



MARCH 2024

SOCIO-ECONOMIC CONSIDERATIONS FOR REGENERATIVE AQUACULTURE ON THE NSW SOUTH COAST

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This project was successful in securing funds from the NSW Government.

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CITATION

Croft, F. Voyer, M., Nichols, R., Mifsud, T., Solitei, M., Boehme, T., Gibbs, L., McIlgorm, A. (2024) Socio-economic considerations for regenerative aquaculture on the NSW South Coast. Report to the Department of Regional NSW.

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Summary

Regenerative aquaculture is non-intensive, feed-free aquaculture which allows the stock to grow on its own, using natural food sources and conditions. It includes shellfish (e.g., oysters, mussels) and kelp farming methods.

The University of Wollongong (UOW) and the Blue Economy Cooperative Research Centre (BE CRC) have collaborated with the NSW Government and industry to identify social, cultural, and economic impacts and opportunities that may be associated with future development of a regenerative aquaculture industry on the South Coast of NSW.

This report contains the outcomes of baseline research designed to inform current and future development of this industry. In particular, the research explored how community values can inform the emerging seaweed farming sector and evolving shellfish farming in waters off the NSW South Coast.

This report is the first of four reports which examine the following:

- 1. The social and economic considerations that current and a future regenerative aquaculture industry will need to be aware of and address (this report),**
- 2. The Aboriginal cultural values, rights and interests in relation to regenerative aquaculture and how these might be protected, enhanced or prioritised as this new industry develops (Report 2),**
- 3. Community engagement preferences (Report 3), and**
- 4. The business case for a regenerative aquaculture industry on the NSW South Coast (Report 4).**

We used a regional survey, semi structured interviews and research workshops associated with community information sessions (hosted by industry proponents) to explore the range of community interests and concerns relating to the development of a regenerative aquaculture industry on the NSW South Coast (Shoalhaven, Eurobodalla, and Bega LGAs).

We found a very high degree of in principle support for the development of this industry across all three LGAs.

75% POSITIVE RESPONSES

An average of 76% of survey participants responded positively to the question ‘would you like to see regenerative aquaculture in your LGA?’ (75% Shoalhaven, 78% Eurobodalla and 75% Bega Valley).

Despite this, proposed kelp farms in two case studies, across three locations (Bermagui, Pambula, and Eden) drew mixed responses from local communities, including strong opposition in some cases.

The table below summarises some of the concerns we heard, along with the areas of potential benefit that community members discussed. In addition, the table outlines potential mitigation actions for possible impacts, and best practice approaches which can enhance potential benefits. These are arranged according to the Social Impact Assessment categories of impact outlined in NSW Planning guidelines.

Many of the actions suggested below require an industry-wide response, and are beyond the responsibility or capability of an individual proponent to deliver.

We therefore recommend consideration of the establishment of a South Coast Regenerative Aquaculture peak body to collectively work on shared responsibilities and opportunities.

Social impact categories	Potential impacts identified	Potential benefits identified	Mitigation options (I: Industry, G: Government, R: Research Institutions, P: Proponents)	Benefit enhancement opportunities (I: Industry, G: Government, R: Research Institutions, P: Proponents)
Environment	Community concern over potential impacts on wildlife, especially whales, coastal processes, and marine debris/pollution	Community support for potential benefits to water quality, biodiversity, fish stocks, and carbon capture	<p>Develop statewide cetacean management guidance for offshore industries (G)</p> <p>Develop Code of practice standards for wildlife interactions (I)</p> <p>Develop site specific wildlife management plans (P)</p> <p>Establish collaborative research projects which explore whale and bird interactions with offshore industries (R)</p>	<p>Use nature-positive design principles in farm planning (I, P)</p> <p>Collaborate with Indigenous Sea Ranger programs to maximise on- water monitoring and surveillance of wildlife interactions (I, P, G)</p> <p>Co-locate regenerative aquaculture with high need restoration sites and activities where suitable (e.g., areas of high nutrient loading, urchin barrens, etc.) (G, I, P)</p>
Way of Life	<p>Impacts on visual amenity</p> <p>Noise pollution</p> <p>Impacts on recreational uses (e.g., surfers)</p>	Maintenance of historic way of life and character through growing a new maritime industry in a region historically a primary production/ maritime area	<p>Explore novel technologies (e.g., bottom-up farming approaches) or innovations in colour and size of buoys to reduce visual impacts (I, R)</p> <p>Establish demonstration sites to familiarize the community with farm practices (G, I, R)</p> <p>Establish noise mitigation techniques through good neighbour arrangements e.g., time restraints on boat usage (P)</p> <p>Avoid high residential areas in site selection (G, I, P)</p>	<p>Promote maritime contribution to community, including character and way of life, as part of regional development and tourism strategies (G)</p> <p>Embed regenerative aquaculture into existing way of life through relationship building with local communities, supply chain businesses and education and training facilities (I)</p>
Community	<p>Conflict between users and uses.</p> <p>Deeper intangible conflicts based on values and worldviews, e.g., different conceptualisations of sustainability</p>	<p>Job creation</p> <p>Support for local economies and supply chains</p>	<p>Make use of spatial management and conflict resolution over shared use of ocean spaces (G, I, P)</p> <p>Develop strategies to maximise access to other users in lease areas (G, I)</p> <p>Develop complaints handling procedures (I, P, G)</p> <p>Engage dedicated mediation support to navigate underlying conflicts within the community, based on values and worldviews (R, I, P)</p>	<p>Maximise co-design and opportunities for community input into blue economy and regenerative aquaculture planning – including local content and employment plans and site selection (R, I, G, P)</p> <p>Establish independent consultative mechanisms to provide a forum for community input into marine planning (See Report 3) (R, G)</p>

Social impact categories	Potential impacts identified	Potential benefits identified	Mitigation options (I: Industry, G: Government, R: Research Institutions, P: Proponents)	Benefit enhancement opportunities (I: Industry, G: Government, R: Research Institutions, P: Proponents)
Livelihoods	Potential impacts on tourism and fisheries industries	Income diversification in regional areas Employment opportunities for youth and First Nations' community	Explore co-location and co-existence opportunities with fisheries (G, P) Engage with tourism industry to develop tourism products based around regenerative aquaculture (G, I)	Establish skills development pathways and training mechanisms (ideally through a dedicated facility and using integrated learning approaches) to grow industry capacity, especially for youth and First Nations' communities (R, I, G, P)
Accessibility	<p>Competition for space with established users, including concerns over public use of beach areas</p> <p>Increased boat traffic and use of shared infrastructure (e.g., boat ramps)</p> <p>Concern about lost infrastructure on remote beaches</p> <p>Concerns about safe navigation</p>	Opportunities to maximise use of ocean spaces through co-location and cooperation between different users	<p>Develop community education materials about myths and misconceptions – i.e., that restrictions to public use are not permitted under lease conditions (G, I)</p> <p>Develop accountability safeguards for marine debris pollution (e.g., floating gear register) (G, I)</p> <p>Explore lessons learnt from mature aquaculture industries around marine debris management (I)</p> <p>Develop site specific vessel management and navigation plans (P)</p>	Develop a Maritime Cluster to harness opportunities for sharing resources, infrastructure (e.g., processing plants) and boat fleets (I, P, R, G)
Health and Wellbeing	Impacts on emotional connections to place, especially in response to natural disasters	Feelings of hope associated with proactive response to environmental threats	Explore models for trauma informed consultation and planning (R, G, I)	Engage with proactive and community led co-design processes to build on hopeful solutions, including through social entrepreneurial activities, nature positive solutions, and First Nations-led approaches (G, R, I, P)

Social impact categories	Potential impacts identified	Potential benefits identified	Mitigation options (I: Industry, G: Government, R: Research Institutions, P: Proponents)	Benefit enhancement opportunities (I: Industry, G: Government, R: Research Institutions, P: Proponents)
Culture	Potential impacts on cultural heritage	Opportunities for First Nations' leadership and involvement in new industry development	Develop robust underwater cultural heritage assessments (G, R, I, P) Encourage co design of future proposals with First Nations' communities (G, R, I, P)	Support leadership and partnerships with First Nations (see report 2) (G, R, I, P)
Governance	Lack of trust in existing mechanisms Disjointed and disconnected opportunities for community participation in marine planning	High level of interest and engagement in being involved in ocean governance	Establish an industry peak body to provide a mechanism to assist governance and consultation Establish Government led processes of site selection incorporating spatial assessment and marine mapping, community consultation, broad scale environmental assessments and investigation of best practice/approaches (G) Enhance community ocean literacy, and readiness and awareness of new and growing Blue Economy industries (G, R, I) Establish shared community advisory groups or other regular consultative mechanisms with representatives across community. (G, R, I, P) Explore options to support early movers to allow them to work with community to develop proposals without fear of losing their competitive advantage (eg 'Certificate of preference' models used in Tasmania)	Embrace innovations in community engagement, including co-design (See Report 3) Establish a Maritime Cluster to create a hub through which Blue Economy industries can engage with local communities in a collaborative way (G, R, I, P) Identify and support key knowledge brokers (e.g., universities or independent bodies) to act as trusted voices or mediators between the needs of community and industry/government and provide a mechanism to build relationships across industry, government, proponents, and research bodies, from the site selection phase onwards (G, R, I) Develop a Government and industry-wide strategy for growth of regenerative aquaculture industry (G, R, I, P)



There is widespread support for regenerative aquaculture on the NSW South Coast – but inadequate support for site selection is creating unacceptable risk to both communities and proponents

There is strong enthusiasm for the industry in the South Coast community but it is highly conditional upon the assurance of strong environmental protections especially in relation to impacts on marine mammals. There is a clear need for industry, government and independent research institutions to work together to conduct and share the baseline information required to meet these expectations. Concern around negative environmental impacts were among the main issues raised by community members throughout the research.

There was a notable difference between the high level of support for the regenerative aquaculture identified through the community survey and the at times, quite hostile response from local communities in the case study areas – most notably, Bermagui. Whilst this may in part reflect the notion of an ‘vocal/engaged’ minority, it should also be noted that due to the lack of support and guidance in site selection in the existing governance processes, there may be occasions where the suitability of a particular sites is not fully known by proponents until after critical decisions have been made about lease location. At present, the existing processes provides minimal guidance on site selection and largely leaves this in the hands of individual proponents.

Inclusive and participatory regional planning is required to address environmental and social concerns for future site selection

Building a ‘social licence’ for the regenerative aquaculture industry is a shared responsibility of significance to the community, the local environment, and the long-term viability of the industry.

Communities want to see careful and thoughtful site selection, genuine partnerships with community and Indigenous peoples, rigorous environmental standards (see below) and a focus on returning benefits to local communities and local environments. Relying on the current ad hoc and industry-led approach in NSW is inadequate. Instead, the industry requires comprehensive support to assess the full spectrum of cultural, social, environmental, and technical constraints and opportunities associated with various sites.

It is essential to involve Indigenous communities from the outset in this planning process, including designating areas for their future development and use (see Report 2). Tapping into local knowledge, through participatory planning processes, may also assist to identify suitable sites (See Report 3).

Social impacts are strongly linked to environmental impacts and benefits – and perceptions of sustainability

There is an intrinsic connection between the social impacts of greatest concern identified in this report and community perceptions of possible environmental values and impacts. In other words, the social impacts of regenerative aquaculture will be heavily dependent on the extent and nature of environmental impacts.



Therefore, effectively managing social impacts necessitates the parallel management of environmental impacts. Recognising this interdependence is essential for the sustainable development of regenerative aquaculture.

Currently, the regenerative potential of this emerging industry is acknowledged but remains largely implicit or assumed. Our research suggests that the regenerative capacity of this industry will be pivotal in securing community support and advocacy, particularly given the contested ways in which environmental benefits were understood and accepted by local communities. Therefore, making these regenerative links more explicit, and built into the design process, would be highly beneficial. This could involve adopting strategies, such as multi-trophic aquaculture approaches, siting farms alongside degraded areas, and actively contributing to restoration projects – ideally in partnership with citizen science and Indigenous groups.

Key terms and acronyms

- △ BE CRC - Blue Economy Cooperative Research Centre
- △ DPI - Department of Primary Industries
- △ EP&A Act - Environmental Planning and Assessment Act 1979 (NSW)
- △ MEMA - Marine Estate Management Authority
- △ NSW MWSAS - NSW Marine Waters Sustainable Aquaculture Strategy
- △ SSD - State Significant Development
- △ PIMBY - Please In My Back Yard – the antithesis of the more commonly understood NIMBY phenomena (Not In My Back Yard). Also called YIMBY (Yes In My Backyard).
- △ SEARS - Secretary's Environmental Assessment Requirements
- △ SLO - Social License to Operate
- △ UOW - University of Wollongong

Acknowledgements

The team would like to acknowledge and thank the valuable contribution of the following people (in no particular order); Angela Williamson, Christopher Ride, Jo Lane, Sam Gordon, Ben Ralston, Anthony Zammit, Ian Lyall, Yuri Maia, Brett Ashby, Cayne Layton, Hugh Forehead, Elle McNeill and Vanessa Fairweather.

The team would also like to thank and acknowledge the input of all the members of the community who attended the workshops, spoke to us formally and informally and helped guide and shape this work.



1. Introduction

The University of Wollongong (UOW) and the Blue Economy Cooperative Research Centre (BE CRC) have collaborated with the NSW Government and industry to identify social, cultural, and economic impacts and opportunities that may be associated with future development of a regenerative aquaculture industry on the South Coast of NSW.

This report contains the outcomes of baseline research designed to inform current and future development of this industry. In particular, the research explored how community values can inform the emerging seaweed farming sector and evolving shellfish farming in waters off the NSW South Coast.

This report focuses on the social and economic considerations that current and future developments will need to address and is guided by the following research question:

What impacts and benefits do local communities want to see considered or prioritised when new regenerative aquaculture activities are proposed?

This report is the first of a series focused on the research outcomes. Report 2 examines how Aboriginal cultural values, rights, and interests can be protected, enhanced or prioritised as this new industry develops. Report 3 explores how local communities can participate in current and future planning processes. Report 4 looks at how local business networks, supply chains and markets can develop around this emerging industry.

The report is structured as follows:

- △ The remainder of **Section 1** provides a background to the project, aquaculture in NSW and the emerging regenerative aquaculture industry.
- △ **Section 2** outlines the methods used to assess the range of possible and likely social and economic impacts and benefits of regenerative aquaculture on the NSW South Coast based on two existing case studies.
- △ **Section 3** provides an overview of the results of the social and economic assessments, summarised around key themes that emerged from the research and presented against the social impact categories specified under NSW Planning guidelines for Social Impact Assessment.
- △ **Section 4** provides key findings and recommendations for industry, Government, and community in order to identify and mitigate social impacts and maximise community benefits.

1.1. What is Regenerative Aquaculture?

Aquaculture is an important contributor to the NSW rural economy and a critical industry in Australia's Blue Economy, with significant opportunities for growth (National Marine Science Committee, 2015).

