

An underwater photograph showing a large school of silver fish swimming over a bed of brown seaweed. The water is clear and blue.

Marine Seaweed
Aquaculture Lease
Disaster Bay,
Wonboyn NSW

Prepared for NSW State Significant Development Planning Submission

Eden 1

Scoping Report (v2.5)

Pre-Development Application PDA-23376549

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Document Purpose:

This Scoping Document has been prepared by Auskelp Pty Ltd for the NSW State Significant Development (SSD) Planning Submission Pre-Development Application PDA-23376549. This Scoping Document relates to the conditional lease for project area aquaculture 200-hectare marine lease in the Disaster Bay designated as AL21/004. This scoping document seeks to provide justification and clarification that the Eden 1 Project is a permissible SSD. This scoping document has been created with the objective of meeting the departments stipulated requirements regarding the strategic, statutory and impact assessment and approach of the proposed development, and Planning Secretaries Environmental Assessment Requirements (SEARs).

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Introduction

1.1 Company Profile

Auskelp Pty Ltd seeks to create an environmentally positive and sustainable seaweed aquaculture industry located within the Bega Valley Shire. Auskelp Pty Ltd is wholly Australian owned and operated. Using the latest technology, research and expert advisors, Auskelp plans to develop commercial kelp farms in the Bega Valley Shire that create a new and innovative industry, while protecting the pristine Sapphire Coast.

The company founder is Christopher Ride, one of Australia's most successful and respected technology businessmen. Christopher Ride has a residence on Wonboyn Lake and a lifetime association with the Wonboyn area.

The 'Eden 1' project will be fully funded by Auskelp Pty Ltd. A long-term view is being taken on the capital and operational requirements, and the associated timeframes for success. Auskelp Pty Ltd is also an active member of the peak body for seaweed industry development – the Australian Sustainable Seaweed Alliance Ltd (ASSA).

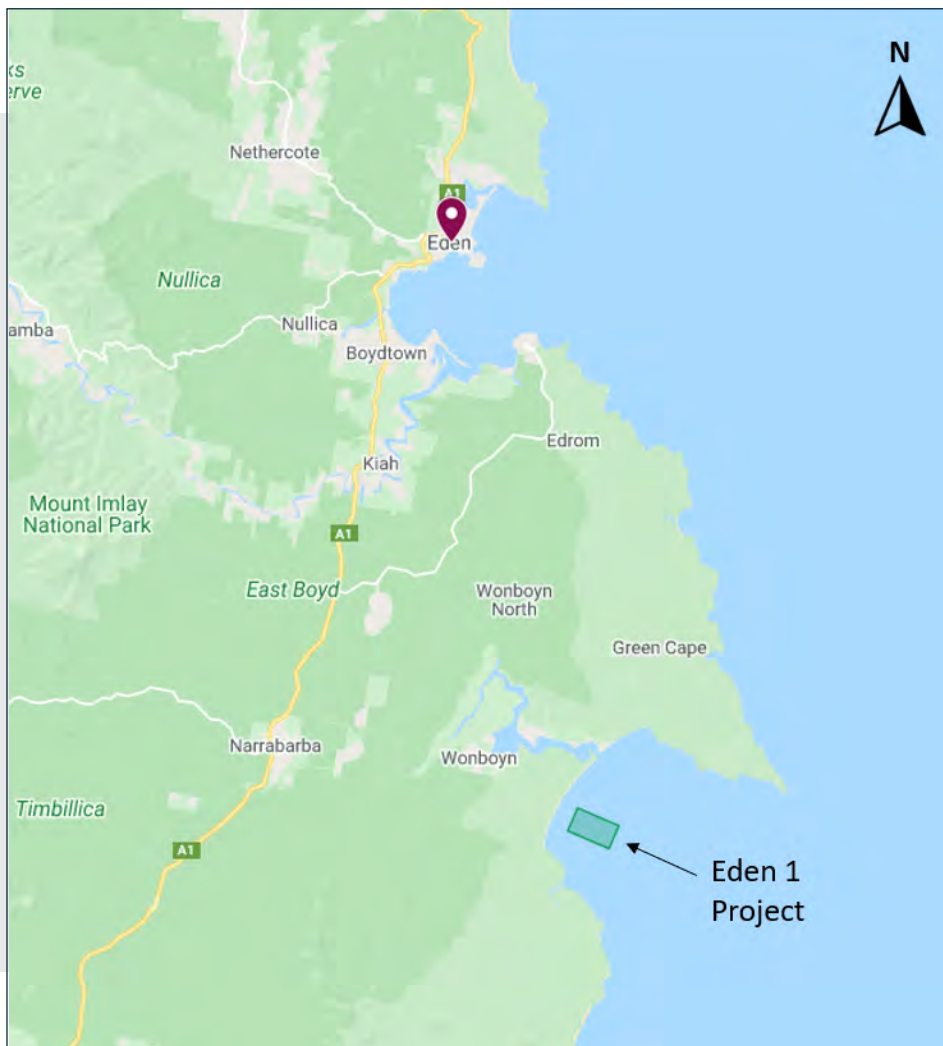


Figure 1
Regional map of Twofold Shelf Bioregion (including Eden and Wonboyn) with Eden marked in maroon and the proposed 200Ha farm indicated by the green rectangle.

(Source: Google Maps)

1.2 Project Brief

Auskelp Pty Ltd is seeking approval for the development of a 200-hectare seaweed aquaculture marine farm on aquaculture lease area AL21/004 within Disaster Bay, off Wonboyn (Figure 1). AL21/004 is located approximately 4.12km East-South-East of Wonboyn village and 23km South-South-West of Eden. Auskelp have obtained an aquaculture permit and marine aquaculture lease for this area from the Department of Primary Industries that is contingent on State Significant Development consent. This project is referred to as the Eden 1 project.

The seaweed ocean farm will use longline structures which are commonly used globally for seaweed cultivation and similar to those already being used in Twofold Bay and Jervis Bay for mussel aquaculture. The native species for cultivation are: *Ecklonia radiata* and *Asparagopsis spp.* which occur locally and have domestic and international markets for food and animal feed products. The animal feed from *Asparagopsis* is particularly in high demand as a methane reducing feed supplement for cattle.

Seaweed seedstock will be provided from a new, purpose-built seaweed hatchery and drying facility that will be developed in close proximity to the marine aquaculture lease at the Edrom Chip Mill, Twofold Bay. This related but separate land-based project is not considered a State Significant Development and is currently underway.

A seaweed aquaculture industry in Eden would create regional jobs and an economic boost that is sorely needed for this region to recover from the 2019/2020 bushfires, repeated flooding events and Covid-19^{1,2,3}. It is estimated that 40–60 direct jobs would be created by this project. Additionally, this development could encourage other seaweed aquaculture operators to establish in this region and across NSW.

1.3 Project Background

Seaweed is a global industry of over USD \$11 billion and is growing rapidly. Development of a seaweed industry is aligned to the National Aquaculture Strategy, to double the current value of Australia's aquaculture industry, and the National Marine Science Plan 2015–2025 (2018) to drive the development of Australia's blue economy.

AgriFutures Australia's Seaweed Industry Blueprint highlighted the opportunity for a seaweed industry in Southern NSW (Jervis Bay to Eden) that could generate \$50M annual gross value of production, 500 jobs in this region, improve water quality and provide habitat for marine life (Kelly, 2020). However, this is dependent on ocean leases being approved for seaweed cultivation in a timely manner.

The proposed 200-hectare seaweed farm is categorised as non-intensive aquaculture and has no addition of feed. The proposed infrastructure is standard long line aquaculture and native seaweeds would grow from locally sourced seedstock. The project is focussed on growing *Ecklonia radiata*, *Asparagopsis armata* and *Asparagopsis taxiformis* which are species that naturally occurs in southern Australian waters from the intertidal area to a depth of 25m. The proposed aquaculture lease will be located at between depths of 13m–25m deep over soft sediment and is not located over any significant habitat based on the desktop information available and local knowledge of the area.

Seaweed farming plays an important role in the blue economy and the achievement of Sustainable Development Goals including contributing to climate change mitigation and adaptation (Duarte et al., 2017; Ahmed and Thompson, 2019; Hossain et al., 2021). Seaweed is one of the fastest growing plants on the planet and absorbs significant amounts of carbon dioxide and nitrogen from the oceans, which provides a unique opportunity to bioremediate and de-acidify oceans while producing a sustainable crop. By sustainably using the marine resources for sustainable aquaculture we contribute to the UN's Sustainable Development Goals – 8, 9, 12, 13 and 14 (Table 1). Because ocean farms require no freshwater, no deforestation and no fertiliser it is more sustainable than any land-based farming approach. Additionally, the Australian coastline including southern NSW has ideal growing conditions for high value, native seaweeds.

1 Hobday, L. (2021). Oyster industry recovers from flood, fire. Manning River Times. <https://www.manningrivertimes.com.au/story/7264247/oyster-industry-recovers-from-flood-fire/>

2 Reardon, A. 2021. Wonboyn oyster farmers fear major stock losses after third flood event this year. ABC South East NSW. <https://www.abc.net.au/news/2021-05-12/wonboyn-oyster-farmers-experience-third-flooding-event-this-year/100134158>

3 McDonald, A. (2020). 'There's a hell of a lot of ash': Fresh fire challenges for shellfish industry. Eden Magnet. <https://www.edenmagnet.com.au/story/6627670/theres-a-hell-of-a-lot-of-ash-fresh-fire-challenges-for-shellfish-industry/>

Seaweed production technologies are not experimental, they are well established and the focus of substantial publications (e.g. Buschmann et al., 2017; Torres et al., 2020). Markets for seaweed products are diverse and expanding (Nayar and Bott, 2014; Birch et al., 2019). Development of an Australian based seaweed industry is consistent with the national need to enhance domestic food and feed

production and production technologies to ensure greater self-sufficiency in an increasingly uncertain global climate. The development and expansion of seaweed farming in Australia is underpinned by substantial research investment by the Commonwealth Government and various research partners through the Marine Bioproducts Cooperative Research Centre (MB-CRC).

Number	SDG	SDG Summary
8	Decent work and economic growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
9	Industry, innovation and infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
12	Responsible consumption and production	Ensure sustainable consumption and production patterns
13	Climate action	Take urgent action to combat climate change and its impacts
14	Life below water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Table 1

Relevant United Nations Sustainable Development Goals (SDG).

Source: United Nations Department of Economic and Social Affairs, Sustainable Development <https://sdgs.un.org/goals>

1.4 Analysis of Alternatives

The Eden 1 project location and approach was chosen after consideration of various alternative locations and options for the project. Alternative locations for growing seaweed were considered east of Ben Boyd National Park, in Wonboyn River and/or Lake near other pre-existing oyster farms and Twofold Bay. Auskelp also considered various cultivation systems for seaweed aquaculture.

Two locations East of Ben Boyd National Park were considered (Figure 2). However, it was noted that these locations are exposed to harsh environmental conditions, particularly waves and currents, as they were not sheltered in a bay. For this reason, these two alternative locations would have higher infrastructure and operational costs. Additionally, risks of infrastructure failure or seaweed detachment would increase due to oceanic conditions.

Preliminary analysis of marine traffic routes using MarineTraffic.com identified that these alternative locations had significant marine traffic activity and seaweed aquaculture at these locations may block/hinder this marine traffic. Furthermore, these alternative locations do not have alternative access routes thereby limiting site accessibility to respond to any emergencies on the farm site would be extended and more influenced by weather.

Siting the seaweed farm in Wonboyn River and/or Lake was also considered. Initially this location was thought to be an ideal location for seaweed cultivation, as oyster cultivation was already prevalent in the Wonboyn River and Lake. Infrastructure, services and other mutually useful resources could have been shared between the oyster farmers and the Eden 1 project. However, upon closer inspection Wonboyn River and Lake were already densely packed with oyster farms, with little area remaining for seaweed cultivation at the scale required. This could lead to competition for river and lake use and lease areas, which could lead to community dissatisfaction with the project as well as navigational and access hazards.

From a physiological perspective, the seaweed would be exposed to lower salinities, half-daily fluctuations in salinity with the tides and higher turbidity, which could limit the growth potential seaweeds. Oyster farmers in Wonboyn River and Lake have already been suffering from severe flooding and bushfire events, which put oysters under stress due to decreased salinity, increased turbidity, altered pH and reduced dissolved oxygen levels. Additionally, oyster farmers and Bega Valley Council face challenges around managing the Wonboyn Lake Entrance, which opens

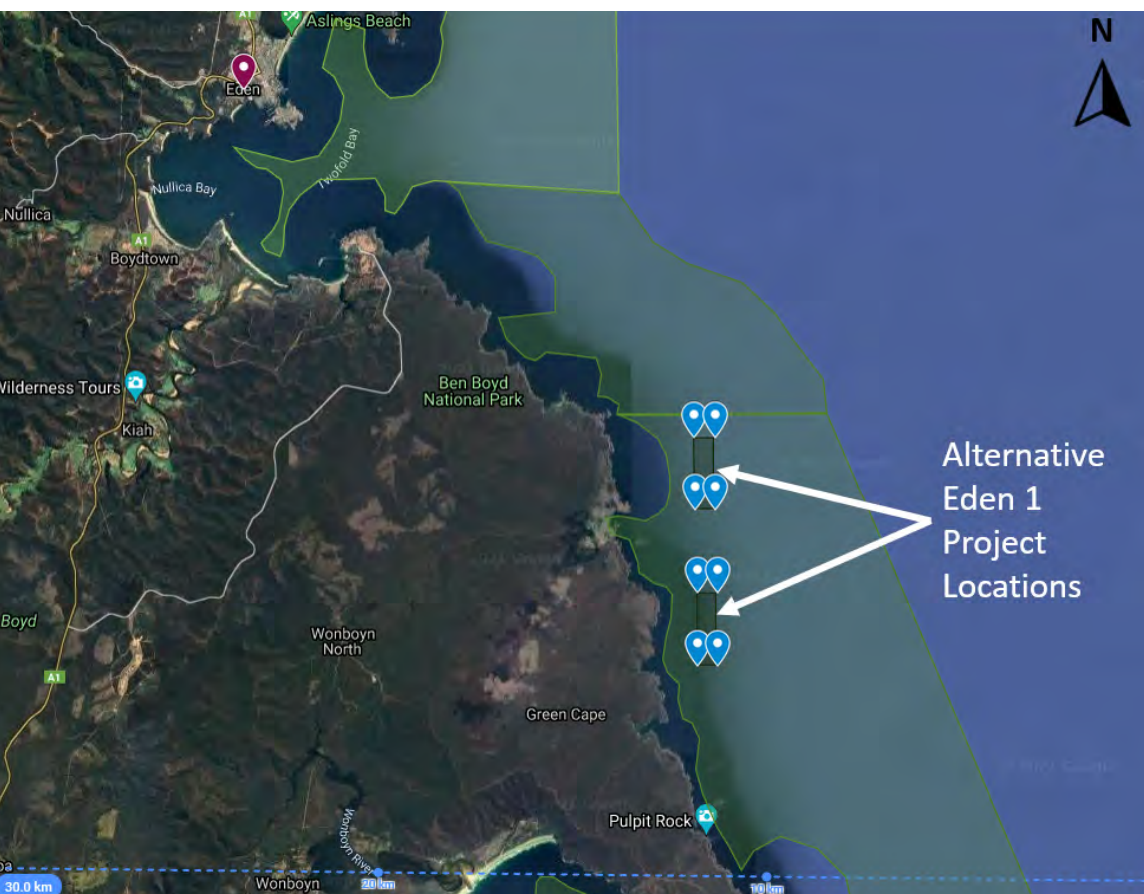


Figure 2
Alternative Eden 1 Project
locations considered East of
Ben Boyd National Park

and closes seasonally and tidally, sometimes limiting the necessary water exchange between the lake and the ocean. These events would likely also put seaweed under stress if located in the Wonboyn River and/or Lake.

