone can be taken up by aquaculture. Aquaculture zone policies also prescribe a maximum hectare limit for farming activities to reflect a conservative measure of the impact the farming activity (e.g. class of permitted aquaculture and infrastructure) may have on the surrounding marine environment and other users/stakeholders of the marine environment. The maximum hectare limit for farming activities is determined by the carrying capacity and resulting prescribed biomass limits for the aquaculture zone (refer to sections 3.5.2 and 3.5.3 below), along with the consideration of availability of water which is not already taken up by other activities (e.g., shipping, fishing grounds) and stakeholder interests (community acceptance with visual amenity, noise etc). PIRSA apply a conservative and precautionary approach to estimating and prescribing the area to be farmed within an aquaculture zone.

There is provision in the Draft Policy for the Minister to alter **only** the maximum hectare limit permitted for **bivalve molluscs** within specific aquaculture zones through notice in the South Australian Government Gazette. Note that importantly the maximum hectare limit permitted for bivalve molluscs within specific aquaculture zones cannot exceed the overall maximum hectare limit for the relevant aquaculture zone, which is not able to be altered through a Gazette notice. In addition, there are provisions in the Draft Policy which must be taken into account regarding productivity of the existing bivalve mollusc industry when a maximum hectare limit alteration for bivalve molluscs is proposed to be increased via Gazette notice. This provides a mechanism to enable flexibility in setting sustainable maximum hectare limits of bivalve molluscs for specific aquaculture zones/sectors and enables future research and environmental monitoring results to be taken into consideration as they become available over time. These provisions are consistent with those in the Current Policy.

3.5.2 Prescribed Biomass Limits (Tonnage) of Species to be Farmed

Control of the amount of nutrients released into or extracted from the environment is achieved at the aquaculture zone policy level by setting maximum biomass limits (i.e. tonnages) for applicable classes of permitted aquaculture within each aquaculture zone (i.e. the maximum biomass of organisms farmed under a particular class of permitted aquaculture at any one time). Where maximum biomass limits are not prescribed at the policy level, these are prescribed as conditions on the aquaculture licence granted within the bounds of the aquaculture zone policy.

The Draft Policy prescribes maximum biomass limits for finfish or equivalent of supplementary fed aquatic animals, SBT and bivalve molluscs within the various aquaculture zones. There is no maximum biomass limit prescribed in the Draft Policy for all other classes of permitted aquaculture (e.g., algae, non-supplementary fed aquatic animals such as echinoderms), which is to be determined through licence conditions set by the Minister. This is consistent with other aquaculture zone policies developed around the State.

The Draft Policy allows for the Minister to alter the maximum biomass limits of specific classes of permitted aquaculture in specific aquaculture zones through notice in the South Australian Government Gazette. This provides a mechanism to enable flexibility in setting maximum biomass limits for specific aquaculture zones/sectors and enables future research and environmental monitoring results to be taken into consideration as they become available over time. These provisions are consistent with those in the Current Policy.

Further detail describing prescribed biomass limits in relation to the Draft Policy is explained in section 3.5.3 below and 7.2 of this report.

3.5.3 Determining prescribed area and biomass limits through carrying capacity

The concepts of 'carrying capacity' and 'assimilative capacity' are important and interrelated tools for natural resource management, and in the case of aquaculture zone policy development, help to determine the prescribed area, and maximum limits of hectares and biomass permitted to be farmed. In regard to supplementary fed classes of aquaculture, a study by O'Bryen and Lee (2003) defines carrying capacity as the biomass (tonnage) of culture product that can be farmed based on the nutrient input to the receiving environment which can be assimilated by the environment without significant environmental changes. Assimilative capacity refers to the extent to which the receiving environment can cope with a particular activity without unacceptable change (O'Bryen and Lee, 2003).

The biological requirements and characteristics of proposed supplementary fed classes of permitted aquaculture, along with feed characteristics are used to determine the carrying capacity for farming of those permitted classes within an aquaculture zone. A conservative maximum hectare limit is set based on this and the underlying benthic environment's assimilative capacity to absorb the resulting nutrients from supplementary fed classes of permitted aquaculture. For supplementary fed finfish aquaculture, it has been possible in the past to determine, using mass balance equations of the type described by Beveridge (1987), the changes in concentration of nitrate and ammonia in the water column. However, due to varying oceanographic conditions at different locations (such as water depth, water flow and background nutrient concentrations), it is necessary to determine carrying and assimilative capacities for each different area (Tanner *et al.*, 2007). In recent years the South Australian Research and Development Institute's (SARDI) oceanographic expertise has provided valuable modelling capability of nutrients to underpin carrying capacity estimates.

SARDI's hydrodynamic and flushing timescale models have been used to understand the carrying capacity of the Spencer Gulf marine system and Lower Eyre Peninsula (LEP) aquaculture zones. This included examination of the cumulative effect of nutrient loads from aquaculture occurring in the Port Lincoln region, as well as other anthropogenic nutrient sources such as from the steelworks in Whyalla and three wastewater treatment plants located in the northern section of the Gulf. The modelling supported that tidal currents and local circulation have the ability to dilute and disperse aquaculture related nutrient inputs away from the aquaculture lease sites (Middleton *et al.,* 2013). The model developed by Middleton *et al.,* (2013) has since been enhanced and validated, and was used to estimate carrying capacity for this report (Middleton and Doubell 2014; Middleton *et. al,* 2014). Further detail is provided in section 7.2 of this report.

Estimating carrying capacities for supplementary fed classes of aquaculture is a different process when compared with non-supplementary fed classes of aquaculture, such as bivalve molluscs or algae. This is largely due to the additive versus extractive nature of supplementary fed production compared to non-supplementary fed production. For bivalve mollusc or algae aquaculture, estimating carrying capacity can be complex as potential production must be estimated from available data for nutrient and light resources. A recent study from Barrett *et al.* (2022) demonstrated how nutrient removal can occur in oyster and mussel farming via bioextraction and denitrification, however the dataset was focussed on estimates from the United States and Europe. At present there are difficulties in confidently predicting potential carrying capacity for non-supplementary fed classes of aquaculture in South Australia, like bivalve molluscs and algae, mainly due to the need to investigate processes such as bivalve mollusc filtration, excretion and respiration rates, algae nutrient uptake and photosynthetic rates and assimilation efficiencies within South Australian coastal conditions and compared to seasonally varying food concentrations and temperatures (Parsons Brinckerhoff and SARDI, 2003; Mount *et al.*, 2007). Research is currently being conducted into feed types and the feeding of oysters, mussels and cockles by SARDI. This will assist to address some of these gaps.

Noting the above limitations, SARDI and Parsons Brinckerhoff developed a shellfish model to provide a conservative calculation of carrying capacity for bivalve molluscs in the Current Policy, and this has

again been used for calculations within the new zones/sectors of the Draft Policy (i.e. Boston Bay (outer) sector and Point Boston aquaculture zone). See section 7.2 for further information.

4. AQUACULTURE LEASE AND LICENCE FRAMEWORK

Once an aquaculture zone policy has been approved, an aquaculture lease and corresponding licence is required under the Act for an entity to undertake farming activities within an aquaculture zone. Specifically, the Act provides that a licence may not be granted for aquaculture in State waters unless the area is subject to a lease granted by the Minister (with the concurrence of the Minister responsible for the administration of the *Harbors and Navigation Act 1993*). The granting of an aquaculture lease therefore provides the lessee with rights for use of State waters and the underlying seafloor prescribed within the lease area for commercial aquaculture purposes. The Act also provides that no one may conduct aquaculture in South Australia unless authorised to do so by an aquaculture licence. Aquaculture licences authorise the nature of the activity conducted (e.g. species to be farmed, farming method, amount of stock permitted), and licence applications must be referred to the EPA for their consent prior to the Minister granting the licence. EPA referral aims to ensure that the proposed activity meets the objectives of the *Environment Protection Act 1993* and associated Environment Protection Policies.

As previously described in section 3.3, applications for new aquaculture leases within an aquaculture zone are considered through a public competitive process endorsed by the ATAB against established criteria relevant to each aquaculture zone and the Minister's assessment guidelines. Successful applicants from the ATAB process are invited to submit an application for a corresponding aquaculture licence, which will be subject to public advertisement to obtain feedback, and a comprehensive Ecologically Sustainable Development (ESD) risk assessment conducted by PIRSA with referral to the EPA for their approval. PIRSA's ESD risk assessment is semi-quantitative, based on a national best practice ESD risk assessment framework (Fletcher *et al.* 2004), and aims to understand both the nature of the environment in which the intended aquaculture operation occurs and the manner in which it interacts with or changes the environment that surrounds it. As part of the ESD risk assessment process, approximately 40 possible risk events that are viewed to be directly relevant to potential aquaculture influences, are considered and applied to both site and regional levels. Risk events are assessed for both the construction phase and ongoing farming activities. Some of the risks that are assessed include (but are not limited to) impacts to habitats, erosion, sedimentation, access by public, visual amenity, escape, disease management, chemical use, water flow, water quality, nutrient discharge or removal, interaction with migratory species and impacts to sensitive habitats.

More detailed considerations such as the size of each lease, individual site suitability, the farming structures permitted on each licence, and the individual stocking densities (biomass limit) for different species is assessed and managed at the individual lease and licence application level. Approval of leases and licences in aquaculture zones will be subject to the provisions of the Act, the Regulations, and relevant lease and licence conditions to manage the activity moving forward. This includes ongoing environmental monitoring to adaptively manage the activity of aquaculture (see section 5).

5. ENVIRONMENTAL MONITORING AND MANAGEMENT

Environmental risks are managed both at the licence assessment stage (as previously described above) and following the approval of a licence through PIRSA's ongoing annual Environmental Monitoring Program (EMP) for all licences and any additional periodic EMP for specific licences pursuant to the Regulations or individual licence conditions. Annual EMP requirements are stipulated in the Regulations for each aquaculture sector, however if required, additional periodic EMP requirements unique to a specific licence may be implemented through the licence assessment process or once a licence is granted via licence conditions or a notice from the Minister pursuant to the Regulations. EMP's monitor a variety of physical and biological factors considered relevant to measuring the environmental effects

of an aquaculture activity. This provides the information necessary for ongoing management of the regulatory aspects associated with a given licence.

PIRSA has produced publicly available performance reports for aquaculture within the State called the 'ZONING IN: South Australian Aquaculture Report'. These reports summarise the aquaculture industry and details information on current practices, management requirements, environmental monitoring and aquaculture sector activities. This provides the public with information relevant to the environmental performance of the aquaculture sector, including for those aquaculture activities occurring within the areas of this policy.

5.1 Environmental Monitoring Program (EMP)

The annual EMP has different reporting requirements depending on the sector or site, however, may include monitoring of parameters such as:

- benthic assessment (colour video recording of the sea floor and written record – if applicable and/or assessment of infauna);
- amount and type of supplemental feed (if applicable to the species farmed);
- biomass maintained on the site;
- aquaculture waste (securing, treating, recovering);
- use of chemicals (amount, frequency and purpose);
- farming structures (number, marking, mooring, maintaining, locating, and recovering);
- interactions with seabirds and large marine vertebrates; and
- escape of stock.

In addition the Regulations provide for:

- notification and reporting of entanglement of certain animals;
- notification and reporting of escape of stock or damage that may lead to escape of stock; and
- notification and reporting of unusually high mortality rate and duty to isolate unaffected organisms.

Additional requirements to be monitored can be determined from the licence assessment process on a case-by-case basis, or based on the results of periodic EMP reporting tailored to a licence.

Furthermore, the Environmental Monitoring Program, namely the Southern Bluefin Tuna and Yellowtail Kingfish Aquaculture Environmental Program 2019/20 – 2022/23 (AEMP) will be used to determine if unacceptable impacts are occurring to the adjacent marine ecosystem in the LEP.

The AEMP is a regional monitoring program being undertaken by SARDI and comprises of two components that focus on pelagic ecosystems and oceanography and the recent addition of seagrasses. The objects of the monitoring program include:

1. Assess status of water quality and lower pelagic ecosystems trophic structure at key sites inside and outside aquaculture zones in the Port Lincoln region.
2. Update and validate ocean models and CarCap software used to optimize aquaculture lease siting, future monitoring program design and estimates of carrying capacity.
3. Assess status of seagrasses at key sites inside and outside aquaculture nutrient plumes in the Port Lincoln region.
4. Assess the contribution of aquaculture derived nutrients to seagrass nutrient budgets at these sites, and the potential contribution of these nutrients to any seagrass decline.

6. CURRENT & PROPOSED AQUACULTURE ZONING

6.1 Current Zoning and Existing Policy

The Current Policy was last amended on 30 January 2014 and covers one of the most diverse and in-demand aquaculture areas within State waters. All established aquaculture sectors are licensed to be farmed within the Current Policy, with most aquaculture zones at, or approaching capacity (i.e. either biomass or leasable area) prescribed in the Current Policy.

It was considered appropriate to review the Current Policy to ensure its continued relevance and appropriateness and that it continues to maximise benefits to the community from the State's aquaculture resources. As each aquaculture sector has become more established over time, including the innovation in production methods, locating each aquaculture sector in the most appropriate location from an environmental and community perspective, whilst considering business efficiencies were all considered as a part of the review process.

An overview of the Current Policy is provided below and in Table 1.

The Current Policy prescribes six aquaculture zones:

- Boston Bay aquaculture zone, comprised of the Boston Bay sector, the Boston Island (east) sector and the Bicker Isles sector.
- Lincoln aquaculture zone, comprised of the Lincoln (inner) sector and Lincoln (outer) sector.
- Louth Bay aquaculture zone.
- Murray Point aquaculture zone.
- Proper Bay aquaculture zone.
- Tod River aquaculture zone.

There are also three exclusion zones:

- Buffalo Rock exclusion zone.
- Lincoln aquaculture exclusion zone.
- Sir Joseph Banks exclusion zone.

Table 1: Summary of zoning framework established under the Current Policy.

ZONE	SECTOR	LEASED AREA (ha)		CLASS	BIOMASS (t)			
					Supplementally fed		Non-supplementally fed	
		Maximum lease area allowed	Lease area allocated		(a) Farming of prescribed wild-caught tuna	(b) Farming of aquatic animals (other than (a)) in a manner that involves regular feeding	(c) Farming of bivalve molluscs	(d) Farming of algae
Boston Bay aquaculture zone	*Boston Bay sector*	308 149 for (c) in Boston Bay sector 20 for (c) in Boston Island (east) sector	268	(a), (b), (c) & (d)	38 research/ education/ tourism purposes only	1,750	2,980	Determined by licence condition
	Boston Island (east) sector		40	(a), (b), (c) & (d)	360		400	
	Bicker Isles sector	60 20 for (c)	60	(b), (c) & (d)	Nil		400	
Lincoln aquaculture zone	Lincoln (inner) sector	1,825	1,805	(a) & (d)	10,500	Nil	Nil	Determined by licence condition
	Lincoln (outer) sector	5,000	Nil	(a) & (d)	14,000			
Louth Bay aquaculture zone		270 155 for (c)	270	(b), (c), & (d)	Nil	1,020*	3,100	Determined by licence condition

Murray Point aquaculture zone	2	2	(c) excluding mussels	Nil	Nil	Determined by licence condition	Nil
Proper Bay aquaculture zone	60 (c)	59	(c) & (d)	Nil	Nil	1,200	Determined by licence condition
Tod River aquaculture zone	38	8	(c) excluding mussels	Nil	Nil	Determined by licence condition	Nil
All aquaculture zones	13 research / education purposes only	Nil	Refer to zone/sector limits	Refer to zone/sector limits	Refer to zone/sector limits	Refer to zone/sector limits	Refer to zone/sector limits
Buffalo Rock aquaculture exclusion zone	Nil						
Lincoln aquaculture exclusion zone	Nil						
Sir Joseph Banks aquaculture exclusion zone	Nil						

* Temporary biomass increase for Louth Bay aquaculture zone of 2,270 tonnes in place until February 2024 or until the Draft Policy is gazetted.

6.2 Proposed Amendments to the Current Policy

Given the complexity and competing interests in marine spatial planning, an LEP Aquaculture Zone Policy Review Advisory Committee (LEP Advisory Committee) was established by the Minister at the time. The LEP Advisory Committee was established to provide advice to Government on the development of a Statement of Intent (SOI) to inform the Current Policy review. The Committee comprised of key representatives from:

- Clean Seas Seafood Ltd (CSS) – Finfish industry
- Australian Southern Bluefin Tuna Industry Association (ASBTIA) – SBT industry
- South Australian Mussel Growers Association (SAMGA) – Mussel industry
- EPA – environmental protection
- SARDI – marine science
- Department of Planning, Infrastructure and Transport (DPTI) – marine transport and planning
- PIRSA Fisheries and Aquaculture – fisheries and aquaculture regulation and planning

The SOI phase of a zone policy review allows PIRSA to identify any gaps in amendments that need to be addressed by inviting comment across select State government agencies, other stakeholders and key representatives to readily draft a comprehensive, fully considered and robust Draft Policy and supporting Report that will be subsequently released for public consultation. The SOI aims to identify any issues that will likely limit the capacity to implement a zone policy due to stakeholder or community concerns. A finalised SOI was prepared by PIRSA and endorsed by the LEP Advisory Committee which outlines proposed amendments and has informed the development of the Draft Policy.

An overview of the proposed amendments to the Current Policy is provided below and in Table 2. Maps displaying the proposed boundaries of aquaculture zones and aquaculture exclusion zones can be obtained from Appendix C or alternatively an interactive map can be viewed through the YourSAy website.

The Draft Policy prescribes seven aquaculture zones:

- Boston Bay aquaculture zone – comprised of the Boston Bay sector, the Bicker Isles sector, and the Boston Bay (outer) sector
- Point Boston aquaculture zone – comprised of the Point Boston (north) sector and Point Boston (south) sector
- Lincoln aquaculture zone – comprised of the Lincoln (inner) sector and Lincoln (outer) sector, with a schedule to add a new Lincoln (inner south) sector in the future via Gazette notice.
- Murray Point aquaculture zone
- Proper Bay aquaculture zone – comprised of the Proper Bay (east) sector and Proper Bay (west) sector
- Tod River aquaculture zone.

There are also four proposed aquaculture exclusion zones:

- Buffalo Reef aquaculture exclusion zone
- Lincoln aquaculture exclusion zone
- Sir Joseph Banks aquaculture exclusion zone
- Dangerous Reef aquaculture exclusion zone.

Table 2: Summary of zoning framework amendments proposed under the Draft Policy

ZONE	SECTOR	LEASED AREA (ha)		CLASS	BIOMASS (t)				
					Supplementally fed		Non-supplementally fed		
		Maximum lease area allowed	Lease area allocated		(a) Farming of prescribed wild-caught tuna	(b) Farming of aquatic animals (excluding (a)) in a manner that involves supplementally feeding	(c) Farming of other aquatic animals in a manner that does not involve supplementary feeding	(d) Farming of bivalve molluscs	(e) Farming of algae
Boston Bay aquaculture zone	*Boston Bay sector*	273 *149 for (d)*	233	(a), (b), (c), (d) & (e)	38 research/ education/ tourism purposes only	1,696	Determined by licence condition	2,980	Determined by licence condition
	Bicker Isles sector	80 *20 for (d)*	60	(b), (c), (d) & (e)	Nil			400	
	Boston Bay (outer) sector	2,000	Nil	(b), (c), (d) & (e)	Nil	23,080		40,000	
Lincoln aquaculture zone	Lincoln (inner) sector	2,100	1,805	(a) & (e)	16,955	Nil	Nil	Nil	Determined by licence condition
	Lincoln (outer) sector	3,500	Nil	(a) & (e)	34,384				
	Lincoln (inner south) sector *	375	Nil	(a) & (e)	3,859				

Louth Bay aquaculture zone		530 *155 for (d)*	109	(b), (c), (d) & (e)	Nil	7,953	Determined by licence condition	3,100	Determined by licence condition
Murray Point aquaculture zone		4	2	(d) excluding mussels	Nil	Nil	Nil	Determined by licence condition	Determined by licence condition
Proper Bay aquaculture zone	Proper Bay (east) sector	60**	59	(d) & (e)	Nil	Nil	Nil	1,200	Determined by licence condition
	Proper Bay (west) sector	40**	Nil	(d) & (e)					
Tod River aquaculture zone		38	8	(d) excluding mussels	Nil	Nil	Nil	Determined by licence condition	Nil
Point Boston aquaculture zone	Point Boston (north) sector	161 *141 (d)*	161	(b), (c), (d), & (e) excluding finfish	Nil	1,191 tonnes equivalent to finfish	Determined by licence condition	2,820	Determined by licence condition
	Point Boston (south) sector	100 *60 (d)*	20	(b) (c), (d), & (e) excluding finfish				1,200	
All aquaculture zones		40 research/ education/ tourism purposes only	Nil	Refer to zone/sector limits	Refer to zone/sector limits	Refer to zone/sector limits	Refer to zone/sector limits	Refer to zone/sector limits	Refer to zone/sector limits
		105 unstocked farming structures	55	NA	NA	NA	NA	NA	NA

Buffalo Rock aquaculture exclusion zone	Nil
Lincoln aquaculture exclusion zone	Nil
Sir Joseph Banks aquaculture exclusion zone	Nil
Dangerous Reef aquaculture exclusion zone	Nil

*The Lincoln (inner south) sector is not proposed to be active in the Draft Policy, but can be activated at a future time if deemed appropriate by Gazette notice (see section 6.2.6).

**The combined area in the Proper Bay aquaculture zone must not exceed 60 ha for bivalve molluscs.

6.2.1 Boston Bay aquaculture zone

The Boston Bay aquaculture zone in the Current Policy comprises a total area of approximately 3,800 ha, with a maximum leasable area of 368 hectares (currently fully allocated), and is defined by 3 sectors: Boston Bay, Bicker Isles, and Boston Island (east) sector. The classes of permitted aquaculture are bivalve molluscs, algae and any regular fed aquatic animals (note this does not permit any non-regular fed aquatic animals such as echinoderms).

The proposed amendments to this aquaculture zone include the removal of the Boston Island (east) sector (to be reallocated as the Point Boston (south) sector see section 6.2.7), creation of a new Boston Bay (outer) sector (within the existing Lincoln (outer) sector of the Lincoln aquaculture zone via reallocation of area), minor realignments to zone boundaries, and inclusion of all classes of aquaculture to be permitted within the zone (including supplementary and non-supplementary fed aquatic animals, such as echinoderms), with some exceptions. In addition, those existing lease areas currently allocated for the placement of unstocked farming structures (i.e. holding and maintenance sites) are now considered separately from the maximum leasable hectare limits for this zone in prescribed criteria for all aquaculture zones combined (see section 6.2.12).

Considering these changes, the proposed Boston Bay aquaculture zone total area will be approximately 18,314 ha, with a maximum leasable area of 2,353 ha, and defined by 3 sectors: Boston Bay, Bicker Isles, and the new Boston Bay (outer) sector. Note that the majority (99%) of the additional total area and maximum leasable area proposed is located offshore in the new Boston Bay (outer) sector.

The provision is retained that allows the Minister to alter the maximum biomass limit and leasable area for specific classes of permitted aquaculture through notice in the Gazette. In addition, the related provision is retained that an increase to the maximum biomass limit of bivalve molluscs must not increase unless the Minister is satisfied that the increase would not compromise the overall productivity of the bivalve mollusc industry. This provides a mechanism to enable flexibility in setting maximum biomass limits for specific permitted classes of aquaculture, taking into consideration future research and environmental monitoring results as they become available over time. Further, this zone will remain as a designated public call area.

Detailed information regarding proposed criteria for each sector in the Boston Bay aquaculture zone is provided below.

Boston Bay sector

The Boston Bay sector commences approximately 3 kilometres north-east from the township of Port Lincoln, encompassing the inner bays of Boston Island (Appendix C2). The Current Policy allows for a total area of approximately 2,702 ha and a maximum leasable area of 308 ha, with 268 ha currently allocated (note that the maximum leasable area of 308 ha is actually fully allocated as it is shared between the Boston Island (east) sector which has 40 ha currently allocated). The classes of permitted aquaculture are bivalve molluscs, algae and any regular fed aquatic animals (note this does not permit any non-regular fed aquatic animals such as echinoderms).

Key points prescribed in the Draft Policy:

- A minor increase in total area to approximately 2,755 ha with a reduced maximum leasable area to 273 ha.
- The increase in the total area of the sector (by 53 ha) is due to a proposed minor realignment of the sector boundary.
- The reduction in maximum leasable area is due to the removal of hectares allocated to unstocked farming structures in the current Boston Bay sector (35 ha), which will be included separately in prescribed criteria for all aquaculture zones combined (see section 6.2.12). Note

that this will not impact the tenure of existing leases which permit the placement of unstocked farming structures within this sector/zone.

- The reduction in maximum leasable area is also due to removal of the Boston Island (east) sector, and associated leases currently contained within it (40 ha). Note this area and associated leases will form part of the proposed Point Boston (south) sector of the Point Boston aquaculture zone (see section 6.2.7).
- Noting the above, 233 ha is currently allocated within the proposed Boston Bay sector, leaving 40 ha available for farming.
- The classes of permitted aquaculture in the sector will now allow for the farming of any aquatic organisms pursuant to the definition of aquaculture in the Act (including supplementary and non-supplementary fed classes of aquaculture, such as echinoderms), with restrictions outlined in the prescribed criteria.
- Prescribed limits are outlined below:
  - The biomass limit for supplementary fed aquatic animals (including Bicker Isles sector; excluding SBT) is proposed to decrease from 1,750 tonnes to 1,696 tonnes (refer to section 7.2 for biomass calculations) or, if some other amount is specified by the Minister by notice in the Gazette, that other amount.
  - Biomass and hectare limits for bivalve molluscs will remain the same at 2,980 tonnes (refer to section 7.2 for biomass calculations) and 149 ha respectively or, if some other amount or area is specified by notice in the Gazette, that other amount or area.
  - Biomass limits for SBT will remain the same at 38 tonnes, and only for the purposes of tourism, education, or research or, if some other amount is specified by the Minister by notice in the Gazette, that other amount.
  - Biomass limits for other non-supplementary fed aquatic organisms permitted within the sector (e.g. non-supplementary fed classes of aquaculture such as algae and echinoderms), will be determined through licence conditions set by the Minister.

Bicker Isles sector

The Bicker Isles sector commences approximately 8 kilometres south-east from the township of Port Lincoln, in the waters west of Cape Donington (Appendix C2). The Current Policy allows for a total area of approximately 243 ha and a maximum leasable area of 60 ha, which at present, is fully allocated. The classes of permitted aquaculture are bivalve molluscs, algae and any regular fed aquatic animals (excluding SBT; note this does not permit any non-regular fed aquatic animals such as echinoderms).

Key points prescribed in the Draft Policy:

- No change to the total area, with a minor increase in the maximum leasable area (by 20 ha) to 80 ha.
- Noting the above, 60 ha is currently allocated within the proposed Bicker Isles sector, leaving 20 ha available for farming (excluding SBT, bivalve molluscs and supplementary fed classes of aquaculture as they are currently fully allocated, but including non-supplementary fed classes of aquaculture such as echinoderms and algae).
- The classes of permitted aquaculture in the sector will now allow for the farming of any aquatic organisms pursuant to the definition of aquaculture in the Act (excluding SBT, but including other supplementary and non-supplementary fed classes of aquaculture, such as echinoderms), with restrictions outlined in the prescribed criteria.

- Prescribed limits are outlined below:
  - The biomass limit for supplementary fed aquatic animals (including Boston Bay sector; excluding SBT) is proposed to decrease from 1,750 tonnes to 1,696 tonnes (refer to section 7.2 for biomass calculations) or, if some other amount is specified by the Minister by notice in the Gazette, that other amount.
  - Biomass and hectare limits for bivalve molluscs will remain the same at 400 tonnes (refer to section 7.2 for biomass calculations) and 20 ha, respectively or, if some other amount or area is specified by the Minister by notice in the Gazette, that other amount or area.
  - Biomass limits for other non-supplementary fed aquatic organisms permitted within the sector (e.g. non-supplementary fed classes of aquaculture such as algae and echinoderms) will be determined through licence conditions set by the Minister.