(National Marine Science Committee, 2015). The potential of the aquaculture industry for Australia's future blue economy is highlighted in the National Aquaculture Strategy (Department of Agriculture and Water Resources, 2017), which aims to double the current value of Australia's aquaculture industry.

In New South Wales (NSW), aquaculture has been estimated to have an economic contribution of approximately \$220m per annum and includes employment for up to 2300 jobs, largely concentrated in regional economies (Barclay et al. 2016; BDO EconSearch, 2023).

There are many different types of aquaculture. These are often classified into categories on the level of input and output per farming area and the stocking density.

Fed or intensive (or semi-intensive) aquaculture are types of aquaculture where food be is added to the production as well as other interventions in the growing process, such as water aeration. Common types of intensive aquaculture include fish and prawn farming. Please note, this type of aquaculture is outside the scope of this research.

Non-intensive, feed free aquaculture are types of farming in which nature provides the inputs needed for growth. Non-intensive aquaculture allows the stock to grow on its own, using natural food sources and conditions, and is common for farming shellfish (such as oysters) and kelp. This type of aquaculture is the focus of this report.

For the purposes of this research, and this report, we have adopted the term regenerative ocean aquaculture to describe the types on non-intensive aquaculture that were included in the study (see details below).

Regenerative ocean aquaculture is defined by Mizuta, Froehlich & Wilson (2023 p. 133) as "commercial or subsistence aquaculture performed with focus on social and economic and ecological responsibility and stability, with minimal external input and impact to the environment".



Regenerative ocean aquaculture might include emerging and existing types of aquaculture, such as seaweed (red, brown and green seaweeds) and shellfish farming (oysters and mussels) (Theuerkauf et al. 2022; Visch et al. 2020). These types of farms rely on nature to provide the feed needed for the products to grow, so they do not require feed inputs and there is no addition of pesticides or fertilisers.

As seaweed is a photosynthesis feeder and shellfish are filter feeders, these aquaculture processes may also assist in improving water quality and provide habitat for other marine species. Regenerative ocean farming may also be improved by farming multiple species in one place, such as seaweed (or kelp), oysters, clams, and mussels. It can therefore be an efficient use of space.

The following sections outline the current literature which discusses the impacts of regenerative farming from a global perspective. In addition, the researchers engaged in multiple conversations, site visits, and formal semi-structured interviews with a number of proponents involved in the regenerative aquaculture industry on the South Coast of the NSW in order to better understand their motivations for engaging in this industry. These are further outlined below.

1.1.1 Why regenerative aquaculture?

Regenerative aquaculture has attracted significant attention as a potential future industry in Australia and around the world because of the potential opportunities it provides to meet environmental, social, and economic outcomes.

A recent analysis demonstrated the alignment of a seaweed aquaculture industry to broad social-economic and environmental goals, and show that the industry could help to address the United Nations Sustainable Development Goals (SDGs) (Spillias et al. 2023a). The study suggested the industry could help to address the following goals:

- | | |
|--|-----------------------------|
| △ SDG 2 (Zero Hunger) | △ SDG 13 (Climate Action) |
| △ SDG 8 (Decent work and Economic Growth) | △ SDG 14 (Life Below Water) |
| △ SDG 9 (Industry, innovation, and Infrastructure) | △ SDG 15 (Life on Land) |
| △ SDG 12 (Sustainable Production and Consumption) | |

The review further argued that the industry could contribute to sustainable development but was contingent on the appropriate management and regulation of the industry to ensure that there were no negative and unwanted outcomes (Spillias et al. 2022).



Social and economic benefits

Regenerative aquaculture has been seen to have positive social and economic benefits in other places. For example, there are examples of positive contributions to employment and livelihood through job creation in local communities, which can lead to improved economic conditions (Spillias et al., 2023a). Similarly, gender equity can be promoted through regenerative aquaculture through the creation of opportunities for women in aquaculture-related activities (McClenachan & Moulton, 2022).

Seaweed and kelp aquaculture is the fastest growing aquaculture sector globally and there is further potential for significant growth (Costello et al. 2020). The World Bank estimates that farming seaweed in 0.1% of the world's oceans has the capacity to create approximately 50 million jobs directly, with a further 100 million indirect jobs (Bjerregaard et al. 2016). In Australia, a number of studies have identified the range of opportunities aquaculture provides regional communities, from on-the-farm work through to associated businesses, including those providing inputs; in transport, processing and sale; and tourism and hospitality operations (BDO EconSearch, 2023; Barclay et al. 2016). Farms require diverse and often high-level skills, but also provide entry-level jobs. Aquaculture farms diversify economic opportunity in regional towns, which is critical for resilience. They generate jobs in places where there are few alternative industries. They provide economic stability by being active through the year, versus seasonal work, such as tourism (Barclay et al. 2016).

In addition to employment and livelihood benefits, contributions to food security and nutrition from regenerative aquaculture have been documented, particularly in the global south.

Seaweed is consumed in many places in the world and there is increasing recognition that it plays an important role in human health (Rimmer et al. 2021). For example, seaweed contains essential omega-3 fatty acids and micronutrients that contribute to food and nutrition security (Costello et al. 2020). Research suggests that kelp, seaweed, and shellfish will become increasingly important sources of protein in the future (Lindell & Kite-Powell, 2021). The High-Level Panel for a Sustainable Ocean Economy suggests that expanding low impact aquaculture such as seaweed and mussels will be important in not only providing a nutritious food source but also in enhancing wild fisheries through the creation of artificial habitat (Costello et al. 2020). Furthermore, social cohesion and community

wellbeing can also be enhanced through regenerative aquaculture in certain contexts. The shared involvement in sustainable aquaculture practices can strengthen communities' ties through resource sharing (Spillias et al. 2023a) and can enhance wellbeing through fostering a place based connection to the ocean and the resources it provides (Campbell et al. 2021). However, Spillias et al. (2023a) also make the point that context is important when assessing the benefits that come from these enterprises. They suggest that in certain contexts social cohesion has weakened as places have become more industrialised and have moved away from traditional farming techniques, reinforcing the importance of place based localised research on the impacts of regenerative aquaculture.

¹ See MSP Global - www.mspsglobal2030.org.

Benefits to marine ecosystems and biodiversity

Evidence suggests that regenerative aquaculture can have multiple benefits for marine ecosystems and biodiversity in some circumstances (Barrett et al. 2022; Theuerkauf et al. 2022; Mizuta, Froehlich & Wilson, 2023).

As a core principle regenerative aquaculture seeks to maintain a healthy environment throughout the farming process and seeks to have net benefits to marine ecosystems (Mizuta, Froehlich & Wilson, 2023).

While the benefits are likely to vary between shellfish and seaweed aquaculture (Forbes et al. 2022; Theuerkauf et al. 2022), potential ecological benefits of regenerative aquaculture might include improvements in water quality and nutrient removal (Gentry et al. 2020), the mitigation of acidification of the ocean on a local level (Mongin et al. 2016), and habitat provision for fish and mobile invertebrates (Forbes et al. 2022; Theuerkauf et al. 2022).

One potential contribution of particular interest on the NSW South Coast is the role that kelp farms might play in restoration and regeneration of degraded ecosystems (Layton et al. 2020; Filbee Dexter et al. 2022). Wild kelp forests play a significant role in maintaining ecosystem health, but are under threat from a variety of stressors in many parts of Australia (Hawkins et al. 2019; Layton et al. 2020).

A recent study projected the collapse of half of all kelp beds along 500kms of the Australian coast (including NSW) by 2030 (Ling & Keane, 2024). Significant concerns have also been raised by Traditional Owners and members of the scientific and broader community about the decline of kelp forests off the NSW coast in recent years (Stewart, 2020; Andrew, 2022).

The kelp farms proposed on the NSW South Coast will farm the local native species of kelp, *Ecklonia radiata*, and it is hoped that these farmed kelp may assist in maintaining local kelp forest health by providing increased reproductive 'seed' in the natural environment (Layton et al. 2020; Filbee Dexter et al. 2022; Forbes et al. 2022).

Water Quality

Kelp farming has been observed to reduce the levels of nutrients within the water column, which can result in improvements in water quality, especially when located in areas where high nutrient loads are associated with issues like algal blooms and eutrophication (Hasselström et al. 2018; Campbell et al. 2019).

Shellfish aquaculture can put extra nitrogen into the ecosystem and can change local ecology, however, when located in areas where tidal movements allow for regular flushing of water, the impact of this is minimal (Würsig & Gailey, 2002).

Co-locating shellfish farms with seaweed aquaculture is a growing area of scientific interest, as this might also assist in maintaining water quality (Buck, 2017; Stenton-Dozey et al. 2021).

Climate Change Mitigation

Kelp does absorb carbon through photosynthesis by using sunlight to create energy, exactly as trees and plants do. However, the long-term storage or sequestration of this captured carbon remains an area of complex and ongoing research (Hurd et al. 2022; Ross et al. 2023).

Options to 'lock up' captured carbon include 'sinking' kelp at depth or incorporating seaweed into building products, and more indirect means of sequestration by providing an alternative to more carbon intensive products. For example, it can be used as a feedstock for cattle that requires less resource intensive farming than other sources of feed such as grain (Costello et al., 2020, Spillias et al. 2023b).

There is also potential for seaweed to be used in the production of renewable energy through seaweed as a bio-gas (Demel, Longo & Mariel, 2020) and bio-plastics (Visch et al. 2023).

While it is recognised that seaweed farming does hold potential as a carbon neutral or even carbon positive future industry, more research is required to fully understand and measure the carbon storage potential of kelp and other forms of regenerative aquaculture.

1.1.2. Regenerative aquaculture proponents on the NSW South Coast: motivations and perspectives

At a local scale, the potential benefits of regenerative aquaculture to the South Coast region were a strong motivator for proponents actively exploring farming opportunities in the region.

Interviews with a number of proponents who participated in this study highlighted a firm belief in the potential for positive social and community benefits¹. The creation of local jobs was one such benefit:

“

Well, I think first and foremost it's an industry that will create jobs for remote and coastal communities (Proponent).

I like that it's done in clean waters, so it's generally a regional industry. It's creating regional jobs, it's creating diversifying skills, so there'll be people needed for hatchery technicians and lab assistants and that sort of stuff. There'll be just casual work for processing, once we get the biomass that I'm predicting we'll be able to employ people in relatively unskilled work, but washing, drying, hanging, that sort of stuff, but regular. There'll be opportunities for boats and diving and then also for ongoing potential research (Proponent).

”

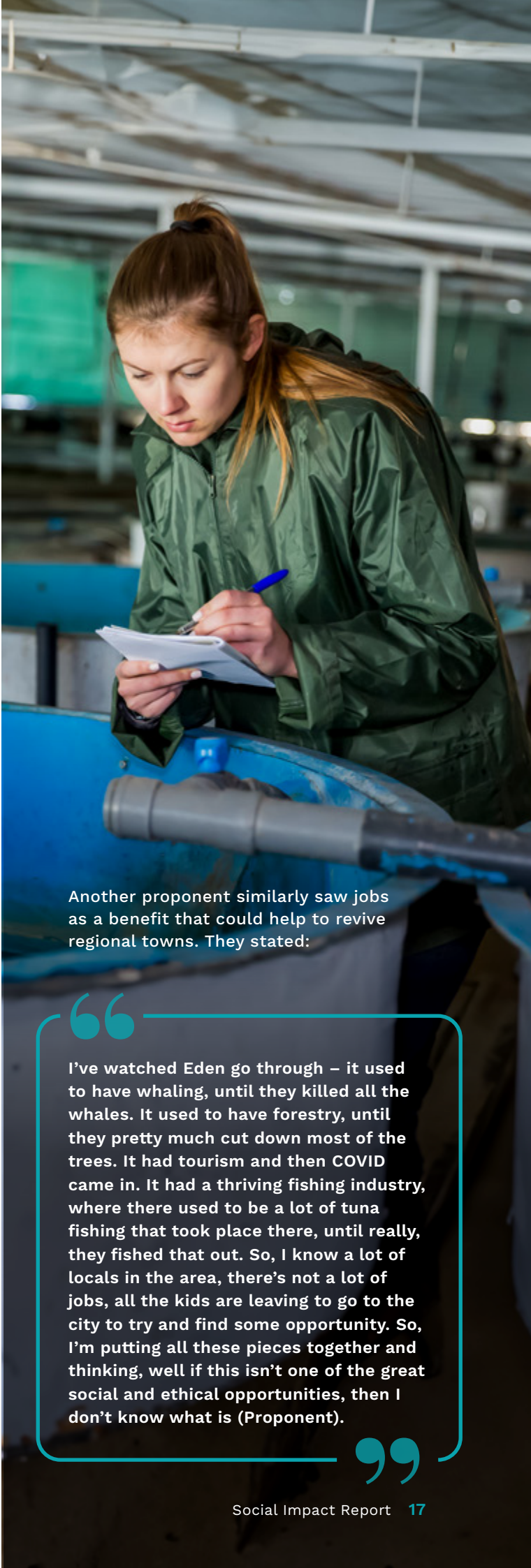
All the proponents saw the development of the regenerative aquaculture industry in NSW as having benefits to the health and wellbeing of the community, including food security and nutritional benefits.

“

It creates high protein food... we would be able to sell it as a natural high protein food source (Proponent).

...the benefits are probably food security for everyone... the benefit that it will create in just a food source is where it'll be (Proponent).

”

A woman with long brown hair tied back, wearing a green raincoat, is leaning over a blue industrial tank or container. She is holding a small white notepad and a blue pen, writing on it. The background shows an industrial facility with metal structures and pipes.

Another proponent similarly saw jobs as a benefit that could help to revive regional towns. They stated:

“

I've watched Eden go through – it used to have whaling, until they killed all the whales. It used to have forestry, until they pretty much cut down most of the trees. It had tourism and then COVID came in. It had a thriving fishing industry, where there used to be a lot of tuna fishing that took place there, until really, they fished that out. So, I know a lot of locals in the area, there's not a lot of jobs, all the kids are leaving to go to the city to try and find some opportunity. So, I'm putting all these pieces together and thinking, well if this isn't one of the great social and ethical opportunities, then I don't know what is (Proponent).

”

Arguments in favour of regenerative aquaculture included efficient use of space, and the need to maximise food production from the limited available area for aquaculture. The positive environmental potential of this industry was also spoken about by proponents as being a motivating factor in their pursuit of commercial licences:

... (this proposal) gave me a real passion and purpose to feel like I could do something positive for the environment. So, it really ticks a lot of boxes for my reason to be here. (Proponent).

Another stated:

... kelp farming provides a hopeful solution, it provides something...that you can hang on to that will make a little bit of a difference. I like that side of it, the social impact as well. I think it's really a positive thing that we can actively do something with a view to having an impact on the climate situation, whereas a lot of the time you feel a bit overwhelmed by the situation (Proponent).

Proponents spoke about issues such as kelp decline and climate change as reasons why they believed the industry to be so important:

It was Ecklonia that was very abundant ... Then it stopped coming in, it's declining and now we're getting a shift, there's more Phyllospora or crayweed on the South Coast than ecklonia. (Proponent).