A location in Twofold Bay would have been preferred from an accessibility perspective and there are aquaculture leases already in place in Twofold Bay that have permission to grow seaweed. The owners of these leases were contacted by Auskelp to try to arrange subletting of the leases for growing seaweed at trial or larger scale. However, the lease owners were not receptive to an offer from Auskelp to sublet their lease at this time and instead have sublet the area to another mussel operator. Other areas in Twofold Bay were considered however we were advised by NSW DPI that there was extensive community opposition to the existing lease areas being extended in previous years. In addition, recent water quality concerns, marine traffic conflicts and water depth are not ideal for seaweed aquaculture.

In assessing feasible alternatives, Auskelp has considered other types of infrastructure for seaweed cultivation e.g. circular systems, tubenets, rafts and net cultivation systems. The traditional methods of tubenet, raft, frame and net cultivation systems typically used in South East Asia are significantly more labour intensive than longline cultivation systems. While these labour costs are less significant in

South East Asia, in Australia the labour costs would make the operational costs of the Eden 1 project prohibitively expensive. Circular systems on the other hand showed promise, but have a low technological readiness level with no known commercial scale circular cultivation system in operation. Longlines were selected due to their high technological readiness level, proven performance in harsh weather environments, lower operational expenses and they are already used for aquaculture in NSW.

1.5 No Project Option

As seen in recent bushfires and repeated flooding events, the Eden economy and small aquaculture industry is vulnerable to severe climatic events (See footnotes 1, 2, 3 & 4 on pages 7 & 10) which are predicted to increase in severity and frequency with climate change. The Bega Valley economy needs more climate-resilient diversification to achieve long term sustainability.

Auskelp intends on supporting jobs and economic development by providing opportunities for local skills, services, equipment and infrastructure from the existing aquaculture and maritime industries. This is because the cultivation and harvesting of seaweed requires similar skills, services, equipment and infrastructure that are also required for oyster and mussel cultivation.

Diversification for the local economy would also be achieved through Eden 1's location. The coastal location for Eden 1 would limit the water quality impacts that the oyster and mussel industries have experienced from bushfires and flooding. Based on the testimonies from the Wonboyn oyster and Eden mussel industry (See footnotes 1, 2 & 3 on page 7), if there is not diversification or at least reskilling programs towards similar sustainable industry, many local people employed in aquaculture may lose employment due to ongoing impacts of water quality on oyster and mussel production. More generally, if Eden 1 was not carried out the potential economic and employment benefits for the Wonboyn and Eden community would not be realised.

Eden 1 has the potential to both reduce local carbon dioxide loads and provide ecosystem services (Theuerkauf et al., 2021), both of which would not be available if Eden was not carried out. Carbon is taken up through photosynthesis within seaweed and, depending on what products are generated, the seaweed products can offset more carbon intense products, such as methane reducing animal feed supplements. Ecosystem services can be provided locally by controlling eutrophication and pH levels and providing habitat and foraging opportunities for fauna (Theuerkauf et al., 2021), which could increase local fishery productivity.

The Eden 1 Project also provides an opportunity for local data collection and education, which would be lost if the project was not approved. The project will generate valuable knowledge about sustainable marine seaweed aquaculture could be validated and/or collected, which would assist to inform future developments of seaweed aquaculture in NSW. In addition, the project could provide ongoing water quality monitoring and infrastructure for other environmental data collection services for Disaster Bay and downstream of Wonboyn River/Lake. These benefits and more would be lost if the project was not approved.

1.6 Related Developments

Auskelp is currently finalising the requirements and timing of land-based property leases for a new purpose-built **seaweed hatchery** and **seaweed processing facility**. The proposed hatchery site is (proposed) to be located on William Allen Road, Edrom, directly adjacent to the Edrom Multi-Purpose Wharf. The hatchery project commencement is contingent on the successful State Significant Development Application for Ocean Lease AL21/004. Until regulatory approval timeframes for AL21/004 are better understood, land-based facilities remain in negotiation with the relevant landlords via mutual Letters of Intent and binding non-disclosure agreements. Edrom has been selected as the ideal location due to water access, proximity to Ocean Lease AL21/004, boat ramp access, commercial wharf facilities, suitable road infrastructure, potential for fresh water storage, land size and topography, and access to workers from Eden and nearby Wonboyn and Kia.

The hatchery facilities are expected to comply with relevant NSW Traffic Management requirements and will not interfere with other local industries such as hospitality, tourism, logging, wood chipping and Australian Naval requirements. Hatchery facilities are to be located in a single-story purpose-built land-based structure approximately 20m x 20m in size. Local kelp species are spawned in water tanks that create ideal light and nutrient conditions that instigate reproduction. Seeded ropes are expected to be created once per year. Hatchery facilities will have minimal effect on local traffic levels and noise and environmental impact will be minimal to none. Kelp processing is expected to occur twice per year, but further research is required to determine local kelp growth rates and optimal harvesting schedules. Processing facilities are expected to require 2 hectares of flat land for drying facilities, granulation and packaging services. There is not expected to be any significant noise or environmental impact related to processing facilities. Once harvest yields are better understood, the required Development Applications will be undertaken for land-based facilities. It is expected that between 40–60 staff will work from the Edrom facilities when the site is fully operational. Transport to Edrom would be via the Princess Highway, turning off at Edrom Road, then turning into William Allen Road. The roadway is excellent with low traffic numbers.

4 Murray, S., Ajani, P. (2020). Ah shucks, how bushfires can harm and even kill our delicious oysters. The Conversation. <https://theconversation.com/ah-shucks-how-bushfires-can-harm-and-even-kill-our-delicious-oysters-131294>



Strategic Context

2.1 Project Justification

Seaweed is a fast-growing Australian industry and a significant opportunity for the Australian economy that will generate income, provide competitive sustainable products for a range of industries and protect marine ecosystems (Kelly, 2020; Theuerkauf et al., 2021). Auskelp Pty Ltd believes that Disaster Bay would be an ideal location for this 200ha seaweed industry development due to favourable environmental, logistical and regional conditions. In a related, but separate project, Auskelp Pty Ltd is also developing a seaweed hatchery and processing facility in the area.

The Eden 1 project would enable NSW to be at the forefront of the Australian seaweed industry. This aligns strongly with Australia's National Aquaculture Strategy, which intends on doubling the current value of Australia's aquaculture industry, and the National Marine Science Plan 2015–2025⁵ to drive the development of Australia's blue economy. Furthermore, with the experience and information gained from the Eden 1 project, NSW Government could better assess future seaweed farm operations and designate specific target regions for seaweed aquaculture development in NSW.

The Local Strategic Planning Statement 2040 (LSPS 2040) from Bega Valley Shire Council⁶, states "Our natural advantage positions the Shire well for continued growth in tourism and eco-tourism industries, in addition to forestry, aquaculture and the marine economy.". To this end, agriculture, forestry and aquaculture was Planning Priority #5 (PP5) in the LSPS 2040. In PP5 action 6 was "Review planning controls to facilitate the establishment of new marine and estuarine industries and the relocation and expansion of onshore oyster processing facilities" over a medium term with a future direction to "Protect the aquaculture industry and support it to adapt to climate change."

The Wonboyn oyster and Eden mussel industries have been suffering losses due to the downstream impacts of flooding and fire events (See footnotes 1, 2 & 3 on page 7). Therefore, the local aquaculture industry needs diversification for increased climate-resilience. The LSPS 2040 also calls for marine industry diversification and support for climate

resilient aquaculture solutions. Eden 1 can provide a new marine industry that can help buffer the economic, environmental and social effects of climate change.

Much of the aquaculture and marine expertise, services, equipment and infrastructure for the Eden 1 project are available locally and the project will provide opportunities for employment and upskilling in seaweed production. If Wonboyn River and Lake become increasingly incompatible for oyster culture, upskilled oyster farmers associated with the Eden 1 project could lead their local industry in developing additional seaweed farms in the region. The Eden 1 project is projected to provide 40–60 direct jobs once fully operational.

As part of South East and Tablelands Regional Plan 2036 by NSW Planning & Environment⁷ \$44m will be invested to extend the breakwater wharf at the Port of Eden. This investment intends to transform the Port of Eden into a "global gateway" for greater exposure to international tourism and export markets. Eden 1 could support and benefit from the investment in Port of Eden by providing proximity to shipping for domestic and international seaweed markets.

2.2 Project Permissibility

The planning controls for marine aquaculture are set by the EP&A Act. The EP&A Act provides a framework for environmental planning in NSW and includes provisions to ensure that proposals that have potential to significantly affect the environment are subject to detailed assessment and community consultation.

State Environmental Planning Policy (Primary Production and Rural Development) 2019 currently provides the key regulatory framework for aquaculture. (SEPP PP&RD 2019)

SEPP PP&RD 2019 Clause 22 states that Marine water aquaculture is permissible with development consent. State Environmental Planning Policy (State and Regional Development) 2011, Schedule 1 State significant development—general Aquaculture:

⁵ National Marine Science Plan 2015–2025: Driving the development of Australia's blue economy. <https://www.marinescience.net.au/wp-content/uploads/2018/06/National-Marine-Science-Plan.pdf>

⁶ Bega Valley Shire Council (2020). Local Strategic Planning Statement 2040. https://shared-drupal-s3fs.s3-ap-southeast-2.amazonaws.com/master-test/fapub_pdf/Local+Strategic+Planning+Statements/LSPS+regional+2020/Bega+Valley+Local+Strategic+Planning+Statement+2020.pdf

⁷ NSW Planning & Environment (2017). South East and Tablelands Regional Plan 2036. <https://www.planning.nsw.gov.au/-/media/Files/DPE/Plans-and-policies/south-east-and-tableland-regional-plan-2017-07.pdf>



- Development for the purpose of aquaculture that has a capital investment value of more than \$30 million.
- Development for the purpose of aquaculture located in an environmentally sensitive area of State significance.

Note: all Coastal Waters are defined as environmentally sensitive area of State significance therefore this proposal triggers the SSD process.

SEPP PP&RD 2019 sets out in clause 24 that "in determining a development application for aquaculture development to which this Division applies, the consent authority is to take into consideration the provisions of an aquaculture industry development plan that are relevant to the subject of the development application."

The MWSAS is given effect as an Aquaculture Industry Development Plan (AIDP) for marine aquaculture in NSW under the provisions of the Fisheries Management Act.

The SEPP PP&RD 2019 identifies where marine waters aquaculture is not permissible, based on the constraint criteria set out in Table 1 of the NSW Marine Waters Sustainable Aquaculture Strategy (MWSAS). The aquaculture lease has been demonstrated to comply with the constraints criteria and a provisional lease approval for 200 hectares of seaweed aquaculture has been approved by NSW Department of Primary Industries. The constraints criteria assessment for the location of this project are shown in the following table attached as Appendix C.

Where marine waters aquaculture is permissible, the SEPP provides that "development by a private individual or organisation may be undertaken with development consent."

Marine waters aquaculture projects requiring development consent, would then be assessed as State Significant Development (SSD) in accordance with State and Regional Development SEPP. (p. 10 MWSAS)

A proponent for SSD must request Secretary's Environmental Assessment Requirements (SEARs) from NSW DPE. The SEARs set out the matters that must be addressed by the proponent in an EIS. The completed EIS is submitted to NSW DPE and placed on public exhibition.

Assessment requirements set out in the MWSAS would be addressed for a marine water's aquaculture project as part of the EIS for SSD. (p.73, MWSAS)

Appendix C

Project Assessment against MWSAS Constraint Criteria

The area is zoned as “available for aquaculture” in the NSW Marine Waters Sustainable Aquaculture Strategy. The proposed site complies with the constraint criteria listed on **page 17** of MWAS and further benthic surveys will be conducted to confirm this is the case should direct negotiation be agreed.

CRITERIA	CONSTRAINT	SPECIFIC TO PROPOSED LOCATION
1. Conservation exclusion zones	Must not be within land reserved or acquired under the <i>National Parks and Wildlife Act 1974</i> , nature reserves, Aboriginal or European historic sites.	Site complies with this requirement.
2. Marine conservation areas	Must not be within marine park Sanctuary Zones (or equivalent) or aquatic reserves.	Site complies with this requirement.
3. Pipelines and cables	Must not be within 1 km of sewage outfall pipelines or protection zones for submarine communication cables.	Site complies with this requirement.
4. Navigation channels and shipping port approaches	Must not be within 1 km of navigation channels and established shipping port approaches.	Site complies with this requirement.
5. Department of Defence operational areas	Must not be within Department of Defence operational areas (for example, Naval Trace area at Jervis Bay).	Site complies with this requirement.
6. Substrate type	Must not be located over rocky reefs (as defined by NSW DPI).	Site complies, based on the preliminary assessment of the region, the benthic layer of Disaster Bay consists primarily of soft sediments offshore of a large reef system that includes the Big Gutter, a large sediment flat extends to the shelf-break (Jordan et al., 2010). The soft-sediment habitat is an area of unrippled, well-sorted, semi-consolidated, thick (greater than 5 centimetres) mud (Jordan et al., 2010). EIS to include a benthic survey to confirm.
7. Seagrass beds	Must not be located over seagrass beds (as defined by NSW DPI).	Site complies, based on the available information and assessment of the region, the benthic layer of Disaster Bay consists primarily of soft sediments offshore of a large reef system that includes the Big Gutter, a large sediment flat extends to the shelf-break (Jordan et al., 2010). The soft-sediment habitat is an area of unrippled, well-sorted, semi-consolidated, thick (greater than 5 centimetres) mud (Jordan et al., 2010)." EIS to include a benthic survey to confirm.

CRITERIA	CONSTRAINT	SPECIFIC TO PROPOSED LOCATION
8. Marine heritage items	Must not be within 1 km of maritime heritage items (for example, historic plane and shipwrecks).	Site complies with this requirement.
9. Artificial reefs	Must not be within 1 km of purposefully constructed artificial reefs.	Site complies with this requirement.
10. Marine infrastructure and monitoring equipment	Must not be within 1 km of marine infrastructure (for example, moorings, boat ramps, and marinas) and monitoring equipment (for example, Wave rider buoys). Note: <i>This distance will be regularly reviewed by NSW RMS and will require consultation prior to any site investigation.</i>	Site complies with this requirement.
11. Species	Culture species must be spawned from the endemic population or from broodstock originating from the east coast of Australia. Culture species must not be genetically modified through the addition of any foreign genetic material (DNA) into an organism.	Species comply with this requirement and Sprovisional approval for <i>Ecklonia radiata</i> and <i>Asparagopsis spp.</i> All seedstock will be sourced locally.
12. Distance between aquaculture leases	Must address biosecurity separation distances between farm operations.	Site complies with this requirement. No other aquaculture leases or operations within proximity.

2.3 Cumulative Impacts

Overall, the project intends to have positive impacts on the environment, economy and community. Seaweed aquaculture has been shown to increase biodiversity, improve water quality and buffer local climate change impacts (Theuerkauf et al., 2021). Other aquaculture developments occur in the area with oyster aquaculture in Wonboyn Lake and mussel aquaculture located in Twofold Bay. The project aims to complement existing marine and aquaculture industries within the local area and provide 40–60 new jobs (FTE) in Wonboyn and Eden, which would be very significant for Wonboyn's small residential population of 103⁸ and significant for Eden's population of 3,151 people⁹. These jobs will be of a wide variety of skill levels and may

assist in combating youth unemployment, as Bega Shire Valley Council survey participants noted the top barrier to young people achieving post school goals in the Bega Shire Valley was a lack of jobs¹⁰.

The location was specifically chosen to minimise conflicts with other users or negative environmental impacts. The area is not recognised as having any navigation channels, shipping routes or regular marine vessel traffic from commercial or recreational usage. The proposed aquaculture lease is not within a marine national park, marine park or aquatic reserve and is sufficiently far away from the nearest of these to have an impact on any of them. Additionally, the nearest heritage area identified is the historic shipwreck in the North-Eastern Portion of Disaster Bay, approximately 3.5km NE from the proposed seaweed aquaculture lease. There is also no known native title claim on the marine area.