Boston Bay (outer) sector

The Boston Bay (outer) sector is a new sector and commences approximately 48 kilometres east from the township of Port Lincoln, in offshore waters south of Buffalo Reef. The sector has been created to provide for adaptive management of the classes of permitted aquaculture farmed within the other two Boston Bay aquaculture zone sectors over time (i.e. Boston Bay sector and Bicker Isles sector), and provide flexibility for farms to move further offshore. It incorporates part of the area of the existing Lincoln (outer) sector of the Lincoln aquaculture zone in the Current Policy (i.e. reallocation of existing area, not new area; see section 6.2.2), and encompasses a total area of approximately 15,316 ha, with a maximum leasable area of 2,000 ha (Appendix C3). Currently there are no leases allocated in this area. The classes of permitted aquaculture in the Current Policy for this area are SBT (i.e. regular fed SBT) and algae.

Key points prescribed in the Draft Policy:

- The total area and maximum leasable area will remain the same as it is reallocated area from an existing sector. None of the area is currently allocated.
- The classes of permitted aquaculture in the sector will now allow for the farming of any aquatic organisms pursuant to the definition of aquaculture in the Act (excluding SBT, but including other supplementary and non-supplementary fed classes of aquaculture, such as echinoderms), with restrictions outlined in the prescribed criteria.
- Prescribed biomass limits are outlined below:
  - The biomass limit for supplementary fed aquatic animals (excluding SBT) is proposed to be 23,080 tonnes (refer to section 7.2 for biomass calculations) or, if some other amount is specified by the Minister by notice in the Gazette, that other amount.
  - Biomass limits for bivalve molluscs is proposed to be 40,000 tonnes (refer to section 7.2 for biomass calculations) or, if some other amount is specified by the Minister by notice in the Gazette, that other amount.
  - Biomass limits for other non-supplementary fed aquatic organisms permitted within the sector (e.g. non-supplementary fed classes of aquaculture such as algae and echinoderms), will be determined through licence conditions set by the Minister.

6.2.2 Lincoln aquaculture zone

The Lincoln aquaculture zone in the Current Policy comprises a total area of approximately 53,471 ha, with a maximum leasable area of 6,825 ha and is defined by two sectors: Lincoln (inner) and Lincoln (outer) sector. The classes of permitted aquaculture are SBT (i.e. regular fed SBT) and algae.

The Draft Policy proposes to retain the Lincoln (inner) sector and Lincoln (outer) sector of the Lincoln aquaculture zone, however, a portion of the area of the Lincoln (outer) sector will be reallocated to the newly created Boston Bay (outer) sector (see section 6.2.1), and there will be realignments to the Lincoln (inner) sector boundary as a result of the creation of the new Point Boston (south) sector (see section 6.2.7). Considering these changes, the proposed Lincoln aquaculture zone total area will decrease to approximately 37,725 ha and the maximum leasable area will decrease to 5,600 ha. In addition, it is proposed to amend the designated public call area from solely the Lincoln (outer) sector for all classes of permitted aquaculture, to the entire aquaculture zone but for the farming of algae only. This is to allow for an equitable lease tenure process amongst competing algae aquaculture businesses. Note there is no public call requirement for SBT lease tenure, as only entities with SBT Commonwealth Statutory Fishing Rights can access the commercial fishery to obtain aquaculture stock, and this needs to be demonstrated during the ATAB assessment process in order to be recommended for lease tenure.

The provision is retained that allows the Minister to alter the maximum biomass limit for SBT through notice in the Gazette. This provides a mechanism to enable flexibility in setting maximum biomass limits for SBT, taking into consideration future research and environmental monitoring results as they become available over time. There are no proposed amendments to the classes of permitted aquaculture in the zone.

Further detailed information regarding proposed criteria for each sector in the Lincoln aquaculture zone is provided below.

Lincoln (inner) sector

The Lincoln (inner) sector encompasses three separate areas and is located approximately 9.6 kilometres east of the township of Port Lincoln, in the waters east of Boston Island (Appendix C4). The Current Policy allows for a total area of approximately 18,447 ha and a maximum leasable area of 1,825 ha, with 1,805 ha currently allocated. The classes of permitted aquaculture are SBT (i.e. regular fed SBT) and algae.

Key points prescribed in the Draft Policy:

- A reduction in total area to approximately 17,883 ha with an increase in maximum leasable area to 2,100 ha.
- The reduction in the total area of the sector (by 564 ha) is due to a proposed realignment of the sector boundary as a result of the creation of the new Point Boston (south) sector (see section 6.2.7).
- The increase in the maximum leasable area (by 275 ha) is due to proposed increases (175 ha) in the maximum SBT biomass limit for this sector and to allow for potential SBT Commonwealth Statutory Fishing Rights quota increases over the next 10 years. These additional hectares also provide 100 ha for the algae industry to expand and facilitate nutrient offsets for the SBT aquaculture sector.
- The classes of permitted aquaculture in the sector will remain the same (i.e. SBT and algae).
- Prescribed limits are outlined below:
    - Biomass and hectare limits for supplementary fed SBT are proposed to increase from 10,500 tonnes to 16,955 tonnes (refer to section 7.2 for biomass calculations) and to 2000 ha respectively or, if some other amount or area is specified by the Minister by notice in the Gazette, that other amount or area.

- Biomass limits for algae will be determined through licence conditions set by the Minister, while hectare limits will be 100 ha or, if some other area is specified by the Minister by notice in the Gazette, that other area.

Lincoln (outer) sector

The Lincoln (outer) sector encompasses two separate areas and is located approximately 42 kilometres east of the township of Port Lincoln, in the waters east/south-east of Spilsby Island (Appendix C3). The Current Policy allows for a total area of approximately 35,024 ha and a maximum leasable area of 5,000 ha. Currently there are no aquaculture leases allocated in this area. The classes of permitted aquaculture are SBT (i.e. regular fed SBT) and algae.

Key points prescribed in the Draft Policy:

- A reduction in total area to approximately 19,842 ha with a reduced maximum leasable area to 3,500 ha.
- The reduction in the total area of the sector (by 15,182 ha) and reduction in maximum leasable area (by 1,500 ha) is due to reallocation of a portion of existing area to the newly created Boston Bay (outer) sector of the Boston Bay aquaculture zone (see section 6.2.1).
- The classes of permitted aquaculture in the sector will remain the same (i.e. SBT and algae).
- Prescribed biomass limits are outlined below:
  - The biomass limit for supplementary fed SBT is proposed to increase from 14,000 tonnes to 34,384 tonnes (refer to Section 7.2 for biomass calculations) or, if some other amount is specified by the Minister by notice in the Gazette, that other amount.
  - Biomass limits for algae will be determined through licence conditions set by the Minister.

Lincoln (inner south) sector (Schedule proposed to be added at a later date through Gazette)

An additional new Lincoln (inner south) sector is also proposed to be created as part of the Lincoln aquaculture zone through Schedule 3 in the Draft Policy. However, Schedule 3 (i.e. the Lincoln (inner south) sector) would not become operational following approval of the Draft Policy, but rather could only be implemented at a future date via a Gazette notice pursuant to section 14(1) of the Act. This is dependent on further benthic habitat investigations being undertaken and proving favourable as seagrass habitat was identified from initial benthic video surveys (8 transects) undertaken within the new proposed sector in October 2021. Specifically, of the 8 benthic transects undertaken, 2 transects recorded low-density seagrass, 5 transects recorded high coverage of seagrass and 1 transect recorded no seagrass. Note also that this proposed new sector will overlap a proposed new Australian sea lion (ASL) Management Area, and therefore any new SBT aquaculture activity within this sector will need to abide by the additional management requirements outlined in section 7.9.1.

This new sector would be located directly below the Lincoln (inner) sector, encompassing a total area of approximately 2,540 ha, with a maximum leasable area of 375 ha (Appendix C5). It would consist of reallocated area from the Sir Joseph Banks aquaculture exclusion zone (see section 6.2.10). The classes of permitted aquaculture are SBT (i.e. supplementary fed SBT) and algae. If the sector is added via Gazette notice at a future date following approval of the Draft Policy, the Lincoln aquaculture zone will comprise a total area of approximately 40,265 ha, with a maximum leasable area of 5,875 ha.

This new sector aims to allow for potential SBT Commonwealth Statutory Fishing Rights quota increases over the next 10 years and resulting expansion of the SBT aquaculture sector, as well as expansion of the algae aquaculture sector. The SBT industry have indicated that the Lincoln (inner south) sector is a highly important area for SBT farming because of the close proximity to the current

Lincoln (inner) sector, the proximity of a port, a suitable depth for SBT farming (20-25 m), and efficient water flow and nutrient dispersal, along with a coarse sediment type.

Key points prescribed in the Draft Policy:

- The sector can only become operational at a future date via a Gazette notice following additional technical investigations being undertaken.
- The total area is proposed to be approximately 2,540 ha, with a maximum leasable area of 375 ha.
- The classes of permitted aquaculture in the sector will be SBT and algae.
- Prescribed biomass limits are outlined below:
  - The biomass limit for supplementary fed SBT is proposed to be 3,859 tonnes (refer to section 7.2 for biomass calculations) or, if some other amount is specified by the Minister by notice in the Gazette, that other amount.
  - Biomass limits for algae will be determined through licence conditions set by the Minister.

6.2.3 Louth Bay aquaculture zone

The Louth Bay aquaculture zone encompasses the waters of Louth Bay, located approximately 17 kilometres north-east from the township of Port Lincoln (Appendix C6). The Current Policy allows for a total area of approximately 9,443 ha and a maximum leasable area of 270 ha, which at present is fully allocated. The classes of permitted aquaculture are bivalve molluscs, algae and any regular fed aquatic animals (excluding SBT; note this does not permit any non-regular fed aquatic animals such as echinoderms).

The Draft Policy proposes to reallocate a portion of the southern area of the Louth Bay aquaculture zone to the newly created Point Boston (north) sector (see section 6.2.7) and to the Lincoln aquaculture exclusion zone (see section 6.2.9), and inclusion of all classes of aquaculture to be permitted within the zone (excluding SBT but including other supplementary and non-supplementary fed aquatic animals, such as echinoderms), with some exceptions. Considering these changes, the proposed Louth Bay aquaculture zone total area will decrease to approximately 7,465 ha and the maximum leasable area will increase to 530 ha.

The provision is retained that allows the Minister to alter the maximum biomass limit and leasable area for specific classes of permitted aquaculture through notice in the Gazette. In addition, the related provision is retained that an increase to the maximum biomass limit of bivalve molluscs must not increase unless the Minister is satisfied that the increase would not compromise the overall productivity of the bivalve mollusc industry. This provides a mechanism to enable flexibility in setting maximum biomass limits for specific permitted classes of aquaculture, taking into consideration future research and environmental monitoring results as they become available over time. Further, this zone will remain as a designated public call area.

Key points prescribed in the Draft Policy:

- A decrease in total area to approximately 7,465 ha with an increased maximum leasable area to 530 ha.
- The decrease in the total area of the zone (by 1,978 ha) is due to reallocation of a portion of existing area to the newly created Point Boston (north) sector of the Point Boston aquaculture zone (see section 6.2.7), to provide flexibility for aquaculture sites, including existing mussel sites, to move further south. It is also due to reallocation of a portion of existing area to the Lincoln aquaculture exclusion zone, to create a buffer area between bivalve mollusc

aquaculture sites in the Tod River aquaculture zone for biosecurity purposes (see section 6.2.6).

- The increase in the maximum leasable area (by 260 ha) is proposed to align with the increase in biomass limits for supplementary fed animals in the zone and to provide opportunity for other non-supplementary fed aquatic organisms permitted within the zone (e.g. non-supplementary fed classes of aquaculture such as algae and echinoderms).
- The classes of permitted aquaculture in the zone will now allow for the farming of any aquatic organisms pursuant to the definition of aquaculture in the Act (excluding SBT, but including other supplementary and non-supplementary fed classes of aquaculture, such as echinoderms), with restrictions outlined in the prescribed criteria.
- Prescribed biomass limits are outlined below:
  - The biomass limit for supplementary fed aquatic animals (excluding SBT) is proposed to increase from 1,020 tonnes to 7,953 tonnes (refer to section 7.2 for biomass calculations) or, if some other amount is specified by the Minister by notice in the Gazette, that other amount.
  - Biomass and hectare limits for bivalve molluscs will remain the same at 3,100 tonnes (refer to section 7.2 for biomass calculations) and 155 ha respectively or, if some other amount or area is specified by the Minister by notice in the Gazette, that other amount or area.
  - Biomass limits for other non-supplementary fed aquatic organisms permitted within the sector (e.g. non-supplementary fed classes of aquaculture such as algae and echinoderms), will be determined through licence conditions set by the Minister.

6.2.4 Murray Point aquaculture zone

The Murray Point aquaculture zone is located within Proper Bay adjacent Murray Point, approximately 4 kilometres south-west of the township of Port Lincoln (Appendix C7). The Current Policy allows for a total area of approximately 72 ha and a maximum leasable area of 2 ha, which at present is fully allocated. The classes of permitted aquaculture are bivalve molluscs (excluding mussels).

The Draft Policy proposes no change to the total area, with a minor increase in maximum leasable area to 4 ha to accommodate the inclusion of algae in the classes of permitted aquaculture, and the requests of the bivalve mollusc sector (excluding mussels) to expand in this zone. This zone will remain as a designated public call area.

Key points prescribed in the Draft Policy:

- No change to the total area, with a minor increase in the maximum leasable area (by 2 ha) to 4 ha.
- The increase in the maximum leasable area is to accommodate the inclusion of algae in the classes of permitted aquaculture, and the requests of the bivalve mollusc sector (excluding mussels) to expand in this zone.
- The classes of permitted aquaculture in the zone will be bivalve molluscs (excluding mussels), and in addition algae.
- Prescribed biomass limits are outlined below:
  - Biomass limits for bivalve molluscs (excluding mussels) and algae will be determined through licence conditions set by the Minister.

6.2.5 Proper Bay aquaculture zone

The Proper Bay aquaculture zone is located within Proper Bay directly below the Murray Point aquaculture zone, approximately 4.5 kilometres south-west of the township of Port Lincoln (Appendix C7). The Current Policy allows for a total area of approximately 2,356 ha and a maximum leasable area of 60 ha, which at present is fully allocated to bivalve mollusc sites. The classes of permitted aquaculture are bivalve molluscs and algae.

The Draft Policy proposes no changes to the classes of permitted aquaculture, a minor realignment to the zone boundary, and creation of two new sectors (the Proper Bay (east) sector and Proper Bay (west) sector) within the existing aquaculture zone boundary area. The two new sectors are to allow for further leasable area in the western area of the aquaculture zone to encourage algae aquaculture growth (noting that the maximum leasable area in the aquaculture zone with both sectors combined for bivalve molluscs is already fully allocated at 60 ha), and aquaculture lease/licence movements between the two sectors. Considering these changes, the proposed Proper Bay aquaculture zone total area will decrease to approximately 2,349 ha and the maximum leasable area will increase to 100 ha split between the two new sectors (60 ha Proper Bay (east) sector; 40 ha Proper Bay (west) sector).

The provision is retained that allows the Minister to alter the maximum biomass limit for bivalve molluscs through notice in the Gazette. In addition, the related provision is retained that an increase to the maximum biomass limit of bivalve molluscs must not increase unless the Minister is satisfied that the increase would not compromise the overall productivity of the bivalve mollusc industry. This provides a mechanism to enable flexibility in setting bivalve mollusc maximum biomass limits for the aquaculture zone, taking into consideration future research and environmental monitoring results as they become available over time. An additional provision that allows the Minister to alter the maximum leasable area for bivalve molluscs through notice in the Gazette has also been added, which is consistent with provisions for all other aquaculture zones within the Current Policy. Further, this zone will remain as a designated public call area.

Key points prescribed in the Draft Policy:

- A minor decrease in the total area (by 7 ha) to 2,349 ha, with a relatively small increase in the maximum leasable area (by 40 ha) to 100 ha split between the new Proper Bay (east) sector (60 ha – currently fully allocated to bivalve molluscs) and the Proper Bay (west) sector (40 ha – currently no allocation).
- The minor decrease in total area is due to realignment of the aquaculture zone boundary.
- The increase in maximum leasable area is to allow for further leasable area in the Proper Bay (west) sector to encourage algae aquaculture growth.
- The classes of permitted aquaculture will remain unchanged (bivalve molluscs and algae).
- Prescribed biomass limits are outlined below:
    - Biomass and hectare limits for bivalve molluscs across the entire aquaculture zone with both sectors combined will remain the same at 1,200 tonnes (refer to section 7.2 for biomass calculations) and 60 ha respectively or, if some other amount or area is specified by the Minister by notice in the Gazette, that other amount or area.

Further detailed information regarding proposed criteria for each sector in the Proper Bay aquaculture zone is provided below.

Proper Bay (east) sector

The Proper Bay (east) sector will allow for a total area of approximately 970 ha, with a maximum leasable area of 60 ha, which is currently fully allocated for bivalve molluscs (Appendix C7).

Proper Bay (west) sector

The Proper Bay (west) sector will allow for a total area of approximately 1,378 ha, with a maximum leasable area of 40 ha, which currently has no area allocated (Appendix C7).

6.2.6 Tod River aquaculture zone

The Tod River aquaculture zone is located approximately 13 kilometres north-east from the township of Port Lincoln, adjacent the Tod River outlet (Appendix C8). The Current Policy allows for a total area of approximately 747 ha and a maximum leasable area of 38 ha, with 8 ha currently allocated. The class of permitted aquaculture is bivalve molluscs (excluding mussels).

The Draft Policy proposes a minor realignment to the zone boundary with an associated small decrease in the total area to 742 ha, and no change to the maximum leasable area and class of permitted aquaculture. Additional provisions have also been proposed at the request of the oyster aquaculture industry to improve biosecurity of bivalves molluscs (excluding mussels) farmed in this zone, in particular oysters, and designate this zone as a bivalve mollusc nursery area. This zone will remain as a designated public call area.

Key points prescribed in the Draft Policy:

- A minor decrease in the total area (by 5 ha) to 742 ha, with no change to the maximum leasable area.
- The minor decrease in total area is due to realignment of the aquaculture zone boundary.
- The class of permitted aquaculture will remain unchanged (bivalve molluscs excluding mussels).
- The following additional biosecurity provisions have been proposed:
  - Bivalve molluscs may only be introduced into the zone from an area outside the zone if the two areas are located within the same disease management area or the area outside the zone from which the molluscs originate is a certified biosecure area.
  - Definitions included in the Draft Policy which refer to the above include:

  - ***certified biosecure area*** means an area where measures are applied to mitigate the risks of introduction and spread of disease that has been annually inspected and certified as being biosecure by a competent authority of the State or Territory where the area is located;

  - ***competent authority***, of a State or Territory of the Commonwealth, means a veterinary authority or government authority having the responsibility in that State or Territory for ensuring the implementation of animal health measures or veterinary health certification;

  - ***disease management area*** means— (a) if the Minister, by notice in the Gazette, has defined disease management areas for the purposes of this clause—an area so defined; or (b) in any other case—a disease management area as defined in *Improving early detection surveillance and emergency disease response to Ostreid herpesvirus using a hydrodynamic dispersion model: Updating disease management areas for the South Australian oyster industry. FRDC Project No 2018-09* published by the Fisheries Research and Development Corporation (FRDC).

  - Bivalve molluscs may only be farmed in the zone for a period not exceeding 6 months. This will restrict the zone's use to the short-term storage of juvenile bivalve molluscs (i.e. nursery area) to prevent grow-out to mature oysters, which is not the intention of the zone.
  - Note that the Lincoln aquaculture exclusion zone will be extended to align with the eastern boundary of the Tod River aquaculture zone to increase the separation distance of the Tod River aquaculture zone and the proposed Point Boston aquaculture zone which holds

leases farming mature bivalve molluscs. This is to further protect the biosecurity of the zone.

- Prescribed biomass limits are outlined below:
  - Biomass limits for bivalve molluscs (excluding mussels) will be determined through licence conditions set by the Minister.

6.2.7 Point Boston aquaculture zone

A new Point Boston aquaculture zone is proposed, comprised of the Point Boston (north) sector and the Point Boston (south) sector (Appendix C6). Although this is a new zone, the area within the zone consists of reallocated areas (i.e. existing areas) from the Louth Bay aquaculture zone (see section 6.2.3), Boston Bay aquaculture zone (see section 6.2.1), and the Lincoln aquaculture zone (see section 6.2.2) under the Current Policy. In addition, the new zone (part of the Point Boston (south) sector) consists of a relatively small proportion of reallocated area from the existing Lincoln aquaculture exclusion zone (see section 6.2.9). This zone has been created to provide flexibility for aquaculture sites, including existing mussel sites, to move further south to potentially more productive areas and to allow for aquaculture industry growth.

The Draft Policy proposes the Point Boston aquaculture zone will encompass approximately 2,927 ha, with a maximum leasable area of 261 ha split between the two new sectors (161 ha Point Boston (north) sector; 100 ha Point Boston (south) sector). Currently, 201 ha has been allocated to existing aquaculture leases, including 20 ha allocated to a lease for the placement of unstocked farming structures (i.e. holding and maintenance site). Consistent with provisions of the proposed Boston Bay aquaculture zone (see section 6.2.1), this existing holding and maintenance site area will be considered separately from the maximum leasable hectare limits for this zone in prescribed criteria for all aquaculture zones combined (see section 6.2.12).

The classes of permitted aquaculture in the zone will allow for the farming of any aquatic organisms pursuant to the definition of aquaculture in the Act (excluding SBT and finfish, but including other supplementary and non-supplementary fed classes of aquaculture, such as echinoderms), with some exceptions. Note that regular fed SBT and finfish are currently permitted classes of aquaculture in parts of the reallocated areas under the Current Policy (i.e. SBT in the Point Boston (south) sector area and finfish in both the Point Boston (south) and (north) sector areas), however these classes are proposed to be excluded due to suboptimal physical characteristics (e.g. water depth and benthic habitat) for the purposes of SBT and finfish aquaculture. There are no SBT and finfish aquaculture sites currently located in these reallocated areas.

A provision is included that allows the Minister to alter the maximum biomass limit and leasable area for specific classes of aquaculture through notice in the Gazette. In addition, an increase to the maximum biomass limit of bivalve molluscs must not increase unless the Minister is satisfied that the increase would not compromise the overall productivity of the bivalve mollusc industry. This provides a mechanism to enable flexibility in setting maximum biomass limits for the specific permitted classes of aquaculture, taking into consideration future research and environmental monitoring results as they become available over time. This zone will remain as a designated public call area.

Key points prescribed in the Draft Policy:

- The area within the zone consists of reallocated areas (i.e. existing areas) from other aquaculture zones under the Current Policy.
- The total area is proposed to be approximately 2,927 ha, with a maximum leasable area of 261 ha split between the two sectors (161 ha Point Boston (north) sector – currently fully allocated; 100 ha Point Boston (south) sector – 40 ha currently allocated including 20 ha for a maintenance and holding site).

- Hectares currently allocated to maintenance and holding sites (i.e. 20 ha in the Point Boston (south) sector) will be included separately in prescribed criteria for all aquaculture zones combined (see section 6.2.12). Note that this will not impact the tenure of these existing maintenance and holding sites. Considering this, 20 ha is currently allocated within the proposed Point Boston (south) sector, leaving 80 ha available for farming.
- The classes of permitted aquaculture in the zone will be for the farming of any aquatic organisms pursuant to the definition of aquaculture in the Act (excluding SBT and finfish, but including other supplementary and non-supplementary fed classes of aquaculture, such as echinoderms), with restrictions outlined in the prescribed criteria.
- SBT and finfish are currently permitted in parts of the reallocated areas under the Current Policy, but have been excluded due to suboptimal physical characteristics (e.g. water depth and benthic habitat) for the purposes of SBT and finfish aquaculture.
- Prescribed biomass limits are outlined below:
  - The biomass limit for supplementary fed aquatic animals (excluding SBT and finfish) for the zone (i.e. with both sectors combined) is proposed to be 1,191 tonnes (refer to section 7.2 for biomass calculations) or, if some other amount is specified by the Minister by notice in the Gazette, that other amount.
  - Biomass and hectare limits for bivalve molluscs are specific for each sector and are described below.
  - Biomass limits for other non-supplementary fed aquatic organisms permitted within the zone (e.g. non-supplementary fed classes of aquaculture such as algae and echinoderms), will be determined through licence conditions set by the Minister.

Further detailed information regarding proposed criteria for each sector in the Point Boston aquaculture zone is provided below.

Point Boston (north) sector

The Point Boston (north) sector is located directly below the Louth Bay aquaculture zone, surrounding Rabbit Island, and consists of reallocated area (i.e. existing area) from the Louth Bay aquaculture zone (see section 6.2.3) under the Current Policy (Appendix C6). The sector will comprise a total area of approximately 1,415 ha with a maximum leasable area of 161 ha, which is currently fully allocated. Biomass and hectare limits for bivalve molluscs must not exceed 2,820 tonnes (refer to Section 7.2 for biomass calculations) and 141 ha respectively or, if some other amount or area is specified by the Minister by notice in the Gazette, that other amount or area.

Point Boston (south) sector

The Point Boston (south) sector is located to the east of Boston Island, and consists of reallocated area (i.e. existing area) from the Boston Island (east) sector of the Boston Bay aquaculture zone (see section 6.2.1) and Lincoln (inner) sector of the Lincoln aquaculture zone (see section 6.2.2) under the Current Policy (Appendix C6). The sector also includes a relatively small proportion of reallocated area from the existing Lincoln aquaculture exclusion zone (see section 6.2.9) to the north and east for aesthetic zone boundary purposes and to allow for further growth in the aquaculture industry. The sector will comprise a total area of approximately 1,512 ha with a maximum leasable area of 100 ha, of which 20 ha is currently allocated. Biomass and hectare limits for bivalve molluscs must not exceed 1,200 tonnes (refer to Section 7.2 for biomass calculations) and 60 ha respectively (note 20 ha is currently allocated) or, if some other amount or area is specified by the Minister by notice in the Gazette, that other amount or area.

6.2.8 Buffalo Reef aquaculture exclusion zone

The Buffalo Reef aquaculture exclusion zone is located approximately 52 kilometres east of the township of Port Lincoln, in the waters south-east of Spilsby Island around the Buffalo Reef ecosystem (Appendix C9). It comprises an area of approximately 1,255 ha in the Current Policy, including a 2 kilometre buffer area to protect the Buffalo Reef ecosystem. The Draft Policy proposes no changes to this aquaculture exclusion zone.

Key points prescribed in the Draft Policy:

- No changes proposed.

6.2.9 Lincoln aquaculture exclusion zone

The Lincoln aquaculture exclusion zone commences from the coastline of the Port Lincoln region and extends seaward towards the Sir Joseph Banks Group (Appendix C10). It comprises an area of approximately 27,383 ha in the Current Policy, and includes the area of the Port of Port Lincoln prescribed in the *Harbors and Navigation Regulations 2009*, shipping lanes, areas with seagrass meadows, and popular fishing spots (within Peake and Moonlight Bay). It also includes buffer exclusion areas around National and Conservation Park boundaries and around the coastline (e.g. Boston Island) to maintain separation between land and aquaculture development.

The proposed amendments to this aquaculture exclusion zone include minor realignments to zone boundaries, reallocation of area under the Current Policy (i.e. existing area) from the Sir Joseph Banks aquaculture exclusion zone to protect a shipping lane (see section 6.2.10) and from the Louth Bay aquaculture zone to create a buffer exclusion zone between bivalve mollusc aquaculture sites in the Tod River aquaculture zone for biosecurity purposes (see section 6.2.6), and reallocation of area under the Current Policy to the proposed Point Boston (south) sector of the Point Boston aquaculture zone (see section 6.2.7) and the Lincoln (inner) sector of the Lincoln aquaculture zone (see section 6.2.2) for aesthetic zone boundary purposes and to allow for further growth in the aquaculture industry.

Considering these changes, the Lincoln aquaculture exclusion zone total area is proposed to increase to approximately 29,557 ha in the Draft Policy.

Key points prescribed in the Draft Policy:

- An increase in total area to approximately 29,5557 ha.
- The increase in total area of the zone (by 2,173 ha) is due to realignment of the aquaculture exclusion zone boundary and reallocation of area (i.e. existing area) from other aquaculture zones under the Current Policy.