But the more I looked at the data, the more I realised that this situation's very serious [climate change, warming oceans, and kelp decline], the ramifications of not doing something are greater than the ramifications of trying to move quickly. So, I then started to turn into the very thing I vowed I'd never be [laughs], which is a bit of an environmental zealot... It's life and death. I'm telling you, this situation, in five years' time we'll look back at this meeting and we'll say did we move the dial or didn't we? At some point, if all the kelp dies out, we're only going to have ourselves to blame and I think that's what it's going to require. There's going to have to be some kind of crisis, where someone writes a report that says, really, we're not going to have any kelp left (Proponent).

Whilst discussing the multitude of environmental benefits they perceived from the industry respondents also acknowledged that it could have some environmental impacts.

However, proponents were confident that impacts could be managed or mitigated and argued that the impacts of regenerative aquaculture needed to be put in context of a range of what they considered to be more significant threats, such as climate change and the loss of biodiversity associated with declining kelp forests. F

or example, when considering the threat of whale entanglements:

The last thing I want to do is create some kind of a whale trap and that's definitely a concern... to my knowledge, and I've tried to read everything I can and speak to everyone I can, there's never been a case of a mammal entangling itself in a kelp farm anywhere in the world, because they're under tension. They're very smart creatures (Proponent).

¹ In order to protect the anonymity of the proponents we have chosen not to differentiate between individuals

1.2. Current status of regenerative aquaculture in Australia

Regenerative aquaculture remains largely in its infancy in Australia, and in particular within NSW. This report considers two main types of regenerative aquaculture; seaweed (particularly kelp) farming, and shellfish farming. It is possible for both these types of farming to be co-located.

1.2.1. Seaweed (kelp)

The coastal waters of Australia boast a myriad of native seaweed species, demonstrating potential for various markets. Seaweed ocean farms require no addition of feed, freshwater or fertiliser, and there is no waste from marine plants (Kelly, 2020; FRDC, 2022).

Seaweed aquaculture in Australia presents potential opportunities across diverse sectors, including food production, animal feed, biofuels, and fertilizers. Seaweed, a member of the algae family, constitutes a significant subgroup. The cultivation of seaweed is feasible on both land and at sea, minimising its environmental footprint. While historically utilised by Indigenous Australians for various applications, Australia's commercial seaweed production currently falls behind that of other regions such as Asia, Europe, and America (Kelly, 2020; FRDC, 2022).

The 2023 report Seaweed Aquaculture Governance in Australia (Kelly & Macleod, 2023) showed that despite seaweed being recognised as a potential area of growth in the Australian Government's National Aquaculture Strategy (Department of Agriculture and Water Resources, 2017), there were still many knowledge gaps and barriers to the development of the industry in Australia. The report by Kelly and Macleod (2023) suggested that the reasons for this included:

- △ “Seaweed is not embraced as a serious aquaculture industry in Australia” (p.6)
- △ “Difficult to obtain large scale ocean lease areas in most state and Commonwealth waters” (p.6)
- △ “Regulation and licencing of seaweed aquaculture is complex, onerous and different in each state” (p. 5).





While opportunities exist to foster a commercial seaweed industry in Australia complex state-based regulatory frameworks have complicated the process. Currently in NSW, there are no commercially licenced seaweed farms.

There are existing licences for wild harvest kelp, as well as land-based seaweed operations. There are mussel aquaculture leases in Jervis Bay and Twofold Bay.

The projects being considered within this report relate to farming native species of kelp, primarily focused on *Ecklonia radiata*. This species is farmed by spores being seeded onto spools of grow line and strung between buoys. This grid-shaped network of grow lines makes up the farm. The seaweed is then harvested after about six months and dried in the sun or commercial dryer before being granulated.

1.2.2. Shellfish (including Mussel and abalone) farming

In Australia, mussel farming is a relatively new venture undertaken in embayments of the southern states.

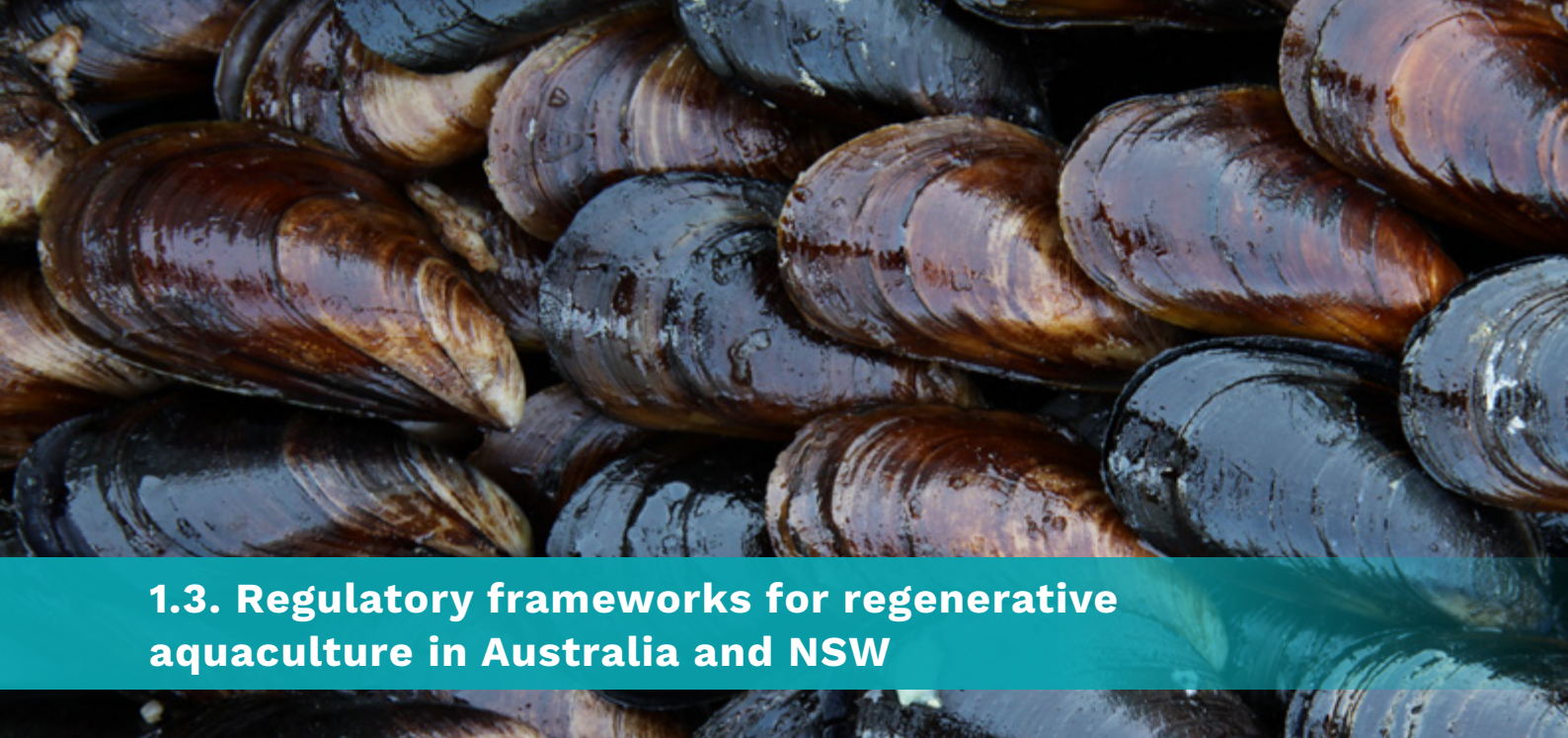
A number of species are cultured around the world, the blue mussel (*Mytilus galloprovincialis*) is the only marine mussel species farmed in Australia. Although the blue mussel in Australia is similar to and share the same scientific name with the one from southern Europe, it is native to Australia and has been found in ancient Aboriginal middens².

Wild caught and hatchery-reared spat settle on special spat ropes and allowed to grow before being mechanically stripped from the ropes, graded and reseeded to culture rope. The time it takes for mussels to reach market size from spat varies between regions. In Eden and Jervis Bay, it is a little over one year³.

The infrastructure and methods associated with mussel farming are complementary to seaweed farming, therefore, it is possible to co-locate these species within the one farm.

² <https://www.dpi.nsw.gov.au/fishing/aquaculture/about-aquaculture>

³ <http://southcoastmariculture.com.au/mariculture>



1.3. Regulatory frameworks for regenerative aquaculture in Australia and NSW

The 2017 National Aquaculture Strategy by the Australian Government states that one of their priorities is to develop “an efficient, effective and supportive regulatory environment that reflects best practice” (Department of Agriculture and Water Resources, 2017). However, presently the policy landscape is complicated as each jurisdiction has individual policy, legislation and regulations surrounding the industry (for further information, see Kelly & Macleod 2023).

Table 1 (following page) shows the current regulatory frameworks in relation to help aquaculture in Australia’s states and territories. NSW has one of the most comprehensive and challenging approvals processes in Australia. The planning controls for marine aquaculture in NSW are set by the Environmental Planning and Assessment Act 1979 (NSW) (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. The State Environmental Planning Policy (Primary Production and Rural Development) 2019 currently provides the key regulatory framework for aquaculture⁴).

In NSW, new aquaculture developments are assessed as State Significant Developments (SSD). This is because all marine waters are classified as ‘a sensitive environmental area’ which triggers SSD legislation. SSD regulations require a range of rigorous environmental, social, cultural, and technical assessments to gain approval.

The nature and scope of these assessments is defined by a dedicated set of Secretary’s Environmental Assessment Requirements (SEARS) specific to each project.

A significant difference between NSW and other states relates to the level of risk managed by the state, as opposed to industry. As identified in Table 1, South Australia (SA) is currently the most advanced state in the country in relation to its level of sophistication within its regulatory frameworks for managing the emerging regenerative aquaculture industry.

In addition to its relatively clear and comprehensive regulatory framework, SA assists to de-risk aquaculture development for proponents by undertaking research and development trials, declaring aquaculture zones, and undertaking community consultation prior to opening up new areas for aquaculture development. In comparison, the onus of site selection, research and development, and community consultation in NSW is primarily left to individual developers.

⁴ <https://www.planning.nsw.gov.au/policy-and-legislation/state-environmental-planning-policies/primary-production-and-rural-development>

Table 1: State-based comparison of governance for seaweed aquaculture development in Australia
(adapted from Agri futures 2023)

	QLD	NSW	VIC	TAS	SA	WA	NT
Specific seaweed sector strategy/policy	No	No ⁵	No	No	Yes	Yes	No
Provision for seaweed aquaculture in existing legislation	Yes	Yes	No ⁶	Yes	Yes	Yes	Yes
One-stop shop for all aquaculture approvals	No	No	Yes	Yes ⁷	Yes ⁸	Yes ⁹ – proclamation of the ARMA ¹⁰ will fully embed this	No
Designated zones for seaweed aquaculture in formal marine spatial planning	Some – Great Sandy Regional Marine Aquaculture Plan	No	No	Yes	Yes	No	No
Commercial seaweed aquaculture approved/ allocated	No	Yes	No	Yes	Yes	Yes	No
Provision for pilot/trial/ research license	Yes – development application still required	Research permits available (not explicitly linked to aquaculture strategy)	Yes	Yes	Yes	Yes	Yes
Research/trials conducted or in progress	Yes – two small pilots underway in different regions	Yes – one R&D trial currently underway in Disaster Bay	Yes – Some small-scale pilots on sites within aquaculture reserves	Yes	Yes	Yes	Yes

Table 2 is a summary of the process for developing a regenerative aquaculture project in NSW. It was collated from existing regulatory documents (e.g., the NSW Marine Waters Sustainable Aquaculture Strategy and EP&A Act requirements) and interviews with existing proponents and NSW DPI. It incorporates an estimation of costs and timelines.

At present SEARS have been issued for two businesses seeking to establish seaweed farms in three lease areas in Bermagui, Pambula and Eden. An additional three leases have been identified as sites for future regenerative aquaculture businesses with plans for these sites still in under development.

⁵Aquaculture strategy mentions seaweed.

⁶Review of seaweed aquaculture governance arrangements in progress at time of publishing.

⁷Application and assessment process managed by single agency. Separate permit from Fisheries for collection of broodstock/seedstock.

⁸Application and assessment process managed by single agency. Separate permit from Fisheries for collection of broodstock/seedstock.

⁹Application and assessment process managed by single agency. Separate permit from Fisheries for collection of broodstock/seedstock.

¹⁰Aquatic Resources Management Act 2016.

Table 2: An overview of the approvals' pathway for regenerative aquaculture developments in NSW, with estimated cost and timelines. Sources: NSW Department of Primary Industries (2018), State Significant Development Guidelines, SEARS for the case study areas and interviews with proponents and NSW DPI

Steps	Details	Relevant Authority	Approx. Cost	Approx. Time
Lease identification	<p>Preliminary assessments and identification of the proposed lease area by the applicant - in accordance with the NSW Marine Waters Sustainable Aquaculture Strategy (NSW MWSAS) and other considerations</p> <p>NSW DPI approval of lease area</p> <p>Public Tender for designated lease area</p> <p>Class 2 Aquaculture Licence issued by NSW DPI to successful tenderer¹¹</p>	NSW Department of Primary Industries (DPI)	Up to A\$200,000 (through pre-assessments, although it should be noted some of these costs would likely be offset by later reductions in costs at the EIS stage)	12 months
Applying for Secretary's Environmental Assessment Requirements (SEARs)	<p>Application and scoping report prepared by the applicant and submitted</p> <p>Assessment and issuing of SEARs setting requirements for EIS</p>	Dept of Planning, Housing and Infrastructure (DPHI)	A\$50,000	3-6 months
Preparation of Environmental Impact Statement	<p>Conflict between users and uses.</p> <ol style="list-style-type: none"> 1. Community engagement and stakeholder strategy 2. Assessment of biodiversity impacts 3. Navigation risk and impact assessment 4. Assessment of impacts on coastal processes 5. Biosecurity risk assessment and biosecurity management plan, 6. Quantitative assessment of potential marine water quality impacts 7. Quantitative traffic impact assessment 8. Aboriginal Cultural Heritage Assessment Report (ACHAR) 9. Heritage impact assessment 10. Assessment of visual impacts 11. Quantitative noise and vibration impact assessment 12. Assessment of waste impacts and waste management plan, 13. Description and identification of impacts on any offshore resources, exploration and mining. 14. A social impact assessment 15. Draft construction, and deployment management plan 	Multiple agencies and acts	A\$400,000-A\$1m	Up to 24 months

¹¹ Note: the successful tenderer may not be the original applicant for the site given the lease area is offered for public tender.