⁷ NSW Planning & Environment (2017). South East and Tablelands Regional Plan 2036. <https://www.planning.nsw.gov.au/-/media/Files/DPE/Plans-and-policies/south-east-and-tableland-regional-plan-2017-07.pdf>

⁸ Australian Bureau of Statistics (2016). 2016 Census QuickStats. https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/SSC14369

⁹ Australian Bureau of Statistics (2016). 2016 Census QuickStats. https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/SSC11375

¹⁰ Bega Valley Shire Council (2020). Youth: Young People https://begavalley.nsw.gov.au/cp_themes/default/page.asp?p=DOC-UDM-26-01-72

Noise and amenity impacts would be minimal as the proposed aquaculture lease area is located approximately 656m offshore with the nearest residential area is approximately 4km away in Wonboyn which has a very small residential population of 103¹¹. Navigation buoys will be positioned at least on the four corners of the proposed lease in accordance with NSW Maritime Authority requirements.

At the scoping stage we have considered the requirement for assessing cumulative water quality impacts, however, there is a lack of other anthropogenic impacts on water quality in the region of a similar type for a cumulative impact assessment. However, appropriate water quality monitoring and assessment is planned as part of the EIS (See 6.7 Water Quality and Water Flow).

Similar to all State Significant Developments (SSDs) Eden 1 will cause a local increase in vehicular and marine traffic, particularly during the construction and decommissioning phase as outlined in 3.4.1. Transportation. After this stage, there would be seasonal marine traffic between the designated hatchery and farm during seeding and harvesting events and regular maintenance from a chosen Disaster Bay marine access point. The farm noise would be minimal, with the highest noise occurring during harvesting and seeding, which will not be louder than a few small to medium sized working boats. If Greenglades Road and Baycliffe Road are determined as viable access routes as part of the EIS, there will be increased vehicular traffic from Wonboyn to Disaster Bay via Greenglades Road, and to a lesser extent via Baycliffe Road, for monitoring and maintenance purposes.

Marine access via the Wonboyn Lake Entrance is anticipated. This entrance has required regular council intervention over the last 10 years to maintain sea water exchange through the entrance. This development will be an active stakeholder for Bega Valley Shire Council regarding the management of the Wonboyn Lake Entrance¹².

Environmental management and monitoring plans are a standard requirement of the aquaculture permit and operational plans will be developed to avoid or mitigate negative risks of the project.

2.4

Key Site Features

The Disaster Bay site off Wonboyn has been selected for AusKelp's seaweed aquaculture project based on the following:

- The area known as AL21/004 was put out for tender by NSW DPI and AusKelp have been successful in obtaining a seaweed aquaculture lease over the area conditional upon receiving State Significant Development approval.
- Area is zoned "Available for Aquaculture" in the NSW Government, Department of Primary Industries Marine Waters Strategy (Figure 3 & Figure 4).
- Green Cape headland to the North and Nadgee to the south create a sheltered region in Disaster Bay.
- Close proximity to aquaculture expertise, employees, infrastructure and services in the Wonboyn region due to the Wonboyn oyster industry.
- Potential long-term collaboration with other aquaculture and marine industries.
- Creation of economic and employment opportunities in and around Wonboyn and Eden area.
- The shallow and sheltered region will require less anchorage.
- Very low marine traffic.
- Minimal recreational use of the beach or bay.
- Minimal residences in the area near the site.
- Near-shore access from Wonboyn River/ Beach.
- Does not fall within a Marine Protected zone.

¹¹ Australian Bureau of Statistics (2016). 2016 Census QuickStats. https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/SSC14369

¹² Bega Valley Shire Council (2021). Agenda of Council – June 30 2021. Bega Valley Shire Council. http://begavalley.infocouncil.biz/Open/2021/06/OC_30062021_AGN_610_AT_WEB.htm

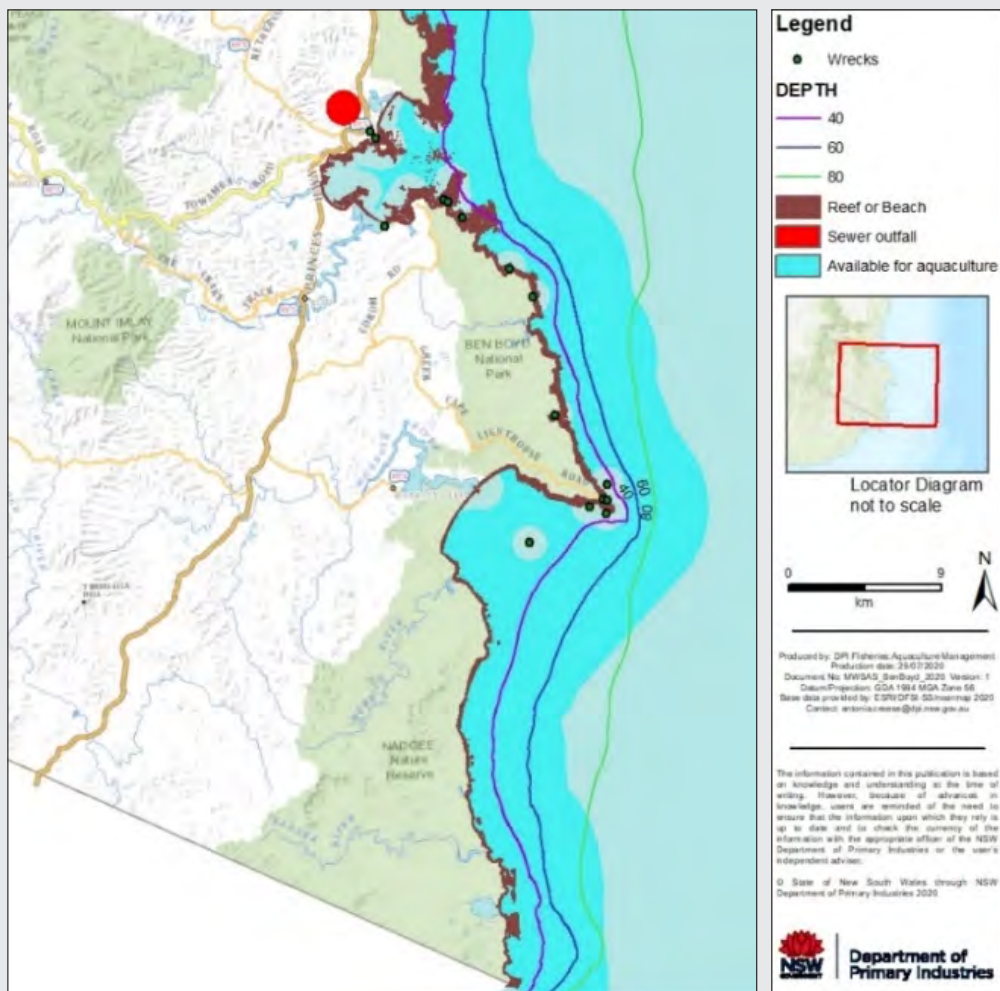


Figure 3
Aquaculture Zoning from
NSW Department of Primary Industries.
 (Source: NSW Government, Department
 of Primary Industries)



Figure 4
 Disaster Bay area with the
 200Ha Eden 1 Project marked
 out in light green, areas
 "Available to Aquaculture"
 marked out in green, offshore
 reef area marked in red and
 Historic Shipwreck marked in
 orange. (Source: Google Maps.)

2.4.1

Environmental Features in Disaster Bay

Disaster Bay has two beaches with a central headland known as Baycliff. To the North is Disaster Bay Beach and to the South is Greenglades beach. According to Jörissen (2015) "Disaster Bay Beach is a 2.4km long, slightly curved beach between the base of the Green Cape headland and the entrance of the Wonboyn Lake. The beach is backed by a 500 m wide Holocene sand barrier, without any development (Figure 5). The beach along the embayment usually maintains a single bar, cut regularly by rips every 200-300m (Short, 2007)." Greenglades is a 4.0km long slightly curved beach with a Holocene barrier fronting Wonboyn Lake and further south borders the Nadgee Nature Reserve, with no development. There are two small creeks at the southern end, which are usually dry, which drain into the ocean during heavy rains. The only access to Greenglades beach is via Nadgee Nature Reserve and across private land via the town of Wonboyn. The area is adjacent to the Eden Upwelling which is identified as key ecological feature in the Commonwealth Marine Area (Huang and Wang, 2019), however the project will not impact that feature.

A preliminary assessment of the region has revealed that the benthic habitat of Disaster Bay consists primarily of soft sediments. Offshore of a large reef system, a large sediment flat extends to the shelfbreak (Jordan et al., 2010) (Figure 7 & Figure 8). The soft-sediment habitat is an area of unrippled, well-sorted, semi-consolidated, thick mud (Jordan et al., 2010). A mapping of the marine habitats for the coast can be seen in Figure 7 & Figure 8. Until further assessment can be conducted, it is assumed that the proposed aquaculture lease will be located over the soft sediment habitat with depths of 13m deep and 25m deep in the shallowest Western and deepest Eastern corners, respectively. The closest marine community is in the reef near the centre of Disaster Bay which is approximately 1km from the nearest corner of the proposed aquaculture lease area. The Disaster Bay area is not identified as location where the seagrass *Posidonia australis* grows, which is a listed endangered species in NSW¹³.

¹³ https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0007/635857/Endangered-populations-of-Posidonia-australis.pdf



Figure 5
Disaster Bay.
(Photo Credit: Henryk Sadura,
Shutterstock.)

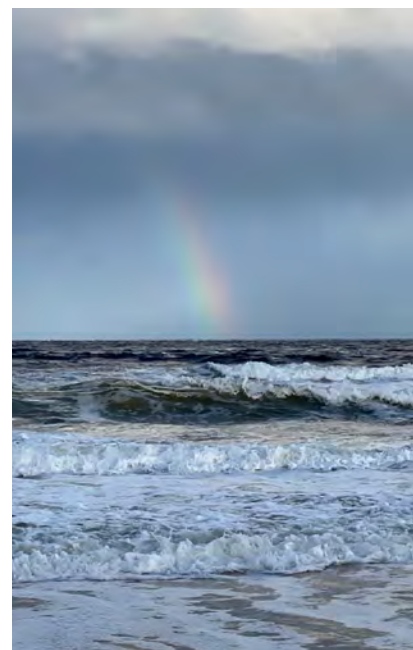


Figure 6
Disaster Bay, Greenglades
Beach, July 2020.
(Photo Credit: Auskelp Pty Ltd.)

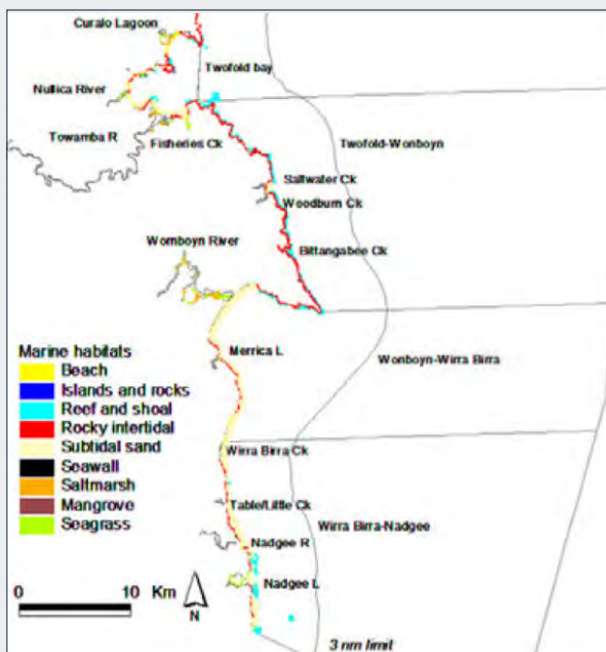


Figure 7
Mapped Marine Habitat units
(Source: Jordan et al., 2010).

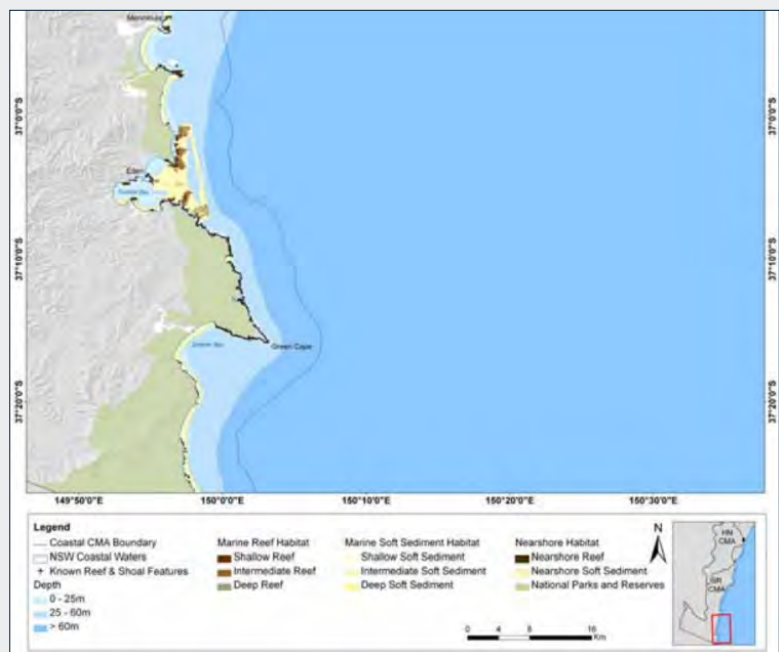


Figure 8
Distribution of known seabed habitats within the region between Bermagui and Cape Howe.
(Source: Australian Ocean Data Network: Open Access to Ocean Data using layer CARS 2009 – CSIRO Atlas of Regional Seas World monthly.)

2.4.2

Threatened Species and Protected Species, Populations and Communities (State and Commonwealth Legislation)

An EPBC Protected Matters Search was undertaken using a 10-kilometre radius from the proposed development location. The radius of this search covered both marine and terrestrial environments. In terms of Matters of National Environmental Significance (MNES), the search identified the possible presence of four listed threatened ecological communities, 69 listed threatened species and 49 listed migratory species. Species can be both threatened and migratory. Of the listed threatened and migratory species, priorities for more detailed assessment include: several species of seabird (e.g. white bellied sea eagle *Haliaeetus leucogaster* and the antipodean albatross *Diomedea antipodensis*), marine mammals (e.g. southern right whale *Eubalaena australis* and the blue whale *Balaenoptera musculus*), the black rock cod (*Ephinephalus daemeli*) and the white shark (*Carcharodon carcharias*). As well as the MNES, the EPBC Protected Matters Search also identified 77 listed marine species and 14 species of whales and other cetaceans.

In addition to national listings, there are also species, ecological communities and key threatening processes that are listed under the NSW Biodiversity Conservation Act 2016. An initial review of information for the south-east corner of NSW identified no additional threatened species that were not also listed by the Commonwealth. A further systematic assessment of matters listed under Commonwealth and State legislation will be undertaken and will determine the likelihood of occurrence at the proposed location pre and post development, identify any relevant impacting processes from the development and relevance with respect to key threatening processes and apply where relevant the EPBC Significant Impact Guidelines for Matters of National Environmental Significance.

2.4.3

Areas of Conservation Significance

According to NSW DPI, most of Disaster Bay is considered "Available to Aquaculture" except for areas around some reef areas and river mouths. The proposed aquaculture lease will be 1km from the edge of the nearest declared reef, within the "Available to Aquaculture" zone and not located in a Marine Protected Area. The nearest Marine National Park is Cape Howe Marine National Park in Victoria and is 24.7km from the proposed seaweed aquaculture lease site (Figure 10). The nearest Marine Park is Batemans Marine Park at 108km NNE of the proposed aquaculture lease (Table 2). There are no aquatic reserves in Disaster Bay and the

nearest aquatic reserve is Bushrangers Bay at 309km NNE. The two nearest national parks, Ben Boyd National Park and Nadgee Nature Reserve, are on nearby land approximately 3km to the North and 800m to the West, respectively (Figure 9). Further assessment of Marine Protected Areas, RAMSAR Wetland and areas of critical habitat declared under the FM Act (1994) and the TSC Act (1995) will be conducted upon NSW Department of Planning, Industry and Environment recommendation for the EIS.