6.2.10 Sir Joseph Banks aquaculture exclusion zone

The Sir Joseph Banks aquaculture exclusion zone is located approximately 20 kilometres east/north-east of the township of Port Lincoln, in the waters surrounding the Sir Joseph Banks Group Conservation Park (Appendix C9). It comprises an area of approximately 96,723 ha in the Current Policy, including the entire Sir Joseph Banks Group Conservation Park, with an additional 1 km buffer exclusion area extending around this Conservation Park, and two ASL buffer exclusion areas extending seaward around major (i.e. 15 km partially around Dangerous Reef) and minor (i.e. 5 km) breeding colonies within the Conservation Park specifically incorporated for SBT and finfish classes of aquaculture.

The Draft Policy proposes no changes to aquaculture exclusion zone areas encompassing the Conservation Park, 1 km Conservation Park buffer, and 5 km ASL buffer. However, the aquaculture exclusion zone area consisting of the partial ASL buffer around Dangerous Reef is proposed to be amended in the following way:

- Replacement through creation of a new 5 km ASL buffer aquaculture exclusion zone (i.e. the Dangerous Reef aquaculture exclusion zone see section 6.2.11) and introduction of a 10 km ASL Management Area extending from 5 km to 15 km from Dangerous Reef (see section 7.9.1).
- Reallocation of existing area to the Lincoln (inner south) sector of the Lincoln aquaculture zone (see section 6.2.2), noting that any new aquaculture activity within this sector will need to abide by the additional ASL management arrangements (see section 7.9.1.).
- Reallocation of existing area to the Lincoln aquaculture exclusion zone to protect a shipping lane (see section 6.2.9).

Considering these changes, the Sir Joseph Banks aquaculture exclusion zone total area is proposed to decrease to approximately 52,487 ha in the Draft Policy.

Key points prescribed in the Draft Policy:

- A decrease in total area to approximately 52,487 ha.
- The decrease in total area of the aquaculture exclusion zone (by 44,236 ha) is due to replacement of the partial ASL buffer exclusion area around Dangerous Reef (comprising a total area of approximately 44,697 ha) with the newly proposed Dangerous Reef aquaculture exclusion zone (with a total area of approximately 7,801 ha) and introduction of new ASL Management Area (with a total area of approximately 57,446 ha), and reallocation of area (i.e. existing area) to other aquaculture zones and aquaculture exclusion zones under the Current Policy.

6.2.11 Dangerous Reef aquaculture exclusion zone

A new Dangerous Reef aquaculture exclusion zone is proposed extending 5 km seaward around Dangerous Reef, and comprising a total area of approximately 7,801 ha (Appendix C9). It replaces part of the existing Sir Joseph Banks aquaculture exclusion zone (see section 6.2.10). The proposed Dangerous Reef aquaculture exclusion zone will encompass the Sir Joseph Banks Group Conservation Park boundary around Dangerous Reef, with an additional 1 km buffer exclusion area extending around this Conservation Park, and a 5 km ASL buffer exclusion area extending around Dangerous Reef in line with other aquaculture exclusion zones created to protect ASL populations (e.g. the Sir Joseph Banks aquaculture exclusion zone). An additional 10 km ASL Management Area extending from 5 km to 15 km from Dangerous Reef is also proposed (see section 7.9.1).

Key points prescribed in the Draft Policy:

- The proposed aquaculture exclusion zone is new, and replaces part of the existing Sir Joseph Banks aquaculture exclusion zone.
- The total area is proposed to be approximately 7,801 ha (not including the ASL Management Area).
- It extends 5 km from Dangerous Reef with an additional new 10 km ASL Management Area extending from 5 km to 15 km from Dangerous Reef.
- Note the total area of the ASL Management Area is approximately 57,446 ha. Combined, the new ASL management arrangements (i.e. Dangerous Reef 5 km aquaculture exclusion zone and 10 km ASL Management Area) comprise a total area of approximately 65,247 ha, which is 20,550 ha greater than ASL management arrangements in the Current Policy.

6.2.12 Miscellaneous prescribed criteria across all aquaculture zones

Aquaculture research, education or tourism

There is 'miscellaneous' prescribed criteria in the Current Policy which applies to all aquaculture zones and provides that of the aggregated area leased or available for lease in aquaculture zones, at least 13 ha must be used or available for use for the farming of aquatic organisms for the purposes of research or a business constituted of education. In addition, there is prescribed criteria within the Boston Bay sector of the Boston Bay aquaculture zone, which provides '*that wild caught tuna must not be farmed other than for the purposes of research, a business constituted of education or a business constituted of tourism*'. The maximum permitted biomass limit for this purpose is 38 tonnes (see section 6.2.1). Licence conditions are also used to regulate aquaculture research, education and tourism activities, and typically include licence conditions which restrict biomass limits and the sale of stock given that their purpose is not to maximise growth rates of stock (i.e. are fed a maintenance diet) or for human consumption.

The Draft Policy proposes to maintain the above provisions, and to promote growth in aquaculture research, education and tourism. To achieve this, the 'miscellaneous' prescribed criteria in the Draft Policy has been amended to include tourism, and the maximum leasable area increased (by 27 ha) to 40 ha.

Note that the classes of permitted aquaculture and any associated maximum biomass limit for the farming of aquatic organisms for the purposes of research, education, or tourism will be restricted by the prescribed criteria of the aquaculture zone/sector the aquaculture activity is proposed to occur within and individual licence conditions.

Key points prescribed in the Draft Policy:

- Miscellaneous prescribed criteria across all aquaculture zones combined for aquaculture research and education purposes will remain and now include aquaculture tourism.
- The maximum leasable area across all aquaculture zones combined for aquaculture research, education and tourism purposes will increase (by 27 ha) to 40 ha.
- The classes of permitted aquaculture will be restricted by the prescribed criteria of each aquaculture zone/sector the activity is proposed to occur within.
- Prescribed biomass limits will be restricted by the prescribed criteria of each aquaculture zone/sector the activity is proposed to occur within and individual licence conditions set by the Minister.

Unstocked aquaculture farming structures

The Current Policy permits aquaculture lease tenure within all aquaculture zones/sectors for the placement of unstocked aquaculture farming structures, which is incorporated within the maximum leasable area prescribed for each aquaculture zone/sector. Currently there are 55 ha allocated in the Boston Bay aquaculture zone for the placement of unstocked farming structures (i.e. empty sea-cages) from the SBT aquaculture sector.

To provide sufficient area for future aquaculture industry needs as they expand, and which does not take up leasable area set aside in each aquaculture zone for production of aquaculture stock, the Draft Policy proposes to amend the 'miscellaneous' prescribed criteria in the Current Policy to include a maximum leasable area of 105 ha for the placement of unstocked aquaculture farming structures within all aquaculture zones combined. In addition, to provide flexibility in setting maximum leasable area for future industry needs, a provision has been added that allows the Minister to alter the maximum leasable area for the placement of unstocked aquaculture farming structures through notice in the Gazette.

Key points prescribed in the Draft Policy:

- New miscellaneous prescribed criteria across all aquaculture zones combined for the placement of unstocked farming structures.
- The maximum leasable area across all aquaculture zones combined for the placement of unstocked farming structures is 105 ha.

7. CONSIDERATIONS INFORMING THE DESIGN AND PRESCRIBED CRITERIA OF THE PROPOSED AND AMENDED ZONES

To uphold the objectives of the Act, PIRSA has taken the following matters into account in reviewing the Current Policy and encouraged comment or advice on each during the public consultation period for the Draft Policy. The following matters have been used to design and amend the zones considered in the Draft Policy.

7.1 Physical and environmental characteristics of the region

The Eyre Peninsula area has a temperate climate characterised by cool, wet winters and warm dry summers with average temperatures on the coast ranging from 25-32°C in summer and 12-18°C in winter and an average rainfall of 350 mm over the past 60 years (CSIRO and BOM, 2020). A major factor influencing the winds of the LEP area is the seasonal migration of the subtropical high-pressure systems. During summer, the west to east migration of high-pressure systems produces winds from different directions depending on the location of the centre of the high-pressure system. When the centre of the system is located over the Great Australian Bight, south-easterly winds dominate over the area, however if the centre is located over the Tasman Sea, north-easterly winds prevail over the region. In summer, the effect of differential land-sea heating produces sea breezes that approach the coastline from the south-east. In winter, due to the tropical migration of the high-pressure systems, north-westerly winds and associated transient south westerlies, caused by the migration of west to east moving low pressure systems, prevail over the region (Sinclair Knight Merz, 2001).

Spencer Gulf has been inundated by the sea and drained many times over the past three million years. These drastic changes can be seen in the diverse type of coastal formations present in the LEP region. From sandy beaches running along Peake Bay, Louth Bay and North Shields; to rounded cliffs along the shoreline of Proper Bay; as well as, dune fields, sand pits and back-barrier lagoons around the Boston Bay area. Additionally, seventeen granite-based islands (Sir Joseph Banks Group) lie about 20 km offshore from Bolingbroke Peninsula. They are low lying islands consisting of granite overlain by limestone (Bourman, 2016).

The seabed of the region consists mostly of silty sand close inshore, with heavier sands further to sea. In depths over 15 m the bottom tends to be mainly bare, coarse sediment with undulations increasing in size with distance from the coast. The tides are generally small as with the rest of the State, however there can be larger tides when strong winds or storms occur. During the summer period, winds generally blow towards the land from the southeast and out to sea across the zones from the northwest during winter. Strong wind events occur during all seasons, and the strongest wind events can create waves that would disturb the seabed to a depth of almost 16 m.

The gulf water circulation is strongly seasonal and driven by both local meteorology and remote forcing (e.g., tides, coastal trapped waves). During winter, the westerly winds and atmospheric cooling combine to drive a westerly shelf circulation with water exiting the gulf from the east and nutrient reach water entering the western side; whereas in summer, factors such as evaporation, reversal of winds and much denser (nutrient rich) water pooling in the sub-surface of the upwelling to the south-east of Kangaroo Island contributes to the reduction in water movement in the gulf (Tanner *et al*., 2009 & Doubell *et al*., 2015).

Seagrasses occur 500 to 1000 m offshore in the shallow protected waters of Peake Bay, Louth Bay and Proper Bay. The dominant seagrass species include *Posidonia australis* and *P. sinuosa* with lower levels of *Halophila australis* and *Amphibolis antarctica*. In more exposed areas like Point Boston, Point Bolingbroke and Cape Donington there are subtidal rocky shore macroalgal communities dominated by *Cystophora* species (PIRSA, 2014 & Miller *et al*. 2009).

It is predicted that oceans will increase in height, become warmer and pH will fall due to climate change. This phenomenon is occurring as a result of an increase in the concentration of greenhouse gases in the Earth's atmosphere. Fifty-year linear regression calculations made by SARDI in 2019 indicate a mean sea level rise in the marine waters of the Eyre Peninsula of 0.04 ± 0.02mm per year across the gulf. Trends in sea surface temperature clearly show an increase of 0.12 degrees Celsius per decade in the Southern Ocean (CSIRO and BOM, 2020). Other factors, such as surface wave conditions are also expected to affect not only, surrounding coastal communities through flooding and erosion, but also, the aquaculture industry's resources. All these factors could result in changes to oceanic and inshore productivity and food webs, possible changes to the availability of suitable aquaculture sites because of sea-level rise; increased wave activity impacts and warming oceans causing changes to growth and reproductive rates (Siebentritt *et al.,* 2014 & Tanner *et al*., 2019).

7.1.1 Bicker Isles

Bicker Isles represent two small (about 250 m and 420 m at their widest) rocky outcrops located approximately midway between the southern extremity of Boston Island and the mainland. Water depths within the Bicker Isles sector of the Boston Bay aquaculture zone vary between 10 and 16 m, with the seafloor composed predominately of bare sand.

7.1.2 Boston Bay

Boston Bay is a large, natural harbor created by Boston Island and lies at the bottom south-western corner of Spencer Gulf. Boston Island, located centrally in the bay, is about 5 km long and about 2 km wide. The wave activity in the bay is low, and follows a general anticlockwise circulation (Doubell *et al*., 2015). Water exchange between Boston Bay and Spencer Gulf occurs mainly through a channel about 3 km wide located north of Boston Island and the water exchange has minimal penetration into the coastal margins. Estimates of the flushing times based on tracers and Lagrangian tracking show times scales of 8 days (Tanner *et al*., 2009 & Loo *et al*., 2014).

7.1.3 Lincoln (inner) sector

Within the Lincoln (inner) sector, sediments are mostly composed of poorly sorted silts and fine sands, predominated by skeletal remains of carbonate-secreting organisms. The contribution of plankton to the organic matter remaining in the sediments has been calculated to be in excess of 80% using concentration-dependent stable-isotope mixing models. An erosional area has been identified south of Rabbit Island where sediments contain up to 50% siliciclastic material, grain size distributions are better sorted and coarser, and organic carbon and total nitrogen contents are very low. In contrast, deeper waters north of Cape Donington have been identified as a depocentre for fine sediments, which contained organic matter levels twice those elsewhere in the region despite the extremely high carbonate contents (Fernandes *et al*., 2006). Additional observations of the seafloor corresponding to the north-eastern section of the Lincoln (inner) sector using underwater video were conducted in November 2006 for PIRSA. In total, 8 transects were filmed, each depicting a relatively barren seafloor, characterised by medium to coarse sand, low to medium bioturbation (a subjective measure of benthic infaunal activity, notably from polychaete worms) and low undulation. The dominant epibenthic fauna observed were razorfish (*Pinna bicolor*) and small sponges. Despite the depth range of approximately 21 to 23 m, sparse seagrass (Posidonia species) was observed in 2 of the 8 transects. Transect 4 contained a single patch whereas seagrass was dispersed along approximately 20% of transect 8. The location of seagrass in these northern most transects probably corresponds to the small patches of

seagrass originating from shallower waters to the south-east of Point Bolingbroke as mapped by Sinclair Knight Merz in 2001.

7.1.4 Lincoln (inner south) sector (to be added via Gazette)

Details surrounding the benthic characteristics of the proposed Lincoln (inner south) sector can be found in section 6.2.2 of this report.

7.1.5 Lincoln and Boston Bay (outer) sectors

The proposed Lincoln and Boston Bay (outer) sectors falls within both the Jussieu and Gambier Biounits but predominantly in the Gambier Biounit. The Jussieu Biounit extends from Cape Catastrophe on the Eyre Peninsula, north to Salt Creek (Tumby Bay). The Gambier Biounit comprises the Gambier Isles and Neptune Islands (Edyvane, 1999). Water depths range from less than 20 m around the Sir Joseph Banks Group to in excess of 40 m (Parsons Brinckerhoff and SARDI Aquatic Sciences, 2003), with most of the proposed sector being in water depths of 30 to 40 m.

The area experiences surface water temperatures ranging from 13°C to 16°C during winter and 19°C to 23°C during summer and wave heights of 1.5 to 2 m (Doubell *et al*., 2015). Depth and time averaged circulation in lower Spencer Gulf are clockwise and generally weak, although areas of higher flow occur to the east of Spilsby Island, hence in the Lincoln and Boston Bay (outer) sectors, as well as through Thorny Passage and between Tumby Bay and the northern end of the Sir Joseph Banks group (Tanner and Volkman, 2009). Monthly average currents are stronger in May and weaker in January. These results are consistent with the expected blocking of the gulf during summer and the large clockwise circulation expected for autumn/winter (Doubell *et al*., 2015).

SARDI undertook an investigation of the Lincoln (outer) sector area described in the Current Policy between September 2009 and November 2010. The (outer) sector was developed to avoid areas of high biological diversity and focus aquaculture in areas where the benthic fauna and flora is categorised as sparse. The total area selected for the technical investigation covered 906 km^2, of which approximately 480 km^2 was considered suitable for aquaculture. The video analysis of the suitable areas depicted mostly barren sand with sea stars, sea cucumbers, solitary ascidians, gastropods, fish, crabs, bryozoans and bivalves in low abundance. Two sites also had scattered occurrences of sponges. The seafloor is dominated by fine to medium sand. The area to the north demonstrated high sponge counts, coralline rubble and reef substrate and was removed from the proposed sector as it was considered sensitive habitat.

7.1.6 Louth Bay

The Louth Bay subtidal zone is located within the Bioregion Eyre and the Jussieu Nearshore Marine Biounit. The Jussieu biounit extends from Cape Catastrophe, including Thistle Island, to Salt Creek north of Tumby Bay. The shoreline of Jussieu is primarily orientated to the east resulting in the biounit being dominated by offshore breezes and low wave energy (EPA, 2016).

Louth Bay is a wide, carbonate rich bay opened to the southeast, with water depths ranging from 10 to 20 m. The northern end of the bay is more exposed to southerly winds and ocean swell than the southern end of the bay, where occasional beach ridges are fronted by wide sand flats. Louth Island has a 1 km sand spit extending from the northern side with sea cliffs and shore platforms on the southern side (Sinclair Knight Merz, 2001). The area is characterized by reduced flushing and a spatial variation in nutrients and elevated chlorophyll a concentrations compared to offshore waters (Doubell *et al*., 2015).

Seagrass meadows occur offshore in the shallow protected waters of Louth Bay, including areas adjacent to Louth and Rabbit Islands. The dominant seagrass species include *Posidonia australis* and *P. sinuosa* with lower abundance *Halophila australis* and *Amphibolis antarctica*. In more exposed areas like Boston Point, there are subtidal rocky shore macroalgal communities dominated by *Cystophora*

species. Additionally, this zone presents patches of unvegetated soft bottom, including areas around Louth Island and Rabbit Island (Byrars, 2003).

7.1.7 Tod River

The Tod River is an important regional habitat being the only estuarine river on the LEP, with mud flats adjacent to the mouth. The Tod River flows into the southern end of Louth Bay when there is sufficient rainfall. The Tod catchment is largely agricultural land where runoff can transport nutrients and sediment to the sea (EPA, 2016).

7.1.8 Proper Bay

Proper Bay is a bedrock embayment containing 53 km of shoreline with low energy sand flats in the southern portion which form relatively stable beaches backed by low, stable fore-dunes. Water depths range from one metre in the western end to approximately 10 m in the eastern end, which opens to the southern end of Boston Bay (Sinclair Knight Merz, 2001 & Bourman, 2016). Although the bay has extensive habitats of dense seagrass meadows, the sewage from Port Lincoln is treated at the Billy Lights Point wastewater treatment plant, which discharges wastewater into Proper Bay (EPA, 2016).

7.2 Carrying capacity and biomass limits

The new carrying capacity estimates (biomass limit within a prescribed water quality guideline value inferred from modelled net $NH4^+$ output) of supplementally fed classes of aquaculture (e.g. finfish and SBT) within the proposed aquaculture zones of the Draft Policy are based on published work by SARDI. These include nitrogen budgets for SBT (Fernandes *et al*. 2007) and Yellowtail Kingfish (Fernandes and Tanner 2008) and the latest hydrodynamic and flushing timescale models (Middleton & Doubell 2014; Middleton et al, 2014).

Carrying capacity estimates for supplementary fed classes of aquaculture were determined assuming the average flushing timescale for aquaculture zones, as well as for finer scale sectors and areas to inform management of those zones. Different water quality guideline values were applied to three distinct flushing areas from inshore to offshore. The approach is designed to limit nutrient emissions in inshore waters where flushing is reduced compared to more offshore areas where emissions are quickly diluted and assimilated into the environment close to background levels. Further detail on proposed biomass limits for finfish and SBT are outlined in section 7.2.1 and 7.2.2 below.

A shellfish model developed by SARDI and Parsons Brinckerhoff in 2003 used to calculate carrying capacity for bivalve molluscs in the Current Policy was again used for calculations within the new zones/ sectors of the Draft Policy (i.e. Boston Bay (outer) sector and Point Boston aquaculture zone). This shellfish model was originally developed for oysters; however, it is likely the same subsistence value would work as a first order approximation for mussels as well. Further detail on proposed biomass limits for bivalve molluscs are outlined in section 7.2.2 below.

Similar to the Current Policy, aquaculture zone biomass limits will be managed through licence conditions and the Draft Policy is flexible in terms of the ability to adjust biomass limits in the future through Gazette notice provisions (for example if nutrient offsets are demonstrated through seaweed production). A summary of the methodology and results for the refined biomass carrying capacity estimates for the Draft Policy is provided below. As mentioned in section 3.5, there are difficulties in confidently predicting potential carrying capacity for some non-supplementary fed classes of aquaculture in South Australia, such as algae, and biomass limits for these classes of aquaculture will continue to be managed through licence conditions consistent with the Current Policy.

7.2.1 ANZECC/ARMCANZ Guideline trigger values

The water quality guideline trigger values determined by the Australian and New Zealand Environment and Conservation Council (ANZECC)/Agriculture and Resource Management Council of Australia and

New Zealand (ARMCANZ) were used as a guideline to determine the modelled carrying capacity estimates for supplementary fed classes of aquaculture (ANZECC/ ARMCANZ, 2018).

The ANZECC/ARMCANZ water quality framework provides for Water Quality Guideline Values (WQGV) that indicate when environmental harm may occur, which should trigger monitoring where required. The framework provides for the WQGV to be 'modified into regional, local or site-specific guidelines', however region-specific values for Spencer Gulf are yet to be developed by the EPA.

The ANZECC/ARMCANZ WQGV for South Australia (South-central) is 50 mg/m³ $NH4^+$. The EPA have previously suggested this value seems too high for the LEP region. For this reason, the previous LEP Advisory Committee involved with drafting the Current Policy discussed and agreed on conservative biomass limits to those calculated based on the 50 mg/m³ $NH4^+$ WQGV at the time. Those lower agreed limits were subsequently adopted in the Current Policy. To improve the decision making process for setting biomass limits of supplementary fed classes of aquaculture in the Draft Policy, the best available oceanographic modelled data, outlined in section 7.2.2 below, was used which included more conservative WQGV's.

Note that within the ANZECC/ARMCANZ framework, if WQGV are reached this does not automatically imply that an activity must cease, but rather further investigation of the activity (e.g. environmental monitoring) should be considered to detect, prevent or minimise the potential for environmental harm. PIRSA's aquaculture environmental monitoring requirements are rigorous, developed in consultation with the EPA, and implemented even when WQGV are not reached, particularly for new activities or where there is uncertainty. This contributes to an improved understanding of any potential impacts and implementation of appropriate mitigation strategies to ensure aquaculture is ecologically sustainable.

7.2.2 Proposed Biomass Limits

Supplementary fed aquatic animals

It is proposed that prescribed biomass limits of supplementary fed aquatic animals for each individual aquaculture zone/sector in the Draft Policy will be estimated from net nutrient (i.e. $NH4^+$) emissions based on the flushing rates, connectivity and differing WQGV's appropriate for three different areas. Figure 1 shows the < 6, and > 12 hourly flushing timescale contours which have been estimated and used to broadly define three different areas of flushing capacity across the inner LEP region (i.e. < 6 hours flush time = high flush rate, 6-12 hours flush time = medium flush rate, and > 12 hours flush time = low flush rate) (Middleton *et. al.,* 2014). Figure 2 also shows these flushing timescale contours including the outer sectors. These areas are based on the influence of the semi-diurnal tide with a period to 12 hours to flush a typical aquaculture lease (i.e. 600 x 600 m in size).

Using SARDI's published carrying capacity model, the above approach provides a more rigorous methodology to setting prescribed biomass limits of supplementary fed classes of aquaculture within zones and sectors compared to previous estimates (Collings *et. al.,* 2007). This provides greater confidence and reduces the potential risks and impacts of nutrient emissions on receiving ecosystems and inshore embayment's.

For example, using this approach in the inner aquaculture zones/sectors where flushing is reduced (> 12 hours flush time = low flush rate) and there is greater connectivity to the bays and inshore ecosystems, more conservative biomass limits have been prescribed using lower WQGV's (i.e. 10 mg/m³ $NH4^+$) which are predicted to result in $NH4^+$ emissions reaching background levels in receiving environments at the boundary of the respective aquaculture zones/sectors. In contrast in the outer aquaculture zones/sectors where there is increased flushing (< 6 hours flush time = high flush rate) to disperse nutrients more efficiently and there are longer timescales of connectivity to inshore ecosystems (which facilitates nutrient assimilation), biomass limits have been prescribed based on a WQGV of 35 mg/m³ $NH4^+$, which is lower than the current ANZECC WQGV of 50 mg/m³ $NH4^+$. For aquaculture zones/sectors located within the middle flushing area (6-12 hours flush time = medium flush rate),

intermediate WQGV's (i.e. 20 mg/m³ $NH4^+$) have been prescribed to estimate carrying capacity. These WQGV's are predicted to result in $NH4^+$ emissions reaching background levels in receiving environments at the boundary of the respective aquaculture zones/sectors. Table 3 provides an overview of carrying capacity estimates for each aquaculture zone and sector taking into consideration flushing rates and associated WQGV.

These carrying capacity modelling results are proposed to inform the biomass limits for supplementary fed aquatic animals for each individual aquaculture zone/sector (e.g. finfish and SBT) similar to the Current Policy, with flexibility for future adjustment of biomass limits (through Gazette notice). Any future adjustment of biomass limits would need to be justified and may require additional management arrangements including environmental monitoring to determine any potential impacts or even nutrient offset measures (e.g. seaweed culture). The new finer scale biomass limit estimates within each flushing area within each aquaculture zone/sector will also be used for management of the activity at the lease/licence application assessment level (e.g. spatial allocation during lease movement applications within/between sectors, new lease/licence applications) and may require further management arrangements as detailed below in section 7.2.3. Note that because the flushing timescale contours are broad general indicators of flushing, based on one seasons water movement, they have not been used to define the boundaries of each aquaculture zone/sector. When required (e.g. allocation or biomass limit close to being reached in a zone or sector), PIRSA will utilise the latest relevant oceanographic model outputs during licence assessment, which has previously occurred.

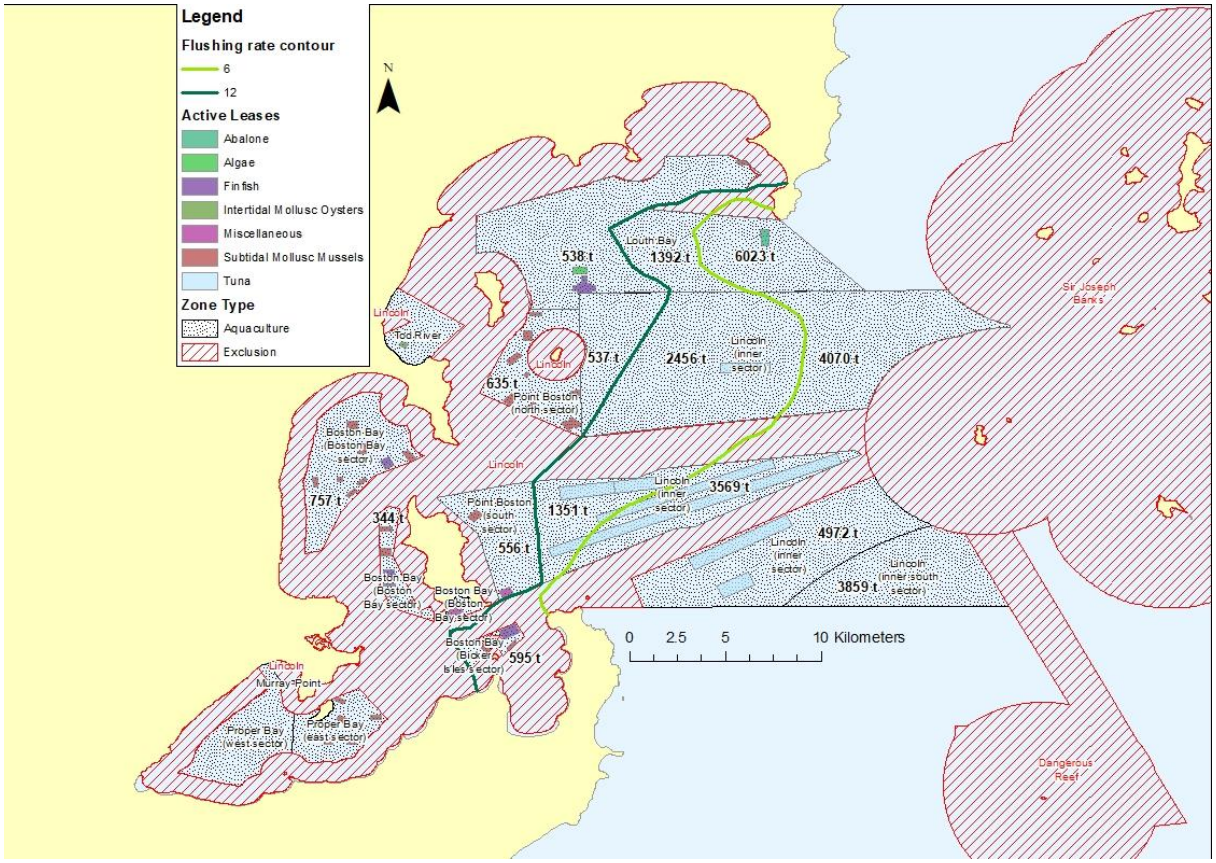

Figure 1: Map of the inner aquaculture zone/ sectors demonstrating the three flushing rate areas and associated supplementary fed carrying capacity estimates based on SARDI modelling using ANZECC/ARMCANZ water quality guideline values for each flushing rate area.