Steps	Details	Relevant Authority	Approx. Cost	Approx. Time
Public exhibition of EIS and public consultation	EIS is placed on public exhibition Public consultation and response to submissions as well as any amendments to EIS by proponent	DPHI	Unknown	28 days (Minimum)
Assessment and determination	Assessment of EIS and recommendations Decision, including any post approval requirements	DPHI Consent Authority		Unknown

As can be seen in Table 1 (section 1.3), at the time of data collection, NSW had, and continues to have, some of the strictest regulatory process relating to the development of kelp and seaweed in Australia. Throughout the project, it became clear that the current regulatory processes, particularly in relation to the requirements for approval of a SSD approval, were seen as prohibitive barriers to gaining consent to grow kelp commercially by all the existing of proponent and prospective proponents.

In interviews with the proponents, feelings of frustration were discussed relating to their experiences of the governance processes. Some participants felt that the Department of Primary Industries (DPI) had handed on the responsibility and the risk of developing a new industry to the proponents, rather than assuming the responsibility themselves.

“

I think what they've done is handed on the responsibility. Like... they don't want to take any responsibility over it, is the way I see DPIs approach (Proponent).

”

They further discussed the amount of risk, both financially and in terms of time and energy that they have put into these processes for little return.

“

Look, I've put the handbrake on at this stage. Just until we know where DPI sits. Because as I say, like it could be – business wise, it could be fantastic, but reality is, to get it to that point, I just don't see the point in putting up hundreds of thousands of dollars to still have a question mark there (Proponent).

”

The same proponent goes on to state:

“

But then I was still - me personally, was still overwhelmed and I was still concerned about what the risk is. Not knowing. Even - you're excited about your own plans because you understand what - my strength is understanding what we want to do and probably achieve in that. But then to the actual regulatory stuff - was just - I couldn't actually see it being achieved. I still, at this stage, can't see it actually being achieved without a huge cost and huge risk (Proponent).

”

When asked what the biggest challenges facing the industry are in NSW, one proponent stated:

Governance and regulation, lack of support (Proponent).

Proponents felt that funding for research and development should be provided to assist with the development of the industry. They expressed their frustration at not being able to properly conduct trials without having to spend a lot of money on the regulatory process.

Get the trials proven and then go righto [sic], this is what you could actually do on this farm, and this is where you can have that sustainable farming model... but I think trials should have been done before someone loses money or makes money (Proponent).

2. Methodology

This report aimed to undertake an initial identification of possible social impacts resulting from the establishment and ongoing operation of regenerative aquaculture.

The details of the methods employed are contained in the sections below. Ethics approval was required through the University of Wollongong Ethics Committee (approval number 2022/371) to conduct the survey, interviews, and research workshops/focus groups.

2.1. Primary and secondary data and literature review

Desk top analysis of the socio-economic and demographic characteristics of the region, including the specific case study localities (see below), was undertaken using available statistical data.

Preliminary identification of potential social impacts was also conducted via desktop literature reviews and comparative studies of both Australian and international examples of seaweed aquaculture to assist in determining the potential scope and extent of any social impacts associated with regenerative aquaculture. Scoping studies already conducted by the proponents, and review of “grey” literature including government reports and media reports were also examined.



2.2. Regional survey

To inform the identification of social impacts and complement the finer-scale interviews and focus groups (detailed in sections 2.3), a telephone survey was conducted across the three LGAs of interest (Bega Valley Shire, Eurobodalla and Shoalhaven).

The regional survey was administered by a contracted fieldwork company, Taverner Research Group, who conducted the telephone surveys using telephone information held in their internal databases.

The fieldwork company did not call anyone under 18 years of age. The survey sample was drawn equally across LGAs, with quota controls for age and gender. The survey questionnaire as administered to telephone respondents can be found in Appendix A.

The telephone survey method contacted people located in the LGAs of interest using their phone numbers. The survey company used a standard CATI system for the telephone survey. A total sample of $n = 540$ people was drawn from the three LGAs, a subsample of $n = 180$ per LGA.

Quotas for age, gender and LGA residence were used to balance the total sample across key demographics. A balance across age groups was not able to be achieved, with older demographics over-represented in the sample (see Figures 1 and 2 on the following page).

In Bega Valley and Eurobodalla LGAs, over half the achieved sample were over 65 (i.e., around Australian retirement age), while across the entire sample, those aged over 55 contributed 60-80% of responses.

Over-representation of older demographics may be more common in telephone surveys, due to a tendency of older people to answer phone calls and to be more available and willing to spend time undertaking surveys (Glass et al., 2015).

This tendency is also heightened in these LGAs of interest due to the older demographics in these LGAs (see section 3.4).

Figure 1: Average Age of Survey Respondents Across All LGAs (n=540)

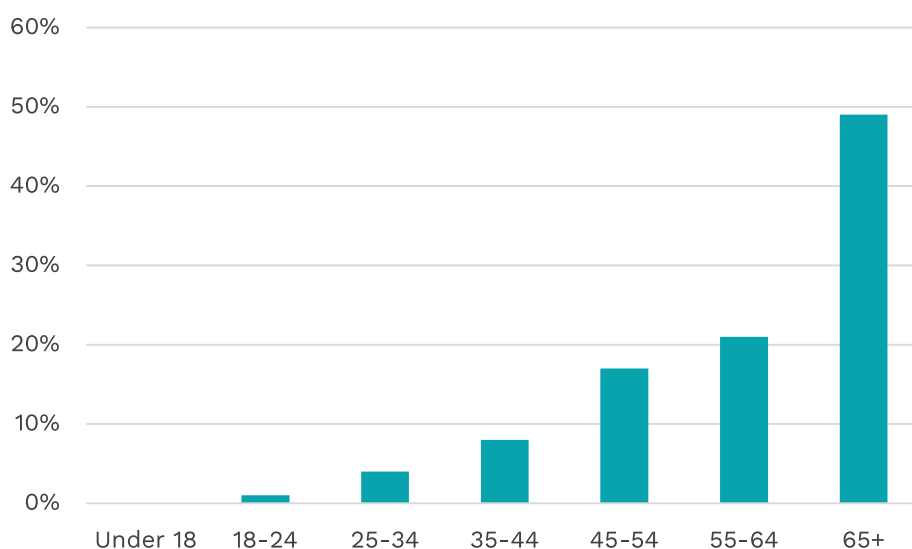
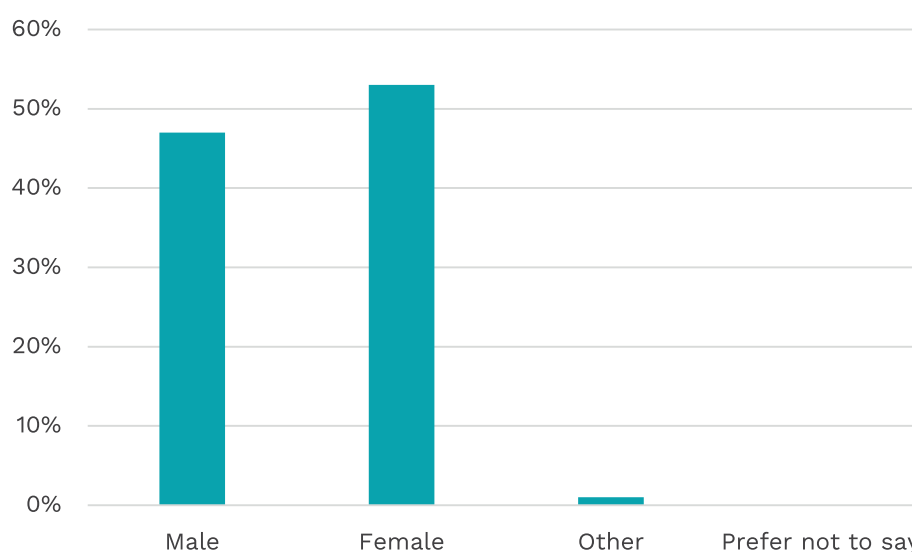


Figure 2: Percentage of Survey Respondents by Gender Across all LGAs (n=540)



Of the respondents, many were retired and were no longer employed (see Table 3 below). Of those who were not retired, most were employed in healthcare or education, were self-employed, or worked for government.

The majority of respondents in each LGA owned their own homes, and most lived quite close to the coastline (Figure 3).

Over 50% of respondents across the subsamples lived less than 5km (travel time) from the coastline, with 87% of respondents in Eurobodalla living close to the coast. A vast majority of respondents held some kind of tertiary qualification (TAFE, university, etc.).

Figure 3: Percentage of Survey Respondents' living adjacent to the coast (n=540 and n=180 in each LGA)

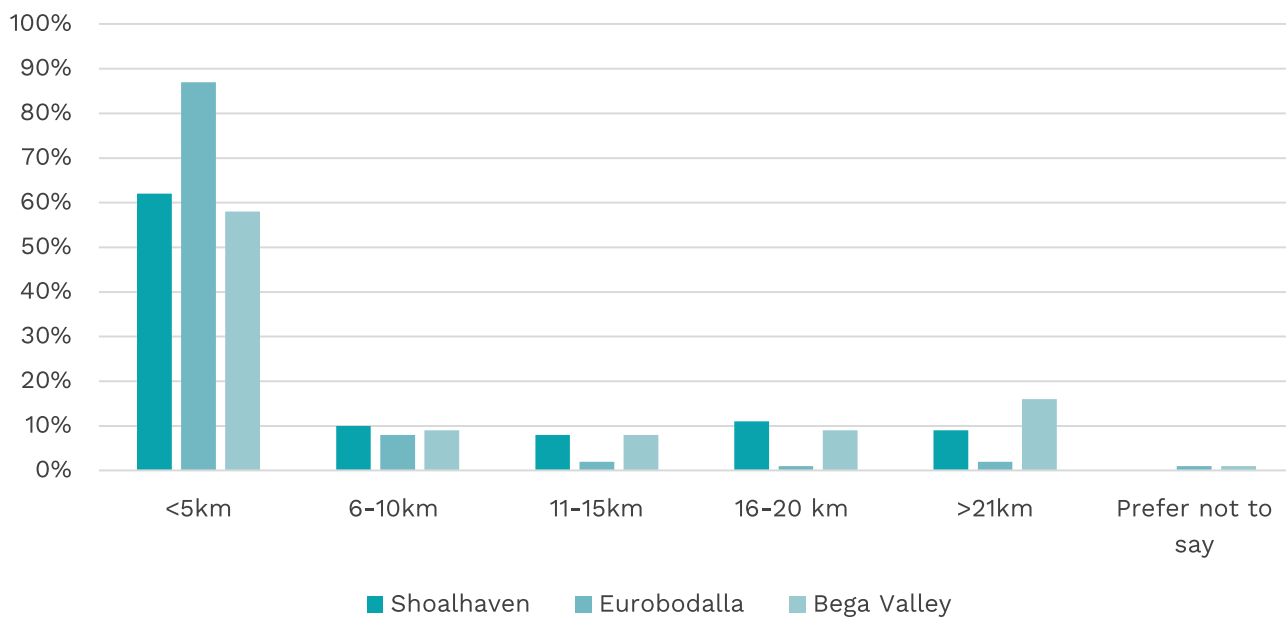


Table 3: Retirement and homeowner status of survey participants

	Shoalhaven	Eurobodalla	Bega Valley
Retired	41%	54%	47%
Owned or mortgaged home	83%	89%	87%
Tertiary education	96%	97%	95%

2.3. Detailed case studies

In addition to regional scale assessment of community attitudes and socio-demographic analysis, two detailed case studies were examined. The case studies focused on two businesses seeking to establish seaweed farms in three lease areas in Bermagui, Pambula, and Eden - Sea Health Products and Auskelp.

The project chose to focus on these proponents and their lease areas as existing SEARS had been issued for these sites and planning and assessment processes were. Using these sites as case studies allowed the research team to observe and record the experiences of both industry and the community and capture current sentiment to help inform the development of an industry wide report.



Sea Health Products is a family company based in Tilba, which hand harvests seaweed from local beaches. The seaweed is dried and processed into powder or granules that can be made into fresh organic products. While demand for kelp products is growing, supplies of kelp have declined. In response Sea Health have developed a proposal for two kelp farms in Bermagui (Haywards Beach – Figure 4a) and Pambula (Merimbula Bay, Figure 4b).

Figure 4a & 4b: Seahealth products lease locations in Bermagui (Haywards Beach) and Pambula (Merimbula Bay).

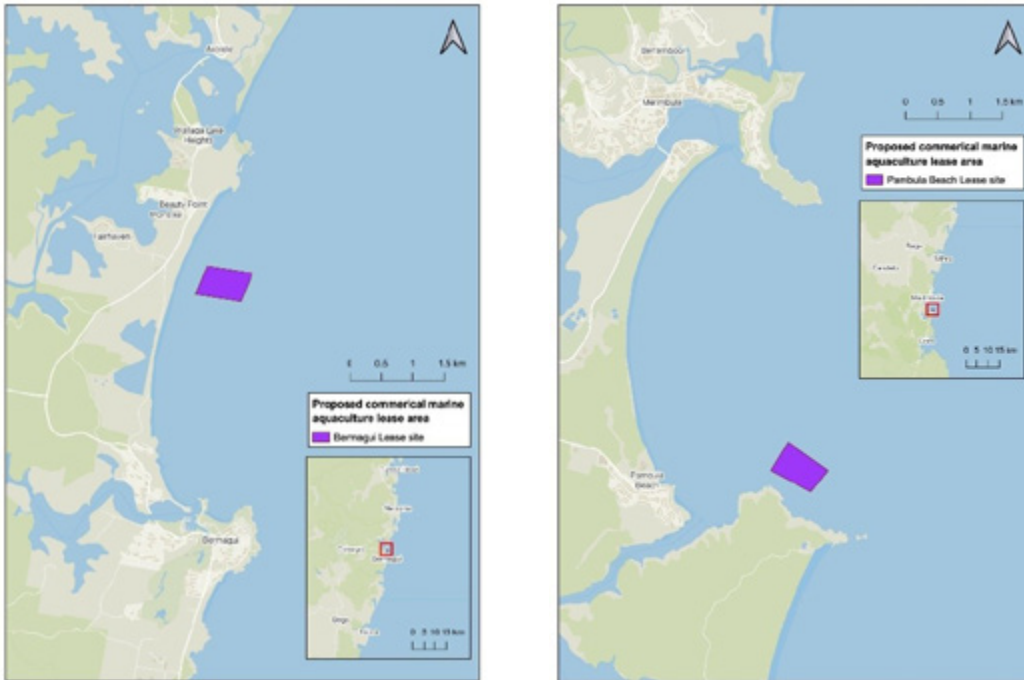


Figure 5: Auskelp Pty Ltd lease location in Disaster Bay (Wonboyn)



Auskelp

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.

Auskelp Pty Ltd is seeking approval for the development of a 200-hectare seaweed aquaculture marine farm on aquaculture lease area within Disaster Bay, off Wonboyn (Figure 5).



2.3.1. Interviews

Semi-structured interviews were held with representatives from identified key stakeholder groups, including community members, recreational and commercial fishers, environmental NGOs, and government regulators.