Area of Conservation Significance	Designation	Distance to Lease (km)
Nadgee	Nature Reserve	0.8km
Ben Boyd	National Park	3km
Mount Imlay	National Park	20km
Cape Howe	Marine National Park	24.7km
Batemans	Marine Park	108km
Bushrangers Bay	Aquatic Reserve	309km

Table 2

Distance of the proposed aquaculture lease to areas of conservation significance.



Figure 9

NPWS Reserve boundaries in Green.

(Source: NSW Spatial Map Viewer. <https://portal.spatial.nsw.gov.au/portal/apps/webappviewer/index?id=44e72c6c7ccf498cb1c822b740c647d3>)



Figure 10

Nearest Marine Park (Cape Howe Marine National Park).

(Source: Moore et al. 2010)

2.4.4

Commercial and Recreational Fishing/Boating

Marine Vessels do not typically pass-through Disaster Bay, with close to no marine vessel movements recorded in Disaster Bay over the 2016–2017. There are no boat ramps in Disaster Bay, but there are small docks and boat ramps in Wonboyn Lake. Wonboyn Lake and Wonboyn River are focal points for recreational fishing including recreational fishing tourism and the lake, river and Wonboyn Beach are a designated recreational fishing under the NSW Fisheries Management 1994 and commercial fishing is excluded.

The proposed aquaculture lease is positioned such that marine traffic would rarely pass over the lease, based on preliminary assessment using MarineTraffic.com. Assuming efficient pathways continue to be taken by marine traffic, the only instance where a marine vessel pathway need to be slightly altered would be if it is departing from Wonboyn Lake Entrance (WLE) and travelling South or is approaching WLE from the South. The distance from the proposed aquaculture lease to the Port of Eden and Multi-Purpose Wharf Eden is approximately 34.8km and 33.3km, respectively, by boat (Figure 11 & Figure 12).

Disaster Bay is part of NSW Commercial Fishing Region 7 which extends from approximately Ulladulla south to the NSW border. Commercial fisheries managed by NSW in this region include the Abalone Fishery, Rock Lobster Fishery, Ocean Trap and Line Fishery and the Ocean Haul Net

(Purse Seine Fishery). Further offshore in Commonwealth waters the Australian Fisheries Management Authority (AFMA) manages the Small Pelagic Fishery which has Ulladulla as a major landing port, and the Southern and Eastern Scalefish and Shark Fishery. The region also has substantial value for Indigenous fishers – particularly in relation to coastal seafood resources.

Based on preliminary research, recreational fishers typically do not fish within the proposed aquaculture lease. Further assessment will be undertaken to determine the likelihood of spatial overlap between fishing activities and the development location through consultation with groups such as the Commonwealth Fisheries Association, the Professional Fisher's Association and the Recreational Fishing Alliance of NSW. It is worth noting that the seaweed farm may also improve local fishery yields and create new recreational or commercial fishing zones around Disaster Bay by providing habitat, shelter and food for small fish.

The development if approved may have some benefit to fished species as it constitutes the creation of suitable habitat for juvenile fish in particular which may enhance settlement and recruitment for some species. This will be explored in further environmental assessments for the project.

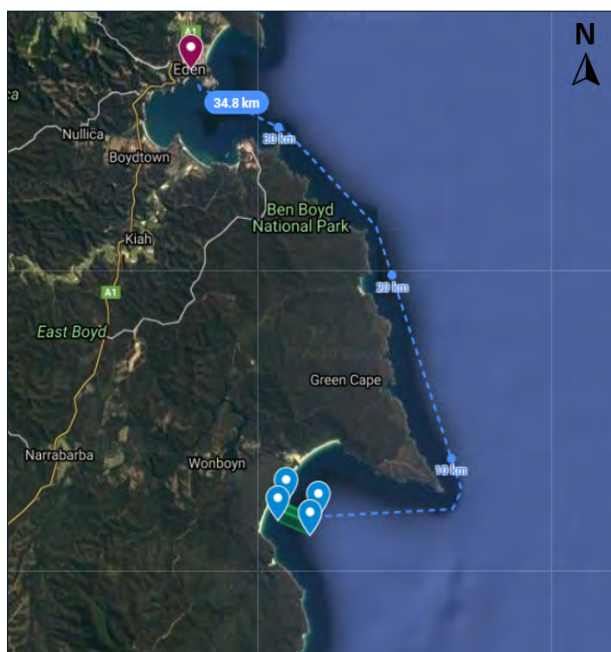


Figure 11
Distance from Eden 1 to the Port of Eden (34.8km).
(Source: Google Maps.)

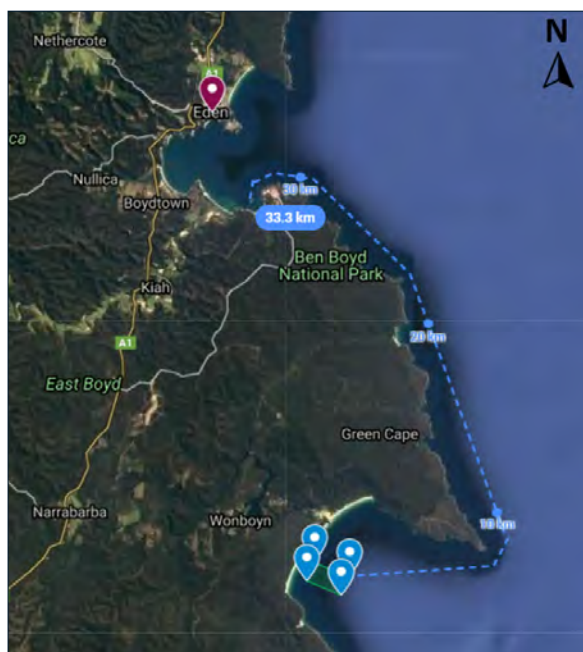


Figure 12
Distance from Eden 1 to the Multi-purpose Wharf in Eden (33.3km).
(Source: Google Maps)

2.4.5

Existing Seaweed Aquaculture Licences in NSW

There are currently three known Lease Based Aquaculture Permits, totalling 37.5ha, approved by NSW Department of Primary Industries for the farming of seaweed in Twofold Bay. In addition to Common Kelp, these leases are also approved for oysters, mussels and scallops (Figure 13).

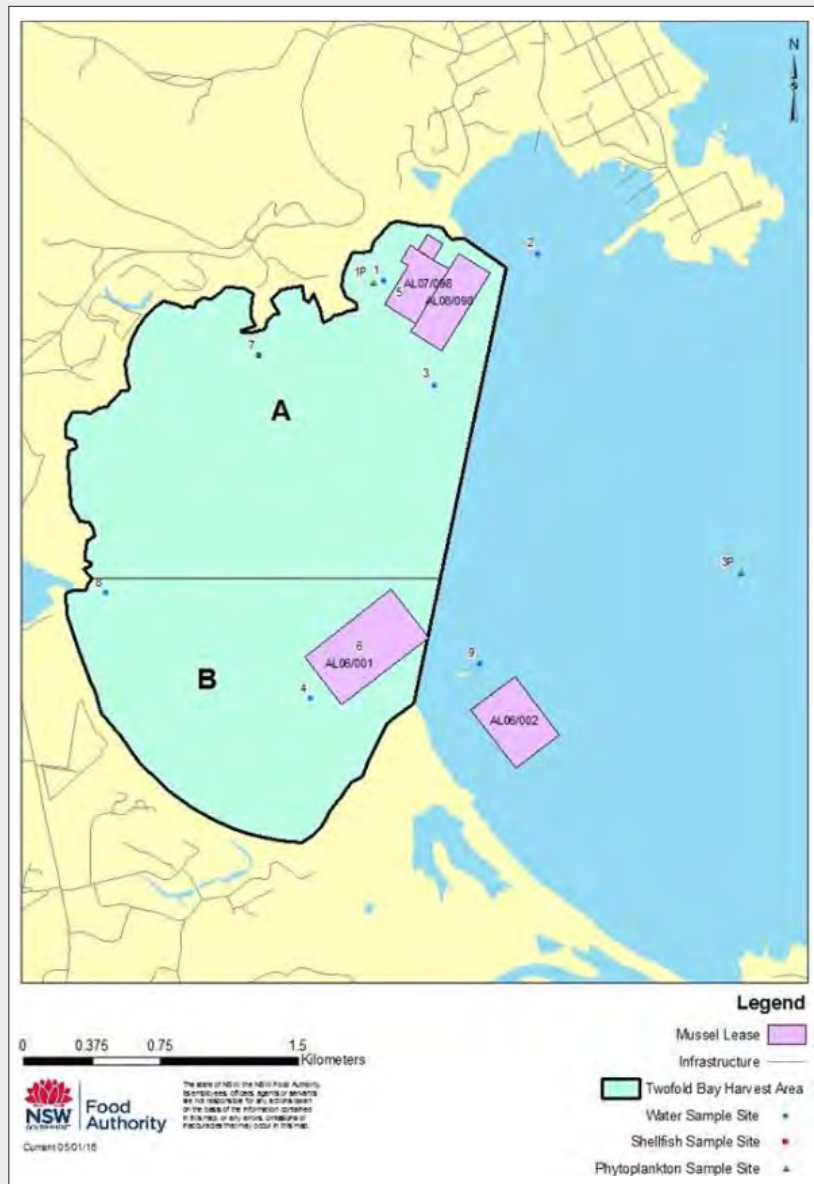


Figure 13

Twofold Bay DPI approved Common Kelp (*Ecklonia radiata*) Lease Areas. Source: Advisian WorleyParsons Group & NSW DI Lands.

(Source: http://epbcnotices.environment.gov.au/_entity/annotation/9bf19f12-cfbd-e611-bdfe-005056ba00a8/a71d58ad-4cba-48b6-8dab-f3091fc31cd5?t=1482105600341)

2.4.6

Navigation and Safety

Based on preliminary assessments the closest navigation markers or buoys were in Wonboyn river (Figure 14). Further assessment will be conducted as part of the EIS.

2.4.7

Heritage

The only heritage location identified in Disaster Bay is a historic shipwreck in the North-Eastern Portion of Disaster Bay, 3.5km NE from the proposed seaweed aquaculture lease (Figure 15).



Figure 14

Zoning map for Wonboyn

(Source: NSW Maritime)



Figure 15

Historic Wreck in North-Eastern Portion of Disaster Bay. (Source: Google Maps)

2.4.8

Navigation and Safety

The primary risks for aquaculture in and around Wonboyn are floods and fires impact on water quality. Oyster farmers in Wonboyn river have already suffered oyster production losses from severe flooding and bushfire events, which put oysters under stress due to decreased salinity, increased turbidity, altered pH and reduced dissolved oxygen levels (See footnotes 1, 2, 3 & 4 on pages 7 & 10). Locating the Eden 1 Project in the Wonboyn River or Lake was originally considered, however the observed impact of floods and fires on the oyster industry led Auskelp to choose a location that would be protected from these events. By locating Eden 1 in Disaster Bay and away from the Wonboyn River outfall, Eden 1 will avoid the most significant impacts on water quality. This is because the turbidity, low salinity, altered pH and reduced dissolved oxygen levels will all be buffered and stabilized by the large body of water and oceanic water exchange in Disaster Bay.

Other potential risks and hazards identified for the Eden 1 site not already mentioned in 2.2 Key Site Features include herbivory and climate change. Herbivory of the seaweed could reduce production rates for the Eden 1 project. The risk of herbivory is one driving factors for choosing a 200ha lease, as a larger system would lose less seaweed to local herbivory as a proportion of the total yield. Climate change is another potential risk for the Eden 1 project, as warming waters or severe storms could inhibit the growth seaweed. This risk will be assessed and appropriate management actions determined as part of the EIS.



3

Project

3.1 Overview

Auskelp Pty Ltd has obtained a conditional lease for a 200-hectare marine area in Disaster Bay (known as area AL21/004) for the purpose of growing and harvesting seaweed for commercial benefit. To proceed the project now requires State Significant Development consent.

The project will develop the 200-hectare marine area for aquaculture of *Ecklonia radiata* and *Asparagopsis spp.* to produce food and animal feed products.

Native seaweed seedstock from the hatchery will be planted out onto long-line infrastructure, an approach that has proved successful in growing seaweed globally and similar infrastructure is used for mussel cultivation in NSW. The seaweed will then be harvested 3 – 4-times per year and the lines will be cleaned in preparation for the next growth cycle.

Unlike most aquaculture, seaweed does not require any addition of feed to the water, as seaweed is autotrophic and primarily gains its energy from photosynthesis and nutrition from dissolved nutrients in the water column. The lease will be serviced by marine vessels for planting out and harvesting and for regular maintenance, monitoring and repairs.

3.2 Project Area Aquaculture Lease Site AL21/004

Auskelp's aquaculture lease area AL21/004 is located within the marine environment off Wonboyn on the South coast of NSW. It is approximately 656m offshore from Wonboyn Beach, 3.1km from the closest edge of Wonboyn Lake, 3.7km from the nearest Green Cape coastal ridges and 4.2km from the local Wonboyn Township (Figure 17).

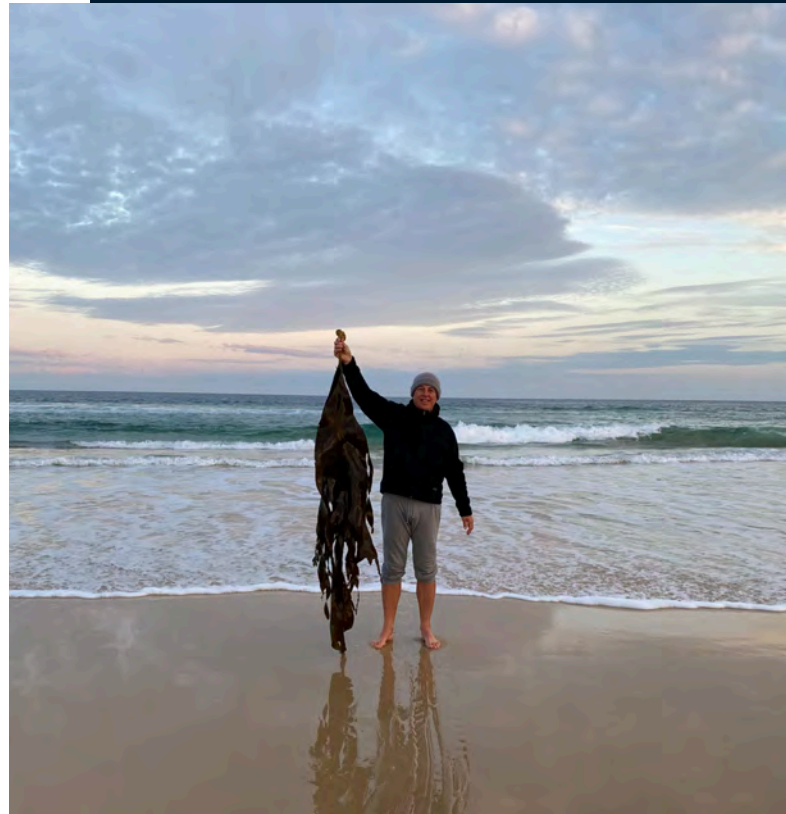


Figure 16:
Storm cast *E. radiata* on
Wonboyn Beach July 2020
(Photo credit: Auskelp Pty Ltd)



Figure 17

Regional map of Wonboyn with the Eden 1 Project location indicated by the green rectangle at a distance of 656m from the beachfront.