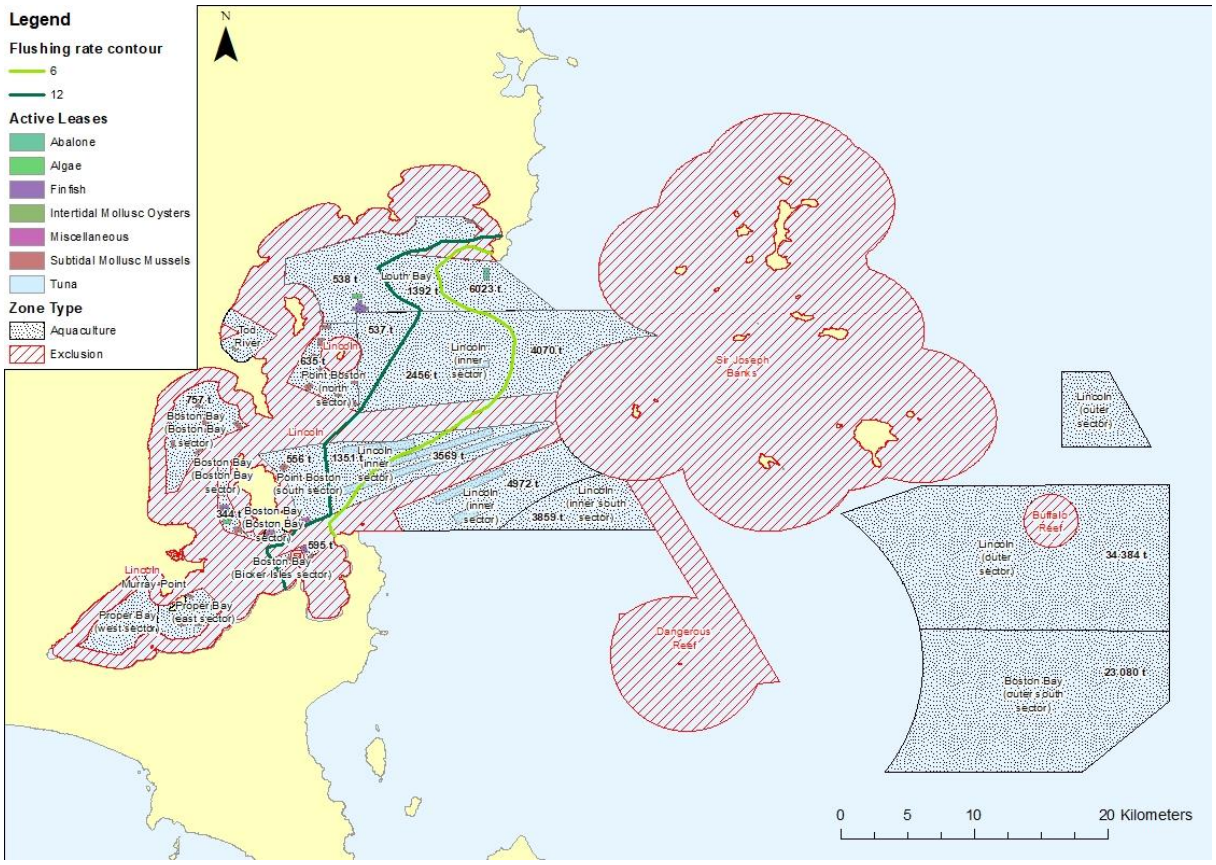

Figure 2: Map of all aquaculture zones/sectors within the Draft Policy (including outer sectors) demonstrating the three flushing rate areas and associated supplementary fed carrying capacity estimates based on SARDI modelling using ANZECC/ARMCANZ water quality guideline values for each flushing rate area.

Table 3: Overview of supplementary fed carrying capacity modelling results from SARDI

Zone	Sector	Location	Flush rate area ***	Carrying capacity (tonnes)	
				Flush rate area	Zone/sector
Lincoln aquaculture zone (5,875 ha)	Inner (2,000 ha)	Northern area	low	537	16,955
			medium	2,456	
			high	4,070	
		Middle area	medium	1,351	
			high	3,569	
		Southern area	high	4,972	
	Outer (3,500 ha)	Northern area	high	9,814	34,384
		Southern area	high	24,570	
	Inner South* (375 ha)	Inner south	high	3,859	3,859
Boston Bay aquaculture zone (2,310 ha)	Boston Bay (250 ha)	Closer inshore	low	757	1,696
		Adjacent Boston Island	low	344	
	Bicker Isles (60 ha)	Bicker Isles	medium	595	
	Boston Bay (outer) (2,000 ha)	Outer	high	23,080	23,080
Point Boston aquaculture zone (261 ha)**	South (100 ha)	South	low	556	1,191
	North (161 ha)	North	low	635	
Louth Bay aquaculture zone (530 ha)		Louth Bay	low	538	7,953
			medium	1,392	
			high	6,023	

*The Lincoln (inner south) sector is not proposed to be active in the Draft Policy, but can be activated at a future time if deemed appropriate by Gazette notice (see section 6.2.2).

**Note that while finfish carrying capacity has been modelled for the Point Boston aquaculture zone, it is proposed to not permit this class of aquaculture and SBT within this aquaculture zone, but permit other classes of aquaculture which are supplementary fed (e.g. gastropods, echinoderms, crustaceans) using finfish carrying capacity as an equivalent (see section 6.2.7).

***high = <6 hourly flush rate with WQGV of 35 mg/m³ $NH4^+$; medium = 6-12 hourly flush rate with WQGV of 20 mg/m³ $NH4^+$; low = >12 hourly flush rate with WQGV of 10 mg/m³ $NH4^+$

Bivalve molluscs

As mentioned previously, the SARDI and Parsons Brinckerhoff shellfish model was utilised to calculate bivalve mollusc carrying capacity and resulting proposed biomass limits in the Current and Draft Policy. The shellfish model utilises the following values: the area covered by the aquaculture zone/sector (km2); the average depth; and the flushing rate. In order to calculate the proportion of food available to shellfish, the following inputs were given (supplied in the SARDI/ Parsons Brinckerhoff model explanation):

- Food supply – amount of food within the site (particulate organic matter; POM) as a representation of food utilised by shellfish – 3.1 mg POM.L $^{-1}$
- Time spent submerged (in this case 100% for subtidal molluscs); and
- Subsistence – a ration value, which determines the amount of food actually required by shellfish to maintain healthy growth – 76 mg POM oyster-1 day-1.

Biomass limits for bivalve molluscs in existing aquaculture zone/sectors in the Current Policy will remain the same in the Draft Policy, as these have been validated through this model. In addition, bivalve mollusc biomass limits for new sectors proposed in the Draft Policy (such as the Boston Bay (outer) sector and the Point Boston (north) and (south) sectors) have also been determined from this model with updated flushing rates from SARDI. Note that the Current and Draft Policy do not prescribe a bivalve mollusc biomass limit for aquaculture zones which permit bivalve molluscs but exclude mussels (i.e. Murray Point and Tod River aquaculture zones). Biomass limits for these aquaculture zones have and will continue to be determined through individual licence conditions set by the Minister.

Consistent with provisions under the Current Policy, the Draft Policy will maintain prescribed criteria which provides flexibility for future adjustment of biomass limits for bivalve molluscs (through Gazette notice) if the Minister is satisfied that an increase would not compromise the overall productivity of the bivalve mollusc industry in that aquaculture zone. Any future adjustment of biomass would need to be justified and may require additional management arrangements including environmental monitoring to determine any potential impacts.

7.2.3 Environmental monitoring programs and adaptive management

As indicated in section 5, annual/periodic EMP's, and compliance activities in addition to the outcomes of the AEMP, will be used to determine if unacceptable impacts are occurring to the adjacent marine ecosystem in the LEP as a result of aquaculture activities.

If monitoring or other programs indicate a negative change to the surrounding marine ecosystem as a result of aquaculture activities, one or a combination of the below options will be used to adaptively manage the industry:

1. Undertake further environmental monitoring to determine any potential impact or if unacceptable impacts are occurring; and/or
2. Introduce integrated multi-trophic aquaculture onto a site or within the aquaculture zone/sector which allows for the uptake of nutrients (e.g. algae); and/or
3. Work with industry to identify relocation options for biomass in the aquaculture zone/sector to locations with higher flushing rates or alternative flushing direction with available area/ tonnage (e.g. away from impacted areas identified); and/or
4. Reduce the biomass in the sector, including by transferring stock to another sector within the aquaculture zone that has available area/tonnage below prescribed biomass levels, or by transferring stock to another aquaculture zone/sector in another zone policy that has available area/tonnage; and/or

5. Other management strategies that provide an appropriate level of protection and mitigation. This includes management responses under the provisions of aquaculture lease and corresponding licence conditions (e.g. licence conditions permitting the Minister to direct a licensee to cease and desist from engaging in an aquaculture activity indefinitely or for a specified period), the Act (e.g. section 58 – provision for direction of licensee by the Minister to carry out required works), the Regulations (e.g. regulation 11 – provision for imposing monetary penalty and expiation for breach by licensee), and the Draft Policy itself (e.g. clauses permitting the Minister to alter maximum biomass limits of aquaculture zones for certain permitted classes of aquaculture through a Gazette notice).

7.3 Integrated Multitrophic Aquaculture (IMTA)

IMTA is defined as '*an aquaculture farming system whereby two (or more species) are farmed together and waste products of one species are recycled as feed for another species*' (note 'together' can be adjacent farms or within one farm site). IMTA can foster the sustainable expansion of the aquaculture industry in South Australia by utilising dissolved inorganic waste from one species to grow other species (Wiltshire *et al.,* 2015). This can provide both an environmental benefit through reduction of nutrient inputs, economic benefit through diversification into other aquaculture products, and increased social acceptability (Troell *et al.,* 2009). Extractive species such as filter feeders (e.g. shellfish) and seaweed can grow faster in integrated systems (Wiltshire *et al.,* 2015), and have been recommended as a means by which nutrient inputs from other activities may be offset or minimised and the environmental impact of other aquaculture activities reduced (Chopin *et al.*, 2001; Buschmann *et al.*, 2007; Wiltshire *et al.,* 2015). Other species that can also be considered are deposit feeders such as sea cucumbers and sea urchins that can take up heavier particulate matter that is released under aquaculture infrastructure from supplementary fed organisms (Soto, 2009 and Hannah *et al.*, 2013).

IMTA systems used to date have included farming systems with all species farmed within the same infrastructure and independent aquaculture sites with monoculture (single species aquaculture) of different species located adjacent to and spaced at a predetermined distance apart to the main nutrient releasing aquaculture system to ensure efficiency of the IMTA system (Soto, 2009). IMTA development in Australia is limited and wider regional planning of IMTA has been considered in the design of the proposed aquaculture zones within the Draft Policy to allow industry to investigate multitrophic aquaculture on a single lease site, or within close proximity of other leases (e.g., algae within proximity to finfish/SBT farms).

7.4 Native Title

PIRSA acknowledges and recognises the native title rights and interests of South Australian Aboriginal people. It is further recognised that it is essential to the well-being of Aboriginal people in the communities that their traditional values and practices are respected, and their heritage and native title interests considered when aquaculture developments are planned for a particular area. PIRSA facilitates the involvement of local Aboriginal representatives in its process for developing and amending statutory aquaculture policies.

Note that an aquaculture zone policy is not the legislative mechanism under the Act to permit an entity to conduct aquaculture within State waters or have exclusive rights of occupation to the seabed, but rather it is the grant of an aquaculture lease and corresponding licence. The grant of an aquaculture lease and corresponding licence is subject to notification requirements under section 24HA of the *Native Title Act 1993*, which PIRSA conducts during the assessment of individual aquaculture lease and corresponding licence applications.

7.4.1 Barngarla Native Title Determination

The Barngarla Native Title Determination Application (SAD 6011) was first lodged in 1998. Although amended since this time the Barngarla Native Title Claim (SAD6011/1998) was determined on the 23/6/2016 and came into effect on the 6/4/2018. The determination area consists of multiple areas in the vicinity of the Eyre Peninsula with a combined area of about 210 sq kms, which includes the central and eastern areas of the Eyre Peninsula (Figure 3). The determination area extends seaward from the coast in a number of areas, including within the boundaries of some aquaculture zones and an aquaculture exclusion zone of the Current Policy and Draft Policy (National Native Title Tribunal, accessed 20/10/2022). Specifically, the determination area extends over portions of the Tod River and Murray Point aquaculture zones, and the Lincoln aquaculture exclusion zone in both the Current and Draft Policies.

An Indigenous Land Use Agreement (ILUA), the Barngarla Determination ILUA (SI20/003), was registered on the 16/11/2018 which covers specific areas of the determination area (Figure 3). The ILUA area includes the above mentioned portions of the Tod River and Murray Point aquaculture zones, and the Lincoln aquaculture exclusion zone in both the Current and Draft Policies. While the ILUA doesn't specifically address the grant of aquaculture leases and corresponding licences, the notification process under section 24HA of the *Native Title Act 1993* still applies, and the State acknowledges that acts validated under section 24HA may be compensible in accordance with the *Native Title Act 1993*.

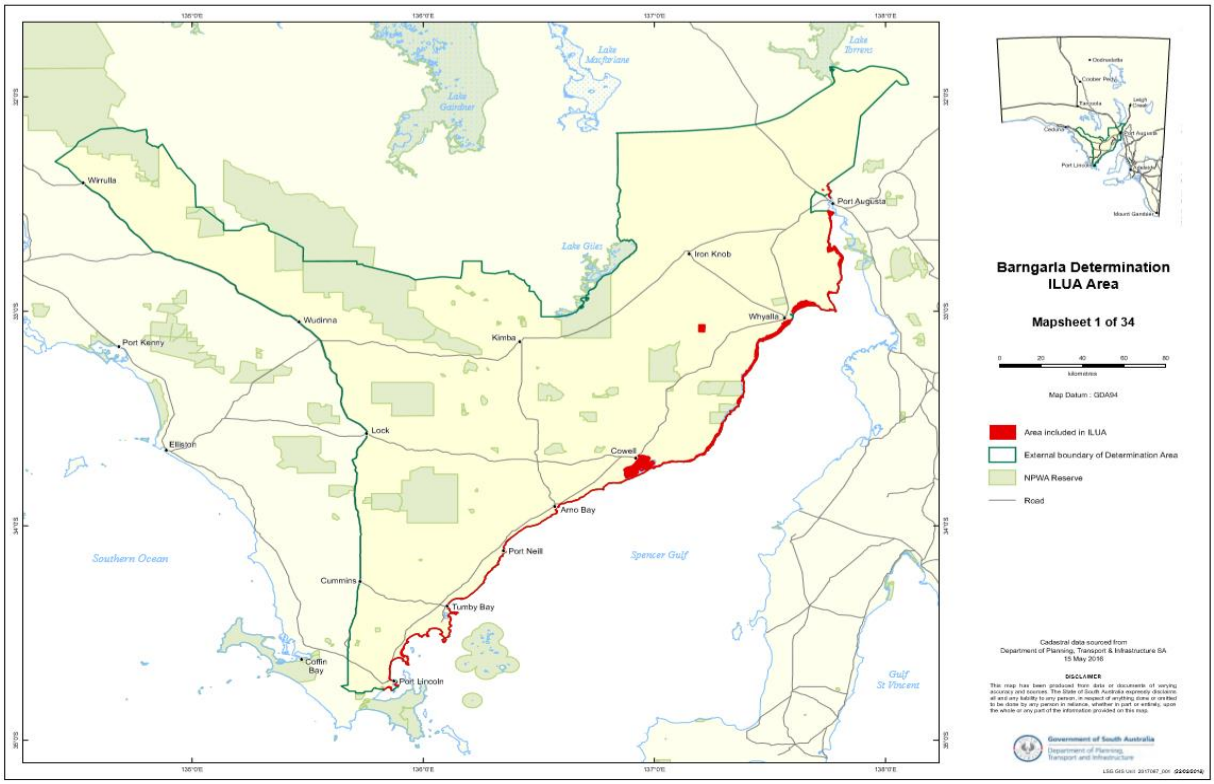

Figure 3: Map displaying the boundaries of the Barngarla Native Title Determination and ILUA area.

7.4.2 Nauo No. 2 Native Title Claim Application

The Nauo No. 2 Native Title Claim Application was submitted on the 21/6/2016 (SAD188/2016) and covers the area as described as the Jussieu Peninsula at the south-east end of Eyre Peninsula, including Boston Island, Taylor Island, Thistle Island, Albatross Island, Williams Island, Curta Rocks, Liguanea Island, Neptune Islands and Gambier Islands (Figure 4). The claim area extends seaward from the coast in a number of areas, including within the boundaries of some aquaculture zones and an

aquaculture exclusion zone of the Current Policy and Draft Policy (National Native Title Tribunal, accessed 20/10/2022). Specifically, the claim area extends over portions of the Proper Bay, Murray Point, Boston Bay, Point Boston, and Lincoln aquaculture zones, and the Lincoln aquaculture exclusion zone in both the Current and Draft Policies. The application status of the claim is active.

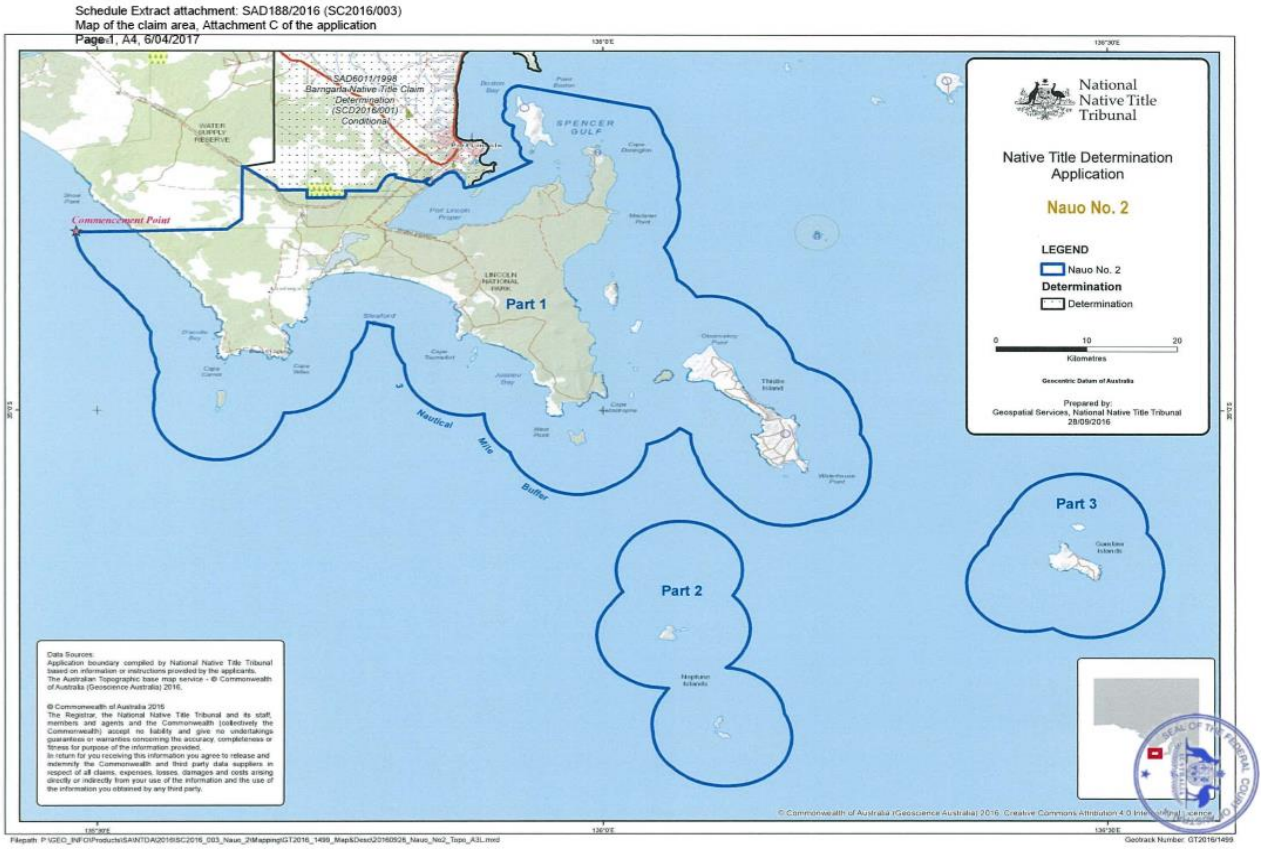

Figure 4: Map displaying the boundaries of the Nauo no. 2 Native Title Claim application.

7.4.3 Native Title considerations for the Draft Policy

As mentioned above, the Barngarla Native Title Determination and ILUA and Nauo Native Title Claim interact with a number of proposed aquaculture zone and aquaculture exclusion zone areas within the Draft Policy. PIRSA notified and extended offers to meet with Native Title representatives and Aboriginal groups in this region during the public consultation period to consider the interests of the local Aboriginal communities.

To maintain PIRSA's commitment to consider the interests and traditions of the local Aboriginal communities, Native Title matters will continue to be addressed through the assessment of aquaculture lease and corresponding licence applications and in the making of other decisions under the Act concerning aquaculture in the region.

7.5 Aboriginal Heritage

The Barngarla and Nauo People have traditional associations with the coastal areas of the Eyre Peninsula, which provide food and resources, and still hold strong cultural significance today. A search of the Central Archive, which includes the Register of Aboriginal Sites and Objects, administered by the Attorney-General's Department-Aboriginal Affairs and Reconciliation Division (AGD-AAR), has multiple entries for Aboriginal sites in the LEP area.

Pursuant to the *Aboriginal Heritage Act 1988* (AHA), it is an offence to damage, disturb or interfere with any Aboriginal site or damage any Aboriginal object or remains (registered or not) without the authority of the Minister for Aboriginal Affairs and Reconciliation. If a planned activity is likely to damage, disturb or interfere with a site, object or remains, authorisation of the activity must be first obtained from the Minister for Aboriginal Affairs and Reconciliation under section 23 of the AHA. Section 20 of the AHA requires that any Aboriginal sites, objects or remains, discovered on the land or water, need to be reported to the Minister for Aboriginal Affairs and Reconciliation. Penalties apply for failure to comply with the AHA.

The *Aboriginal Heritage (Miscellaneous) Amendment Act 2016* came into operation on 24 March 2016. The amendments to the AHA included provision for the establishment of Registered Aboriginal Representative Bodies (RARBs) and local heritage agreements that can include agreements about aquaculture.

Note that an aquaculture zone policy does not propose to undertake disturbance of the seabed i.e. is not a planned activity. If any Aboriginal sites, objects or remains are encountered during community engagement on the Draft Policy, PIRSA will advise the Minister for Aboriginal Affairs and Reconciliation and, where possible, avoid the heritage area or apply for relevant authorisations as necessary.

Following approval of any aquaculture zone policy, aquaculture lease and/or licence applicants who seek to conduct ground or sea disturbing works (i.e. a planned activity) are reminded of their obligations under the AHA and encouraged by PIRSA to request a search of the Central Archive through AGD-AAR. It should be noted that the Central Archive does not purport to be a comprehensive record of all Aboriginal sites, objects and remains in South Australia. Sites or objects may exist in the area even though they are not recorded.

7.6 Non-Aboriginal Heritage

Heritage is made up of aspects of the past and present that are important to share with future generations. This can include:

- historical buildings and monuments
- relics of agricultural and industrial heritage
- archaeological artefacts and fossils
- caves, mines and volcanic and geological sites
- shipwrecks, lighthouses and whaling stations

The different types of heritage in South Australia are managed by various government agencies, local councils, peak bodies and through legislation. Heritage South Australia of the South Australian Department of Environment and Water (DEW) is responsible for protecting and conserving built, maritime and intangible heritage of non-Aboriginal cultural heritage significance. It administers relevant legislation including the *Heritage Places Act 1993*, State Heritage provisions of the *Development Act 1993/ Planning Development and Infrastructure Act 2016*, the *Commonwealth Underwater Cultural Heritage Act 2018* and the *State Historic Shipwreck Act 1981* (DEW, 2022).

The South Australian Heritage Register (SAHR) contains information about places of heritage value in South Australia. It includes State heritage areas, places and related objects of State significance. The SAH register is maintained by the South Australian Heritage Council, supported by DEW under the *Heritage Places Act 1993* (DEW, 2022). An online search (conducted 4 March 2022) of the South Australian Heritage Register for the Port Lincoln region showed 7 records (Table 4), none of which are overlapping with the Draft Policy.

Table 4: Records of South Australian Heritage places in the Port Lincoln region.

Heritage No for Details	Address	LGA	Details	Class	State Heritage Place No
16590	Dorset Place PORT LINCOLN	Port Lincoln	Former Windmill Base (sometime Pioneer Mill Museum)	State	14219
16591	Hawson Place PORT LINCOLN	Port Lincoln	Hawson's Grave, Hawson Square	State	14220
27791	Le Brun Street PORT LINCOLN	Port Lincoln	Port Lincoln Locomotive Depot and Workshops	State	26501
16588	152 Proper Bay Road PORT LINCOLN	Port Lincoln	'Arrandale' (Dwelling, Cottage and Stables)	State	14217
16592	Railway Terrace PORT LINCOLN	Port Lincoln	Port Lincoln Railway Station	State	14608
16589	36 Washington Street PORT LINCOLN	Port Lincoln	Port Lincoln Police Station & Courthouse	State	10219
16587	20 Windsor Avenue PORT LINCOLN	Port Lincoln	Dwelling ('Ravendale House')	State	10914

7.7 Marine Parks

Marine parks are the principal tool under the *Marine Parks Act 2007* for managing both current and future activities that take place in marine parks. The Draft Policy and aquaculture activities in the Spencer Gulf Marine Parks are integrated to achieve multiple-use outcomes, in accordance with the objects and the four types of zones established by the *Marine Parks Act 2007*.

The *Marine Parks Act 2007* makes provision for the following types of marine park zones:

a) A general managed use zone – is a zone established so that an area may be managed to provide protection for habitats and biodiversity within a marine park, while allowing ecologically sustainable development and use. Within this zone aquaculture farming activities are deemed a compatible activity that is permitted to be undertaken.

b) A habitat protection zone – is a zone primarily established so that an area may be managed to provide protection for habitats and biodiversity within a marine park, while allowing activities and uses that do not harm habitats or the functioning of ecosystems. Within this zone aquaculture farming activities are deemed a compatible activity that is permitted to be undertaken.

c) A sanctuary zone – is a zone primarily established so that an area may be managed to provide protection and conservation for habitats and biodiversity within a marine park, especially by prohibiting the removal or harm of plants, animals or marine products. Within this zone, aquaculture farming activities are not deemed to be a compatible activity that is permitted to be undertaken.

d) A restricted access zone – is a zone primarily established so that an area may be managed by limiting access to the area. Within this zone, aquaculture farming activities are not deemed to be a compatible activity that is permitted to be undertaken.

The Draft Policy encompasses the boundaries of the Sir Joseph Banks Group Marine Park. Located in lower western Spencer Gulf and covering 2,627 km^2, the Sir Joseph Banks Group Marine Park includes part of the Eyre and Spencer Gulf Bioregions. The marine park is adjacent to LEP and includes the islands of the Sir Joseph Banks Group and Dangerous Reef. This marine park overlays two other

protected areas, including the Tumby Island Conservation Park and the Sir Joseph Banks Group Conservation Park (DEW, 2022).