Interviews were also conducted with experts in the field such as industry representatives, academics, and policy makers. Interviews enabled in-depth discussion that can allow for nuanced personal perspectives to be explored. Interviews were recorded and transcribed, and analysed using NVIVO qualitative software.

A total of 16 interviews with 18 participants were conducted with community members and stakeholders from across the region between July and September 2023. Interview participants included 4 industry proponents, as well as, members of the commercial fishing industry, community members, representatives from conservation groups, and a member of local council. Table 4 shows the types of interview participant, as well as the location of the interview.

Table 4: Type and Location of Interview

Stakeholder Group	Number of Interviewees	Location
Proponents	4	Batemans Bay, Eden, Bermagui, Jervis Bay
Local Government	1	Bega
Fishers	6	Eden, Narooma, Bermagui
Local Residents	3	Merimbula, Bermagui, Wonboyn
Conservation groups	2	Bega, Narooma
Oyster Farmers	1	Wonboyn
Tourism Operators	1	Eden
Total	18	

The concerns and issues (positive and negative) expressed in the interviews are outlined in the Results section below under the categories of social impact most commonly considered within Social Impact assessments (as required by the Department of Planning’s Social Impact Assessment Guideline for State Significant Projects)¹².

2.3.2. Focus Groups and research workshops

Three research workshops and one drop-in session were held between July and September 2023 in Bermagui, Tura Beach and Eden (research workshops) and Womboyn (drop-in session).

The workshops involved a mix of two open forum public meetings, one invited closed forum meeting with the University of the Third Age (U3A) in Tura Beach and one open community drop-in session (See Table 5).

The research workshops were organised in collaboration with an interactive information session by the proponents (Sea Health Products in Bermagui and Tura Beach, Auskelp in Eden and Wonboyn). The collaboration aimed to serve the following dual purposes: interview.

1. For the proponents, the sessions provided an opportunity to introduce the Bermagui, Eden and Wonboyn communities to their proposals to facilitate ongoing conversations around the potential development of the farm.
2. For UOW, holding the workshop in conjunction with the information sessions allowed the researchers to gain insights into community reactions and responses to the proposals.

The research workshop involved small group discussions using a deliberative democracy methodology known as a world café (Löhr et al., 2020). Participants moved around three tables and responded to the following questions at each table:

Table 1: Head

- △ Does regenerative/seaweed farming seem like practical/feasible/logical plan to you? Why/why not?
- △ What further information or practical considerations are required?

Table 2: Heart

- △ How do you feel about this project proposal?
- △ In principle, does this seem like the 'right' thing to do to you? Why/why not?

Table 3: Ears

- △ What does 'good' consultation look like in your experience?
- △ How would you like to be consulted in this process?

The drop-in session at Wonboyn was a more informal activity with participants able to respond to discussions through short interviews or informal discussions with UOW staff.

Table 5: Research Workshop Details

Focus Group	Details	Number of attendees
Bermagui	A research workshop was held on 20 July 2023 in Bermagui, NSW. The workshop was organised in collaboration with an interactive information session by Sea Health Products on their proposed seaweed farm at Haywards Beach, Bermagui.	Approximately 60 people
Tura Beach	A research workshop was held on 21 July 2023 U3A in Tura Beach, NSW. The workshop was organised in collaboration with an interactive information session by Sea Health Products on their proposed seaweed farm at Pambula. This meeting was an invitation only event to members of the U3A group.	Approximately 20 people
Eden	A research workshop was held on 14 September 2023 with in Eden, NSW. The workshop was organised in collaboration with an interactive information session by Auskelp Pty Ltd on their proposed seaweed farm at Disaster Bay.	Approximately 35 people.

The workshops produced a range of responses from community, reflecting the specific site-specific concerns of community members associated with each of the proposed developments. The results of the focus groups are outlined in the Results section below, along with tables summarising the results of each workshop. This report will focus on responses to questions focused on social and environmental impacts.

¹² <https://www.planning.nsw.gov.au/policy-and-legislation/under-review-and-new-policy-and-legislation/social-impact-assessmenttender>.

3. Results and findings

This section outlines the data that were captured throughout the survey, focus groups, workshops, and interviews of research participants.

It will start by outlining general attitudes and perceptions towards both the ocean, as well as the development of the industry. It then outlines the findings in relation to community perceptions of the impacts and benefits of regenerative aquaculture, grouped in accordance with the social impact assessment categories commonly used in social impact assessment reporting (as required by the Department of Planning's Social Impact Assessment Guideline for State Significant Projects)¹³.

Throughout the results, both qualitative and quantitative data will be discussed together, with illustrative quotes and survey statistics being used to demonstrate key points.

3.1. General Attitudes and Perceptions Towards the Development of a Regenerative Aquaculture on the NSW South Coast

The regional survey provided a broad picture of community attitudes and concerns regarding ocean industry developments, specifically regenerative aquaculture.

The results from the survey suggest that, in aggregate, residents in these LGAs feel a very strong emotional connection to the ocean and use the ocean frequently for recreation and as a source of general physical and emotional well-being (See Section 3.3 and 3.7). They value the ocean as a pristine environment and want to keep it that way. However, this is balanced by the pragmatic knowledge that the ocean is also a place for industrial and commercial activity, and through this activity, a source of economic wellbeing for local communities.

Figure 6 outlines community acceptance of major maritime industries both established and emerging. It highlights a high level of comfort with all forms of aquaculture not requiring feed – particularly oyster and mussel aquaculture (88% comfortable) and seaweed aquaculture (81% comfortable) – as well as ecotourism (85% comfortable). Abalone ranching had slightly lower levels of approval (61%).

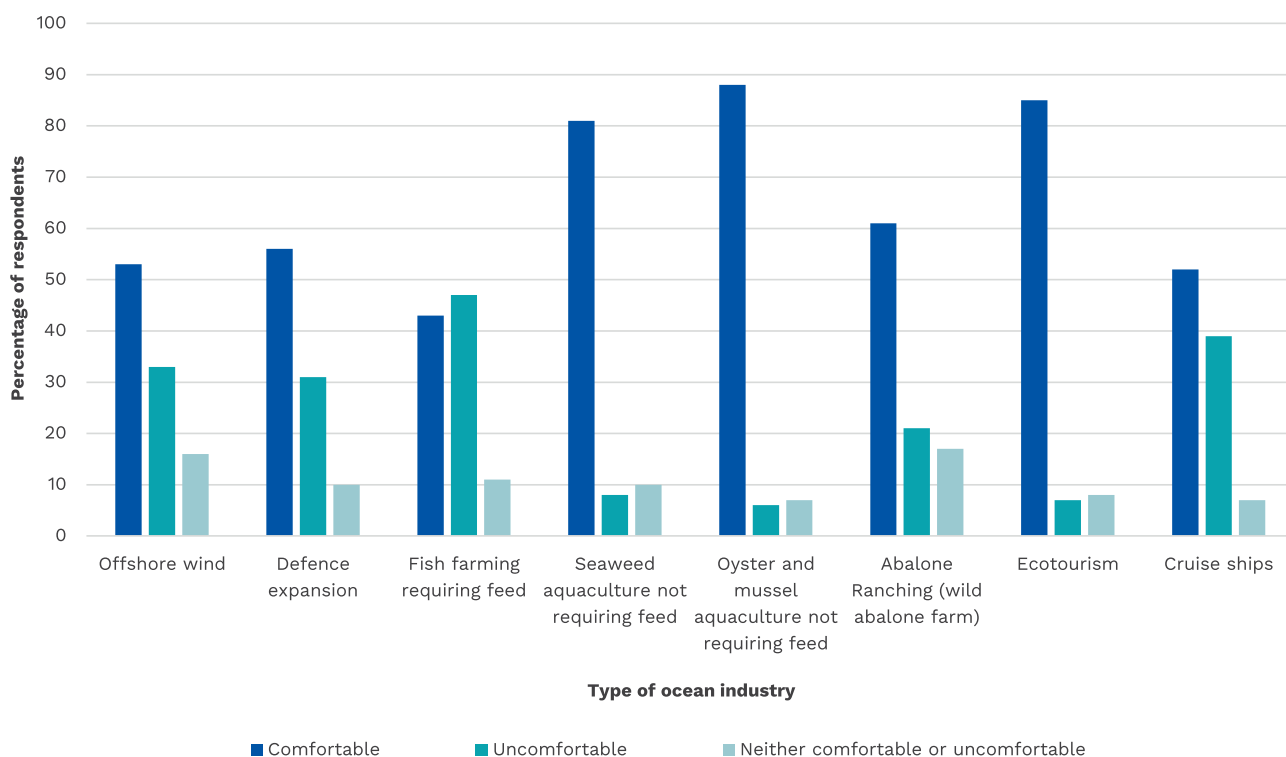
Building on these results, respondents were then asked about their attitudes towards “regenerative aquaculture”, which is an alternate name for non-feed aquaculture used internationally. In this way, we were able to explore the effect of labelling and “brand recognition” on community acceptance of these types of aquacultures.

¹³ <https://www.planning.nsw.gov.au/policy-and-legislation/under-review-and-new-policy-and-legislation/social-impact-assessment>

¹⁴ Please note in the survey respondents were asked their level of comfort or discomfort on a 5-tiered Likert scale ranging from very uncomfortable, somewhat uncomfortable, neither comfortable or uncomfortable, somewhat comfortable, very comfortable. For the purposes of analysis, we have combined the responses from 'very uncomfortable and somewhat uncomfortable' to be 'uncomfortable' and we have combined the responses from 'very comfortable' and 'somewhat comfortable' to be 'comfortable'.



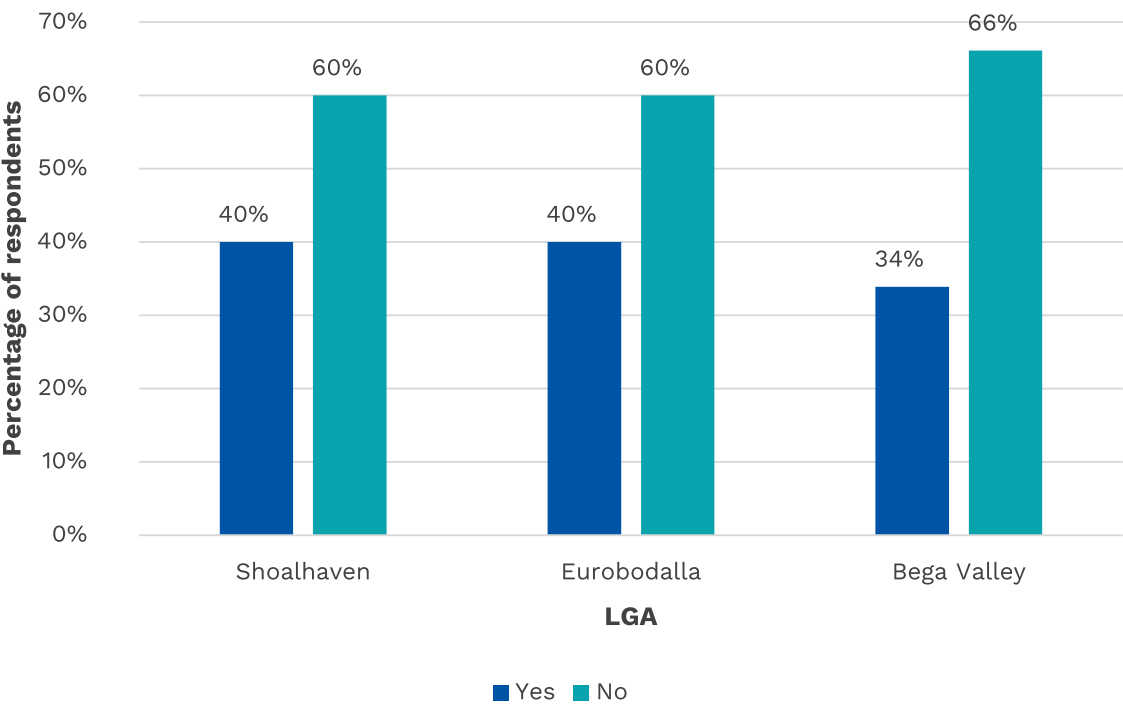
Figure 6: Percentage of Survey respondents reporting levels of comfort when asked: Please indicate whether you feel comfortable or uncomfortable with these industries being developed on the South Coast (n=540)



Respondents were first asked whether they had heard of the term ‘regenerative aquaculture’ (see Figure 7). Most respondents had not; 60% in Eurobodalla and Shoalhaven LGAs and 66% in Bega Valley.

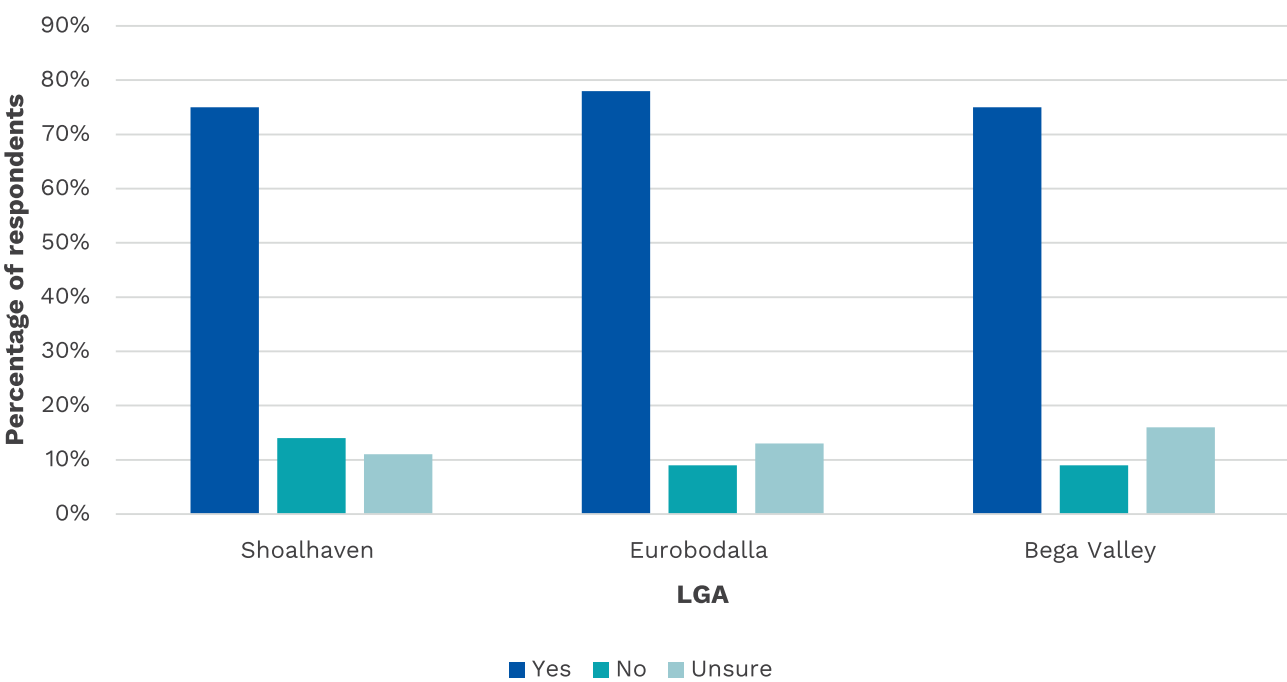
vlf respondents indicated they had not heard of regenerative aquaculture, the telephone survey company read out a block of descriptive text before proceeding with the rest of the survey. This block of text can be found in the survey document in Appendix A.