(Source: Google Maps)

3.3 Project Infrastructure and Design

The proposed 200-hectare seaweed farm will use longlines with marine anchors and buoys which are commonly used for the cultivation of seaweed globally and mussels in NSW. Figure 18 shows a simplified infographic for seaweed aquaculture from The Nature Conservancy.

A preliminary design of the long line aquaculture infrastructure has been prepared and will be finalised during the EIS process.

The farm will initially use 17 parallel sets of farm modules with a 6–8m separation distance between sets and 25–28m horizontal distance for anchors (Figure 19). Each set will be 100m wide and 1000m long containing on the order of 67 individual farming modules. Each farming module will be separated by 3–6m to allow for access and anchorage. Each farming module will contain 4 longlines for a total of 500–1000 longlines per 100m * 1000m longline set and 5,000–10,000 longlines for the 200ha farm. Further engineering design, taking into considering the environmental and benthic conditions present in Disaster Bay will be conducted in parallel with the EIS. The long lines will be held in place using the anchoring and bridle systems and will maintain buoyancy with the integrated buoyancy systems. Considerations have been made for the anchorage system with further region-specific marine engineering to be completed.

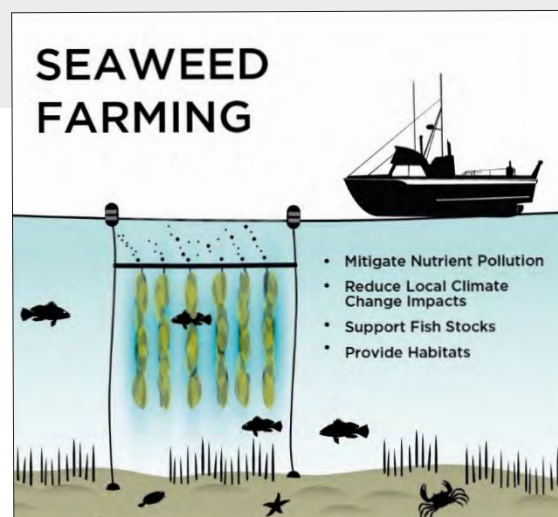


Figure 18

Seaweed Farming benefits.

(Adapted from Jones et al., 2019.)

Buoys will be attached to the system to maintain buoyancy and tension with the anchor lines. The system will be kept in tension from a combination of the anchor points, buoys and taut structural ropes and longlines for growing the seaweed. The tension minimizes the risk of mammal entanglement while also providing an easier system to deploy and construct onsite.

The majority of the system will be submerged below the water surface by at least 0.5 metres to reduce the visual footprint in Disaster Bay, minimize wave loading on the infrastructure and prevent the seaweed from receiving direct sunlight on the water surface (Figure 20). Navigation buoys will be positioned at least on the four corners of the lease area in accordance with NSW Maritime Authority requirements.

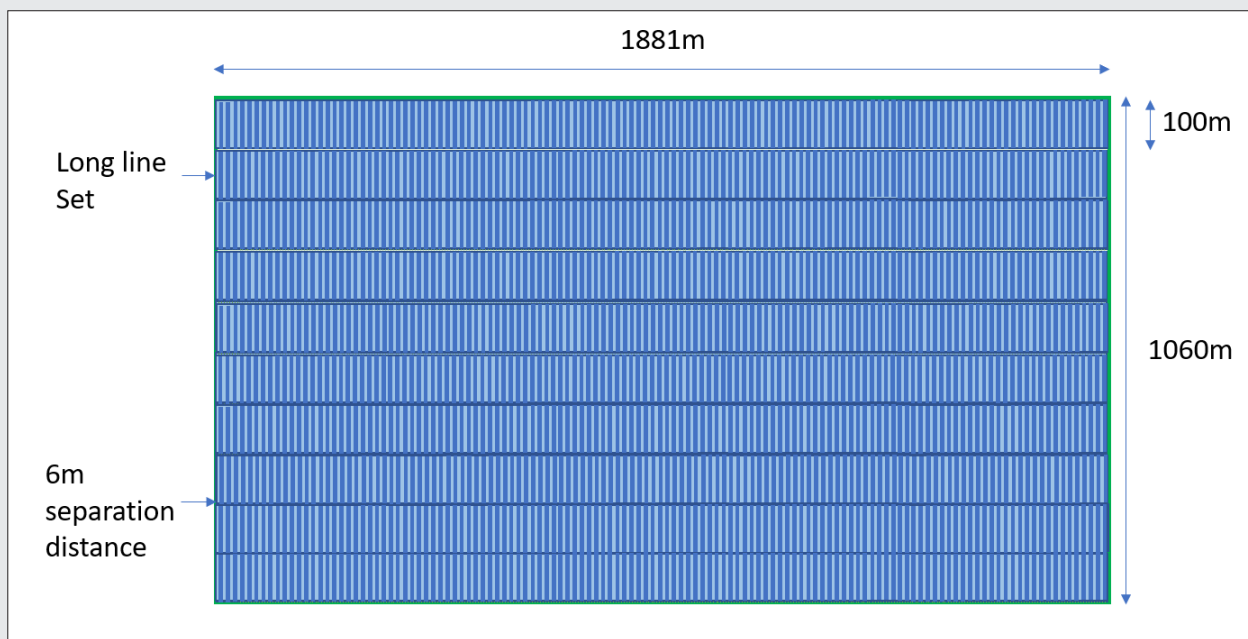


Figure 19
General Farm Layout with 17 long line sets (aligned horizontally) each separated by 6m with 25–28m of horizontal distance for anchorage.

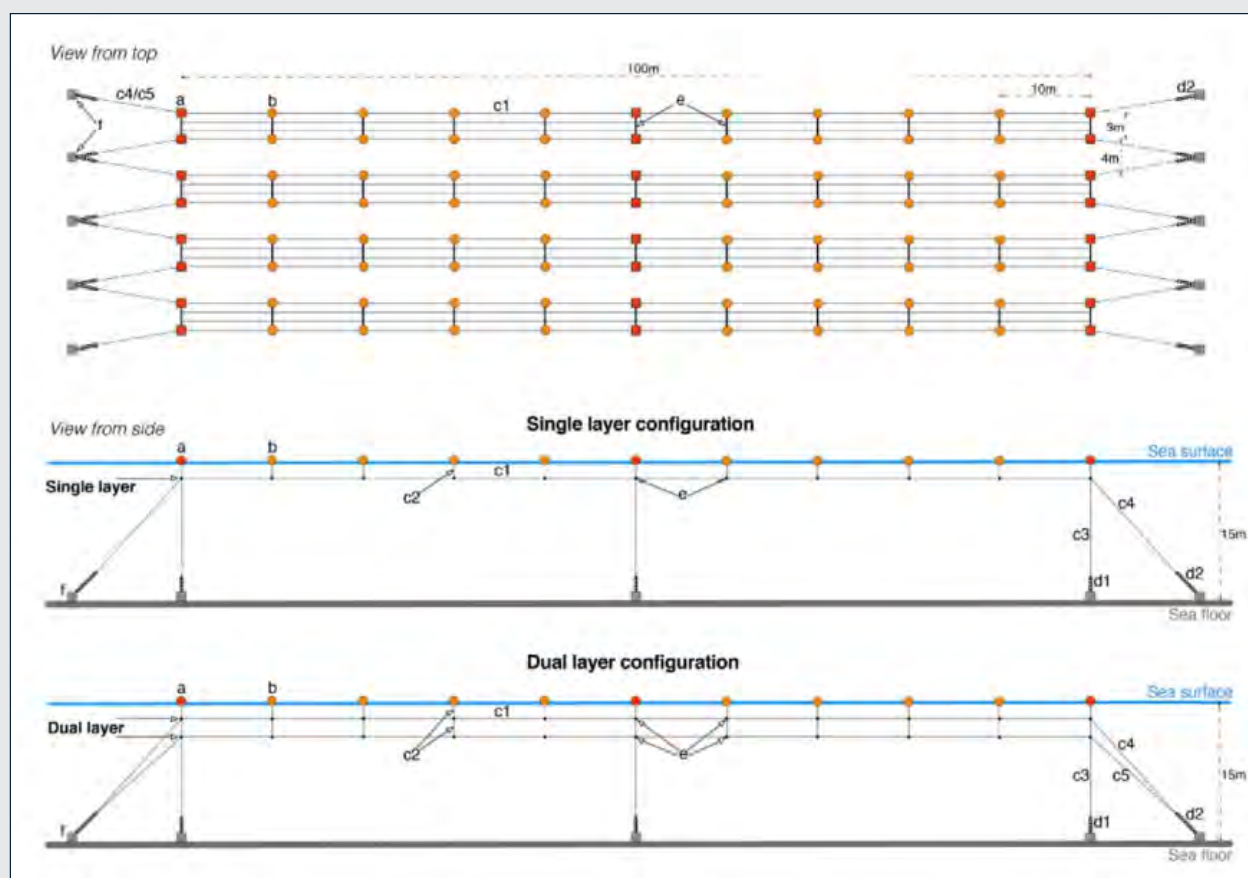


Figure 20
Example schematic representation of a typical seaweed long line cultivation infrastructure viewed from above and from the side. The infrastructural components are (a) marker buoys, (b) small buoys, (c) PP rope (longline), (d) steel chain, (e) strip strengtheners and (f) concrete anchors. Source: van Oirschot et al. (2017)

3.4

Transport of Materials and People to/from Site

The primary routes for accessing the Eden 1 lease will be by boat from the Port of Eden and Eden Multi-purpose Wharf which are approximately 34.8km and 33.3km, respectively, by boat. This route will be used for the construction, seeding, harvesting, monitoring and some maintenance activities. Access to site by smaller marine craft for regular monitoring, maintenance and emergencies could also be undertaken via the Wonboyn Lake Entrance and Auskelp will also assess access to the beach via Greenglades Road for regular monitoring, maintenance and emergencies (Figure 21).

During construction, the components of the farm will be transported by truck to the wharf/port where they will then be transported by a marine vessel to the aquaculture lease. The most significant of these components will be anchors, anchor lines, longlines, buoys and bridles for long lines, that can be coiled.

Once the construction phase is completed and the operational phase is in effect, the number of marine vessel movements would be approximately 1-4 per day originating from Edrom. Staff vehicular road transport to the (proposed) land base operations facilities [and water access to ocean leases] will be via William Allen Road, Edrom where the Hatchery, Processing Facilities, Office and Service Vessel Mooring facilities are to be located. Please see further information regarding land based facilities as detailed in Section 1.6 Related Developments.

During the operational phase, materials and product transportation will almost exclusively involve the transport of seaweed seedstock and mature harvested seaweed from the farm to the Edrom Processing Facility. Routine ocean farm maintenance and monitoring of equipment will also be conducted via the same ocean routes.



Figure 21
Wonboyn (A) to Wonboyn Beach
access point (B) via Greenglades rd
access road.

3.4.1. Operating Hours

During the construction phase the operational hours will typically be between 7am and 7pm. Operational and maintenance times may vary with prevailing weather conditions and seasonal daylight hours, however most operations would likely occur during the day due to the difficulty of night operations on water. Throughout the majority of the year, with possible changes April – July, there will be a preference for the operational times to occur in the mornings due to lower wind conditions experienced at 9am compared to 3pm. Weather conditions may also impact construction completion times and planting and harvesting times.

3.4.2. Biosecurity

Auskelp intends to establish an on land seaweed aquaculture facility in Edrom where reproductive material will be sustainably collected from wild seaweed populations, using established methods of kelp collection and biosecurity protocols. During the hatchery phase seaweeds will be monitored throughout the various life cycle stages for pests and diseases prior to seeding onto the longlines.

Once the seaweed is planted out onto the farm the health of the seaweed will be monitored regularly to assess any presence of disease, parasites, biofouling or herbivory. Accumulation of biofouling and epiphytes will also be monitored and managed as necessary with cleaning using high pressure water systems. The farm infrastructure will be cleaned seasonally as needed throughout the grow-out period.

Once the grow-out phase is complete, the seaweed will be harvested and collected in large bins on the marine vessel and transported to the Eden Multi-Purpose Wharf for road transport to the processing facility on Edrom Road, Edrom for further inspection and processing. Any harvesting for human consumption will be done in accordance with NSW Food Authority requirements. No processing of the seaweed will occur on the proposed aquaculture lease.

3.4.3. Decommissioning

Auskelp Pty Ltd proposes to operate the seaweed farm at the lease site for the maximum term of the lease and longer, pending ongoing renewal of the lease. When the aquaculture project ceases to operate then decommissioning would occur. Because the farm will be arranged in individual modules, the farm will be decommissioned incrementally, with the decommissioning of individual modules over time. Considering the structure is in tension, the majority of the longlines will be removed first followed by the anchorage systems and then the buoyancy and remaining longlines will be removed and taken to Edrom for storage and/or reuse. Considering the substrate beneath the farm is soft-sediment, no reef under the farm had been identified and the seaweed farm is unlikely to have a detrimental accumulation of waste products beneath the farm and no earth works will likely be required to rehabilitate the site. Removing the anchors will likely be the only substrate disturbance associated with the decommissioning of the farm. The sandy substrate beneath the farm is highly mobile with strong currents¹⁴ and should naturally redistribute the sediment over the effected anchorage areas.

It is typical for aquaculture operators to be required to pay a bond to DPI equivalent to decommissioning costs based on quotations from experienced marine contractors.

¹⁴ Disaster Bay – Beach in Wonboyn Bega Valley NSW (2020). SLS Beachsafe. Accessed 14th October 2020. <https://beachsafe.org.au/beach/nsw/bega-valley/wonboyn/disaster-bay>

3.5

Project Timeline

The proposed timeline for the project is as follows:

STAGE	ACTIVITIES	ESTIMATED TIMEFRAME	APPROXIMATE DATES
SSD Process	• Scoping Report • SEARS • Marine Surveys • Detailed Engineering Design • Stakeholder Engagement • Public Consultation • EIS • EIS Assessment	12 – 18 months	Apr 2022 – Apr 2023
Procurement	• Engage Marine Contractor • Procure Materials	Following all approvals* 3 – 6 months	May 2023 -Aug 2023
CONSTRUCTION Phase 1 – 50 Hectares	• Deploy infrastructure across 25% of the site • Plant out from hatchery • Harvest	6 months	Sep 2023 - Mar 2024
Phase 2 – 100 Hectares	• Deploy infrastructure across 50% of the site • Plant out from hatchery • Harvest	6 months	Apr 2024 - Oct 2024
Phase 3 – 200 hectares	• Deploy infrastructure across 100% of the site • Plant out from hatchery • Harvest	9 months	Nov 2024 - Aug 2025
Fully Operational		For duration of the lease	Sept 2025

The stages of the project that will likely have the greatest impact will be the construction phases. Construction will require the marine vessels to transport and deploy the infrastructure of the farm. The impacts at this stage will likely be on noise, visual amenity, benthic and marine traffic. Deployment of the sea anchors will likely be of greatest impact, as they are the only component that interacts with the sea floor and are the heaviest components. These anchors may also require specific vessels for deployment, depending on the type and size of the anchors determined by the requirements of the detailed design and EIS.

3.6

EIS Assessment of Alternatives

During the EIS process, Auskelp will undertake more detailed design of the project based on data collected and engagement. Additionally, a degree of flexibility will be needed in the project for Auskelp to appropriately respond to recommendations and outcomes from the EIS and findings from the detailed engineering design process for this Disaster Bay specific project.



Statutory Context

4.1

Statutory Context Summary Tables

Table 3

Statutory requirements for Eden 1 project.