As mentioned above, the two types of marine park zones that do not permit aquaculture to occur include sanctuary zones and restricted access zones. Three sanctuary zones exist within the Sir Joseph Banks Group Marine Park, near Kirkby Island, Seal Rock and Dangerous Reef, and no restricted access zones exist. PIRSA, with consideration for the objects of the *Marine Parks Act 2007*, have provided for an exclusion zone in the Draft Policy to be placed over the Sir Joseph Banks Group of Islands and Dangerous reef and which encompass sanctuary zones. Note that there are also general managed use zones and habitat protection zones within the Sir Joseph Banks Group Marine Park which overlap portions of aquaculture zones in the Draft Policy and also the Current Policy. As stated above, these types of marine park zones permit the activity of aquaculture to be undertaken within their boundaries, and aquaculture activity will be managed under the Act to ensure that all reasonable and practicable measures are taken to achieve the definition of these marine park zones.

7.8 Reserves and Conservation Areas

The Lincoln (outer) sector is adjacent to the eastern side of the Sir Joseph Banks Group Conservation Park. The Sir Joseph Banks Group Conservation Park includes twenty islands in Spencer Gulf. With the exception of Spilsby Island (which remains privately owned), the islands of the Banks group were incorporated into a proclaimed Conservation Park between 1967 and 1974. The Sir Joseph Banks Group Conservation Park contains ecologically significant benthic and pelagic biodiversity, representative of South Australia's unique Flindersian (transitional warm-cold temperate' waters) marine flora and fauna. The park is on the Register of the National Estate.

Approximately 38 km to the south-west of the proposed Boston Bay (outer) sector is the Neptune Islands Conservation Park. The park consists of all islands in the North and South Neptunes, except the southernmost island which was one of South Australia's last staffed Lighthouse Reserves (Edyvane, 1999).

Approximately 22 km to the south of the proposed Boston Bay (outer) sector is the Gambier Islands Conservation Park which includes Wedge Island, South West Rock, Peaked Rocks and North Islet. The Gambier Isles are not subject to human induced change and exhibit a range of habitats and nursery areas (Parsons Brinckerhoff and SARDI Aquatic Sciences, 2003).

The boundaries of existing and proposed aquaculture zones in the Draft Policy are sited to minimise potential impacts on, and to protect the integrity of, reserves under the *National Parks and Wildlife Act 1972*. This is consistent with planning policies contained within the Planning and Design Code under the *Planning, Development and Infrastructure Act 2016* and includes locating aquaculture zones a distance of 1km seaward of the boundary of any reserves.

7.9 Matters of National Environmental Significance

The *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) addresses the protection of matters of national environmental significance.

A search of the Protected Matters Database was conducted (20 October 2022) on the Australian Government Department of Agriculture, Water and the Environment website using the Protected Matters Search Tool (https://www.awe.gov.au/environment/epbc/protected-matters-search-tool) to obtain a list of threatened and migratory species that are considered to occur in the region (see Table 5). The resultant database report listed 46 migratory species (mainly consisting of birds, marine mammals, and sharks) and 59 threatened species (predominately consisting of birds) (Table 5). Other Matters Protected by the EPBC Act include 85 listed marine species and 14 whales and other cetaceans and one nationally important wetland.

The data retrieved form the Protected Matters Database is derived primarily from general distribution maps for each species and therefore at least some of the species described may not occur within proposed zones or individual lease and licence areas if granted in the future. Further assessment is conducted at the individual lease and licence application assessment stage which depends largely on the species and type of infrastructure applied for (i.e. mussel lines versus finfish cages versus benthic structures) within the aquaculture zone and potential impact on threatened and migratory species identified. In addition, section 19 and 20 of the Regulations specifies that each aquaculture sector or alternatively the licence holder must have a written strategy approved by the Minister to minimise adverse interactions with seabirds and large marine vertebrates.

Table 5: Threatened species (endangered and vulnerable) listed by the department of agriculture, water and the environment for the LEP marine region including (as at 20 October 2022).

Common Name(s)	Species	Status
Antipodean Albatross	*Diomedea antipodensis*	Vulnerable
Australasian Bittern	*Botaurus poiciloptilus*	Endangered
Australian Fairy Tern	*Sternula nereis nereis*	Vulnerable
Australian Painted Snipe	*Rostratula australis*	Endangered
Australian Sea-lion	*Neophoca cinerea*	Endangered
Black-browed Albatross	*Thalassarche melanophris*	Vulnerable
Blue Petrel	*Halobaena caerulea*	Vulnerable
Campbell Albatross	*Tahlassarche impavida*	Vulnerable
Curlew Sandpiper	*Calidris ferruginea*	Critically endangered
Eastern Curlew	*Numenius madagascariensis*	Critically endangered
Eastern Hooded Plover	*Thinornis cucullatus cucullatus*	Vulnerable
Fairy Prion (southern)	*Pachyptila turtur subantarctica*	Vulnerable
Fin whale	*Balaenoptera physalus*	Vulnerable
Great White Shark, White Shark	*Carcharodon carcharias*	Vulnerable
Greater Sand Plover, Large Sand Plover	*Charadrius leschenaultii*	Vulnerable
Green Turtle	*Chelonia mydas*	Vulnerable
Grey Falcon	*Falco hypoleucos*	Vulnerable
Indian Yellow Nose Albatross	*Thalassarche carteri*	Vulnerable
Leatherback Turtle, Leathery Turtle, Luth	*Dermochelys coriacea*	Endangered
Loggerhead Turtle	*Caretta*	Endangered
Mallee Whipbird	*Psophodes leucogaster leucogaster*	Vulnerable
Malleefowl	*Leipoa ocellata*	Vulnerable
Northern Giant Petrel	*Macronectes halli*	Vulnerable
Northern Royal Albatross	*Diomedea sanfordi*	Endangered
Nunivak Bar-tailed Godwit	*Limosa lapponica baueri*	Vulnerable
Plains-wanderer	*Pedionomus torquatus*	Critically endangered

Common Name(s)	Species	Status
Red Knot, Knot	*Calidris canutus*	Endangered
Sei Whale	*Balaenoptera borealis*	Vulnerable
Shy Albatross	*Thalassarche cauta*	Endangered
Soft-plumaged Petrel	*Pterodroma mollis*	Vulnerable
Sooty Albatross	*Phoebetria fusca*	Vulnerable
Southern Giant Petrel	*Macronectes giganteus*	Endangered
Southern Right Whale	*Eubalaena australis*	Endangered
Southern Royal Albatross	*Diomedea epomophora*	Vulnerable
Wandering Albatross	*Diomedea exulans (sensu lato)*	Vulnerable
White-capped Albatross	*Thalassarche cauta steadi*	Vulnerable

7.9.1 Australian Sea Lion interactions

In the Current Policy (approved in 2013), ASL buffer exclusion areas around major (i.e. Dangerous Reef) and minor ASL breeding colonies (i.e. other islands in the Sir Joseph Bank Group Conservation Park) respectively were incorporated as aquaculture exclusion zones. These were introduced as a precautionary measure based on recommendations in 2002 from a Marine Mammal Protected Area Aquaculture Working Group (MM-MPA-AWG). The MM-MPA-AWG concluded that the only aquaculture activity to pose a potential risk to ASL colonies is finfish aquaculture (note finfish includes SBT), and the only ASL colonies potentially at risk from finfish aquaculture are breeding colonies of ASL.

The resulting aquaculture exclusion zones were created to limit finfish aquaculture, but inadvertently have also limited the ability for all other species to be farmed, including species which provide ecosystem services such as uptake of nutrients from finfish activities (e.g. bivalve molluscs and algae). A report by Goldsworthy *et al.* (2009) identified that there was no biological basis to the precautionary buffer exclusion areas managing potential risks to individual ASL populations, and due to the high variability of individual ASL foraging distances within and between a colony from satellite tracking (e.g. generally within 100 km from Dangerous Reef, which overlaps all aquaculture zones in the Current Policy), buffer exclusion areas may be of limited value. Further, the report identified that in contrast to the MM-MPA-AWG recommendations, smaller breeding sites were likely more vulnerable than larger ones. In light of this finding Goldsworthy *et al.* (2009) recommended a review of the buffer exclusion areas. Additionally, there have been no reported adverse interactions between finfish aquaculture and ASL to PIRSA in the years since licence holders were required under the *Aquaculture Regulations 2005 and Aquaculture Regulations 2016* to report protected animal interactions (e.g. ASL) to PIRSA (i.e. since 2005). SARDI has also advised that there is no evidence of adverse ASL interactions from finfish aquaculture in South Australia during this period. It is noteworthy that during this period of reporting (i.e. since 2005), the ASL buffer exclusion areas only came into effect as aquaculture exclusion zones in 2013.

Given this and the limitations of existing aquaculture exclusion zones for this purpose, representatives of equivalent expertise and from the same government divisions as the previous MM-MPA AWG were convened to table the feasibility of refining the aquaculture exclusion zones, based on latest science and data, within the Current Policy that relate to the previous MM-MPA-AWG advice. Those that attended the meeting included representatives from DEW, PIRSA, SARDI and ASBTIA.

The proposal at the meeting was to make the current aquaculture exclusion zone around the Dangerous Reef major ASL colony consistent with the aquaculture exclusion zones around minor ASL colonies within the Current Policy (i.e. 5 km; Appendix C9). In addition, a new 10 km ASL Management Area (i.e.

10 km area extending from the boundary of the 5 km aquaculture exclusion zone out to 15 km; see Figure 5) will be implemented, noting that this ASL Management Area will itself not be legislated as an aquaculture exclusion zone or an aquaculture zone. However, a relatively small proportion may overlap the Lincoln (inner south) sector of the Lincoln aquaculture zone if implemented in the future via Gazette notice (see section 6.2.2). The ASL Management Area will be referred to if PIRSA receives any new finfish aquaculture applications within its boundaries. This includes any finfish aquaculture pilot lease/licence applications located outside any aquaculture zone in the ASL Management Area and any SBT aquaculture lease/licence applications located within the Lincoln (inner south) sector of the Lincoln aquaculture zone. The ASL Management Area will incorporate additional management requirements that aquaculture licence holders must adhere to (i.e. further to current requirements e.g. *Aquaculture Regulations 2016:* regulation 27 – protected animal interaction reporting; regulation 18 – Minister approved strategy for minimising/responding to adverse protected animal interactions; regulation 22 – annual EMP reporting), including additional licence conditions, periodic EMP reporting, contributing to independent ASL research or monitoring in the area or any other management measures as determined by the Minister through PIRSA's aquaculture licence application assessment process. Representatives of the meeting were supportive of the proposal being included in the Draft Policy, which included public and targeted stakeholder consultation as part of the zone policy development process under the Act. SARDI have also advised separately that the risk of increased adverse ASL interactions from this proposal are likely to be low.

In addition to the above management arrangements and regulatory requirements, the SBT and finfish industry sectors have their own best practice procedures in place to avoid/minimise interactions with large marine vertebrates, including ASL. These include net design, maintaining net integrity and anchoring systems, daily inspections, and staff training.

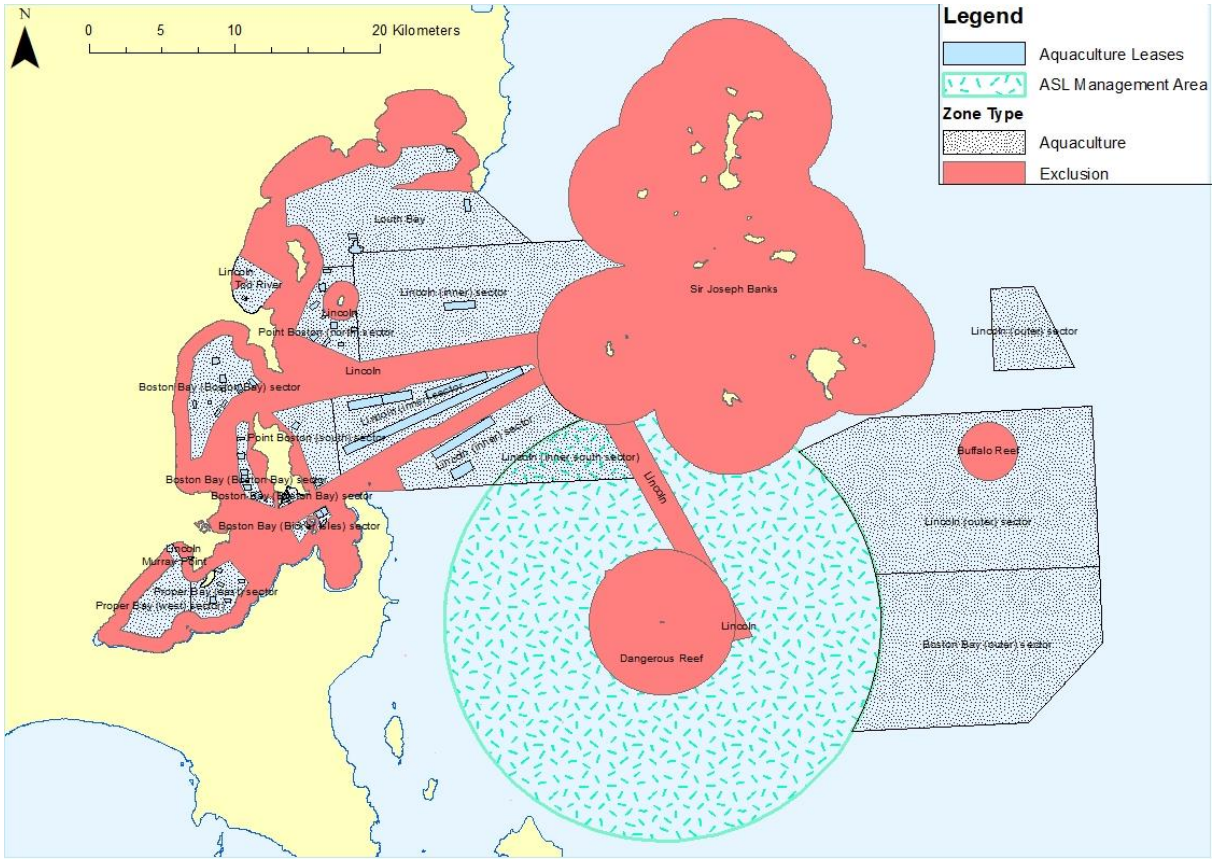

Figure 5: Map of proposed ASL Management Area in relation to all aquaculture zones/sectors within the Draft Policy.

7.10 Shark Interactions

A study was conducted on the movement and residence of White Sharks (*Carcharodon carcharias*) and Bronze Whalers (*Carcharhinus brachyurus*) in southern Spencer Gulf by Rogers and Drew (2018), with the aim to determine if commercial finfish aquaculture activities correlated with patterns of fidelity and migration of these species, along with other objectives. Results from the study identified that there was negligible overlap between sharks and finfish aquaculture activities in Spencer Gulf, suggesting that finfish aquaculture does not lead to aggregations of sharks to an area. More recently, a different study monitoring White Shark and Bronze Whaler movements and residency adjacent to an aquaculture tourism lease containing finfish species in South Australia did not find any evidence of the operation affecting these sharks (Huveneers *et al.,* 2022).

In addition, husbandry practices of aquaculture operators have improved as the business of aquaculture has evolved and become more commercially focussed. Some of these husbandry practices include increased frequency of diver removal of dead fish from sea-cages, checking for holes in nets and introducing false bottoms to nets to increase the distance from the bottom of sea-cages to fish outside the cages—this decreases the opportunity for predators to reach dead fish in sea-cages.

Local shark experts have the capacity to undertake research on shark behaviour and population movements in South Australia. PIRSA considers the results of this research when zoning for aquaculture.

7.11 Historic Shipwrecks

Any shipwreck or relic in South Australian waters that is older than 75 years is protected under the Historic *Shipwrecks Act 1981* (SA). Historically significant shipwrecks that are less than 75 years old, may be protected by Ministerial declaration under this Act. A protected historic shipwreck includes articles associated with the ship, including moveable artefacts, and these are classified as historic relics under this Act and are also protected.

Historic shipwrecks (i.e. 20) proclaimed under the *Historic Shipwrecks Act 1981* are located within the boundaries of the Current Policy and Draft Policy. This consists of 13 protected historic shipwrecks (one shipwreck found; 12 shipwrecks not found) and 6 non-protected historic shipwrecks (all shipwrecks not found) located within the boundaries of aquaculture exclusion zones, and one protected historic shipwreck (shipwreck not found) located within the boundaries of one aquaculture zone (i.e. Louth Bay aquaculture zone whose boundaries remain the same in the Draft Policy compared to the Current Policy).

During PIRSA's ESD risk assessment of marine-based aquaculture licence applications, potential impacts to historic shipwrecks are considered using Geographic Information System (GIS) spatial software comparing the proximity of proposed aquaculture sites with historic shipwrecks contained on the DEW historic shipwreck register. Marine-based aquaculture licence holders are also reminded of their obligations under the *Historic Shipwrecks Act 1981*, following the grant of an aquaculture licence. These processes are designed to avoid potential impacts on historic shipwrecks and historic relics from aquaculture development, and is consistent with performance outcomes contained within the Planning and Design Code of the *Planning, Development and Infrastructure Act 2016* regarding historic shipwrecks and historic relics.

7.12 Commercial and Recreational Fishing

Aquaculture zones are designed in a manner that minimises impacts on commercial and recreational fishing activities. The LEP region is an important area for both commercial and recreational fishing activities. The offshore area bounded by Gambier Islands in the south, Thistle Island to the south-west, Sir Joseph Banks group of islands to the north-west and Yorke Peninsula to the east are important

spawning areas for King George whiting (Fowler *et al*., 1999, 2000). Most species caught in any abundance in South Australia are found in this area. Australian salmon, snapper and a number of other species caught in the marine scalefish fishery are the most predominant catch in the area, with smaller amounts of southern calamari, King George whiting and garfish also taken (Drew *et al.,* 2021). The area to the west of the Sir Joseph Banks group of islands is a significant commercial sardine catch area (Ward *et al.,* 2017).

The LEP region is also used by abalone divers and lobster fishermen, with lobster fishing associated with hard substrate around Buffalo Rock and south of Spilsby Island. The Sir Joseph Banks group of islands is also popular with recreational fishers and the charter fishing industry frequent the waters within the boundaries of the Lincoln and Boston Bay (outer) sectors.

Recreational fishing is important for the local community and tourism value of the LEP. Recreational fishing in the LEP includes shore fishing and boat fishing for a variety of species, focussing on line fishing for King George whiting, sand flathead, yelloweye mullet, Australian salmon, snapper, garfish, tommy rough, and southern calamari. Fishing for blue swimmer crab also occurs in this area. PIRSA undertook a South Australian Recreational Fishing Survey in 2013/14. The survey found that more than 277,000 South Australians participated in recreational fishing during the survey and that the greatest proportion of recreational fishing (37%) took place in the Spencer Gulf region. Note that an updated survey was conducted between 2021-2022 and results are expected to be published in 2023 (see: https://www.pir.sa.gov.au/recreational_fishing/community_engagement/rec_fishing_survey#toc_Data-collection-and-privacy).

7.13 Shipping and Navigation

The boundaries of the Current Policy and Draft Policy overlap the boundaries of the Port of Port Lincoln port limit and the Port Lincoln Shipping Lane proclaimed under the *Harbors and Navigation Act 1993*. Flinders Ports have a Port Operating Agreement to manage navigational safety within the Port of Port Lincoln port limit under the same Act. To mitigate potential impacts to shipping/navigational safety, aquaculture exclusion zones are located over the Port Lincoln Shipping Lane and the overwhelming majority of the Port of Port Lincoln port limit. In addition, aquaculture zones are located at least 100 m from the boundary of the Port Lincoln Shipping Lane. These have been developed through previous discussions between PIRSA and DIT to establish a preferred route for commercial boats travelling from Port Lincoln, Whyalla, Wallaroo and potentially Sheep Hill. Discussions have also been previously held with the Department of Defence regarding the proximity of exercise areas to aquaculture zones, with confirmation that aquaculture zones will not impinge on naval exercise areas.

To further mitigate potential impacts to shipping/navigational safety, it is a condition of all aquaculture leases that navigational marks must be installed whenever structures are located in the lease area and the Regulations stipulate the requirement to mark-off a lease area and maintain structures used to mark-off that area in good working condition. For any applications for a new aquaculture lease site or movement of an existing aquaculture lease site, concurrence must be received from the Minister responsible for the *Harbors and Navigation Act 1993*, prior to a lease being granted or varied (i.e. moved). Therefore, aquaculture infrastructure within the proposed aquaculture zones should not pose a navigational hazard.

Access to an aquaculture zone area not under a lease is permitted by all vessel types, however pursuant to the Act it is at the discretion of the lease holder as to whether access to an aquaculture lease area is permitted at anytime to protect infrastructure and stock from damage caused by other vessel operators.

Regarding oil spills within the area, Flinders Ports has an oil spill contingency plan and PIRSA would consult with Flinders Ports if one were to occur. PIRSA also have provisions under Part 6, Division 5 of

the Act to enable efficient and streamlined actions when dealing with emergencies, such as an oil spill, involving the use of an Emergency Lease.

7.14 Tourism

Port Lincoln is a thriving regional community. With a population of approximately 16,500 people, its fishing and aquaculture industries, coupled with the regions mild Mediterranean style climate and unique geography, make it a popular tourist destination.

The waters surrounding Port Lincoln are home to sea-lions, dolphins, southern right whales and a plethora of shellfish and fish species. The abundant and varied marine life brings many people to Port Lincoln and its surrounds, undertaking recreational fishing, dive experiences with dolphins, sea-lions, and sharks.

Other tourism activities within the Port Lincoln area include sailing, bushwalking and surfing as well as visiting the Lincoln National Park and Sir Joseph Banks Group Conservation Park. The distinct flora and fauna found in this area coupled with the beauty and variety found in the geography make these popular tourist destinations. Yacht races occur in the middle of the proposed Lincoln and Boston Bay (outer) sectors and in Louth Bay (Adelaide to Lincoln Yacht race and others).

Based on the year ending March 2021 there was an estimated 382,000 overnight visitors to the Eyre Peninsula region, with an expenditure of $260 M. A total of 78% percent of these visitors were leisure visitors (holiday or visiting friends and relatives). Approximately 92% were intrastate visitors, 8% interstate visitors and there were no international visitors. The absence of international visitors, and reduction of interstate visitors compared to previous years is due to the South Australian borders being closed for the COVID-19 pandemic. On average interstate visitors stayed 10.8 nights and intrastate visitors 4 nights. Some of the incentives for people to visit the region included the scenery, uncrowded beaches, seafood and unique experiences around viewing and engaging with local wildlife (land and aquatic) (South Australian Regional Tourism Profile, 2021). In terms of creating jobs and gross regional product, tourism industries are important to the local economy.

7.15 Sites of Scientific Importance

There are no recorded geo-heritage sites located within the Draft Policy area (Geological Society of Australia, 2022).

7.16 Mineral Tenements

The *Mining Act 1971* addresses the grant of exploratory and production mining tenements in South Australia and is administered by the Department for Energy and Mining.

Data was obtained from the online South Australian Resources Information Gateway that describes where mining tenement applications and licences are located in the State (8 April 2022).

Based on this search, there were no mining tenement applications or licenses within the State Waters of the LEP, or in the location of the proposed zones.

7.17 Aquatic Animal Health and Biosecurity

South Australia's freedom from many significant aquatic diseases provides competitive advantages in seafood production and market access. PIRSA has a dedicated aquatic animal health program, which aims to safeguard SA's aquaculture, fisheries and natural resources from the impact of aquatic diseases. Aquatic Animal Health is regulated under the Act*, Aquaculture Regulations 2016*, *Fisheries Management Act 2007*, and the *Livestock Act 1997*.

Disease management includes requirements to report disease (including notifiable diseases), to report unusually high and unexplained mortality events, for disease treatment, for disease control and requirements to maintain stock records (i.e. stock movement, mortality rate). These requirements are for aquaculture licence holders as prescribed under the Regulations. Biosecurity and disease risks are also assessed during PIRSA's ESD risk assessment of all aquaculture licence applications to consider risks that are specific to the species or farming system being used/proposed.

Requirements under the Regulations provide for disease surveillance (passive), and early disease detection that can trigger investigations (e.g. aquaculture mortality or fish kill reports) to rule out disease (to support trade and market access or for rapid disease response). Disease management also now includes zoning. For example, Disease Management Areas for Pacific Oysters are now considered in PIRSA's Emergency Response Plans (Roberts *et al*., 2020). Emergency disease response protocols are in line with the OIE Aquatic Animal Health Code and Australia's AQUAVETPLAN series of emergency disease response guidelines: www.agriculture.gov.au/animal/aquatic/aquavetplan.

Disease management in aquaculture can also include farm biosecurity, which may be a requirement for livestock translocation approvals or importing jurisdictions/countries. General and specific aquaculture farm biosecurity guidelines have been developed: www.agriculture.gov.au/animal/aquatic/guidelines-and-resources).

7.18 Development Considerations

Pursuant to regulation 17 of the *Planning, Development and Infrastructure (General) Regulations 2017* aquaculture development is not considered "development" if it is located within an aquaculture zone set out in an aquaculture policy under the Act. Therefore if the Draft Policy is approved, future aquaculture development located within aquaculture zones under the Draft Policy will not require a development application and associated development approval under the *Planning, Development and Infrastructure Act 2016*. This is consistent with provisions of the Current Policy.

8. REGIONAL IMPACT ASSESSMENT

Matters raised in the Draft Policy may:

- Directly affect a region or regions;
- Indirectly affect a region or regions;
- Affect or relate to regional issues; or
- Treat or affect regional and metropolitan areas differently.

Accordingly, it is considered appropriate to fully assess the effects of the Draft Policy within the region. This section contains an assessment of the expected effects of the Draft Policy on the LEP region.

8.1 Stakeholders

The main issues raised by stakeholders during consultation on the development of aquaculture zones are the perceived or actual encroachment of the aquaculture zone on other resource uses, for example recreational and commercial fishing and concerns around the potential for interactions with sensitive species and habitats.

The following groups may be affected by the proposed zoning and policy:

- The aquaculture industry, local community, Native Title claimants/holders and other indigenous groups, local government, recreational and professional fishers, Government agencies,

conservation groups and other Non-Government Organisations, research organisations, boards and other relevant planning and natural resource management (NRM) bodies, recreational users, tourists and the tourism industry, the recreational boating sector and commercial shipping.

PIRSA sought and/or invited input and guidance from these parties throughout the consultation process.

8.2 Consultation Undertaken in Relation to Regional Issues

Following preparation of the Draft Policy and Report, the Minister is required to refer both documents to prescribed bodies and to any public authority whose area of responsibility is, in the opinion of the Minister, likely to be affected by the Policy (section 12(4) of the Act).

The following bodies are prescribed:

- Conservation Council (CCSA) of South Australia Incorporated;
- Local Government Association of South Australia;
- RecFish SA;
- South Australian Aquaculture Council;
- South Australian Native Title Services Limited (SANTS);
- Any registered representatives of native title holders or claimants to native title in land comprising or forming part of a zone or area to which the policy applies;
- Any person holding an aquaculture licence or aquaculture lease over an area comprising or forming part of a zone or area to which the policy applies;
- Any regional Landscape Board (within the meaning of the *Landscape South Australia Act 2019*) responsible for a region comprising or forming part of a zone or area to which the policy applies; and
- Economic development agencies responsible for a region comprising or forming part of a zone or area to which the policy applies.

In addition to prescribed bodies, PIRSA consults with the following parties:

- Aquaculture and fishing industry representatives, EPA, Attorney-General's Department (AGD), DIT, South Australian Tourism Commission (SATC), SARDI, DEW, AGD-AAR, local councils, Department for Trade and Investment (DTI) including the Planning and Land Use Services Division, Regions SA, Regional Development Australia Eyre Peninsula, PIRSA Legal Unit, Fisheries Compliance Services, PIRSA Biosecurity, and Flinders Ports.

The Draft Policy and Report were distributed to the above prescribed bodies and key stakeholders as the basis for consultation. These documents were available on the YourSAy website for the mandatory two-month (minimum) public consultation process as per the Act, which ran for approximately two and a half months from 14 November 2022 to 29 January 2023. Due to stakeholder requests, the consultation period was re-opened for an additional month from 16 March until 16 April 2023.

Public notices were placed in *in The Advertiser, Port Lincoln Times, Eyre Peninsula Advocate, and Koori Mail* seeking comment from interested parties.