Figure 7: Survey respondents’ report on the question ‘have you head of the term “Regenerative Aquaculture”’ (n=540, and n=180 in each LGA)



Following this explanation, the participants were asked ‘would you like to see regenerative aquaculture in your LGA?’. The majority (an average of 76%) of survey respondents answered yes to this question (75% Shoalhaven, 78% Eurobodalla and 75% Bega Valley). Conversely, a significant minority (11%) of survey respondents across the 3 LGAs answered no to the same question (14% Shoalhaven, 9% Eurobodalla and 9% Bega Valley) (see Figure 8).

Figure 8: Survey respondents’ response to the question ‘would you like to see regenerative aquaculture in your local area?’ (n=540, and n=180 for each LGA).



These results suggest that the term regenerative aquaculture does not significantly influence the level of acceptability of the relevant types of aquaculture that generally fall within the definition of regenerative aquaculture. That is, levels of approval were generally consistent regardless of the terminology used.

Across the three main types of aquaculture that is generally considered within the regenerative aquaculture (shellfish, abalone and seaweed), levels of comfort averaged at 76%. When specifically asked about regenerative aquaculture, the average levels of comfort were also 76%.

This report will now go on to outline findings in relation to each specific social impact assessment category.

3.2. Environment

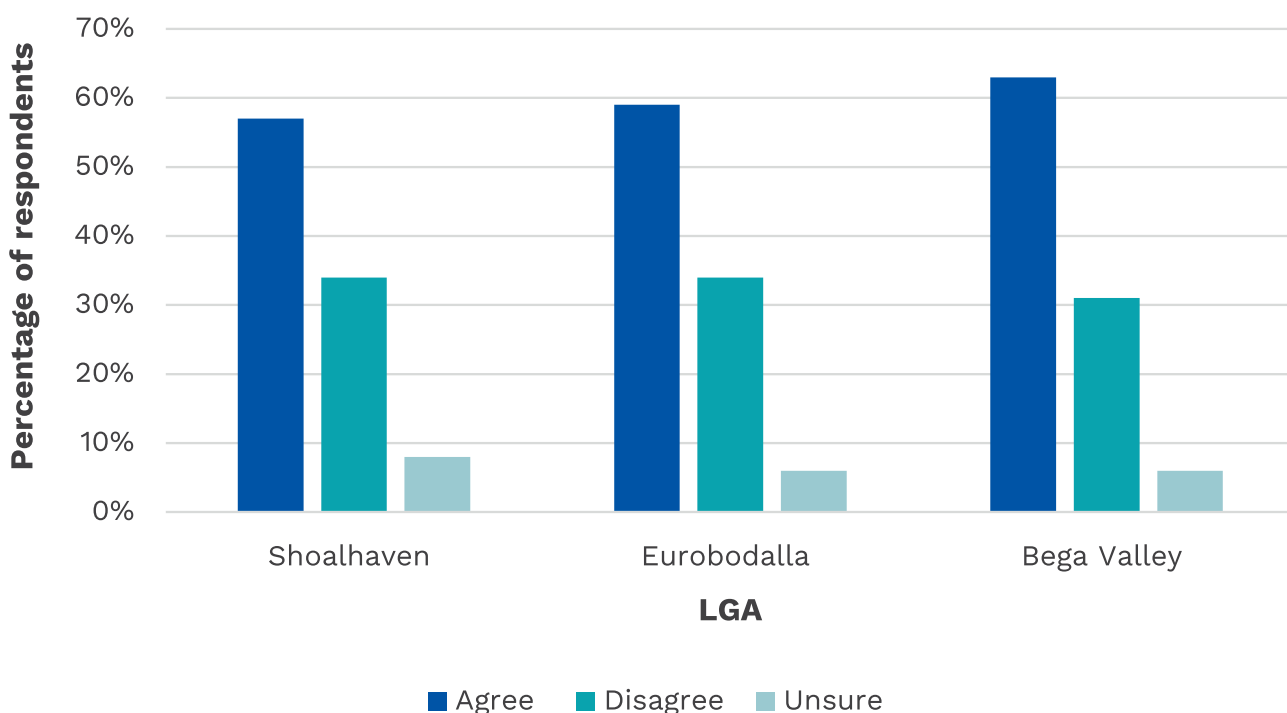
Environment refers to surroundings, including ecosystem services such as pollution control, erosion control, public safety and security, access to and use of the natural and built environment, and aesthetic value and amenity.

3.2.1. Baseline levels of community concerns in relation to environmental health and climate change

The regional survey assessed community-wide attitudes towards significant environmental challenges and concerns.

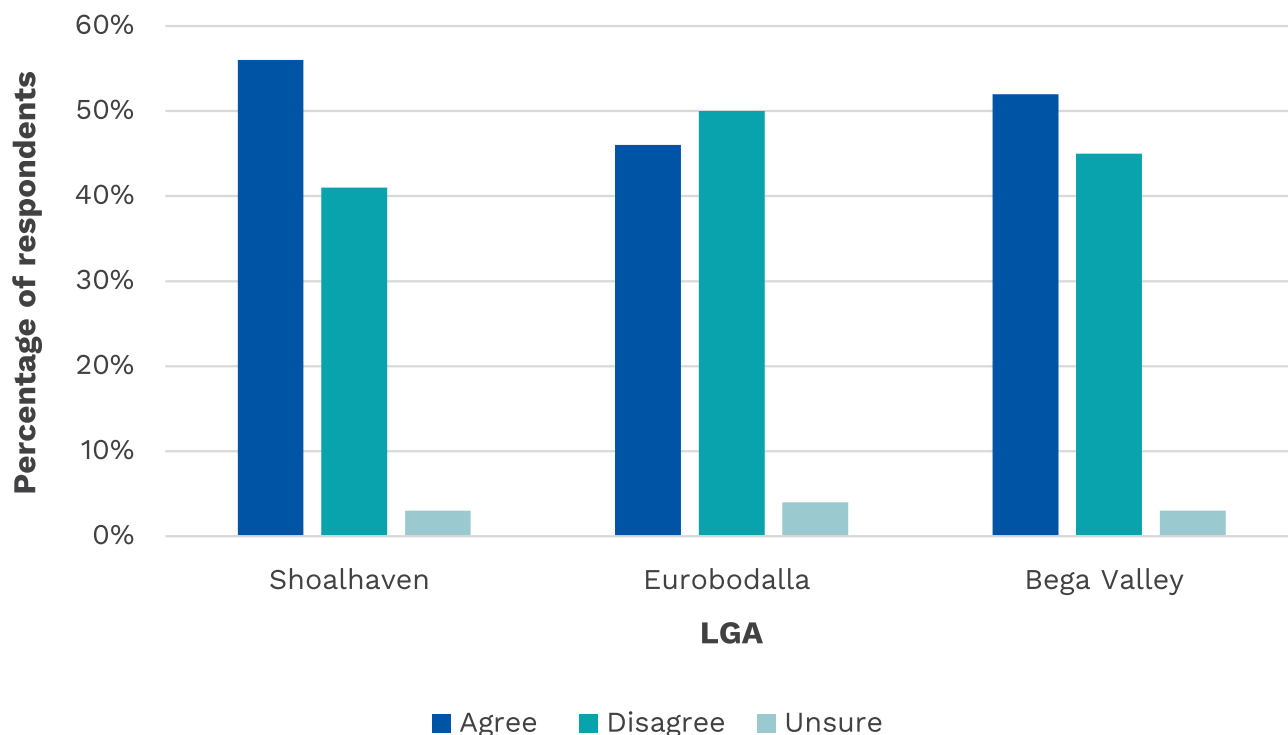
As shown in Figure 9, the survey revealed that most participants (on average 60%) are frustrated by a lack of action on climate change (57% Shoalhaven, 59% Eurobodalla and 63% Bega Valley).

Figure 9: Survey respondents reporting on the question 'please indicate if you agree or disagree with the statement 'I am frustrated by a lack of action on climate change' (n=540, and n=180 in each LGA)



The majority of respondents (an average of 51%) also reported that they were worried about the health of the ocean in their local area (56% Shoalhaven, 46% Eurobodalla and 52% Bega Valley) (see Figure 10).

Figure 10: Survey respondents reporting on the question ‘please indicate if you agree or disagree with the statement ‘I am worried about the health of the ocean in my area’ n=540, n=180 in each LGA)



This underlying concern for the health of the environment was also clear in the interview and workshop data.

Some participants expressed concerns related to both environmental health and climate change.

Often this concern was related to marine heatwaves, impacts to fish stocks, urchin barrens and kelp decline. Fishers, residents, and conservation group representatives all expressed some level of concern. For example, one interview participant stated:

It was – we always used to call it bull kelp – and the fact it’s just diminished almost entirely (Local Resident 3).

Some participants expressed frustration with the slow pace of positive change and a lack of action on known environmental concerns (such as the loss of kelp):

A good example of that is government departments more – being more interested in monitoring collapse than looking at solutions to retard or mitigate that collapse. There is work – there is – in some instances, it is worthwhile to try and slow a process down, mechanism down on the hope that you can aid adaption, instead of just watching something completely fall over and go, that’s really bad but we’ve got all this really great science. It was really interesting watching this whole system die (Fisher 6).

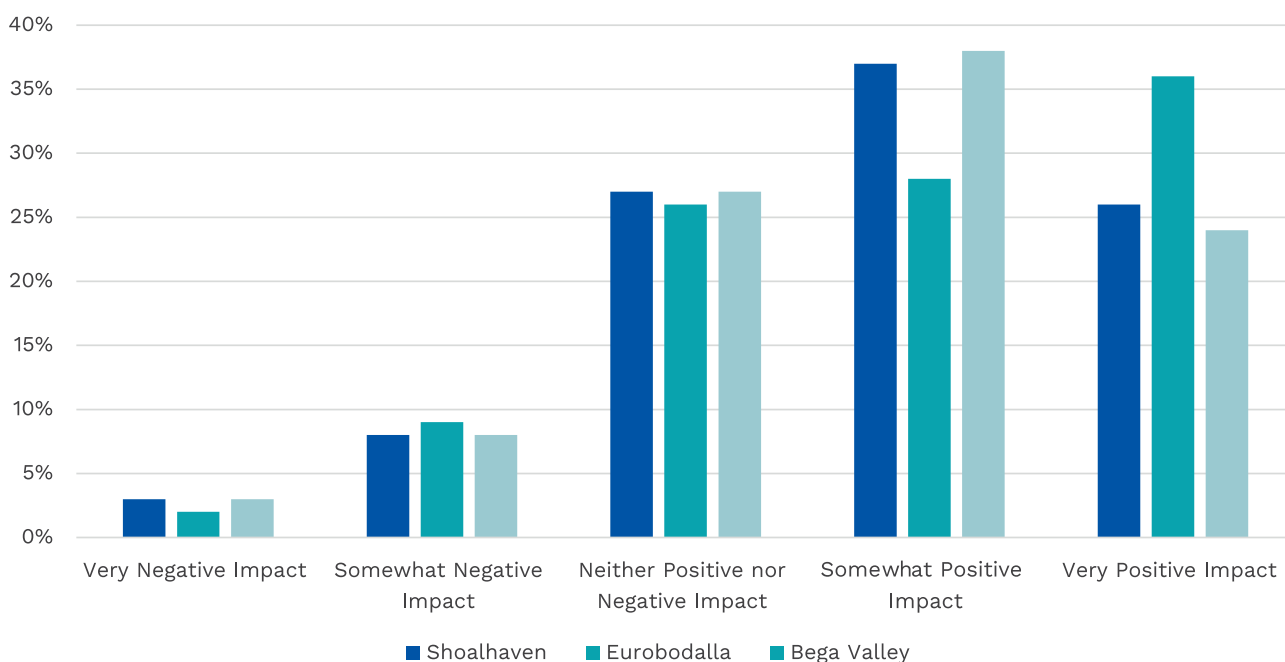
3.2.2. Community perceptions about the environmental impacts and benefits of regenerative aquaculture

Whilst the environmental challenges facing the South Coast and broader ocean ecosystems were largely recognised across the community, the research identified vastly different responses to the question of whether regenerative aquaculture could assist in addressing these challenges.

For those that did believe that kelp farming could assist in achieving environmental objectives, the proposals created a sense of hope and optimism. For some of those who did not, the proposals caused stress, anger and distress. Debate over the environmental impacts and benefits of the proposals dominated the interviews, public information sessions and associated research workshops.

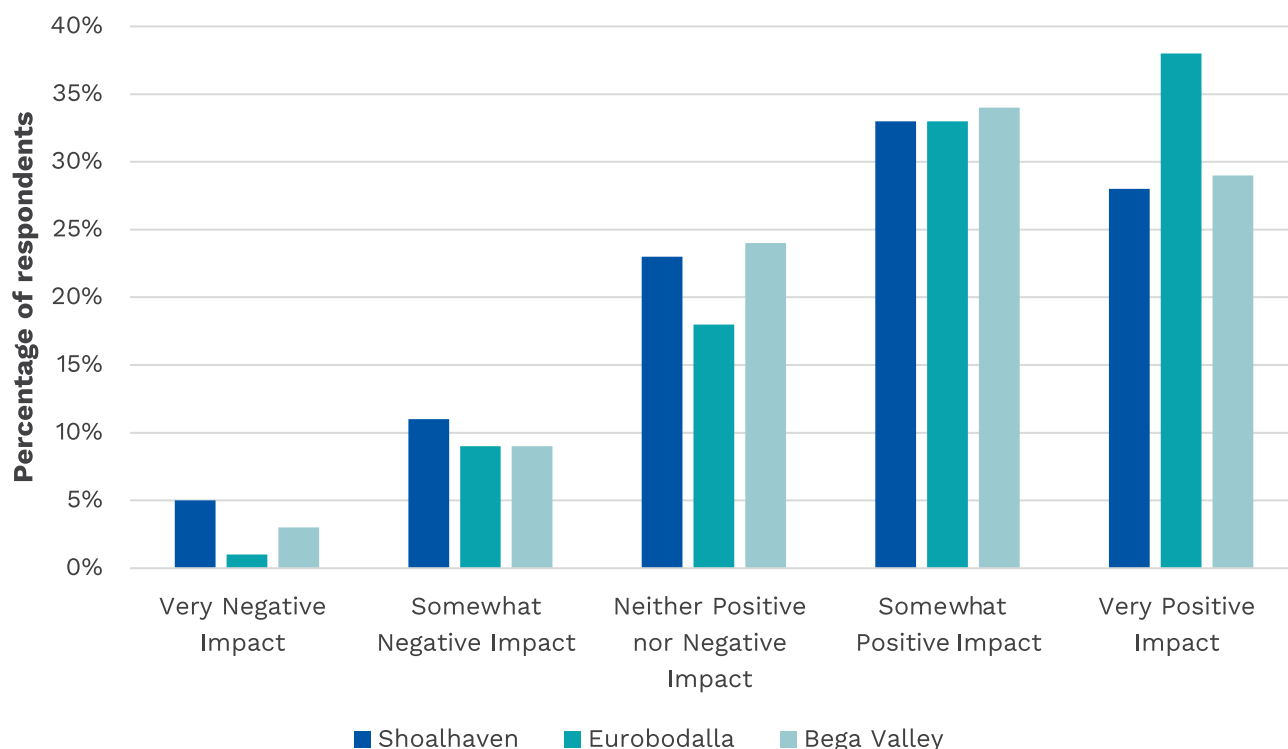
As can be seen in Figure 11, the majority of survey participants felt that regenerative aquaculture would have either a somewhat positive, or very positive impact on overall ocean health, including mitigating climate change (63% Shoalhaven, 64% Eurobodalla and 62% Bega Valley).