MATTER	STATUTORY REQUIREMENTS	SUMMARY
Power to grant consent	Fisheries Management Act 1994	An aquaculture lease issued under Section 163 of the FM Act has been obtained conditional upon SSDA. An aquaculture permit issued under Section 144(1) of the FM Act has been obtained. The MWSAS is given effect as an Aquaculture Industry Development Plan (AIDP) for marine aquaculture in NSW under the provisions of the FM Act. Implementation of the MWSAS is supported by planning legislation and instruments.
Permissibility	EP&A Act and Regulation	State Environmental Planning Policy (State and Regional Development) 2011, Schedule 1 State significant development—general Clause 2 – Aquaculture – specifies State Significant Development as: 1) Development for the purpose of aquaculture that has a capital investment value of more than \$30 million. 2) Development for the purpose of aquaculture located in an environmentally sensitive area of State significance. (Coastal Waters is categorised as environmentally sensitive area of State significance.) Therefore, this proposal is classified as a State Significant Development under Schedule 1 Clause 2 of the SRD SEPP. Under the section 4.12 of the EP&A Act and clause 3(8) of Schedule 2 of the EP&A Regulation, the development application (DA) for an SSD project must be accompanied by an Environmental Impact Statement (EIS) that complies with the Planning Secretary's Environmental Assessment Requirements (SEARs) for the project. Under 4.38 of the EP&A Act and clause 8A of the State & Regional Development SEPP, all SSD projects require development consent from either the Independent Planning Commission or the Minister before they may proceed. State Environmental Planning Policy (The SEPP) (Primary Production and Rural Development) 2019 currently provides the key regulatory framework for aquaculture. SEPP PP&RD 2019 Clause 22 states that Marine water aquaculture is permissible with development consent. The SEPP identifies where marine waters aquaculture is not permissible, based on the constraint criteria set out in Table 1 of the NSW Marine Waters Sustainable Aquaculture Strategy (MWSAS). The aquaculture lease has been demonstrated to comply with the constraints criteria and a provisional lease approval for 200 hectares of seaweed aquaculture has been approved by NSW Department of Primary Industries. The constraints criteria assessment is provided in the report.

Continues on next page

MATTER	STATUTORY REQUIREMENTS	SUMMARY
Permissibility	EP&A Act and Regulation	Where marine waters aquaculture is permissible, the SEPP provides that "development by a private individual or organisation may be undertaken with development consent." Marine waters aquaculture projects requiring development consent, would then be assessed as State Significant Development (SSD) in accordance with State and Regional Development SEPP. A proponent for SSD must request Secretary's Environmental Assessment Requirements (SEARs) from NSW DPE. The SEARs set out the matters that must be addressed by the proponent in an EIS. The completed EIS is submitted to NSW DPE and placed on public exhibition. Assessment requirements set out in the MWSAS would be addressed for a marine water's aquaculture project as part of the EIS for SSD. (Reference p73, MWSAS)
Other Relevant Legislation	Coastal Management Act 2016 and Bega Valley Local Environmental Plan 2013 and further relevant legislation listed in both	Under the CM Act 2016, the Eden 1 Project would fall under the coastal zone as defined by Part 2 of the Act. Part 3 outlines directions for Coastal Management Programs (CMP) for each local council. The purpose of CMPs is to set the long-term strategy for the co-ordinated management of land within the coastal zone with a focus on achieving the objects of the CM Act. From initial observations, the Bega Valley Shire Council (BVSC) does not yet have a Coastal Management Program (CMP), but is currently in the process of developing a CMP. If the CMP for BVSC is developed before the end of the EIS, the CMP relevance and application to the Eden 1 project will be assessed as part of the EIS.
Other approvals	Food Act 2003	Food businesses in NSW must either hold a licence from the NSW Food Authority or notify their business details to the relevant body. Seaweed products for human consumption are intended to be produced from the Eden 1 project and so a Food Authority Licence will be required before Auskelp markets is able to market seaweed food products.
Pre-conditions to exercising the power to grant approval	Environment Protection and Biodiversity Conservation Act 1999; Commonwealth Department of the Environment – Nationally Threatened Ecological Communities and Threatened Species Guidelines (various) & Survey Guidelines for Nationally Threatened Species (various); Threatened Species Survey and Assessment Guidelines; NSW Biodiversity Offsets Policy for Major Projects (Office and Environment and Heritage, 2014); Framework for Biodiversity Assessment (Office and Environment and Heritage, 2014).	The proposed development will be assessed with reference to the Environmental Protection Biodiversity and Conservation Act (EPBC Act) and according to the EPBC Act Policy Statement 1.1 (Significant Impacts Guideline: SIG 1.1) in conjunction with EPBC Act Policy Statement 2.2 (Offshore Aquaculture) and to determine if the proposed development needs to be assessed as a matter of national environmental significance. In addition, other listed legislation will be reviewed as part of the biodiversity assessment. Full details of the assessment will be included in the EIS.

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MATTER	STATUTORY REQUIREMENTS	SUMMARY
Pre-conditions to exercising the power to grant approval	NSW Biodiversity Conservation Act 2016	An initial review of information for the south-east corner of NSW identified no additional threatened species as part of the NBC Act that were not also listed by the Commonwealth. However, a further systematic assessment of matters listed under Commonwealth and State legislation will be undertaken as part of the EIS and will determine the likelihood of occurrence at the proposed location pre and post development, identify any relevant impacting processes from the development and relevance with respect to key threatening processes and apply where relevant the EPBC Significant Impact Guidelines for Matters of National Environmental Significance.
	State Environmental Planning Policy (Coastal Management) 2018	The development application is not on land however there are boat routes to/from the site that may use coastal land and the considerations of this SEPP may apply to this development. To be advised by NSW Government.
	Control of Naval Waters Act 1918	At this stage it is not known whether the Eden 1 Project lease area falls under the CNW Act, thus the relevance of the CNW Act will be assessed as part of the EIS.
	Crown Land Management Act 2016 No 58	Land owners' consent under the Crown Land Management Act 2016 is required.
	Aboriginal Land Rights Act 1983	While evidence of indigenous use of Disaster Bay has not been found, further investigation of indigenous use of Disaster Bay will be completed as part of the EIS.
	Native Title Act 1993, Native Title (NSW) Act 1994	Disaster Bay does not fall within the "Determined area" boundaries of Native Title defined by National Native Title Tribunal as of 30 June 2021. While Native Title claims in Disaster Bay have not been found, further investigation of indigenous use of Disaster Bay will be completed as part of the EIS.
	Marine Estate Management Act	The Eden 1 Project may need consideration as marine estate as the lease falls within coastal waters of the state. Given that the NSW Marine Aquaculture Strategy identified this area as "Suitable for Aquaculture" then we would assume this is not a requirement. We seek guidance from NSW Government on this.
	Protection of the Environment Operations (Noise Control) Regulation 2017 and NSW Road Noise Policy for Industry	Noise and noise control will need to be considered as part of the EIS.
	Environmental Planning and Impact Assessment Practice Note (Roads and Maritime Services, 2013).	To ensure alignment with the principles of ecologically sustainable development socio-economic assessment should be performed in accordance with the Environmental Planning and Impact Assessment Practice Note (Roads and Maritime Services, 2013).

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MATTER	STATUTORY REQUIREMENTS	SUMMARY
Pre-conditions to exercising the power to grant approval	Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC / ARMCANZ, 2000)	While impacts on water quality are expected to be minimal, negligible or positive, water quality impacts and management approaches will be assessed in accordance with the listed legislation.
	ANZECC Guidelines and Water Quality Objectives in NSW (Department of Environment and Conservation, 2006)	Not applicable.
	Guide to Traffic Management – Part 3 Traffic Studies and Analysis (Austroads, 2013)	For any road activities associated with the setup and maintenance of the farm Auskelp will be referring and complying to the listed legislation.
	NSW's Guide to Traffic Generating Developments Version 2.2 (RTA, 2002)	Not applicable.
Mandatory matters for consideration	EP&A Act	Section 4.15 outline these considerations for the consent authority.
	Heritage Act 1977	The Eden 1 Project is not located over a historic shipwreck, however there is a historic shipwreck 3.5km NE from the proposed seaweed aquaculture lease that may require consideration under the Heritage Act 1977.
	National Parks and Wildlife Act 1974	The Eden 1 Project lease is not in any national park or nature reserves or Aboriginal heritage area. The NPW Act may apply given the adjacent Nadgee Nature Reserve and Ben Boyd National Park and any transit that may be necessary through Nadgee Nature Reserve along Greenglades Rd and/or Baycliff Rd to provide timely maintenance to the farm.
	Underwater Cultural Heritage Act 2018	At this stage, it is unknown whether the historic shipwreck 3.5km NE from the proposed seaweed aquaculture lease falls under the UCH Act and/or the Heritage Act 1977 and this will need to be investigated further as part of the EIS. Auskelp may also find other underwater cultural heritage in or near Disaster Bay as part of the EIS that may require consideration under the UCH Act.



5

Engagement

5.1

Engagement Conducted and Community Views

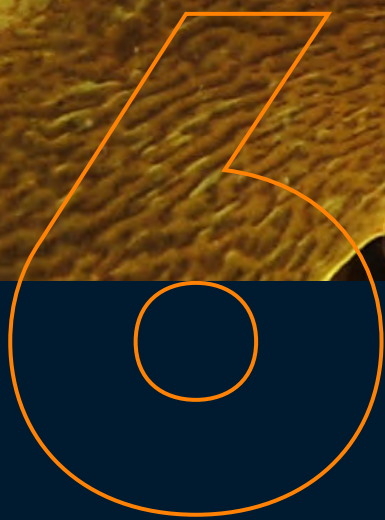
Table 4

Local community engagement carried out by Auskelp.

STAKEHOLDER	CONNECTION TO PROJECT	ENGAGEMENT CARRIED OUT AND COMMUNITY VIEWS
Wonboyn Oyster Farmers	Upstream of seaweed farm. Potential source of experience, local knowledge, services and employees. Mutual benefits between oyster and seaweed farms.	Comprehensive engagement with Wonboyn Oyster farmers regarding project scope, delivery objectives and timelines. Oyster Farmers mutually recognised synergies and the desire to leverage off each other's resources and expertise. Wonboyn Oyster Farmers are keen to see a complimentary aquaculture producer that provides investment and job opportunities in the area.
Eden Chip Mill	Could provide location for aquaculture nursery and processing facility.	Discussions with Eden Chip Mill about using the Edrom chip mill area for a future hatchery and processing facility for the farm. Specific lease area has been nominated and lease drawn up. Design and planning approval process has commenced for the construction of the land facilities and the necessary partnership and MoU agreements required between Pentarch and Auskelp.
Aquaculture lease holders in Twofold Bay	Potential alternative deployment location.	Phone calls with the aquaculture lease holder in Twofold Bay, as their leases also allow the growing of seaweed in their 37.5 hectare lease zones, to see whether Auskelp could sublet these leases to cultivate seaweed. However, the lease was sublet to another mussel operation. We are still in discussions, but there are many shareholders and there is lack of consensus required to drive an outcome.
Bega Valley Shire Council	Local council, permitting, economic development objectives.	Presentation to Council, discussions with Mayor and key Council stakeholders. Positive support provided from local government with a strong desire to create a new environmentally-friendly aquaculture industry that will make long-term capital investments and provide local jobs.
NSW State Government	Regional Development. Aquaculture Industry Development. Bushfire Recovery.	DPI – Ongoing discussion and tender process since March 2020. This culminated in the 200-hectare lease area AL21/004 which was secured through an open tender process on 18 May 2021 (pending successful State Significant Development affected areas approval). In addition, ongoing discussion with Daniel Murphy from Department of Regional NSW regarding progress and assistance that can be provided. Strong emphasis on creating environmentally-friendly aquaculture industry that will make long-term capital investments and provide local jobs.
Federal Government	Federal Aquaculture Strategy objectives to increase aquaculture Regional Development.	Further engagement will be undertaken with the Federal Government via the Regional Development (NSW RDA). Ian Smith from NSW RDA will be contacted once SSDA next steps and timings are better understood.

5.2 Engagement to be Conducted during EIS

STAKEHOLDER	CONNECTION TO PROJECT	ENGAGEMENT AND COMMUNITY VIEWS
Eden/Wonboyn Community	In proximity to seaweed farm. Potential source of experience, Mutual benefits between oyster and seaweed farms.	• Discussions ongoing. • Invitation to public consultation.
Yuin Indigenous Group	Traditional owners and employment opportunities.	• Email notification. • Invitation to public consultation.
Wonboyn Oyster Farmers	Upstream of seaweed farm. Potential source of experience, local knowledge, services and employees. Mutual benefits between oyster and seaweed farms.	• Discussions ongoing. • Invitation to public consultation.
Twofold Bay Mussel farmers	Could provide location for aquaculture nursery and processing facility.	• Discussions ongoing.
Eden Chip Mill	Hatchery and Processing facility land holders.	• Discussions ongoing.
Wonboyn recreational fishing bodies	Recreational fishers will likely benefit from the Eden 1 project, due to increased local ecosystem productivity.	• Email project summary and request feedback. • Invitation to public consultation.
Bega Valley Shire Council	Local council, permitting, understanding local environment and objectives.	• Meeting with Planning Department. • Information to elected officials. • Invitation to public consultation.
NSW State Government	DPI. Maritime Safety. Environment. Regional Development. Aquaculture Industry Development. Bushfire Recovery for affected areas.	• Meeting with Elected officials. • Invitation to public consultation.
Federal Government	Environment re: EPBCA	• Meeting with key officers as required. • Invitation to public consultation.
Commonwealth Fisheries Association	Peak body for the interests of Commonwealth commercial fishers	• Email project summary and request feedback. • Invitation to public consultation.
Professional Fisher's Association	Peak body for the interests of NSW commercial fishers.	• Email project summary and request feedback. • Invitation to public consultation.
Recreational Fishing Alliance of NSW	Peak body representing the interests of NSW recreational fisher.	• Email project summary and request feedback. • Invitation to public consultation.



Proposed Assessment of Impacts

Scoping has identified a number of environmental issues that require detailed assessment should the project proceed to the EIS stage. This includes at the farm site itself as well as access routes. The main issues are identified here. Being a marine based project, most putative impacts that require further environmental assessment can be categorised as being related to Biodiversity – Aquatic Flora and Fauna as identified in Appendix B of the NSW Government requirement for scoping reports. The impacts of kelp farms on aspects of marine ecology have been studied in other parts of the world and these studies provide sufficient guidance as to the type, scale and magnitude of potential impacts and how they can be mitigated. Studies have been undertaken in Ireland (Walls et al., 2017), Sweden (Visch et al., 2020), Kenya (Mirera et al., 2020) and Tanzania (Eklöf et al., 2005).

6.1. Benthic Habitats and Assemblages

While the approximate bathymetry at the farm location is known, detailed information on the seabed fauna is lacking. It requires a detailed level of assessment. Typically, the spatial scale of an impact from a marine aquaculture farm such as the one proposed is localised to the farm site and the area directly adjacent (10s to 100s metres). It should be noted however that unlike several other forms of marine aquaculture such as the farming of finfish in sea cages or the production of abalone on land, the farming of seaweed requires no input of feeds and no nutrient enriched discharges at the production site.

Field assessments will be undertaken to determine the structure of faunal assemblages present, and the presence of any specific habitat features. It is proposed that multiple methods be used including video assessments and benthic grab samples. As well as identifying the infauna, the benthic grab samples will also assess the physical characteristics of the sediment (e.g. particle size and total organic matter). In addition to sampling occurring at the proposed farm site, sampling will also occur at two reference locations. These locations will be sufficiently remote from the proposed farm location so as not to be impacted from it if it proceeds but of a similar depth and habitat type. This baseline sampling will occur at least twice prior to the farm proceeding and will serve as an effective baseline dataset to monitor any changes to benthic assemblages as a result of farm activities. In summary, the benthic habitat is proposed to be assessed and monitored using a Before-After-Control-Impact (Beyond BACI) experimental design (Underwood, 1992). This is a robust design commonly used to assess human impacts in the marine environment, including those from marine aquaculture (e.g. Aguado-Giménez et al., 2012; De Biasi et al., 2016; Visch et al., 2020).