To provide stakeholders with the opportunity to speak directly with PIRSA Officers, public briefings were organised during the consultation period, with details placed in public notices and on the YourSAy website.

Table 6 outlines stakeholder group meetings and discussions held prior, during and after the mandatory public consultation process:

Table 6: Stakeholder group meetings and discussions.

Date	Name of Meeting	Attendees
20 November 2019 Adelaide/On-line	LEP Advisory Committee Meeting #1	CSS, ASBTIA, SAMGA, EPA, SARDI, DPTI, PIRSA
27 April 2020 Adelaide/On-line	LEP Advisory Committee Meeting #2	CSS, ASBTIA, SAMGA, EPA, SARDI, PIRSA
4 November 2020 Adelaide/On-line	LEP Advisory Committee Meeting #3	CSS, ASBTIA, SAMGA, EPA, SARDI, PIRSA
28 April 2021 Adelaide/On-line	LEP Zone Policy Review Preliminary Consultation	DEW, ASBTIA, SARDI, PIRSA
21 May 2021 Adelaide/On-line	LEP Advisory Committee Meeting #4	CSS, ASBTIA, SAMGA, EPA, SARDI, PIRSA
25 November 2021 Adelaide/On-line	LEP Zone Policy Review Preliminary Consultation	DIT, PIRSA
14 December 2021 Adelaide/On-line	LEP Advisory Committee Meeting #5	CSS, ASBTIA, SAMGA, EPA, SARDI, PIRSA
23 February 2022 On-line	LEP Zone Policy Review Preliminary Consultation	Yumbah Port Lincoln Pty Ltd, PIRSA
1 December 2022 Port Lincoln/On-line	ASBTIA briefing on Draft Policy and Report	ASBTIA, tuna lease/licence holders, EPA, PIRSA
7 December 2022 Port Lincoln/On-line	Public briefing on Draft Policy and Report	Eyre Peninsula Landscape Board, general public, aquaculture lease/licence holders, PIRSA
7 December 2022 Port Lincoln/On-line	Aquaculture industry briefing on Draft Policy and Report	Representatives from Tuna, Oyster, Algae, Mussel and Abalone aquaculture sectors, PIRSA
8 December 2022 Port Lincoln	LEP Local Councils briefing on Draft Policy and Report	City of Port Lincoln, District Council of Lower Eyre Peninsula, PIRSA
13 December 2022	Government agencies briefing on Draft Policy and Report	DEW, EPA, SATC, SA Water, DIT, District Council of Tumby

Adelaide/On-line		Bay, Regional Development Australia Eyre Peninsula, PIRSA
13 December 2022 Adelaide/On-line	Public briefing on Draft Policy and Report	General public, PIRSA
14 December 2022 Adelaide	CCSA briefing on Draft Policy and Report	CCSA, PIRSA
8 May 2023 Adelaide	Seaweed submission consultation	Seaweed industry proponent, PIRSA
17 May 2023 On-line	EPA submission consultation	EPA, PIRSA
18 May 2023 On-line	Eyre Peninsula Landscape Board submission consultation	Eyre Peninsula Landscape Board, EPA, PIRSA
23 May 2023 Adelaide	CCSA submission consultation	CCSA, PIRSA

8.3 Potential Effects

The Draft Policy defines areas within State waters where specified classes of aquaculture and their respective amounts (i.e. leasable area, biomass limits) will be permitted (i.e. aquaculture zones) and where no aquaculture will be permitted (i.e. aquaculture exclusion zones). Aquaculture has a number of potential economic, social and environmental effects. These are included in the following section.

The LEP has a number of advantages over potential alternative locations where developers might seek to expand or initiate aquaculture operations.

Regional favourable attributes include:

- Local industry support services including boat launching, equipment maintenance, consumables and transport.
- Substantial existing infrastructure including roads, electricity, airport, telecommunications, fish processing, cold chain facilities and fish waste management facilities.
- The waters off LEP provide suitable physical characteristics for aquaculture.

Favourable factors for existing aquaculture operators in the proposed Draft Policy area include:

- Familiarity with local waters, infrastructure, institutional conditions, and commercial networks.
- Proximity to existing operations, reducing travel and communications costs.
- Established relationships with service, input providers and workforce participants.
- Optimal environmental conditions to conduct operations safely (e.g. wave height, currents, winds).

Without the holistic planning process of aquaculture zone policies, aquaculture development may occur in an ad-hoc manner via the pilot lease and corresponding licence application process under the Act

and the development application process under the *Planning, Development and Infrastructure Act 2016*. As a result, the full economic potential of the industry is unlikely to be achieved. Aquaculture zone policies should be relevant and reviewed periodically to provide for regional growth and expansion of the industry in an ecologically sustainable manner.

8.3.1 Economic and Employment Factors

The aquaculture industry plays an important role in creating wealth and prosperity for South Australia, particularly in regional communities where aquaculture zone policies are located (BDO EconSearch, 2023). The industry has recorded strong growth in volume and product range during the past decade and this trend is set to continue. Aquaculture is evolving, with more ecologically sustainable farming systems and practices now available such as; inland ventures using recycled water, emerging filter feeding species such as cockles and razorfish, and increasing interest in macro-algae farming, integrated multi-trophic aquaculture, and aquaponic-type production systems.

A report by BDO EconSearch (2023) estimated the direct output of aquaculture in South Australia in 2021/22 to be $312.4 million ($237.9 million on-farm and $74.5 million in downstream activities). Direct employment was estimated to be 1,296 FTE positions in 2021/22 with 1,547 flow-on jobs, giving total employment of 2,843 FTE, with around 61% of these jobs generated in regional South Australia. The SBT and Oyster sectors accounted for the majority of aquaculture employment in the Eyre Peninsula region (66%). SBT farming is the largest single sector in the State's aquaculture industry accounting for 46% ($110.4 million) of the State's gross value of aquaculture production in the 2021/22 financial year (BDO EconSearch 2023).

Aquaculture zone policies have a range of potential economic benefits, including:

- Facilitating industry growth – zoning provides a framework that facilitates the ecologically sustainable development of aquaculture activities, therefore helping to promote significant investment and to enhance employment opportunities in rural and regional economies.
- Optimizing the use of marine resources – zoning helps to ensure that maximum benefits are derived from the use marine resources by encouraging activities to take place where they bring most value, and do not devalue other activities.
- Reducing costs – zoning can reduce the cost of regulation, planning and decision making, and can eliminate duplication in approval processes. For example, aquaculture development proposed to be located within an aquaculture zone under an aquaculture zone policy removes the need to seek development approval from the relevant planning authority (regulation 17 of the *Planning, Development and Infrastructure Regulations 2017*).

In consideration of aquaculture industry requests and supporting sustainable aquaculture industry growth, the Draft Policy proposes to increase overall aquaculture lease tenure available (i.e. leasable area) and maximum biomass limits for all permitted classes of aquaculture (e.g. supplementary fed aquatic animals such as SBT and finfish, algae, bivalve molluscs), expand permitted classes of aquaculture able to be farmed, increase aquaculture lease tenure within industry identified productive areas, increase opportunities for aquaculture related research/education/tourism ventures, and reduce biosecurity risks for a designated bivalve mollusc growing area. This will have positive implications for aquaculture production, and although not modelled, likely positive growth in the resulting value and employment generated from this. Furthermore, the expansion of aquaculture in the LEP area arising from the Draft Policy will deliver downstream benefits for existing businesses in terms of maintenance, support services, first level of transport, processing, marketing and labour.

In addition, by providing for new classes of aquaculture such as sea urchins, sea cucumbers and algae in the Draft Policy, this may also benefit the existing aquaculture industry and region by contributing to the diversification and economic resilience of aquaculture businesses; further generating flow-on

economic benefits for local employment and commercial services. The inclusion of these species as IMTA systems, also has the potential to improve the ecological sustainable practices of aquaculture operators.

8.3.2 Social Effects

Liveability is a measure of the attractiveness of a region to people and is the sum of the factors that add up to a community's quality of life including the built and natural environments, economic prosperity, social stability and equity, educational opportunity, and cultural, entertainment and recreation possibilities.

The 2021/22 BDO EconSearch report has shown that the growth of aquaculture in this area has benefited local communities through employment and direct income. The relatively large requirement for labour and material inputs shows that the industry has the potential to positively improve the standards of living for many local families and communities. In addition, the demand for local labour, goods and services from aquaculture development may assist in offsetting the contraction of other local industries and thus avoid a range of social pressures associated with declining regional economies (unemployment, social assistance and migration to other regions).

As described in section 8.3.1, the Draft Policy is likely to increase employment and value generated in the region and in-turn the positive social effects listed above. Further, consultation on the Draft Policy took into consideration the support, participation and opportunities for Aboriginal communities in aquaculture. By actively engaging the voice of our Indigenous Nations in projects and policy we are able to incentivise regional social and economic inclusiveness.

On balance, social improvements to the local area from the Draft Policy may be reflected in:

- Workforce development, skills and training
- Population size/demographics
- Additional business and capital attracted to the region
- Increased attraction and promotion of the area through aquaculture tourism opportunities

One of the challenges for both government and the local community is to manage potential negative social impacts that may result from an expansion in aquaculture development. Negative social impacts resulting from aquaculture zone policies may include loss of resource access and amenity, noise and visual impacts, and concerns about the loss of identity, remoteness, naturalness and aesthetic values of a region. These have been considered in the design of the proposed zones in the Draft Policy as the majority of zones already exist and changes in boundaries are minimal. This includes maintaining aquaculture exclusion zones close to the coast near built-up areas and areas of environmental significance (e.g. national parks), and situating aquaculture zones offshore to minimise noise and visual impacts. Any negative social impacts were further considered during consultation on the Draft Policy.

In addition, as mentioned in section 4, social risks posed by an aquaculture activity will also be assessed at the time of individual licence application through PIRSA's ESD risk assessment process, incorporating risks identified from feedback during public notice of an application. These assessments consider social risks, as well as other risks, at both the site and regional levels. Additionally, environmental risks from aquaculture once operational, which can have social implications, are monitored as part of EMP's (see section 5). Adaptive management arrangements are implemented as required depending on each individual circumstance to minimise social risks of aquaculture operations. This includes management responses under the provisions of aquaculture lease and corresponding licence conditions (e.g. licence conditions permitting the Minister to direct a licensee to cease and desist from engaging in an aquaculture activity indefinitely or for a specified period), the Act (e.g. section 58 – provision for direction of licensee by the Minister to carry out required works), the Regulations (e.g.

regulation 23 – provision for additional periodic EMP's to collect further environmental information), and the Draft Policy itself (e.g. clauses permitting the Minister to alter maximum biomass limits of aquaculture zones for certain permitted classes of aquaculture through a Gazette notice). There are also requirements under the Regulations (e.g. regulation 11 – aquaculture waste restrictions) and standard aquaculture lease and licence conditions (e.g. no nuisance lease conditions) which aim to minimise social impacts occurring from aquaculture once operational.

8.3.3 Environmental Effects

Based on the latest scientific modelling and information, the Draft Policy proposes increases to the maximum biomass limits of supplementary fed aquatic animals, such as SBT and finfish, albeit at levels that result in nutrient (i.e. $NH4^+$) concentrations below ANZECC water quality guidelines, and the more conservative WQGV's adopted in the Draft Policy. Anthropogenic nutrient outputs (not only from aquaculture, but also other anthropogenic sources such as stormwater and sewage discharge, and agricultural run-off) have the potential to impact aquatic environments, such as seagrass beds, if output levels in the adjacent receiving environment are excessively above background levels. As mentioned in section 7.2, the Draft Policy proposes updated conservative supplementary fed aquatic animal biomass limits based on the latest carrying capacity models developed by SARDI to ensure that the amount farmed does not exceed what the environment can assimilate in the area and maintains water quality within EPA guidelines. Further detail surrounding regional environmental monitoring programs for potential nutrient impacts and resulting management actions are also detailed in this section, including the provision for IMTA (see also section 7.3).

Increases to the maximum biomass limits of extractive permitted classes of aquaculture, such as bivalve molluscs and algae, are also proposed in the Draft Policy (i.e. either through specific maximum biomass tonnage limits or through maximum leasable area permitted). This has the potential for increased competition with naturally occurring extractive aquatic organisms in the region. As described in section 7.2, the Draft Policy proposes conservative bivalve mollusc biomass limits determined through shellfish carrying capacity models developed by SARDI to ensure that the amount farmed has negligible impacts on naturally occurring extractive aquatic organisms. In regard to biomass limits of other extractive or non-supplementary fed permitted classes of aquaculture, such as algae, as these are relatively new and developing aquaculture sectors, no scientific models have been developed for this region to provide tonnage limits for biomass. Instead, conservative biomass limits are proposed to be applied through restrictions on the amount of leasable area available in the Draft Policy, with further restrictions on biomass limits applied through licence conditions during the ESD risk assessment of individual aquaculture licence applications by PIRSA. Further detail surrounding environmental monitoring programs for potential extractive impacts and resulting management actions are also detailed in section 7.2.

As mentioned in section 4, environmental risks posed by an aquaculture activity are assessed at the time of individual licence application through PIRSA's ESD risk assessment process. These assessments consider environmental risks, as well as other risks, at both the site and regional levels. Additionally, environmental risks from aquaculture are monitored as part of EMP's (see section 5), with adaptive management arrangements implemented as required depending on each individual circumstance. This includes management responses under the provisions of aquaculture lease and corresponding licence conditions (e.g. licence conditions permitting the Minister to direct a licensee to cease and desist from engaging in an aquaculture activity indefinitely or for a specified period), the Act (e.g. section 58 – provision for direction of licensee by the Minister to carry out required works), the Regulations (e.g. regulation 23 – provision for additional periodic EMP's to collect further environmental information), and the Draft Policy itself (e.g. clauses permitting the Minister to alter maximum biomass limits of aquaculture zones for certain permitted classes of aquaculture through a Gazette notice). Management responses in relation to potential environmental effects from aquaculture may also be instigated following the results of future research. There are also requirements under the Regulations

(e.g. regulation 10 – aquaculture chemical use restrictions) and standard aquaculture lease and licence conditions (e.g. maximum stocking density licence conditions) which aim to minimise environmental impacts occurring from aquaculture once operational.

9. SUBMISSIONS

The Draft Policy and Report were made publicly available for approximately two and a half months as per the Act (two months minimum), with the consultation period re-opened for an additional month at the request of stakeholders. These documents were available during this period on the YourSAy website. Feedback in the form of online written submissions was invited using the YourSAy website.

Information on the proposed changes was also provided during two public briefings held in Adelaide and Port Lincoln at dates prescribed in public notices and on the YourSAy website. A hard-copy of the Draft Policy and Report was available if requested, as well as further information regarding the documentation, by contacting PIRSA on Email: pirsa.aquaculture@sa.gov.au or phone (08) 8207 5333.

Following this period of consultation, the content of the submissions received were considered, meetings with key stakeholders arranged as required, and consequential amendments to the Draft Policy and Report were made. All stakeholders who made a submission through the period of statutory consultation will receive a response outlining how their feedback has been incorporated into the final Policy and Report.

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APPENDIX A - GLOSSARY OF TERMS

Adaptive Management	Management involving active response to new information of the deliberate manipulation of fishing intensity or other aspects in order to learn something of their effects. Within a stock, several sub-stocks can be regarded as experimental units in which alternative strategies are applied.
Assimilative capacity	The capacity of a natural body of water to absorb pollutants without deleterious effects to aquatic life.
Benthic	A body of water, including the sediment surface and some sub-surface layers.
Biodiversity	The variability among living organisms from all sources (including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part) and includes: (a) diversity within species; and (b) diversity of ecosystems.
Biomass	The total live weight of a group (or stock) of living organisms (e.g. fish, plankton) or of some defined fraction of it (e.g. spawners), in an area, at a particular time. Any quantitative estimate of the total mass of organisms comprising all or part of a population or any other specified unit, or within a given area at a given time; measured as volume, mass (live, dead, dry or ash-free weight) or energy (joules, calories).
Bivalve mollusc	Any mollusc belonging to the taxonomic class Bivalvia, being characterised by a shell consisting of two hinged sections. Includes clams, cockles, mussels, oysters, pipis and scallops.
Broodstock	Group of mature aquatic organisms from which subsequent generations are intended to be produced for the purpose of aquaculture.
Carrying capacity	The maximum population of a given organism that a particular environment can sustain.
Closures	Prohibition of fishing during particular times or seasons (temporal closures) or in particular areas (spatial closures), or a combination of both.
Ecologically sustainable development	ESD is described in the *Aquaculture Act 2001* as: 'Development is ecologically sustainable if it is managed to ensure that communities provide for their economic, social and physical well-being while— (a) natural and physical resources are maintained to meet the reasonably foreseeable needs of future generations; and (b) biological diversity and ecological processes and systems are

	protected; and (c) adverse effects on the environment are avoided, remedied or mitigated. In making decisions as to whether development is ecologically sustainable or to ensure that development is ecologically sustainable— (a) long-term and short-term economic, environmental, social and equity considerations should be effectively integrated; and (b) if there are threats of serious or irreversible environmental harm, lack of full scientific certainty should not be taken to justify the postponement of decisions or measures to prevent the environmental harm'.
Ecosystem	A dynamic complex of plant, animal, fungal, and microorganism communities and the associated non-living environment interacting as an ecological unit.
Habitat	A place that meets all the environmental conditions an organism needs to survive.
Harvest	A productivity measuring technique relating to the yield of seasonal aquaculture produce.
Infauna	Invertebrates living within aquatic sediments. They include polychaetes, oligochaetes, bivalves, nemerteans, echiurans, sipunculids, as well as small crustaceans such as burrowing amphipods and isopods.
Marine Park	Means an area established as a marine park under Part 3 Division 1 of the *Marine Parks Act 2007*.
Integrated Multitrophic Aquaculture	IMTA is an aquaculture farming system whereby two (or more species) are farmed together to improve efficiency, reduce waste, and provide ecosystem services, such as bio-remediation.
Population	A group of individuals of the same species, forming a breeding unit and sharing a habitat.
Spatial	Of or relating to space.
Stakeholder	An individual or a group with an interest in any decision or activity related to a resource.
Stock	A group of individuals of a species occupying a well defined spatial range independent of other groups of the same species, which can be regarded as an entity for management or assessment purposes.
Supplementary fed	The addition of feed to aquatic organisms to supplement any naturally available food.

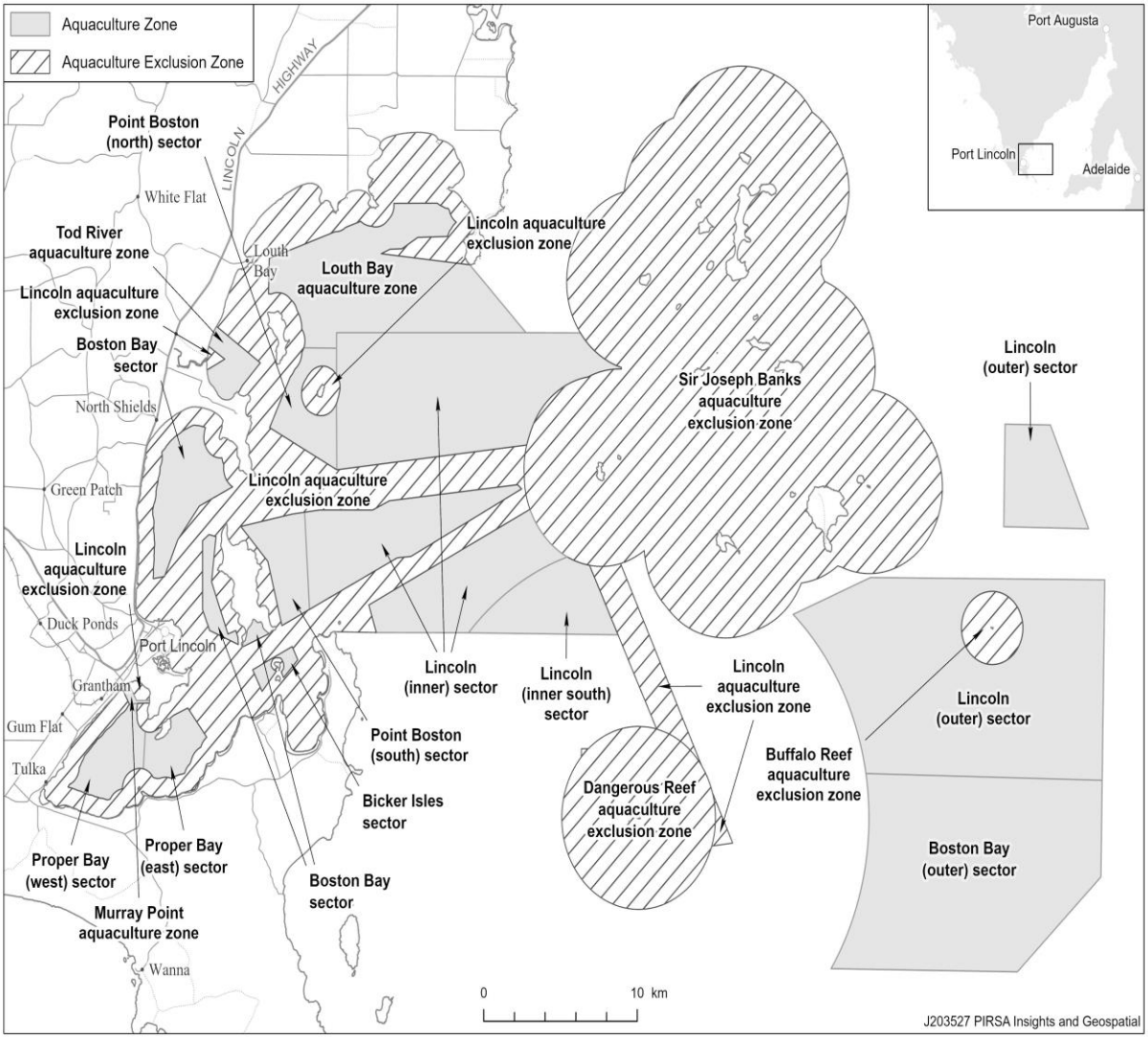
APPENDIX B - LIST OF ACRONYMS

AEMP	Aquaculture Environmental Monitoring Program
AGD	Attorney-General's Department
AHA	*Aboriginal Heritage Act 1988*
AQUAVETPLAN	Aquatic Animal Veterinary Emergency Plan
ASBTIA	Australian Southern Bluefin Tuna Industry Association
ASL	Australian sea lion
ATAB	Aquaculture Tenure Allocation Board
BOM	Bureau of Meteorology
CCSA	Conservation Council of South Australia
CRC-P	Cooperative Research Centre Program
CSIRO	The Commonwealth Scientific and Industrial Research Organisation
CSS	Clean Seas Seafood Limited
Current Policy	Aquaculture (Zones – Lower Eyre Peninsula) Policy 2013
DEW	South Australian Department of Environment and Water
DEWNR	South Australian Department of Environment, Water and Natural Resources
DIT	Department for Infrastructure and Transport
AGD-AAR	Attorney-General's Department-Aboriginal Affairs and Reconciliation Division
Draft Policy	Draft Aquaculture (Zones – Lower Eyre Peninsula) Policy 2023
Report	Report Supporting the Draft Aquaculture (Zones – Lower Eyre Peninsula) Policy 2023
EMP	Environmental Monitoring Program
EPA	Environment Protection Authority
EPBC Act	The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ERDC	Environment, Resources and Development Committee
ESD	Ecological Sustainable Development
FRDC	Fisheries Research and Development Corporation
FTE	Full Time Equivalent
ILUA	Indigenous Land Use Agreement
IMTA	Integrated Multitrophic Aquaculture

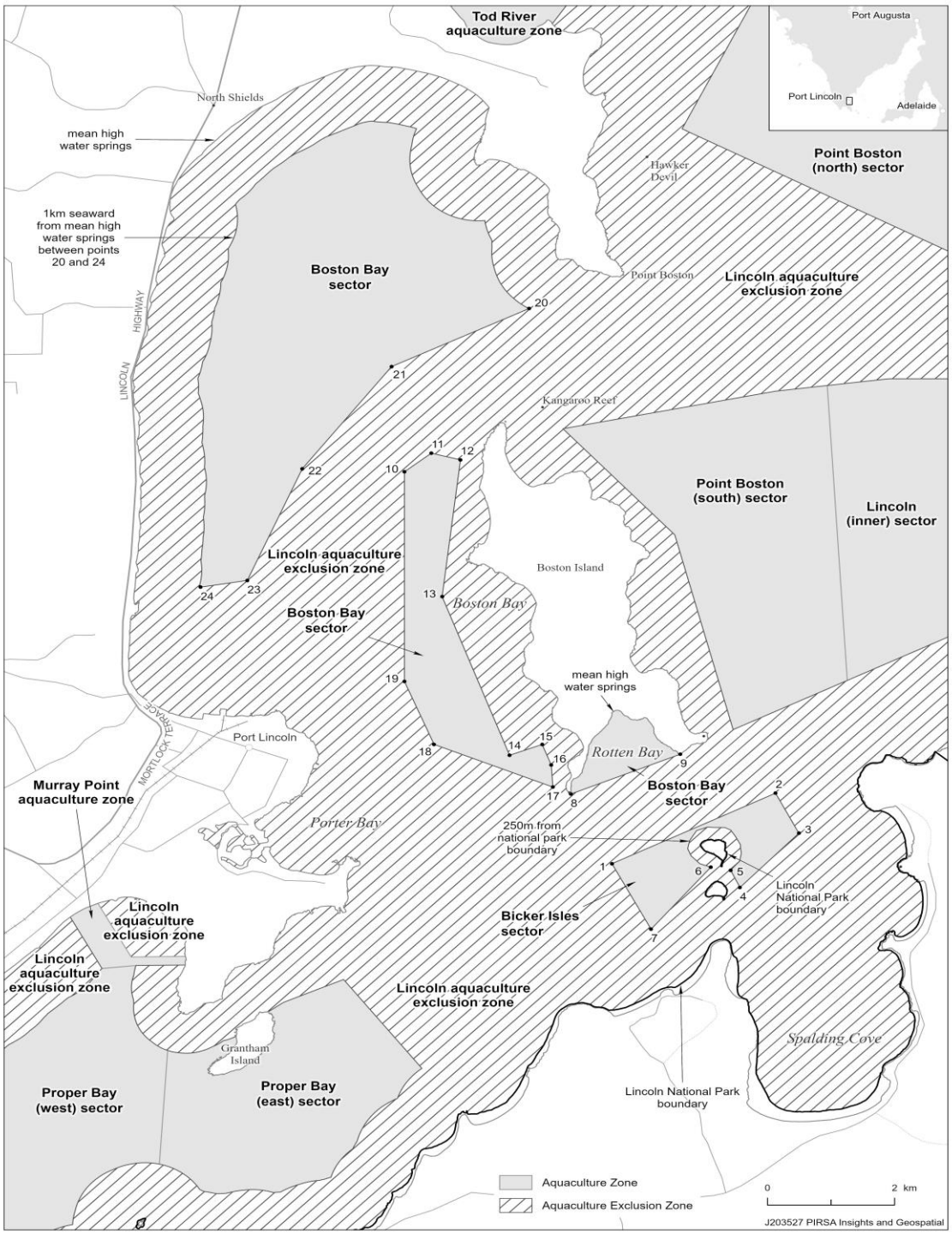
LEP	Lower Eyre Peninsula
NRM	Natural Resource Management
OIE	*Office International des Epizooties* (World Organisation for Animal Health)
PIRSA	Department of Primary Industries and Regions
RARBs	Registered Aboriginal Representative Bodies
SAMGA	South Australian Mussel Grower's Association
SANTS	South Australian Native Title Services Ltd
SARDI	South Australian Research and Development Institute
SATC	South Australian Tourism Commission
SBT	Southern Bluefin tuna
SOI	Statement of Intent
the Act	*Aquaculture Act 2001*
The Minister	The Minister responsible for administration of the Act

APPENDIX C - MAPS AND COORDINATES

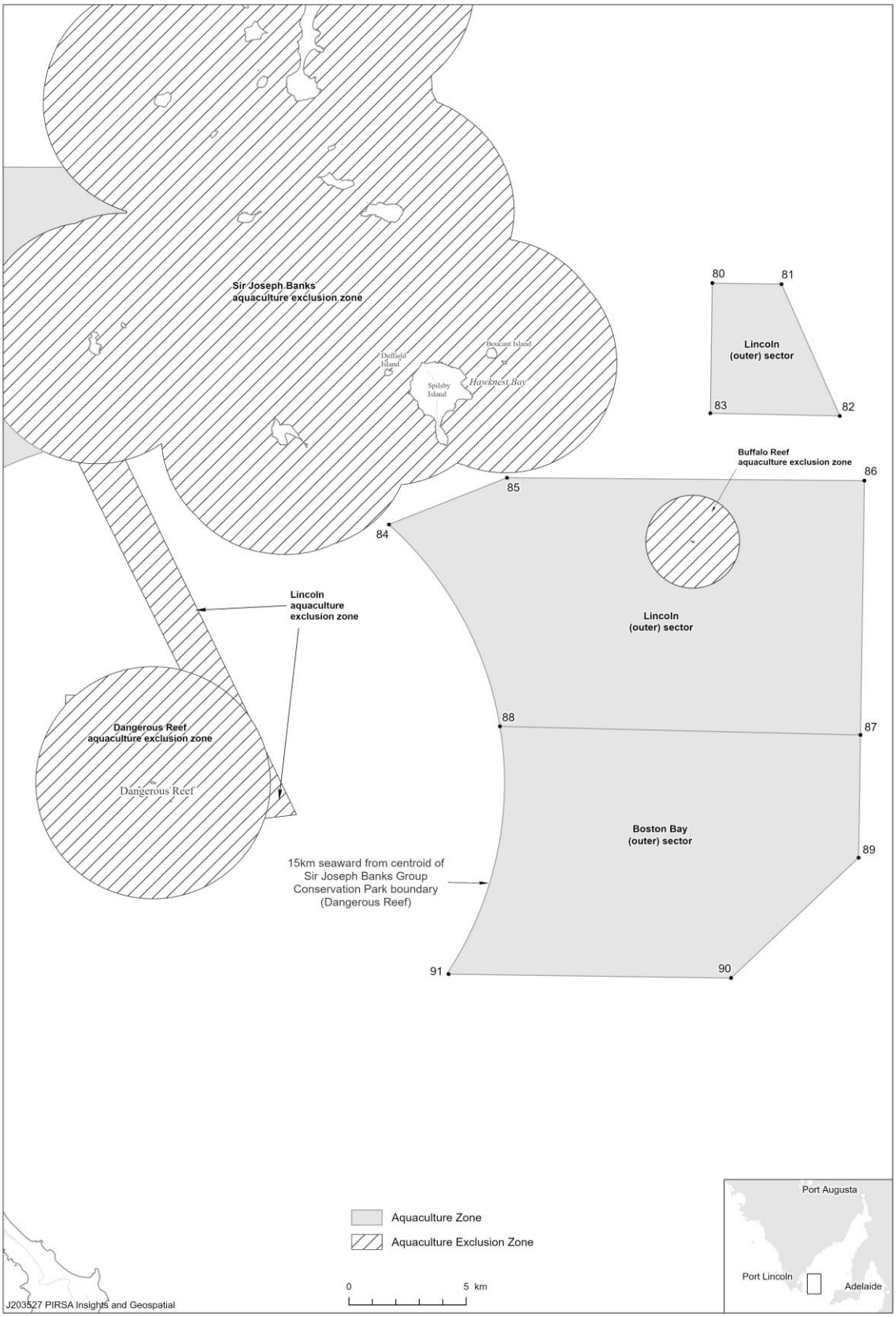
Note a written desription of the proposed aquculture zones and aquaculture exclusion zones is provided in the Draft Policy. An interactive map of the Draft Policy can also be viewed through the YourSAy websites.