Figure 11: Survey respondents' response to the question 'do you believe the expansion or establishment of new regenerative aquaculture sites could have a positive or negative impact on overall ocean health, including mitigating climate change' (n=540, and n=180 in each LGA).



In addition, the majority of survey participants also felt that that regenerative aquaculture would have either a somewhat positive, or very positive impact on water quality (61% Shoalhaven, 71% Eurobodalla, and 63% Bega Valley) and the local environment (60% Shoalhaven, 67% Eurobodalla, and 63% Bega Valley) (Figure 12).

Figure 12: Survey respondents' response to the question 'do you believe the expansion or establishment of new regenerative aquaculture sites could have a positive or negative impact on water quality (n=540, and n=180 in each LGA).



When specifically discussing the proposed kelp farms in the case study areas, those members of the community who were supportive discussed the potential benefits that seaweed farms may provide. These included the regeneration of the wider ecosystem, assistance with climate solutions, alleviating land based environmental pressures and habitat creation.



Issues like climate change, global economic insecurity, loss of ecology requires integrated & diverse approaches to resolve. Looking to Blue economics would relieve conventional pressures on other domains (land & riparian zones). All options need to be considered meaning 'trying them' ASAP (Research workshop participant – Bermagui).

Yes, caring for oceans and waterways while using their resources feels right (Research workshop participant – Tura Beach).

IT HAS TO BE! For the future of our children & our future. We need better solutions to the problems that have been caused/ created in the past. Whether it is feasible is a different question (Research workshop participant – Eden).



For those members of the community who were opposed or unconvinced about the benefits of the proposed kelp farms, environmental impacts loomed large as one of the primary reasons they were concerned.



I think large scale kelp farming has been proposed as a solution for some of the problems, but you're talking about intruding on marine life in an area that may support migratory species, important feeding grounds, complex ecosystems that from my perspective look like they haven't been studied thoroughly. Fundamentally, we need to look at the ocean's health, life support systems, wildlife behaviour before (Local Resident 1).



By far the greatest level of environmental concern related to whales with the potential risk of entanglement and impacts on migration, breeding, and birthing. This concern was very strongly expressed in interviews and all three research workshops. More significantly, at the proposed location near Bermagui there are recordings of birthing activities by the endangered Southern Right Whale.

Well, there's a few worries. The first one is entanglement risk for whales. Whale entanglement is becoming more and more and more, and to run the seaweed lines, there's got to be a whole system of ropes... which is like the worst possible thing for whales (Tourism Operator).

...whales are pretty smart, I guess but you do see lots of media coverage of them being entangled in fishing nets and those SMART drumline buoys so it's likely it's pretty high risk I would think for these types of structures where you've got the infrastructure set up in waters that are known to be whale migration routes or rest areas or - you'd only need one whale to get caught up and that would be such a bad PR for your operation (Conservation Group Representative 1).

Concerns extended beyond whales to include a range of other potential impacts, which include impacts on coastal processes, birds, pollution from seaweed wrack and gear, and infrastructure on beaches. Residents often displayed deep understanding and knowledge of their local ecology which they shared as a means of expressing their concerns and fears about the proposal:

Concerned about potential impacts to marine species, refer to Carroll et al. research into foraging habitats utilised by E. minor, 3 species of shearwater breeding up & down coast, prey resources may shift & even improve if the site becomes a suitable habitat. Potentially some species such as cormorants may benefit. The species that may be impacted through their ecology are M. senator, their diving behaviour may result in negative interactions and/or injuries (Research workshop participant – Bermagui).

For some participants, the environmental concerns were largely localised to the specific sites that were proposed. This was particularly prevalent at the Haywards Beach (Bermagui) location. Some participants expressed this concern in regard to the specific environmental qualities of the area and questioned the need for 'regenerative' activities in those locations. There was a sense that the proposals would be better located where negative impacts were minimised and positive benefits were most required. Some participants put forward suggestions on locations that would be better from their perspective.

Please find a degraded site that needs 'regeneration' rather than ruining a pristine site (Research workshop participant – Bermagui).

Find a safer place for seaweed farmer, a place that needs restoration/less impact (Research workshop participant – Bermagui).

3.3. Way of Life

Way of life refers to the ways in which people live, how they move around, how they work, how they play, and how they interact each day.

We assessed the baseline conditions according to Regional, LGA and local scales below, with particular attention to relevant ocean and coastal aspects of way of life.

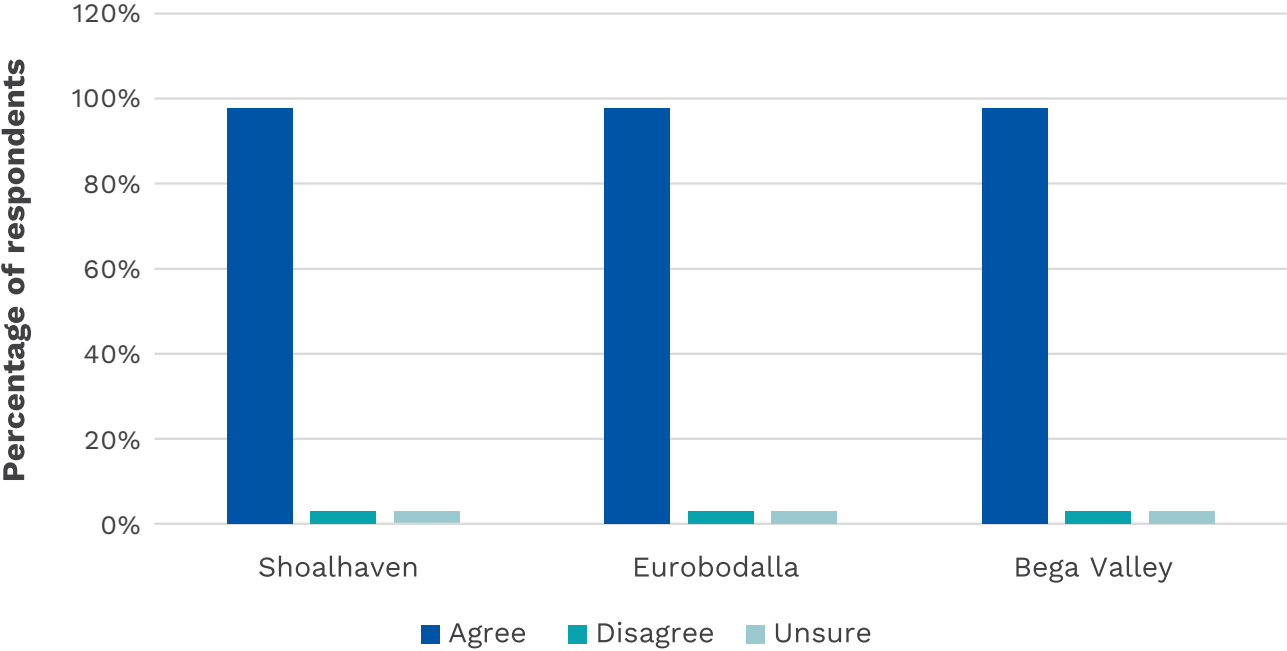
Studies by the NSW Marine Estate Management Authority (MEMA) have highlighted the critical role that coastal areas play in the provision of range of social benefits relevant to way of life, including socialising and sense of community (Gollan et al., 2019).

At the local scale there are some notable contributions of the maritime sector of relevance to way of life:

- △ **Bermagui:** Bermagui has historically prided itself on its history of big game fishing and commercial fishing, with the commercial harbour a major drawcard of the town. More recently, the town has more heavily focused on tourism as its economic base and has shifted away from its primary production heritage.
- △ **Eden:** traditionally a town founded on forestry and maritime industries including whaling, fishing and, more recently, aquaculture. Eden is currently undergoing a number of changes which will impact the way of life within this small town. For example, notable shifts in the economic base are occurring in response to the construction of a wave attenuator in Snug Cove, aimed at providing a safer harbour for local and visiting vessels and improve the protection of existing maritime infrastructure within Snug Cove, Eden. A range of existing and new uses of the harbour are expected to be facilitated through the construction of this infrastructure, including greater use by recreational and tourism (cruise ship) vessels. At present, the town focuses heavily on its maritime heritage as a tourism drawcard, for example, through the Eden Killer Whale Museum.
- △ **Pambula:** Oyster farming is a significant industry within the Pambula township, feeding into the important tourism and hospitality sectors.

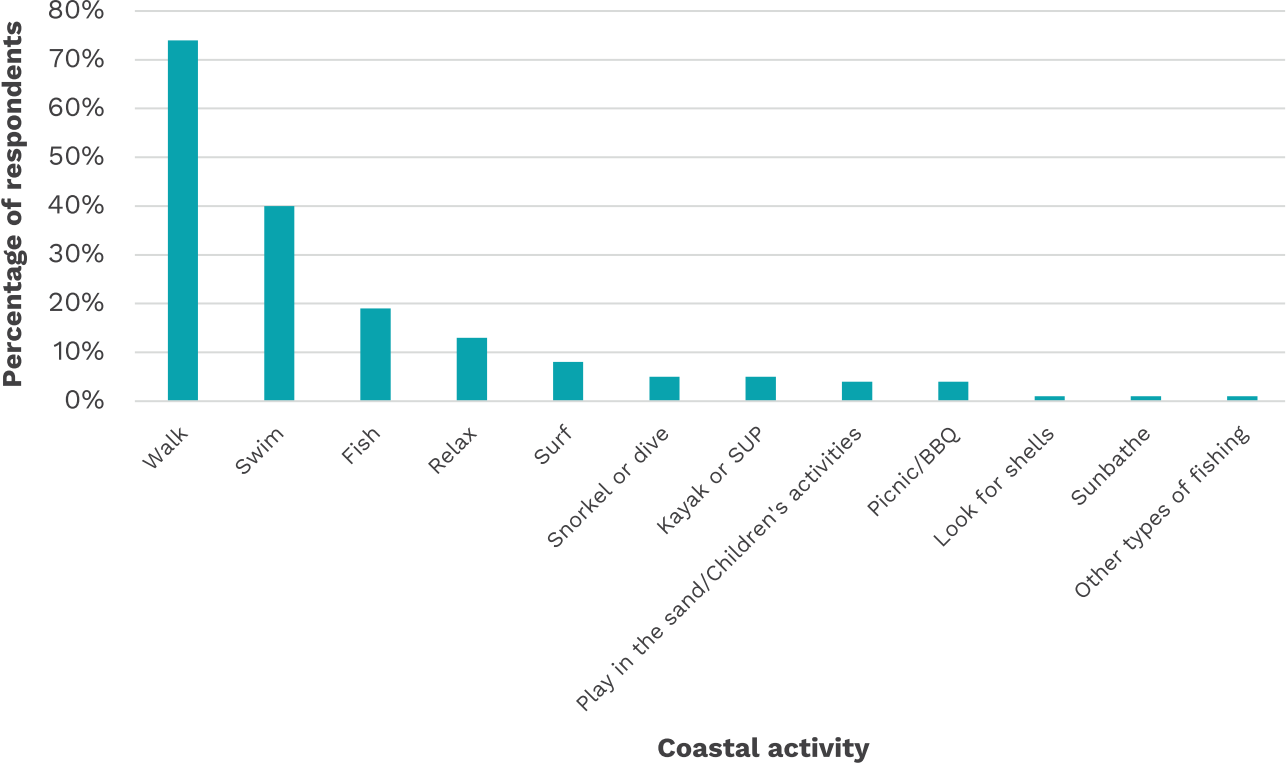
The importance of ocean and coastal spaces on the way of life for coastal communities on the NSW South Coast was confirmed through our regional survey. For example, the survey showed that 98% of respondents in Eurobodalla and Shoalhaven, and 97% in Bega Valley felt that the ocean was a source of pleasure and relaxation (see Figure 13).

Figure 13: Survey respondents’ responses to the question ‘please indicate if you agree or disagree with the statement “the ocean is a source of pleasure and relaxation to me”’ (n=540, and n=180 in each LGA).



The biggest use of the coast by research participants was walking (74%), followed by swimming (40%), as indicated in Figure 14.

Figure 14: Survey respondents’ responses to the question ‘can you briefly describe what you do when you visit the beach, coastline, or ocean’ (n=540, and n=180 in each LGA).