6.2. Fauna of Marine Conservation Significance

The EPBC Protected Matters Report identified listed ecological communities and species that require consideration. Early scoping has identified that a number of these species and ecological communities are not likely to be present given the habitat at the proposed development location. This includes various animals such as amphibians. The focus will be on ostensibly marine animals. This includes marine mammals, the black rock cod and the white shark. Additional matters protected under NSW State Legislation will also be considered and addressed.

The location is known to be utilised by various species of marine mammals and they require a standard level of assessment to determine the species present and their likely pattern of habitat use in Disaster Bay. Sufficient published information exists to determine the likely presence and seasonality of marine mammals in the Disaster Bay region. Marine mammal entanglement is a risk associated with the project. Further environmental assessment will describe the level of risk and a detailed Marine Entanglement Mitigation Plan will be prepared. This plan will consider design elements of the project including minimising loose ropes in the water, enhancing if necessary and where possible the acoustic profile of the farm, relevant monitoring, and emergency protocols should an interaction occur. It should be noted that unlike sea cage farming for salmon and southern blue fin tuna, a seaweed farm is not inherently attractive to pinnipeds (seals and sea lions) and sharks.

6.3. Mobile Fauna (Nekton)

Marine aquaculture facilities can function as artificial reefs or Fish Aggregating Devices (FADs) and wild fish can aggregate around them (Visch et al., 2016). The exact nature of these impacts are dependent on location, species present, and the type and size of the aquaculture facility. The proposed farm represents a structurally complex vertical habitat, and it is likely to result in the aggregation of small pelagic species such as the yellowtail scad (*Trachurus novaezelandiae*) and midwater predators such as yellowtail kingfish (*Seriola lalandi*). Impacts are likely at the local scale only. It requires a standard level of assessment. The structure and function of the mobile faunal assemblage are well known and able to be described at the location and regionally based on desktop information augmented by advice from fisheries stakeholders. Predictions of impacts can be made based on the available information and monitoring will be designed to test the predictions.

6.4.

Navigation and Fisheries Access

While current available information suggests that the farm location is not a focal point for recreational and commercial fishing effort, engagement with peak bodies representing recreational and commercial fishing interests will be undertaken. Existing information also suggests that the location is not on a navigation route. It requires a standard level of assessment. The area may become a more desirable location for fishing should the development proceed, and fishing access arrangements need to be balanced with safety and integrity of the farm. This will form a substantial focus of engagement with fishing stakeholder groups. The proponent will work with NSW Maritime to identify appropriate navigation aids and markers for the farm which will be included in further environmental assessment.

In terms of navigation by vessels associated with the farm itself, the number of vessel movements and the navigation route will be documented in the EIS. It requires a minor level of assessment.

6.5.

Marine Debris

The loss of farm infrastructure and stock represents a potential financial burden to the proponent as well posing environmental and amenity risks. It requires a standard level of assessment. The main mooring posts will not be at risk from extreme weather. Further environmental assessment will document the design features and procedures that are focussed on preventing equipment loss and the recovery procedures should any be lost. Approaches that will be discussed include: removing certain pieces of infrastructure that are at risk of coming adrift during extreme weather and the labelling of all farm equipment. Understanding from coastal management process modelling will determine where lost equipment will end up and will anticipate detailed recovery procedures.

6.6.

Cultural Heritage – Indigenous and European

Disaster Bay has rich Indigenous and European cultural heritage. The Yuin (Djuwin) people are the Traditional Owners and Custodians of the south coast region that includes Disaster Bay. They have a long, complex and dynamic relationship with the coastal environment. The Yuin people cooperatively hunted humpback whales with orcas¹⁵. Other important marine fishing activities

of the Yuin people on the NSW south coast included the collection of abalone (*Haliotis rubra*) and other invertebrates as well as the harvest of various coastal finfish (Schnierer and Egan, 2016). Traditional fishing activities remain important for traditional owners on the NSW south coast. A standard level of assessment to determine any impacts on Yuin cultural values and how to mitigate them will be undertaken using published information (e.g. Colley, 1997; Nash, 2012; White, 2015) as well as discussion with traditional owners. These discussions will also involve meaningful Indigenous employment opportunities within the project should it proceed.

The region also contains significant examples of European cultural heritage including that related to commercial whaling (Pearson, 1983; Howard, 2015), early European arrival (e.g. Green Cape Lighthouse), and various shipwrecks and possibly lost aircraft. A standard level of assessment will be applied to determine sites of European cultural heritage value. For shipwrecks, the NSW Maritime Cultural Heritage and the Australasian Underwater Cultural Heritage databases will be used to identify any within the region. Preliminary analysis has not revealed the presence of any within the development footprint.

6.7.

Water Quality and Water Flow

Marine aquaculture can impact water quality although the impacts tend to be from elevated nutrient levels whereas seaweed farming can result in a local reduction of nutrients under some conditions (Campbell et al., 2019). Changes to concentrations of dissolved organic matter (DOM) can result from seaweed farming but such impacts tend to be negligible (Campbell et al., 2019). The impacts of the farm on local nutrient levels will be modelled as part of further environmental assessment. It requires a standard level of assessment with any impacts likely to be concentrated at or directly adjacent to the farm site. While marine aquaculture farms can alter water flows, the open nature of the proposed farm site makes this unlikely and it will require a minor level of assessment.

6.8.

Disease, Herbivory and Biofouling

Disease, herbivory and biofouling risks will be identified and discussed in the EIS. Given the nature of the product to be farmed, disease, herbivory and biofouling risks are considered low but will be assessed to a standard level of assessment. This standard level of assessment is precautionary. Where diseases have been evident in seaweed farming, they have tended to have been a symptom of poor site selection and water quality issues (Campbell and MacLeod, 2019). Herbivory and biofouling may occur from fish, crustaceans, molluscs, crown of thorns, etc.

¹⁵ <https://www.nationalparks.nsw.gov.au/things-to-do/lookouts/green-cape-lookout/learn-more>

6.9. **Noise (including underwater noise)**

Noise will occur during the construction phase and during the operation phase with the latter principally associated with vessel movement. The EIS will identify land-based receptor locations and model the noise generated on these receptors with a focus on the construction phase. Given the nature of the proposed activities and the distance from the shoreline and residences, which also have biophysical buffers in between them and the project location, the proposed assessment is of a minor level.

Underwater noise and its impacts on marine fauna (particularly cetaceans) is well known and is an increasing focus of environmental impact assessment (Erbe, 2002; Farcas et al., 2016; Marley et al., 2017). Noise from underwater construction activities (particularly pile driving) is an issue that requires consideration and the implementation of practical management measures that mitigate impacts (Erbe, 2009). Underwater noise will be assessed to a standard level.

The EIS will identify the ambient underwater environment through field studies. The EIS will explore mitigation measures with a focus on the construction phase. Sources of underwater noise impacts will be identified and modelled if necessary. Mitigation measures that will be assessed and incorporated where necessary in the project EMPs including timing of construction activities, the presence of marine mammal observers during construction and operational procedures when the farm is active.

6.10. **Visual Amenity**

The potential impact of the project on the scenic values of the region will be assessed. The key location to assess visual amenity from is the Disaster Bay Lookout in Ben Boyd National Park. The design and arrangement of farm infrastructure will take into consideration visual amenity impacts and balance these with the integrity of farm infrastructure and the need to provide for a safe navigational environment for vessels. Visual amenity will be assessed to a minor level.

6.11. **Non-native Seaweed Species**

The production of seaweed can involve non-native species and this can have environmental implications (Campbell et al., 2019). However, the current proposal involves the culture of native species only. As such, further environmental assessment for the project will be a minor level of assessment.



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Appendix A: Scoping Summary Table

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LEVEL OF ASSESSMENT	MATTER	CUMULATIVE IMPACT ASSESSMENT REQUIRED? (STANDARD OR DETAILED)	COMMUNITY ENGAGEMENT	RELEVANT GOVERNMENT PLANS, POLICIES AND GUIDELINES	SCOPING REPORT REFERENCE
Detailed	Biodiversity – aquatic vegetation and fauna (benthic habitats and assemblages)	No	Y – public consultation Y – small test site proposed under permit to inform EIS Y – Direct consultation with NSW regulatory agencies undertaken on proposed small test site	• NSW Fisheries Management Act 1994 • NSW Marine Waters Sustainable Aquaculture Strategy (2018) • NSW DPI Policy and guidelines for fish habitat conservation and management (2013)	2.3.2, 6.1
Standard	Biodiversity – aquatic vegetation and fauna (Fauna of Conservation Significance)	No	Y – targeted engagement with peak bodies and local community (including with eNGOs) Y – small test site proposed under permit to inform EIS Y – Direct consultation with NSW regulatory agencies undertaken on proposed small test site	• NSW Biodiversity Conservation Act 2016 • NSW Fisheries Management Act 1994 • NSW Biodiversity Regulation 2017 • Commonwealth Environment Protection and Biodiversity Conservation Act 1999 • Commonwealth EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance (Commonwealth of Australia, 2013) • Commonwealth EPBC 1.2 Significant Impact Guidelines – Actions on, or impacting upon, Commonwealth Land and Actions by Commonwealth Agencies (Commonwealth of Australia, 2013) • Commonwealth Department of the Environment – Nationally Threatened Ecological Communities and Threatened Species Guidelines (various) • Commonwealth Department of the Environment – Survey Guidelines for Nationally Threatened Species (various) • The Biodiversity Assessment Method 2020 https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/accredited-assessors/biodiversity-assessment-method-2020 – Marine vegetation collection for commercial purposes – information kit	2.3.2, 6.2
Standard	Biodiversity – aquatic vegetation and fauna (marine nekton)	No	Y – targeted engagement with peak bodies and local community Y – small test site proposed under permit to inform EIS Y – Direct consultation with NSW regulatory agencies	• NSW Biodiversity Conservation Act 2016 • NSW Fisheries Management Act 1994 • NSW Biodiversity Regulation 2017	2.3.2, 6.3
Standard	Amenity	No	Y – public consultation	• NSW Biodiversity Regulation 2017 • NSW Fisheries Management Act 1994 • Interim Construction Noise Guideline (nsw.gov.au)	3.4, 6.9
Standard	Economic – Commercial and Recreational Fishing	No	Y – targeted engagement with peak bodies and local community	• State Environmental Planning Policy (The SEPP) (Primary Production and Rural Development) 2019 • NSW Marine Waters Sustainable Aquaculture Strategy 2018	1.5, 2.2.10, 3.5, 4.1, 6.4, 6.6

LEVEL OF ASSESSMENT	MATTER	CUMULATIVE IMPACT ASSESSMENT REQUIRED? (STANDARD OR DETAILED)	COMMUNITY ENGAGEMENT	RELEVANT GOVERNMENT PLANS, POLICIES AND GUIDELINES	SCOPING REPORT REFERENCE
Standard	Hazards – Biosecurity Disease	No	Y – targeted engagement with NSW DPI	• Biosecurity Act 2015 • Commonwealth of Australia's Aquaculture Farm Biosecurity Plan: generic guidelines and template • NSW Marine Waters Sustainable Aquaculture Strategy • Zoning Policy Guidelines (2000) • Department of Agriculture, Water and the Environment	6.8, 6.11
Standard	Hazards and Risks Risks – Coastal and environment and hazards	No	Y – targeted engagement with Bega Valley Local Council	• Bega Valley Local Environmental Plan 2013 • Coastal Mgt Act 2016 • Coastal Mgt SEPP	1.3, 2.2.2, 2.2.3, 2.2.4, 2.2.6, 2.2.14, 3.2.1, 4.1, 6.5
Standard	Heritage – Cultural Heritage – Indigenous and European	No	Y – targeted engagement with Yuin	• NSW Heritage Act 1977 • Commonwealth Underwater Cultural Heritage Act 2018 • National Parks and Wildlife Act 1974 (Aboriginal cultural heritage) • Heritage Act 1977 (environmental heritage)	2.2.13, 4, 6.6
Standard	Water – Water Quality	Yes – Standard	Y – public consultation	• Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC / ARMCANZ, 2000) • Using the ANZECC Guidelines and Water Quality Objectives in NSW (Department of Environment and Conservation, 2006) • Bega Valley Local Environmental Plan 2013	2.2.5, 4, 6.7
Minor	Access – Navigation and safety	Yes – Standard	Y – targeted engagement with NSW and Maritime	• NSW Marine Waters Sustainable Aquaculture Strategy • Marine Safety Act 1998 • Marine Safety Regulation 2016	1.3, 2.2.12, 3.5, 4.1, 6.4
Minor	Access – Road/ rail network, traffic and parking	Yes – Standard	Y – public consultation	• Guide to Traffic Management – Part 3 Traffic Studies and Analysis (Austroads, 2013) • Guide to Traffic Generating Developments Version 2.2 (RTA, 2002)	1.4, 3.4, 3.5, 3.6, 4.1
Minor	Access – Port and airport facilities	Yes – Standard	Y – targeted engagement with Port and Wharf	• NSW Marine Waters Sustainable Aquaculture Strategy	1.4, 2.1, 2.3.4
Minor	Amenity – Noise on surrounding residents	No	Y – test site proposed, public consultation	• NSW Road Noise Policy (Environment Protection Authority, 2011) • Protection of the Environment Operations (Noise Control) Regulation 2008	3.5
Minor	Amenity – Visual	No	Y – test site proposed, public	• NSW Marine Waters Sustainable Aquaculture Strategy consultation	1.4, 2.1, 3.3, 3.5, 3.6, 6.10
Minor	Water – Hydrology	No	No	• NSW Marine Waters Sustainable Aquaculture Strategy	2.3.1, 3.6, 6.7
Minor	Hazards and risks – Waste	No	No	• Protection of the Environment Operations Act 1997 (POEO Act) • Waste Classification Guidelines (DECCW, 2014)	3.4.3, 6.5
Minor	Hazards – Biosecurity –	No	No	• Biosecurity Act 2015 • Fisheries Management Act 1994 • NSW DPI Primefact 1720: What to include in your Aquaculture Biosecurity Plan (Primefact 1720) • Biosecurity plan template for NSW Aquaculture Operators (DOCX, 280.26 KB) • DPI Biosecurity Policy – Aquatic biosecurity pests and diseases • DPI Biosecurity Policy – Surveillance for diseases of animals & aquatic pests	6.11



Appendix B: Site Information – Climate and Oceanic Conditions

Temperature, Rainfall and Winds

The Eden region experiences a temperate climate with mean maximum air temperatures ranging from 24.6°C in February to 15.8°C in July, while mean minimum air temperatures range from 15.4°C in February and 4.4°C in July (Figure 23). The highest average monthly rainfall for the region occurs in February–April (76 – 91.0mm), while the lowest rainfall occurs during July and September (41.2 – 56.3mm) (Figure 22).

For most of the year the morning winds are dominated by South–Westerly winds, with Oct–Jan having slightly more North–Easterly winds, and afternoon winds dominated by North–Easterly winds. Average morning wind speed varies slightly across the year with a maximum September – November (12–13.4km/hr) (Figure 24). Average afternoon wind speed varies over the year with maximums experienced September – January (20.3–21.2km/hr).

Wave Climate

The nearest wave rider buoy to the proposed aquaculture lease is the Eden Waverider Buoy (Figure 25). The significant wave heights (H_s) reach their maximum during Winter and Spring and larger waves are less frequent in Summer and Autumn (Figure 26, Table 5, Figure 27). The average peak spectral period of the waves reaches a maximum in May–July (9.88–10.19 sec) and minimum in Jan, Feb, Nov and Dec (8.6 – 8.8 sec). The maximum peak spectral period can reach 19.79 sec throughout most of the year and minimum peak spectral period of 2.8 sec in August (Table 6). The dominant wave direction throughout the year is South to South–South–East with Summer having a more even spread of wave direction from NNE to SSW.