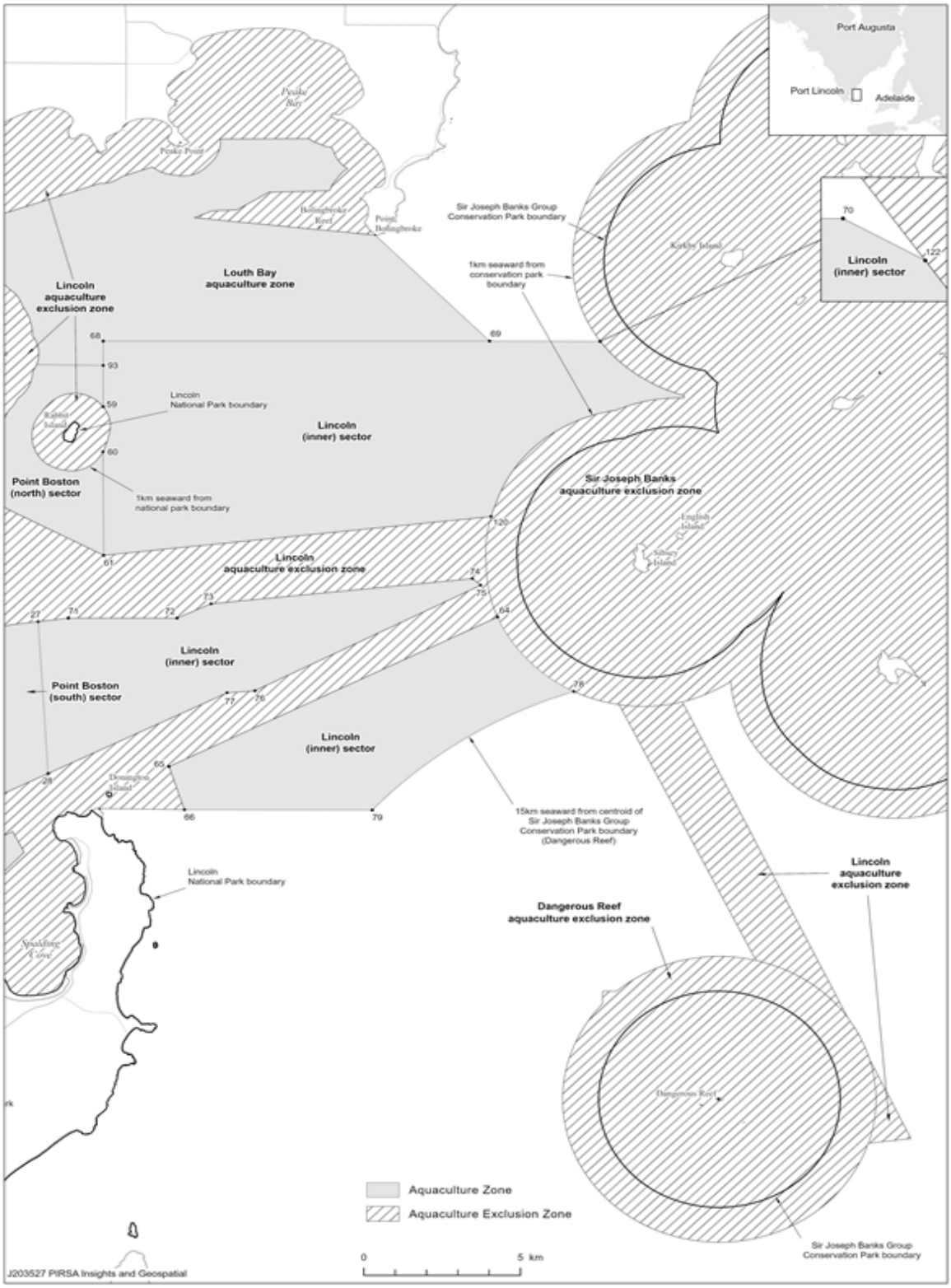
Appendix C1: Overview of aquaculture zones and aquaculture exclusion zones proposed for the Draft Policy including the Lincoln (inner south) sector (proposed to be added at a later date through Gazette).



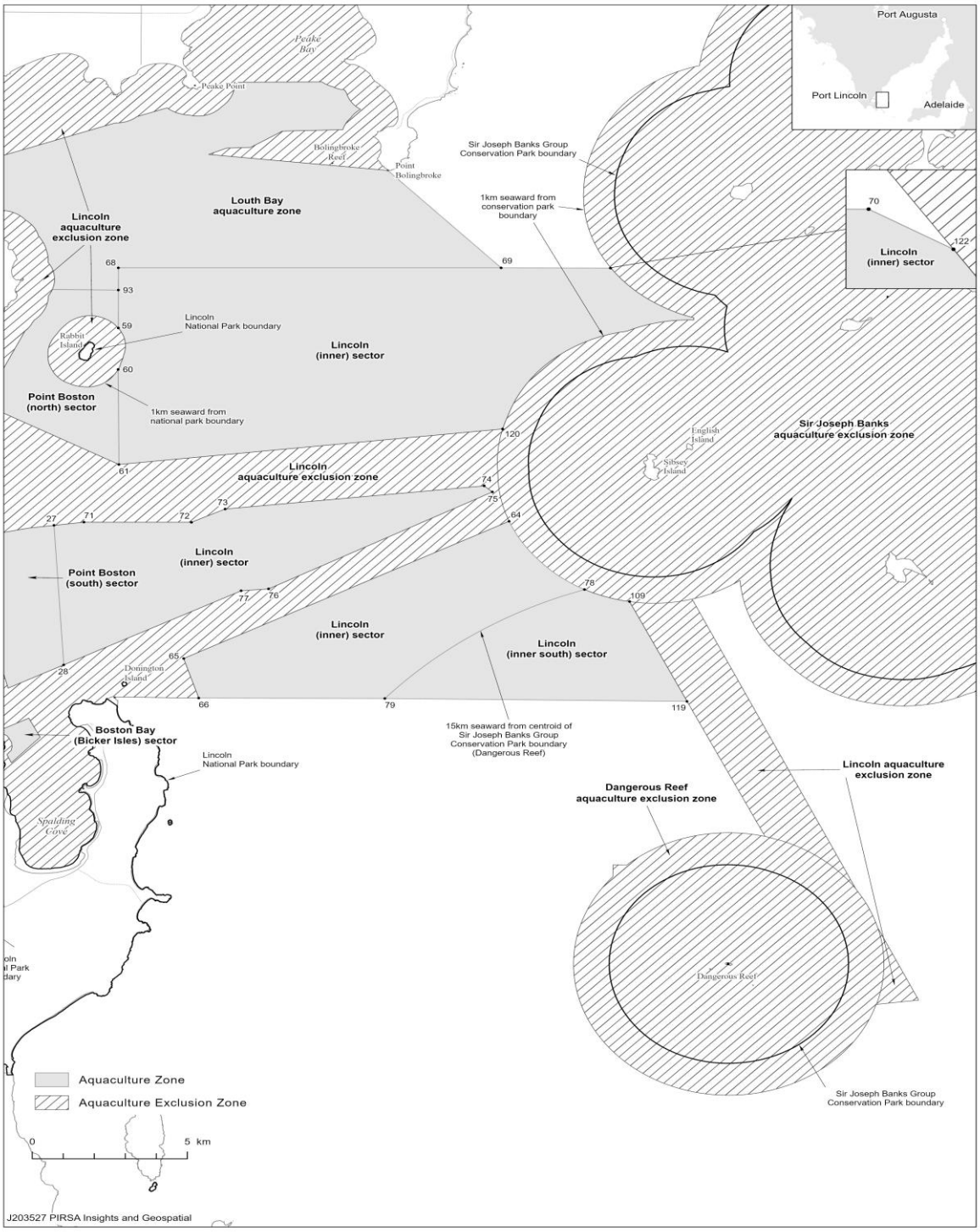
Appendix C2: Boston Bay aquaculture zone showing Boston Bay and Bicker Isles sectors.



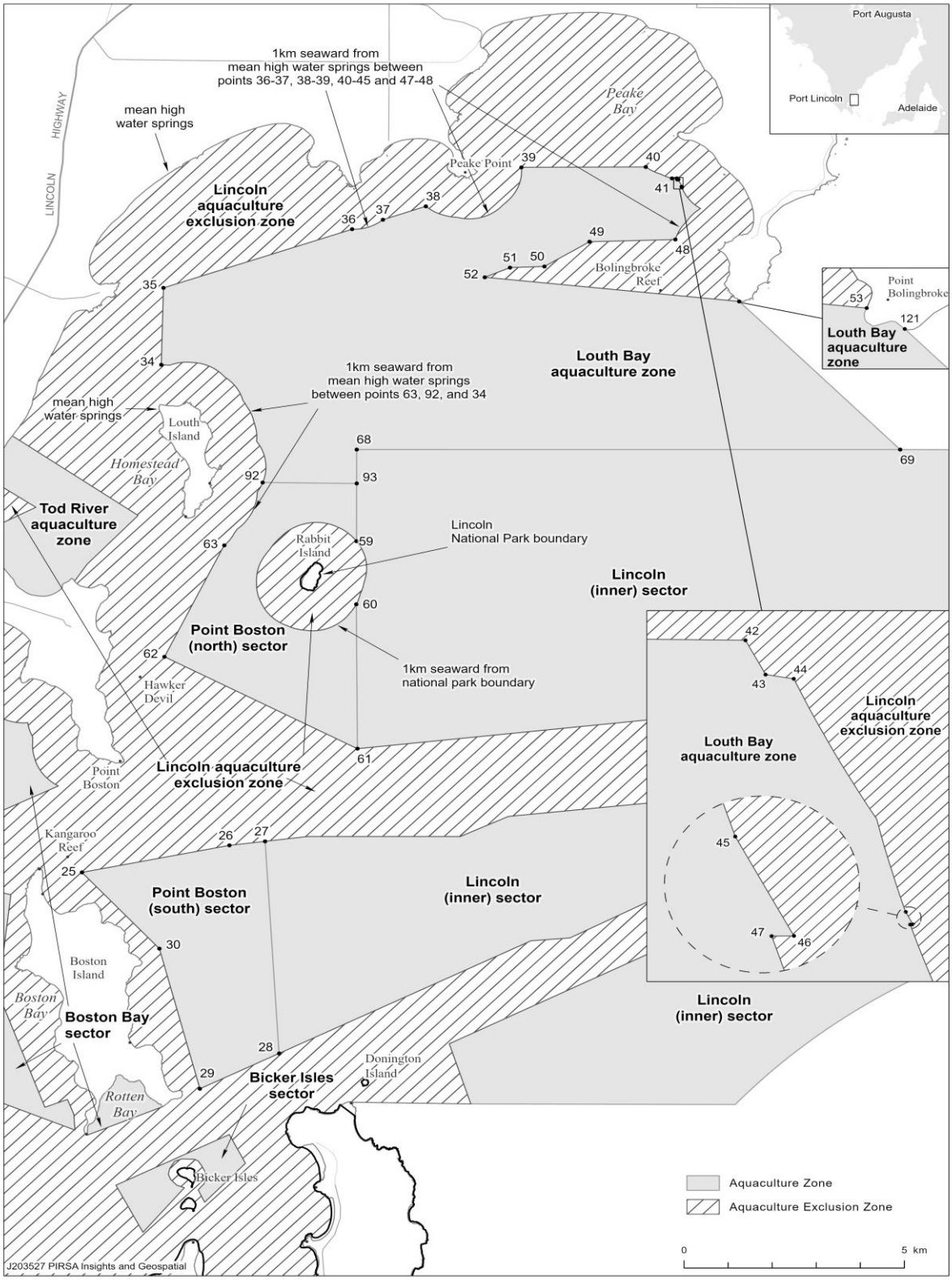
Appendix C3: Boston Bay aquaculture zone (Boston Bay (outer) sector) and Lincoln aquaculture zone (Lincoln (outer) sector).



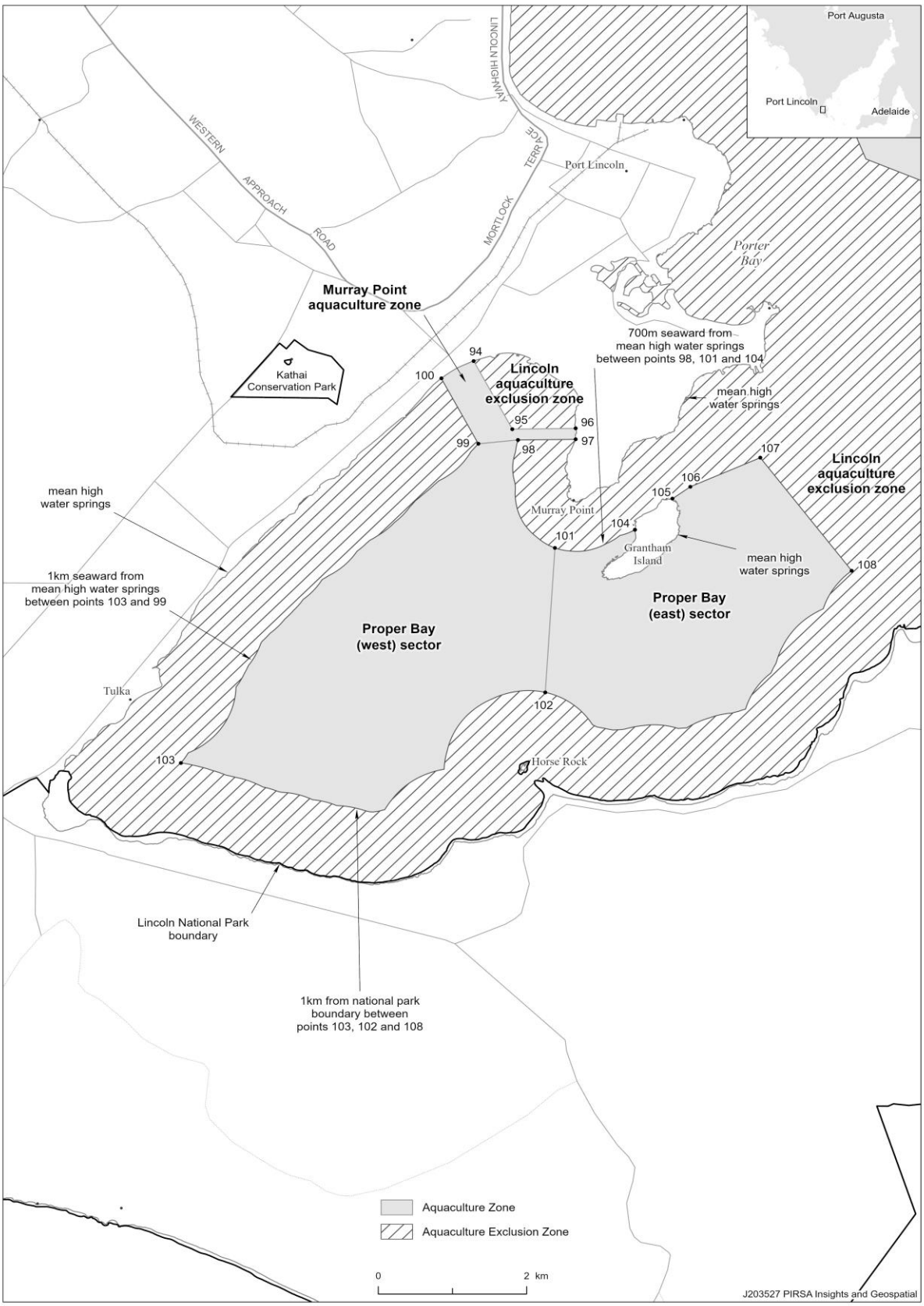
Appendix C4: Lincoln aquaculture zone showing Lincoln (inner) sector.



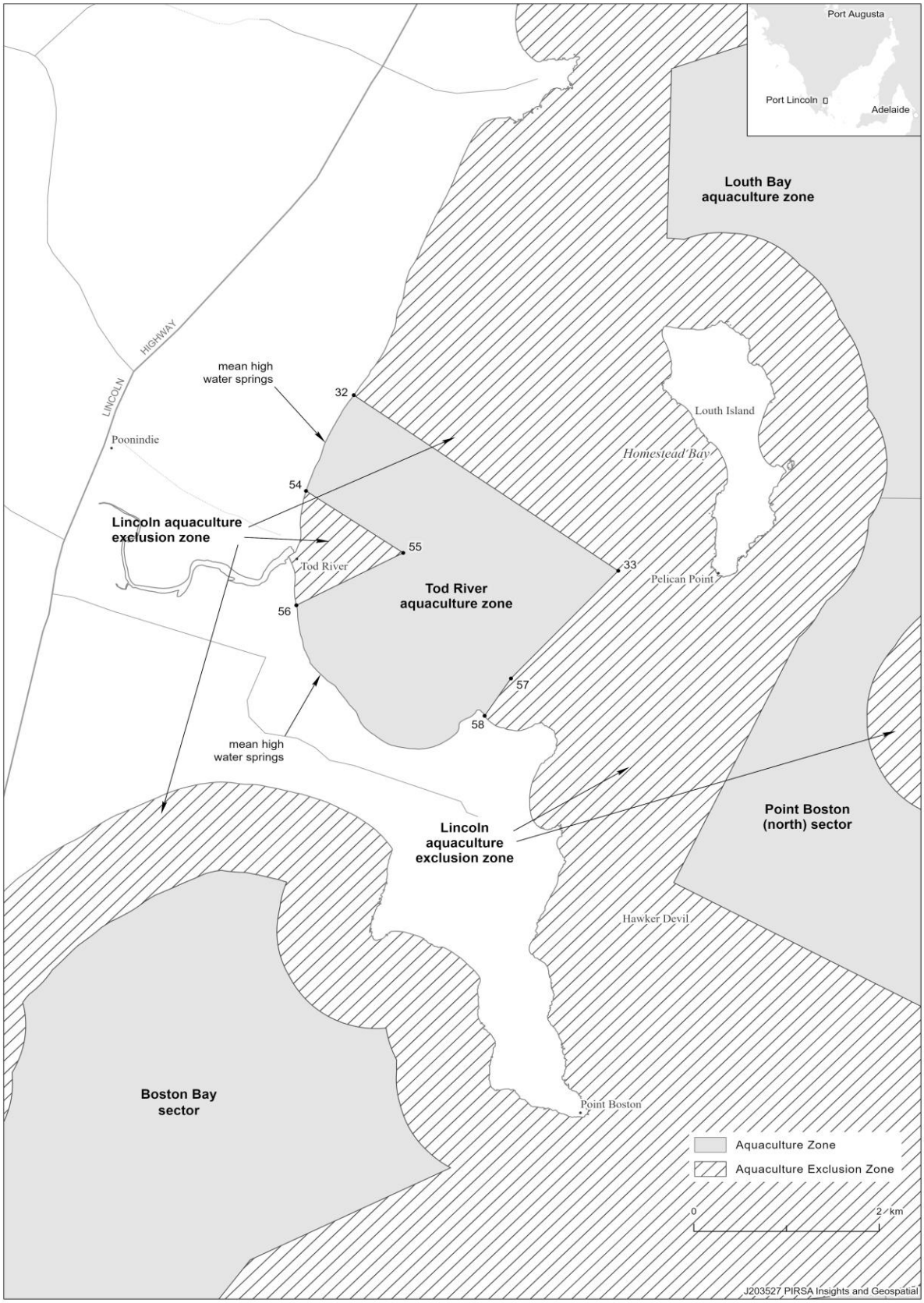
Appendix C5: Lincoln aquaculture zone showing Lincoln (inner south) sector proposed to be added via Gazette.



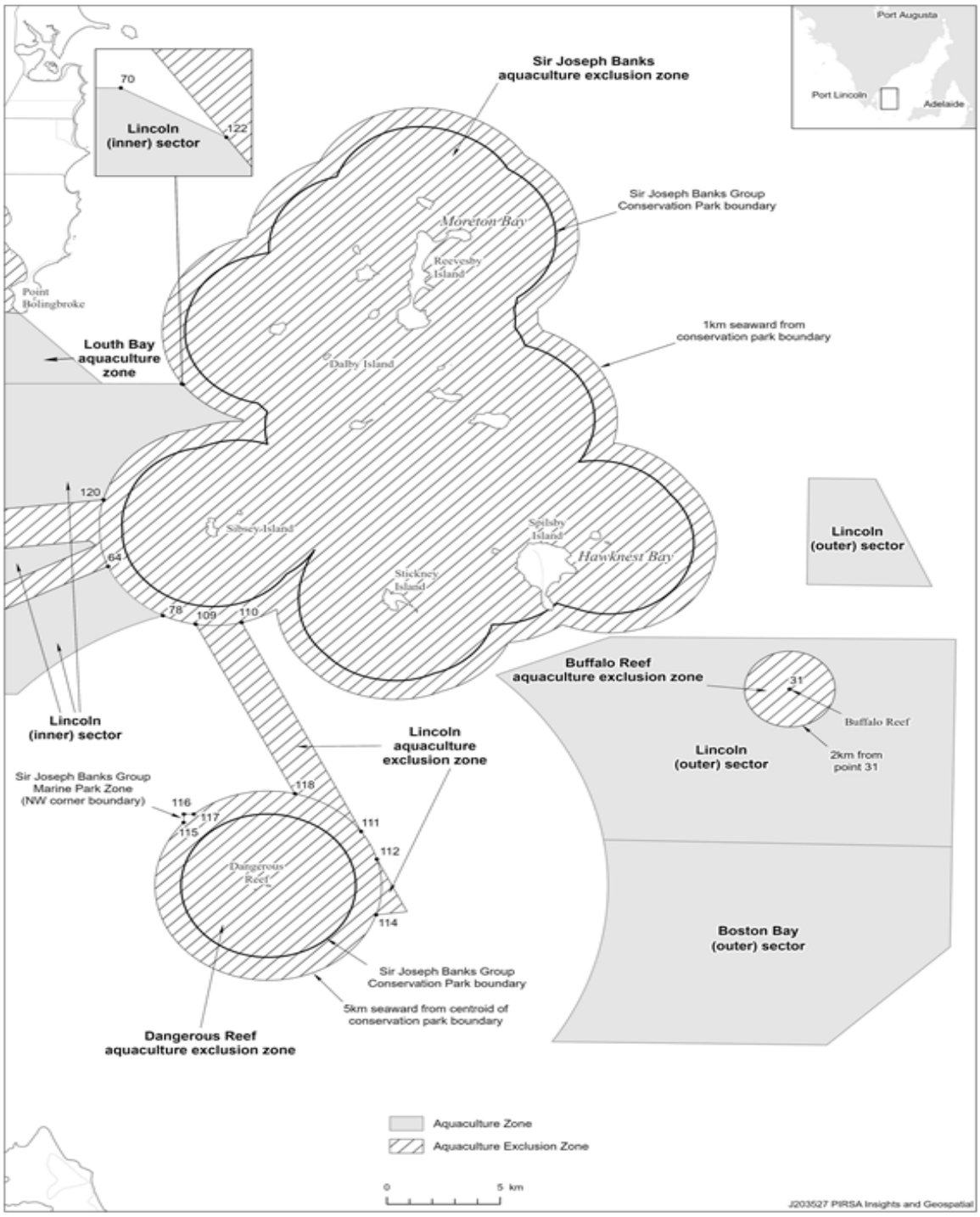
Appendix C6: Louth Bay aquaculture zone and Point Boston aquaculture zone showing Point Boston (north) and (south) sectors



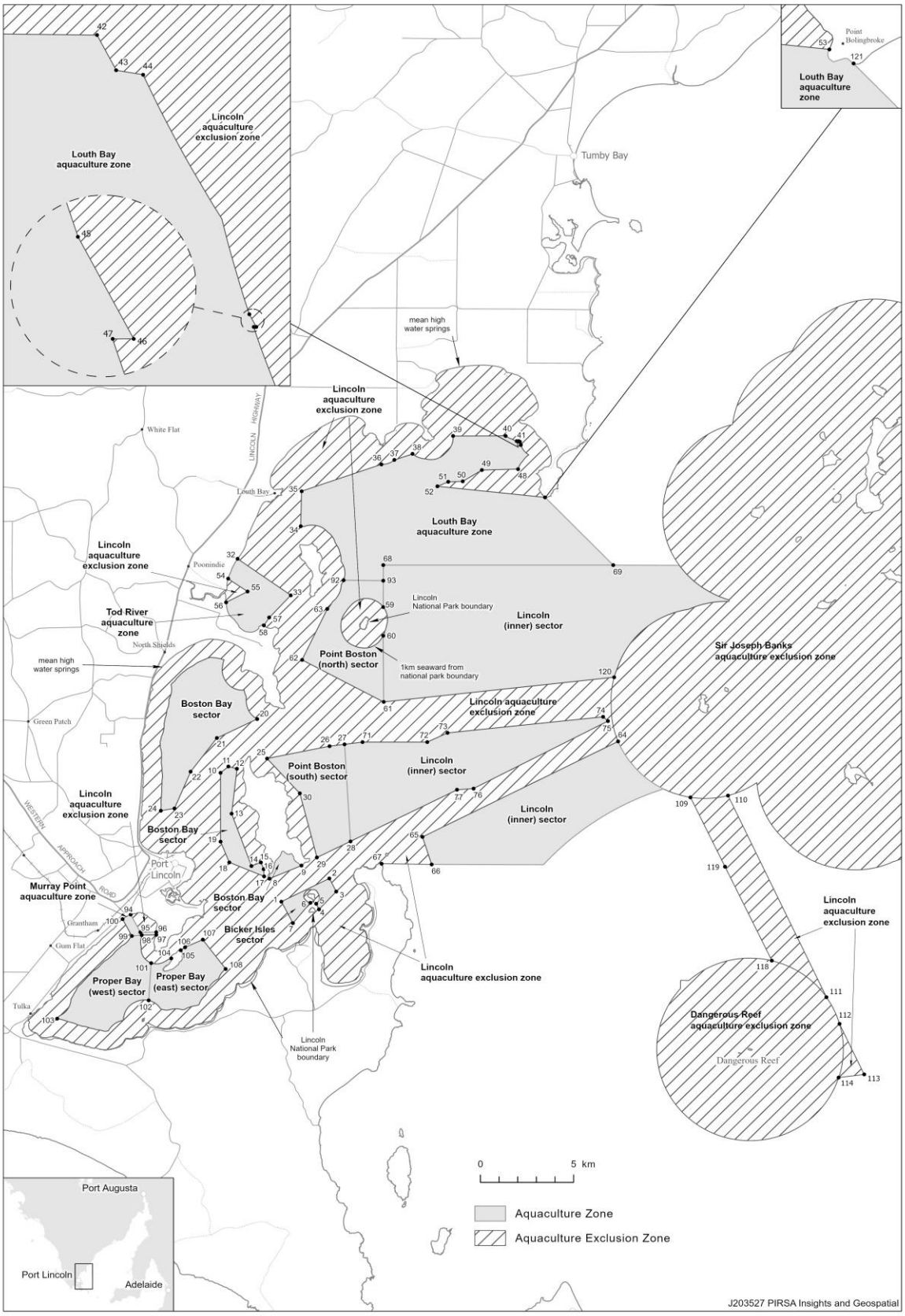
Appendix C7: Murray Point aquaculture zone and Proper Bay aquaculture zone showing Proper Bay (east) and (west) sectors.



Appendix C8: Tod River aquaculture zone.



Appendix C9: Buffalo Reef aquaculture exclusion zone, Dangerous Reef aquaculture exclusion zone and Sir Joseph Banks aquaculture exclusion zone.



Appendix C10: Lincoln aquaculture exclusion zone.

APPENDIX D - CONSISTENCY OF THE DRAFT POLICY WITH OTHER LEGISLATIVE REQUIREMENTS

Legislation / Policy*	Objectives	Consistency
State Planning Policies for South Australia	The State Planning Policies (SPP) set out a framework for land use in South Australia to improve the liveability, sustainability and prosperity of the state. There are 16 State Planning Policies which address the economic, environmental and social planning priorities for South Australia.	The Draft Policy is consistent with the following relevant State Planning Policies: SPP1 Integrated Planning – The Draft Policy uses integrated planning by considering other users of the marine environment in aquaculture zone design, including fishing areas and shipping transport routes. SPP2 Design Quality – The design and consultation process for aquaculture zones within the Draft Policy considers social risks, such as visual amenity (see section 8.3.2). SPP4 Biodiversity – The Draft Policy aims to minimise impacts from aquaculture development to biodiversity in the design and consultation process, including through conservative biomass limits of supplementary fed and extractive permitted classes of aquaculture, and providing for (see section 8.3.3). SPP5 Climate Change – The Draft Policy provides adaptability to climate change impacts, by providing for flexibility in areas able to be farmed, biomass limits, and the type of permitted classes of aquaculture. It also provides for permitted classes of aquaculture, such as algae, which can store carbon and reduce greenhouse gas emissions. SPP7 Culture Heritage – The Draft Policy considers in its design and consultation process historic shipwrecks/relics, Aboriginal heritage, native title, and other heritage places (see sections 7.4, 7.5, 7.6, 7.12). SPP8 Primary Industry – The Draft Policy aims to provide for future growth of the aquaculture primary industry (e.g. increased maximum biomass limits) in an ecologically sustainable manner while minimising potential impacts to the fishing primary industry (see section 7.11). SPP9 Employment Lands – The Draft Policy aims to provide for the economic expansion of the aquaculture primary industry and likely increased local employment opportunities and other economic flow-on benefits for the region (see

Legislation / Policy*	Objectives	Consistency
		section 8.3.1) SPP10 Mineral and Energy Resources – The design and consultation process for aquaculture zones within the Draft Policy considers potential impacts to mineral and energy resources (see section 7.16). SPP11 Strategic Transport Infrastructure – The Draft Policy considers vessel routes, including shipping transport, within the design and consultation processes for aquaculture zones (see section 7.13). SPP13 Coastal Environment – The design and consultation process for aquaculture zones in the Draft Policy considers potential environmental and social risks (see sections 8.3.2 and 8.3.3). SPP14 Water Security and Quality – Conservative biomass limits for supplementary fed classes of aquaculture in the Draft Policy have been proposed to maintain water quality within EPA requirements (see section 7.2). SPP15 Natural Hazards – The location of proposed aquaculture zones has taken into consideration oceanographic conditions specific to each zone/sector. There are emergency lease provisions under the Act to manage risks from natural hazards (e.g. algal blooms) to individual aquaculture developments once operational. SPP16 Emissions and Hazardous Activities – The design and consultation process for aquaculture zones within the Draft Policy takes into consideration potential environmental and social risks (see section 8.3.2 and 8.3.3).
Eyre and Western Region Plan	The South Australian Planning Strategy includes plans for seven regional areas of the state, as well as the 30 year plan for greater Adelaide. The regional plans contain the state government's directions on land use and development, including policies relating to population growth and demographic changes among others. The Eyre and Western Region Plan aims to, among other things; balance the social, economic and environmental demands of the region; maximise the region's competitive advantage in aquaculture; manage natural resources and protect vulnerable environments and species; and manage and facilitate existing and planned infrastructure to maximise economic development and job growth.	The Draft Policy is consistent with the Eyre and Western Region Plan, in that it aims to provide for increased aquaculture development in an ecologically sustainable manner, likely resulting in increased economic and employment for the region (see section 8.3).

Legislation / Policy*	Objectives	Consistency
Planning, Development and Infrastructure Act 2016 *Planning, Development and Infrastructure (General) Regulations 2017* Planning and Design Code	The *Planning, Development and Infrastructure Act 2016, Planning, Development and Infrastructure (General) Regulations 2017*, and Planning and Design Code detail the processes for making and assessing development applications. 'Development' is defined in the *Planning, Development and Infrastructure Act 2016* to include: (a) a change in the use of land; or (b) building work; or (c) the division of an allotment; or (d) the construction or alteration (except by the Crown, a council or other public authority (but so as not to derogate from the operation of paragraph (e))) of a road, street or thoroughfare on land (including excavation or other preliminary or associated work); or (e) in relation to a State heritage place—the demolition, removal, conversion, alteration or painting of, or addition to, the place, or any other work that could materially affect the heritage value of the place; or (f) in relation to a local heritage place—any work (including painting) that could materially affect the heritage value of the place (including, in the case of a tree, any tree-damaging activity) specified by the Planning and Design Code for the purposes of this paragraph (whether in relation to local heritage places generally or in relation to the particular local heritage place); or (g) the external painting of a building within an area specified by the Planning and Design Code for the purposes of this paragraph; or (h) in relation to a regulated tree—any tree-damaging activity; or (i) the creation of fortifications; or (k) prescribed earthworks (to the extent that any such work or activity is not within the ambit of a preceding paragraph); or (l) an act or activity in relation to land declared by or under the regulations to constitute development, (Including development on or under water) but does not include an act or activity that is declared by or under the regulations not to constitute development for the purposes of this Act; Under the *Planning, Development and Infrastructure (General) Regulations 2017*, aquaculture development is not considered 'development' if it is located within an aquaculture zone set out in an aquaculture policy under the Act. The Planning and Design Code specifies the assessment provisions, including desired and performance outcomes, for marine-based aquaculture development.	The Draft Policy is consistent with these provisions in that it seeks to ensure the ecologically sustainable development of the marine-based aquaculture industry and recognises and respects other users of the marine resource. If the Draft Policy is approved, future aquaculture development located within aquaculture zones under the Draft Policy will not require a development application and associated development approval under the *Planning, Development and Infrastructure Act 2016*. However, aquaculture proposed outside of the Draft Policy remains subject to full development assessment. This is consistent with provisions of the Current Policy.

Legislation / Policy*	Objectives	Consistency
Aboriginal Heritage Act 1988	The *Aboriginal Heritage Act 1988* provides for the protection and preservation of Aboriginal sites, objects and remains, whether registered or not, without an authorisation from the Minister for Aboriginal Affairs and Reconciliation pursuant to section 23. Section 20 of this Act requires that any Aboriginal sites, objects or remains discovered on land, be reported to the Minister for Aboriginal Affairs and Reconciliation.	The Draft Policy seeks to locate aquaculture development to avoid potential impacts on sensitive Aboriginal sites. If any Aboriginal sites, objects or remains are encountered during community engagement, PIRSA Fisheries and Aquaculture will advise the Minister for Aboriginal Affairs and Reconciliation and, where possible, avoid the heritage or apply for relevant authorisations as necessary. In addition, aquaculture applicants who seek to conduct ground or sea disturbing works are reminded of their obligations under the AHA and encouraged to request a search of the Central Archive, administered by AGD-AAR.
Native Title Act 1993	The *Native Title Act 1993* (Cth) provides for the recognition by Australian law that some Indigenous people have rights and interests that come from their traditional laws and customs (National Native Title Tribunal (NNTT) 2009). In particular, the *Native Title Act 1993* may validate past acts; provide for future acts; extinguish native title either in full or part; provide a process to determine native title; provides three approaches to negotiating native title, including Indigenous Land Use Agreements (ILUA); and, provides for a range of other matters including the establishment of a land trust and the National Native Title Tribunal.	The South Australian Native Title Services (SANTS), Native Title Unit of AGD, and representatives of Native Title holders/claimants/ILUA's are consulted during the development of aquaculture zone policies. Note that an aquaculture zone policy is not the legislative mechanism under the Act to permit an entity to conduct aquaculture within State waters or have exclusive rights of occupation to the seabed, but rather it is the grant of an aquaculture lease and corresponding licence. The grant of an aquaculture lease and corresponding licence is subject to notification requirements under section 24HA of the *Native Title Act 1993*, which PIRSA conducts during the assessment of individual aquaculture lease and corresponding licence applications (see section 7.4).
Australia's Ocean Policy (Cth)	Australia's Oceans Policy sets in place a framework for integrated and ecosystem-based planning and management for Australia's marine jurisdictions. It promotes ecologically sustainable development of the ocean resources and encourages internationally competitive marine industries, whilst ensuring the protection of marine biological diversity. The key tool is Regional Marine Planning i.e., planning based on large areas that are ecologically similar, and seeks to integrate the use, management and conservation of marine resources at the ecosystem level. Marine Plans establish an overarching strategic planning framework to guide State and local government planners and natural resource managers in the development and use of the marine environment. Fundamental to these Marine Plans is an ecologically based zoning model. Each of these zones is supported by goals and objectives.	The Draft Policy is consistent with Australia's Ocean Policy as it seeks to avoid aquaculture development over unique and sensitive ecosystems, and provides for orderly, sustainable and internationally competitive marine industries.

Legislation / Policy*	Objectives	Consistency
Marine Parks Act 2007	The *Marine Parks Act 2007* provides the legislative framework for the dedication, zoning and management of South Australia's marine parks. South Australia's marine parks are zoned for multiple-use to protect coastal, estuarine and marine ecosystems, while also providing for continued ecologically sustainable use of suitable areas. This means that most activities, including aquaculture operations, will still be allowed within a marine park. However, some activities will not be permitted in particular zones. Areas with high conservation values will be designated as either Restricted Access Zones or Sanctuary Zones to provide the necessary level of protection for habitats, species, ecological and geological features. Both of these zones preclude commercial fishing, recreational fishing and aquaculture operations.	It is widely recognised that Aquaculture is an important and growing industry in this State that provides significant benefits to South Australia. The needs of the industry have been considered with commitments to accommodate, as far as possible, existing aquaculture operations. The aquaculture zone areas have previously been prepared having regard to Marine Park objects and boundaries and in accordance with the agreement between DEW (previously DEWNR) and PIRSA (see section 7.7). In addition, as required by Section 12(7a) of the Act, concurrence from the Minister to whom the administration of the *Marine Parks Act 2007* is committed has been obtained for the Draft Policy to apply within the specially protected area of Marine Parks.
Landscape South Australia Act 2019 *Landscape South Australia (General) Regulations 2020*	From the 1 July 2020, the *Landscape South Australia Act 2019* replaced the *Natural Resources Management Act 2004* as the key framework for managing the state's land, water, pest plants and animals, and biodiversity across the state. Eight regional landscape boards and a metropolitan board, Green Adelaide, administers the Act across nine landscape management regions. The boards support local communities and land managers to be directly responsible for managing their region's landscapes with an emphasis on land and water management, biodiversity and pest animal and plant control.	The Act and its supporting policies are also underpinned by ecologically sustainable development principles. The Draft Policy falls within the area of responsibility of the Eyre Peninsula Landscape Board. As the Draft Policy applies only to marine aquaculture there are no related matters of water allocation, groundwater or surface water. The Draft Policy is consistent with the Eyre Peninsula Regional Landscape Plan, including the regional priorities of biodiversity and community (see section 8.3.2 and 8.3.3). The Eyre Peninsula Landscape Board was consulted during public consultation for the Draft Policy.
Environment Protection Act 1993 *Environment Protection (Water Quality) Policy 2015*	The *Objects of the Environment Protection Act 1993* (EP Act) include the promotion of the principles of ecologically sustainable development, and to ensure that all reasonable and practicable measures are taken to protect, restore and enhance the quality of the environment. The Objects of the Act also include ensuring that continual improvement obligations, the precautionary and polluter-pays principles, and appropriate monitoring requirements are applied to polluting activities. The Environment Protection (Water Quality) Policy 2015 provides the structure for regulation and management of water quality in South Australian inland surface waters, marine waters and groundwaters. The principal object of the Environment Protection (Water Quality) Policy 2015 (Water Quality Policy) established	The Draft Policy is consistent with the provisions of the EP Act, associated Regulations and the Water Quality Policy as it seeks to define areas of state waters that are considered appropriate for aquaculture in that they prevent, reduce, minimise and where practicable, eliminate harm to the environment, whilst considering the principles of ecologically sustainable development.

Legislation / Policy*	Objectives	Consistency
	under the EP Act is to ensure that all reasonable and practicable measures are taken to protect, restore and enhance the quality of the environment while having regard to the principles of ecologically sustainable development. The Policy: • declares environmental values for the protection of streams, rivers, oceans and groundwater. • encourages better management of wastewater by: - avoiding its production - eliminating, or reducing it - recycling and re-using it - treating it to reduce potential harm to the environment • promotes best practice environmental management. • allows for discharge limits for particular activities to be established. The Water Quality Policy refers to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000) as part of the guidance regarding the general environmental duty. In this context, the ANZECC guidelines are used as trigger values for aquatic ecosystems and primary industries.	
Harbors and Navigation Act 1993	The *Harbors and Navigation Act 1993* sets out the following objectives: • To provide for the efficient and effective administration and management of South Australian harbors and harbor facilities for the purpose of maximising their use and promoting trade; • To ensure that efficient and reliable cargo transfer facilities are established and maintained; • To promote the safe, orderly and efficient movement of shipping within harbors; • To promote the economic use and the proper commercial exploitation of harbors and harbor facilities; • To provide for the safe navigation of vessels in South Australian waters; • To provide for the safe use of South Australian waters for recreational and other aquatic activities; and • Insofar as this Act applies to the Adelaide Dolphin Sanctuary, to further the objects and objectives of the *Adelaide Dolphin Sanctuary Act 2005*.	The Draft Policy is consistent with the provisions of the *Harbors and Navigation Act 1993* as it seeks to define areas of state waters that are considered appropriate for aquaculture and have regard to other resource users; including operators of recreational and commercial vessels. Section 20 of the Act provides that the grant of aquaculture leases is subject to the concurrence of the Minister responsible for administration of the *Harbors and Navigation Act 1993*.
Coast Protection Act 1972	The *Coast Protection Act 1972* establishes the Coast Protection Board. The functions of the Board are: • To protect the coast from erosion, damage, deterioration, pollution and misuse; • To restore any part of the coast that has been subjected to erosion, damage, deterioration, pollution or misuse;	The Draft Policy is consistent with the provisions of the *Coast Protection Act 1972* as it seeks to protect the coast by minimising any risk of erosion, damage, deterioration, pollution and misuse of the resource, through appropriate siting of aquaculture zones and aquaculture exclusion

Legislation / Policy*	Objectives	Consistency
	• To develop any part of the coast for the purpose of aesthetic improvement, or for the purpose of rendering that part of the coast more appropriate for the use or enjoyment of those who may resort thereto; • To manage, maintain and, where appropriate, develop and improve coast facilities that are vested in, or are under the care, control and management of the Board; • To report to the Minister upon any matters that the Minister may refer to the Board for advice; • To carry out research, to cause research to be carried out, or to contribute towards research, into matters relating to the protection, restoration or development of the coast; and • To perform such other functions assigned to the Board by or under this or any other Act.	zones, the specification of appropriate types and levels of aquaculture development.
Native Vegetation Act 1991	The objects of the *Native Vegetation Act 1991* are: • The conservation, protection and enhancement of the native vegetation of the State and, in particular, remnant native vegetation, in order to prevent further - • Reduction of biological diversity and degradation of the land and its soil; and • Loss of quantity and quality of native vegetation in the State; and • Loss of critical habitat; and • The provision of incentives and assistance to landowners to encourage the commonly held desire of landowners to preserve, enhance and properly manage the native vegetation on their land; and • The limitation of the clearance of native vegetation to clearance in particular circumstances including circumstances in which the clearance will facilitate the management of other native vegetation or will facilitate the sustainable use of land for primary production; and • The encouragement of research into the preservation, enhancement and management of native vegetation; and • The encouragement of the re-establishment of native vegetation in those parts of the State where native vegetation has been cleared or degraded.	The Draft Policy is consistent with these objectives as it seeks to minimise impacts on native vegetation through appropriate siting of aquaculture zones and appropriate selection of prescribed species classes to within a zone. The establishment of aquaculture exclusion zones around sensitive habitats is also applied where relevant.
Historic Shipwrecks Act 1981 (SA)	Any shipwreck or relic in South Australian waters that is older than 75 years is protected under the *Historic Shipwrecks Act 1981* (SA). Historically significant shipwrecks that are less than 75 years old, may be protected by Ministerial declaration under this Act. A protected historic shipwreck includes articles associated with the ship, including moveable artefacts, and these are classified as historic relics under this Act and are also protected. Note that as the Draft Policy area encompasses only State internal waters, the *Underwater Cultural Heritage Act 2018 (Cth)* is not applicable.	The implementation of the Draft Policy is consistent with these requirements as the design and consultation process for aquaculture zones considers the location of historic shipwrecks/relics (see section 7.12). In addition, PIRSA considers the proximity of historic shipwrecks/relics during the individual assessment of aquaculture licence applications. PIRSA also reminds aquaculture licence holders of their obligations under the *Historic Shipwrecks*

Legislation / Policy*	Objectives	Consistency
		Act 1981.
National Parks and Wildlife Act 1972	An Act to provide for the establishment and management of reserves for public benefit and enjoyment; to provide for the conservation of wildlife in a natural environment; and for other purposes.	The Draft Policy is consistent with these requirements, as the boundaries of existing and proposed aquaculture zones in the Draft Policy are sited to minimise potential impacts on, and to protect the integrity of, reserves under the *National Parks and Wildlife Act 1972* (see section 7.8).
Fisheries Management Act 2007	An Act to provide for the conservation and management of the aquatic resources of the State, the management of fisheries and aquatic reserves, the regulation of fishing and the processing of aquatic resources, the protection of aquatic habitats, aquatic mammals and aquatic resources and the control of exotic aquatic organisms and disease in aquatic resources; to repeal the *Fisheries Act 1982* and the *Fisheries (Gulf St. Vincent Prawn Fishery Rationalisation) Act 1987*; to make related amendments to other Acts; and for other purposes.	The Draft Policy is consistent with provisions of this Act, as the design and consultations processes for aquaculture zones seek to ensure aquaculture is conducted in an ecologically sustainable manner, and considers potential impacts to aquatic resources, and recreational and commercial fishing stakeholders (see section 7.11, 7.13 and 8.3.3). Further, to minimise adverse interactions with seabirds and large marine vertebrates, section 18 of the *Aquaculture Regulations 2016* requires a licensee to have a written strategy approved by the Minister, which includes avoiding or minimising adverse impacts on/or adverse interactions with, seabirds or large marine vertebrates. In addition, aquatic resource/fishing stakeholder risks posed by an aquaculture activity are assessed by PIRSA at the time of licence application through the ESD risk assessment process.

*Note that no other relevant instruments have been prescribed by regulation under section 12(3)(c)(iii) of the Act requiring an assessment of the consistency of the Draft Policy against them. Irrespective, an assessment against relevant instruments has been provided.

APPENDIX E - RESEARCH AND DEVELOPMENT

As part of its commitment to supporting industry growth and developing an adaptive resource management framework, PIRSA plays a key role in supporting a number of strategic research initiatives. Many of these projects are led and conducted by SARDI, the research division of PIRSA, which offers an integrated research and development (R&D) capability to sustainably create, nurture and grow aquaculture industries.

SARDI and PIRSA work closely with the aquaculture sector to produce applied research outcomes and timely delivery. SARDI's aquaculture research program is uniquely set up to provide support across the whole spectrum of industry research needs, including:

- developing novel technologies, species and sites
- environmental assessment, monitoring, oceanography and carrying capacity modelling
- improving spawning, and larval and juvenile rearing of stock
- developing and evaluating improved and more cost-effective sustainable feeds
- providing advice and support on selective breeding programs and aligned molecular technologies
- enhancing algal production and systems to produce biomass for a diverse range of products.
- addressing disease and pest issues, through support with chemical registration, monitoring and surveillance, evaluation of therapeutics and development of improved husbandry practices
- pre- and post-harvest product safety and quality, including developing novel products and packaging
- trade and market access.

The outcomes of such initiatives are integrated into decision-making processes such as those associated with aquaculture zoning, disease control, managing interactions with protected wildlife species and environmental management. A large number of aquaculture related research projects have been undertaken over the years, most of which can be found at: www.pir.sa.gov.au/research/research_specialties/aquatic_sciences and www.frdc.com.au/.

A strategic research initiative is the Innovative Solutions for Aquaculture Planning and Management suite of projects (IS). Commenced in 2004, this program was a joint initiative between PIRSA and the FRDC to fund research to foster the continued sustainable development of the SA aquaculture industry. Stage One of IS involved a site or species focus. Projects included an environmental audit of marine aquaculture, spatial impacts and carrying capacity for Finfish aquaculture, Finfish parasites, seal interactions and the development of rapid environmental assessment and monitoring techniques. In addition, a communication and extension strategy was developed to disseminate project outcomes to industry. The particular focus of the second stage of the IS program was to facilitate further economic growth of the aquaculture industry and to provide information to improve the management of aquaculture resources. Projects completed under Stage Two have included oceanic and biological modelling of Spencer Gulf, biosecurity, new technologies and new species and improving programs for environmental monitoring.

More recently a project investigating interactions of sharks with marine activities (e.g. aquaculture and fisheries) in southern Spencer Gulf was finalised. The project focused on the movement dynamics of two pelagic sharks, the White Shark (*Carcharadon carcharias)* and Bronze Whaler (*Carcharinhus brachyurus),* in SA. Specific aims were to: (1) determine if aquaculture activities correlated with patterns on fidelity and migration; and (2) assess and compare the use of natural foraging areas and areas used

during human marine activities. Additional objectives included the development of industry guidelines for removal and release of pelagic sharks from finfish aquaculture pontoons, and surveys to collect baseline information on perceptions of shark associations with aquaculture and other marine activities. A key outcome for this project was that there was negligible overlap between sharks and aquaculture activities in Spencer Gulf, suggesting that aquaculture does not lead to aggregations of sharks to an area. The final report for this project can be downloaded at https://www.frdc.com.au/project/2014-020.

The Future Oysters Corporate Research Centre Program (CRC-P) was developed in conjunction with the Oyster industry, FRDC, and the Commonwealth Government to undertake the research needed to rebuild and evolve the Australian Oyster aquaculture industry in the face of POMS and other diseases affecting Oysters. The research focusses on breeding disease-resistant Oysters, improving disease 51 management, increasing productivity and profitability, and diversifying risks to allow the industry to grow and supply domestic markets and a growing global consumer demand for seafood. Improved diagnostic technologies for POMS are being developed, including more efficient approaches to area surveillance, a test using flow cytometry for better quantification of the POMS virus in water, and a better understanding of sampling to test for POMS. This program is also investigating the causes and approaches to managing Winter Mortality in Sydney Rock Oysters and mortalities of unknown cause in the South Australian Pacific Oyster industry. More on this project can be found at https://www.oystersaustralia.org/current-crcp.

A current project is underway, which aims to identify the feeding requirements of Pacific Oysters, Cockles and Mussels, investigate the factors influencing food availability in South Australian Oyster farming regions, and improve our understanding of the relationship between food availability, bivalve feeding and farm production/productivity, and the potential implication of aquaculture development on different species. More information on this project can be found at http://www.frdc.com.au/project/2014-027.

In 2019, PIRSA's Aquatic Animal Health Unit completed a project to improve early detection surveillance and emergency disease response to POMS using a hydrodynamic model to predict the dispersion of OsHV-1. This project provided a case study for how such a model can predict pathogen spread to underpin improved surveillance designs, effective emergency disease response (identified disease management areas around the state) and appropriate biosecurity zoning for translocation protocols. More on this project can be found at https://www.frdc.com.au/project/2018-090.

In June 2020, PIRSA's Aquatic Animal Health Unit completed another project, which developed national guidelines to provide the Australian sea-cage Finfish (non-salmonid) industry with the tools and templates to create an auditable farm biosecurity plan. Consideration was given to the current farming of Yellowtail Kingfish (*Seriola lalandi*), Southern Bluefin Tuna (*Thunnus maccoyii*) and Cobia (*Rachycentron canadum*). More on this project can be found at https://www.frdc.com.au/project/2019-088.

Another project being undertaken by PIRSA's Aquatic Animal Health Unit is investigating risk factors and management strategies associated with summer mortality in Australian Abalone. The project aims to summarise current Abalone health and summer mortality research, and retrospective mortality investigations and laboratory submissions for Australian Abalone, develop a case definition for summer mortality and investigate summer mortality events during the life of the project to comprehensively rule out primary pathogens and infectious agents, in both control and impacted Abalone populations. More on this project can be found at https://www.frdc.com.au/project/2019-147.

During 2019-2022, an FRDC project assessing the capacity for sustainable Finfish aquaculture in the vicinity of seagrasses is being undertaken. The project was prompted by the re-establishment of Yellowtail Kingfish aquaculture in Fitzgerald Bay. The outcomes of the project will: (1) determine cost-effective approaches to assessing the influence of Finfish aquaculture derived nutrients on seagrasses, and using Fitzgerald Bay as a case study what that influence is; (2) Develop a predictive modelling

ability to estimate carrying capacity and allow scenario analysis of future aquaculture developments and how it might affect seagrasses. The model will also allow managers to make informed decisions about where to place future developments, and how much to allow existing developments to expand; (3) Also, use Fitzgerald Bay as a case study to document seagrass condition using a range of metrics both before the commencement of Finfish aquaculture, and once production has reached a substantial level; and (4) Develop a range of cost-effective indicators for monitoring the effects of aquaculture on adjacent seagrass beds. More on this project can be found at https://www.frdc.com.au/project/2018-186.