While further data should ideally be collected, it is assumed that the wave energy in Disaster Bay will be significantly lower than that recorded by the Eden Waverider Buoy due to the protection afforded by Green Cape Headland and Nadgee. A snapshot example of the reduced wave energy in Disaster Bay can be seen in Figure 28. In addition, the Eden wave rider buoy demonstrated South to South–South–East wave directions for the majority and more severe waves throughout the year. Thus, the Green Cape Headland should provide significant wave energy reduction to the proposed aquaculture lease to the South–West of the Green Cape.

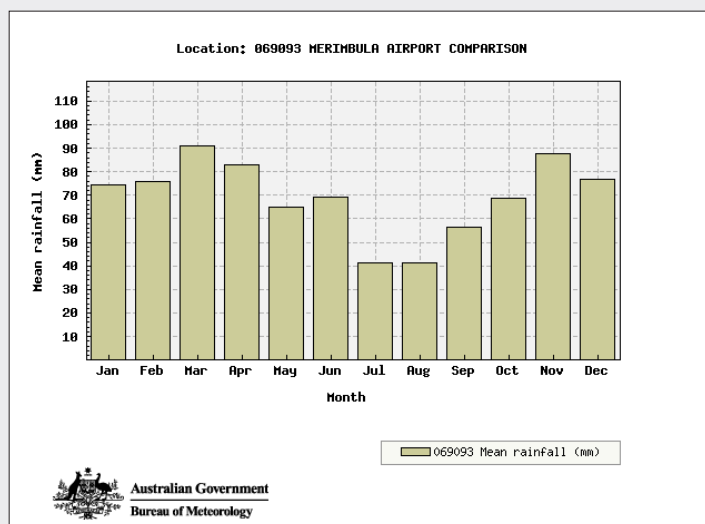


Figure 22
Mean Rainfall (mm) from 1969–1998 for Merimbula Airport (36.91°S 149.90°E).

Source: Bureau of Meteorology, accessed 2020.

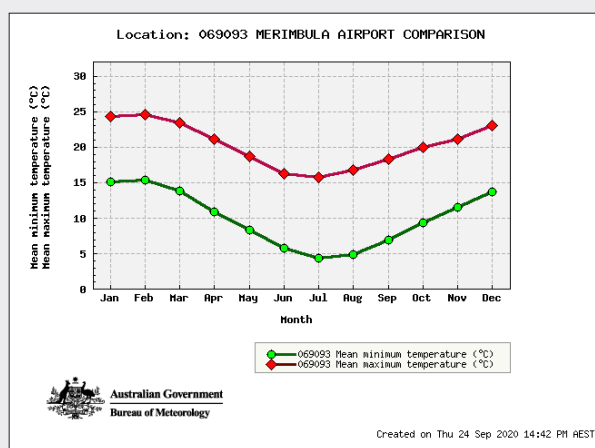


Figure 23
Mean minimum and maximum air temperatures from 1969–1998 for Merimbula Airport (36.91°S 149.90°E).

Source: Bureau of Meteorology, accessed 2020.

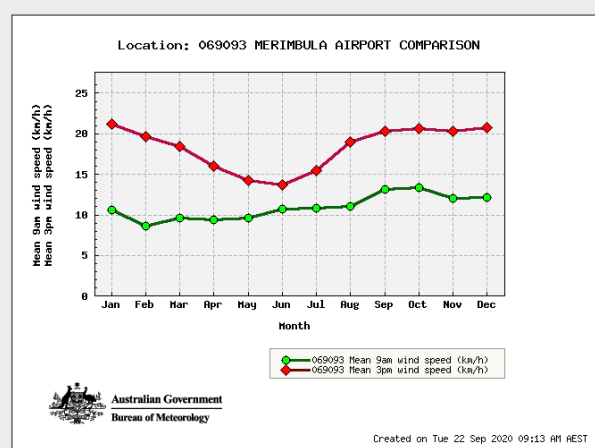


Figure 224
Mean monthly 9 am and 3 pm wind speed (1969–1998) for Merimbula Airport (36.91°S 149.90°E).

Source: Bureau of Meteorology, accessed 2020.



Figure 25

Eden Waverider buoy location.

Source: NSW Government, Manly Hydraulics Laboratory

<https://mhl.nsw.gov.au/Data-Wave>

[https://s3-ap-southeast-2.amazonaws.com/www-data.](https://s3-ap-southeast-2.amazonaws.com/www-data.manly.hydraulics.works)

[manly.hydraulics.works](https://www.stations/wave/eden_)

[/www.stations/wave/eden_](https://www.stations/wave/eden_)

[SeasonalWaveHeightDirectionRoses.pdf](#)

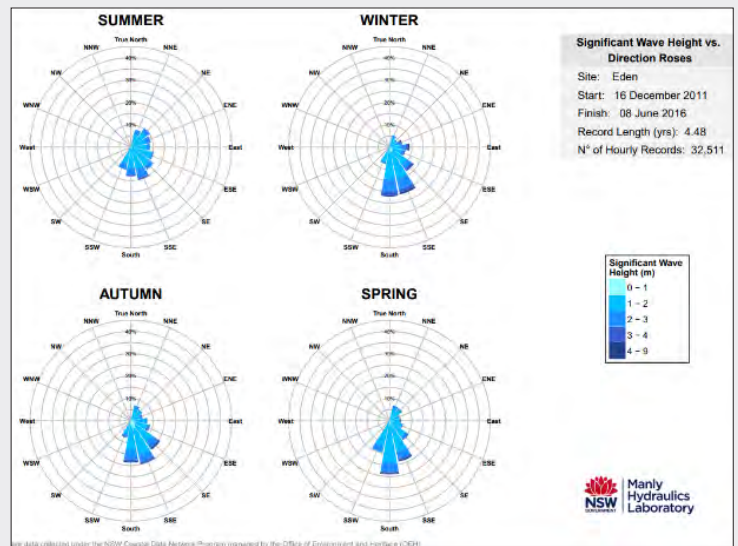


Figure 26

Significant Wave Height vs. Direction Roses from Eden

Waverider buoy. Source: NSW Government, Manly

Hydraulics Laboratory.

Percentage Exceedance for Hsig (m)

Monthly Exceedance Probability												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hsig (m)												
0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
0.50	99.94	99.88	99.92	99.83	99.56	99.83	99.81	99.74	99.75	99.87	99.93	99.92
1.00	93.51	94.02	92.88	88.96	86.46	87.71	87.22	86.23	89.91	87.92	90.42	89.80
1.50	57.28	54.58	53.07	53.44	53.18	55.56	51.65	45.79	50.47	49.89	51.32	48.50
2.00	20.22	20.28	19.88	24.08	24.33	28.83	25.43	20.25	21.31	20.80	19.75	18.67
2.50	5.28	7.15	7.75	10.39	10.09	15.43	12.30	8.79	8.72	8.72	7.87	6.14
3.00	1.70	2.57	3.51	4.87	4.15	8.82	5.93	3.85	3.31	3.89	3.50	2.10
3.50	0.63	1.06	1.92	2.01	1.87	5.21	3.10	1.92	1.23	1.77	1.69	0.92
4.00	0.34	0.53	1.13	1.09	0.97	2.70	1.61	0.93	0.42	0.92	0.88	0.41
4.50	0.22	0.28	0.67	0.50	0.47	1.39	0.86	0.41	0.26	0.53	0.36	0.14
5.00	0.13	0.10	0.42	0.18	0.26	0.70	0.37	0.13	0.17	0.19	0.12	0.05
5.50	0.04	0.03	0.15	0.03	0.14	0.39	0.12	0.03	0.10	0.09	0.00	0.01
6.00	0.00	0.00	0.06	0.00	0.05	0.16	0.02	0.01	0.05	0.03	0.00	0.00
6.50	0.00	0.00	0.03	0.00	0.01	0.08	0.00	0.00	0.02	0.00	0.00	0.00
7.00	0.00	0.00	0.01	0.00	0.00	0.07	0.00	0.00	0.01	0.00	0.00	0.00
7.50	0.00	0.00	0.01	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00
8.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monthly Statistics												
Minimum	0.37	0.38	0.38	0.29	0.29	0.38	0.29	0.29	0.29	0.38	0.38	0.38
Average	1.65	1.65	1.66	1.68	1.66	1.79	1.70	1.59	1.63	1.62	1.63	1.58
Maximum	5.88	5.98	8.06	5.68	7.31	8.49	6.70	6.14	7.15	6.35	5.73	5.56
Number of Data Points Used for Statistical Analysis												
No. Points	19,667	18,453	19,360	19,708	21,547	21,076	21,120	20,626	18,898	21,517	20,511	20,153
Percent Capture Based on Nominated Start/Finish												
% Capture	80.51	82.91	78.75	83.27	86.72	83.39	83.62	84.29	81.99	88.61	85.27	78.66
												83.17

Table 5

Percentage exceedance of significant wave heights (1978 – 2016).

Source: NSW Government, Manly Hydraulics Laboratory.

https://s3-ap-southeast-2.amazonaws.com/www-data.manly.hydraulics.works/www.stations/wave/eden_WaveHeightExceedanceStatistics.pdf

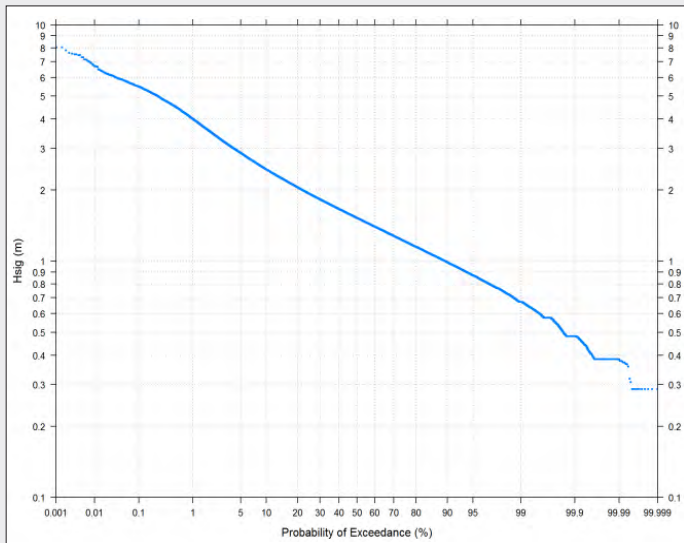


Figure 27
Percentage exceedance of significant wave heights (1978 – 2016).

Source: NSW Government, Manly Hydraulics Laboratory.
https://s3-ap-southeast-2.amazonaws.com/www-data-manly.hydraulics.works/www/stations/wave/eden_WaveHeightExceedanceStatistics.pdf



Figure 28
Example of Wave conditions September 23rd 2020 experienced along the Twofold Shelf Bioregion. Note that Wonboyn Beach significantly smaller significant wave heights than the coast of Green Cape.

Source: NSW Government, Manly Hydraulics Laboratory.

TP1	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
0.00 - 1.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
2.00 - 3.99	0.15	0.09	0.07	0.24	0.17	0.21	0.28	0.31	0.21	0.39	0.27	0.33	0.231
4.00 - 5.99	9.44	10.24	6.96	4.96	4.13	4.66	4.20	6.46	6.76	9.25	10.89	10.67	7.360
6.00 - 7.99	30.35	26.92	19.85	14.24	13.94	12.44	12.48	15.44	19.30	20.46	24.69	25.72	19.494
8.00 - 9.99	32.58	29.39	29.45	31.42	29.12	26.66	28.36	30.26	32.14	34.21	35.33	34.75	31.159
10.00 - 11.99	19.36	20.66	24.67	28.40	28.43	29.98	31.46	24.79	22.96	21.19	19.41	19.99	24.331
12.00 - 13.99	7.11	11.10	16.97	18.44	21.22	22.87	20.17	19.58	15.97	12.37	8.75	8.18	15.313
14.00 - 15.99	0.83	1.44	1.76	2.02	2.58	2.94	2.79	2.82	2.23	1.77	0.57	0.35	1.859
16.00 - 17.99	0.15	0.16	0.25	0.25	0.37	0.22	0.26	0.32	0.39	0.36	0.09	0.01	0.238
18.00 - 19.99	0.02	0.01	0.02	0.03	0.03	0.02	0.00	0.02	0.03	0.00	0.00	0.00	0.015
Average :	8.60	8.80	9.40	9.78	9.88	10.19	10.00	9.70	9.33	9.10	8.70	8.66	9.43
Maximum :	19.70	19.70	19.70	19.70	19.70	19.70	17.55	19.79	19.79	19.70	17.14	17.10	19.79
Minimum :	3.42	3.20	3.70	3.10	3.10	3.10	3.10	2.80	3.20	3.13	3.10	3.00	2.80

Table 6
Percentage Occurrence for peak spectral Period (sec) (1978 – 2012).

Source: NSW Government, Manly Hydraulics Laboratory.

Tides, Currents and Sea Surface Temperature

Tides in Disaster Bay are semidiurnal to mixed tides and microtidal with strong currents in the region (Disaster Bay, 2020). The average water temperature is seen to vary between a maximum of 21°C in February to 15°C in August in a sinusoidal fashion.

Water Quality

Preliminary assessment indicates an Eden upwelling in the region that may supply nutrients for the seaweed farm (Figure 29). According to Rochford 1984 Nitrate levels in the Eden region range from 0–8–g NO₃/l (0–0.13–mol-NO₃/l) (Figure 30). According to the coarse data from CSIRO Atlas of Regional Seas, nitrate and phosphate would be in the range of 0.0563–mol-NO₃/l and 0.2324–mol-NO₃/l, respectively (Figure 31). Chlorophyll-a studies have also been conducted in a coastal site in Eden, demonstrating chlorophyll-a levels between 0–0.5 mg/m³ depending on the year, season and assessment method used (Kelly et al., 2015). Based on a preliminary assessment the nearest sewer outfall in the Twofold Shelf Bioregion is in Eden at approximately 22km away.



Figure 31
Very coarse nitrate (0.0563 umole/kg) (top) and phosphate levels (0.2324 umole/kg) (bottom) for Twofold shelf Bioregion. Source: Australian Ocean Data Network: Open Access to Ocean Data, using layer CARS 2009 – CSIRO Atlas of Regional Seas World monthly.



Figure 29
Upwelling region east of Eden (including the Eden region) in turquoise green. Source: Department of Agriculture, Water and the Environment, Australian Government.
<http://www.environment.gov.au/webgis-framework/apps/ncva/ncva.jsf>

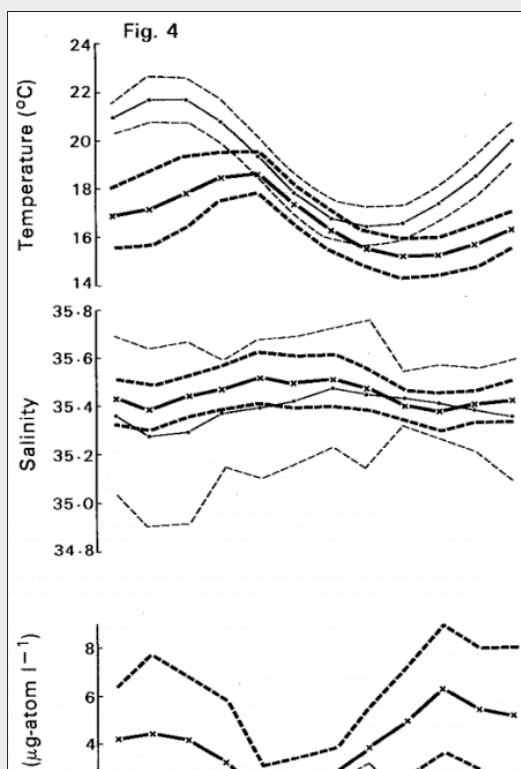


Figure 30
Nitrate, Salinity and Temperature measurements off Eden from Rochford (1984) (1–g NO₃/l = 0.016128–mol NO₃/l.).

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