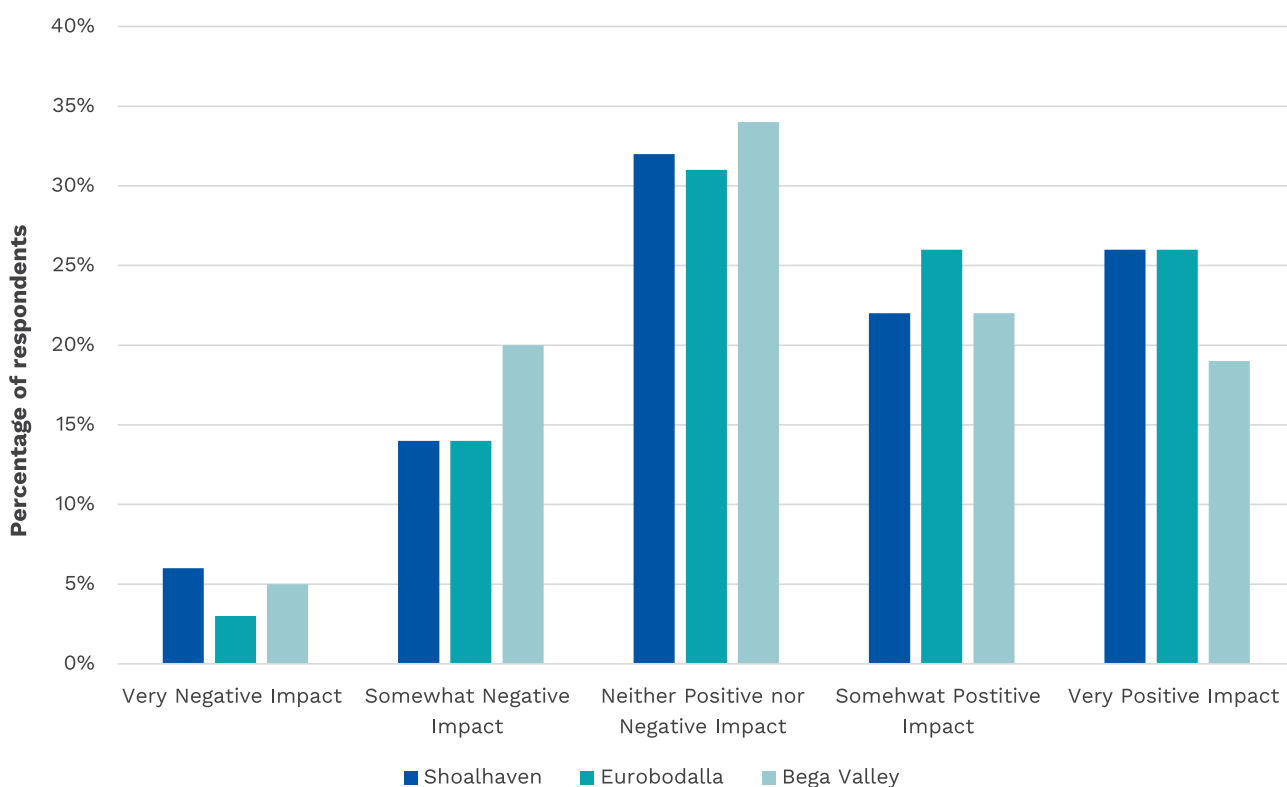
The following sections outline community perceptions on how regenerative aquaculture may impact or support these strong contributions of coastal spaces to way of life.

3.3.1. Community perceptions about the environmental impacts and benefits of regenerative aquaculture

Impacts of regenerative aquaculture on visual amenity of coastal spaces was one of the most prominent concerns raised by research respondents in both the survey and through the interviews and research workshops.

Across all three LGAs, responses tended towards a higher level of concern in relation to visual amenity than other areas of potential impact – although it should be noted that these concerns were relatively low. For example, 14% of people in Eurobodalla and Shoalhaven thought that these activities would have a “somewhat negative” impact on visual amenity, while 20% in Bega Valley thought the same. Around 30% of people in each LGA thought there would be a neutral impact (see Figure 15).

Figure 15: Survey respondents’ response to question ‘Do you believe the expansion or establishment of new regenerative aquaculture sites could have a positive or a negative impact on the visual amenity of the ocean in your local area (n=540, and n=180 in each LGA).



The relatively low levels of concern in the community survey are potentially a reflection on the scale of impact of this category. That is, impacts on visual amenity will be highly localised and largely concentrated on those residents and visitors who frequent the areas in which farms are proposed.

This was supported by the feedback from respondents to the interviews and research workshops where visual amenity was raised as a very significant concern for communities surrounding the proposed case study areas. It was of most significance in the Bermagui case study area, where the proposed farm would have likely been visible to local residents and from the township of Bermagui, with concerns on the impacts on tourism and the use and enjoyment of residents and visitors.

I think it was a very visual, very visible location, like the site was kind of - we were at the caravan park and we would have been able to see it from our front veranda kind of stuff.

So that kind of, yeah, that was probably not ideal ...

(Local Conservation Group Representative, Bermagui 1).

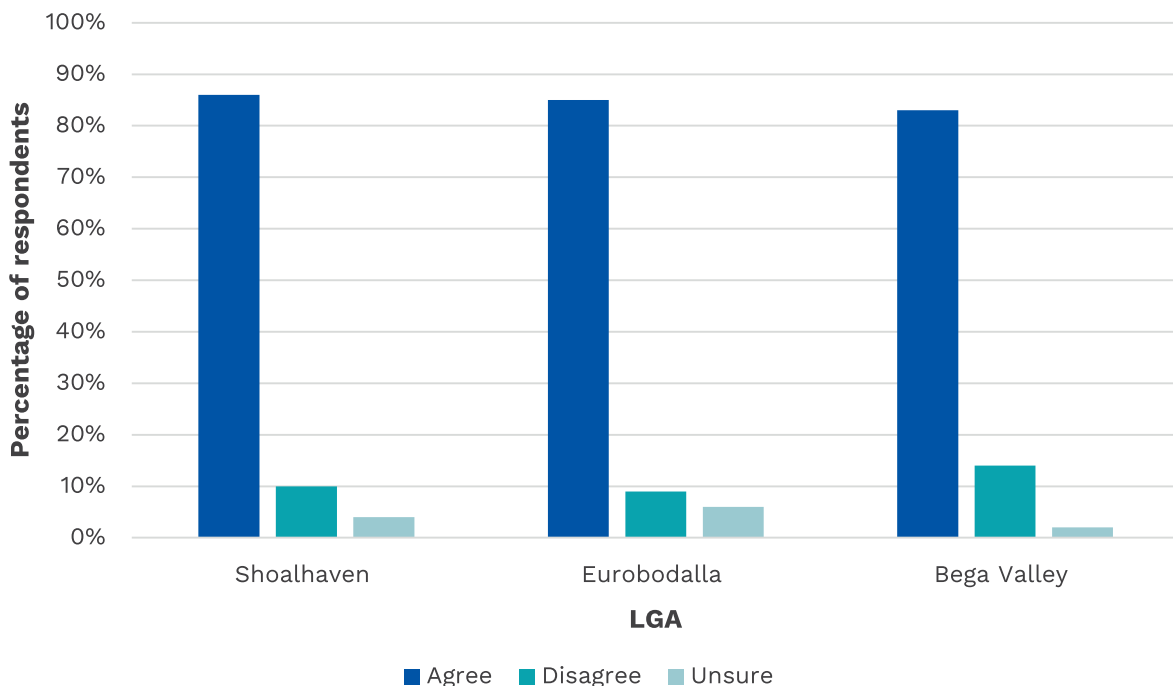
Visual amenity concerns were also raised in the Disaster Bay site, however, this was largely raised in the context of the impact it would have on the remote and wilderness character of the areas.

But if you've got these things out there, you can see them visually impacting and it kind of goes against the grain, particularly in some of the spectacular coastline here (Local Resident 3).

It can therefore not be assumed that placing a regenerative aquaculture farm in a remote location automatically allays concerns over visual amenity, although in this case, it does appear to have been less intense. It is noteworthy that the Bermagui community do not currently have familiarity with aquaculture infrastructure, such as mussel farming, in their local area in the same way as the Eden community, and this familiarity may have influenced community responses to visual amenity concerns.

While there was variation in the level of concern, the impacts of the developments on the 'pristine coastline' were expressed across all three case study areas. It is notable that there were very high levels of agreement across all three LGAs (83-86%) that permanent industrial operations should aim to have minimal visual effect from the shoreline (see Figure 16), highlighting that this impact is a high priority for the community and will need to be carefully managed as the industry develops.

Figure 16: Survey Respondents responses when asked if they agreed or disagreed with the statement 'permanent industrial operations in the ocean should have minimal visual effect from the shoreline'. (n=540, and n=180 in each LGA)



In addition to visual amenity, some concerns were raised in regard to noise from additional boat movements, particularly in the Haywards Beach location, which was the closest case study area to residential areas.

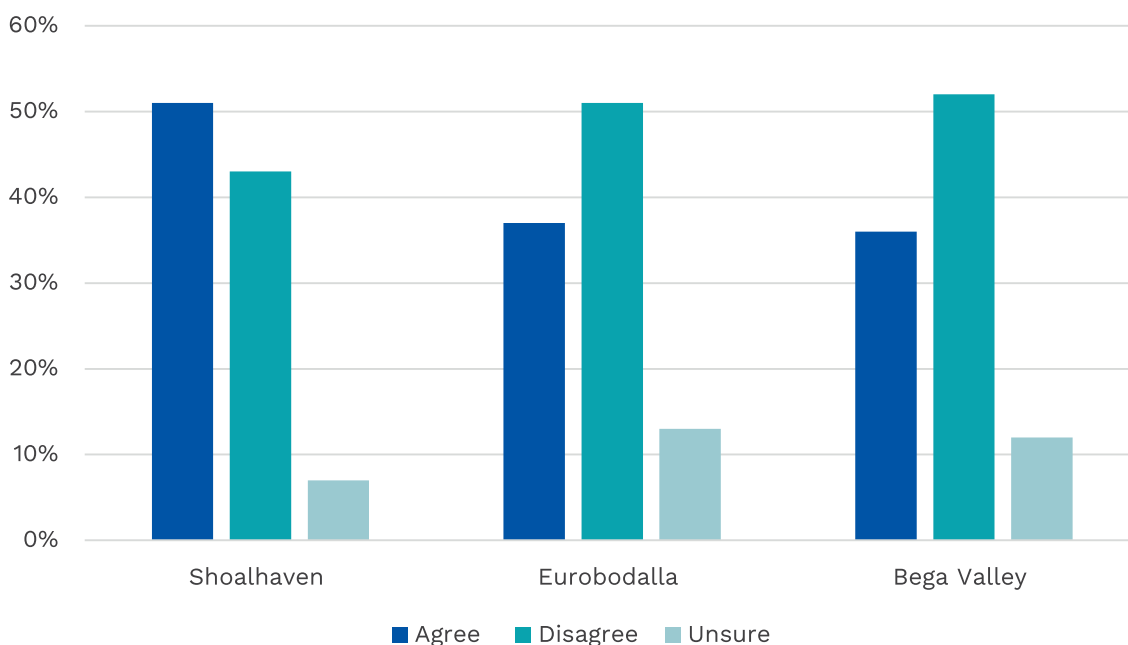


3.3.2. Community perceptions of likely impacts on other uses/ users or general amenity

Given the high level of connection to the oceans as source of pleasure and relaxation (at least 97% of respondents – see Figure 13), it is highly likely that any impacts on this enjoyment would be of concern for local communities.

At present, a high proportion of respondents feel like these impacts are possible with between 36-49% of residents feel that ocean industries impact their enjoyment of the sea (Figure 17).

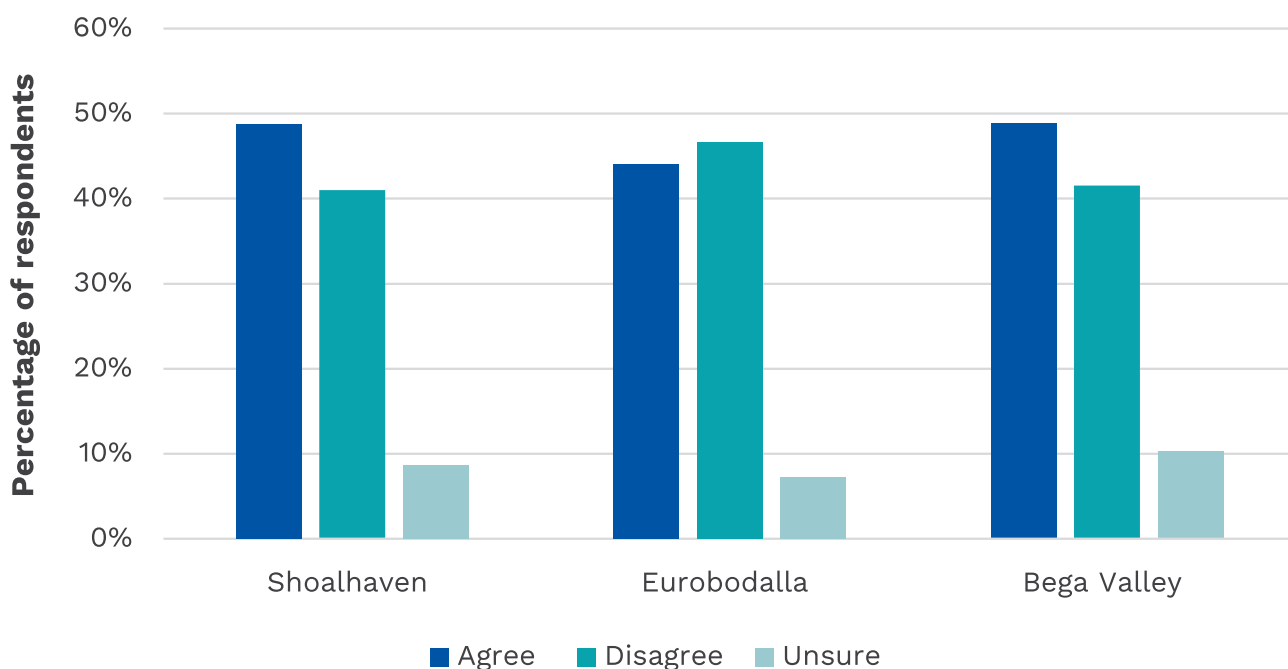
Figure 17: Survey respondents' responses to the question 'please indicate if you agree or disagree – "ocean industries affect my enjoyment of the sea" (n=540, and n=180 in each LGA).



In addition, between 45-49% of respondents indicated that they believed industry expansion in ocean spaces would change the way they engaged with the coast (see Figure 18). It is worth noting that these questions did not interrogate the nature of these impacts or whether they would be perceived as positive or negative.



Figure 18: Survey respondents' responses to the question 'please indicate if you agree or disagree with the statement 'industry expansion in ocean spaces will change the way I engage with the ocean and the coast' (n=540, and n=180 in each LGA).



In the case study areas, there were mixed responses to whether the proposed kelp farms would have impacts on other users. In Bermagui, concerns were raised regarding potential impacts on surfers, recreational users and commercial fishers.

These concerns related to access to ocean spaces (e.g., fishing grounds), impacts on coastal processes (e.g., surf breaks, beach erosion), and impact on passive uses (e.g., loss of visual amenity for tourists and residents). Impacts on navigation and boating movements were also raised in the case study areas, with one participant raising concerns in regard to impacts on safe anchoring in poor weather in the Disaster Bay location.

However, respondents also acknowledged a number of potentially positive impacts, particularly for fishers, through subsequent environmental benefits such as habitat creation and kelp restoration.

An aerial photograph of a coastal town, likely in the NSW South Coast. The image shows a dense residential area with many houses, interspersed with green trees. A wide, sandy beach runs along the edge of the town, meeting the ocean. The water is a vibrant turquoise color, with white foam from breaking waves visible near the shore. In the background, rolling hills are visible under a clear sky.

3.4. Community

The impact category of ‘community’ includes the composition, cohesion and character of the locality.

It considers how the community functions, its resilience, and people’s sense of place. We have assessed the baseline conditions according to regional, LGA and local scales, with particular attention to relevant ocean and coastal aspects of way of life. The research particularly explored potential (positive and negative) impacts associated with way of life.

3.4.1. Baseline conditions – socio demographic structure of the South Coast community

The NSW South Coast is a region in transition. With a population of under 200,000 people¹⁵, the stretch of coast from the Shoalhaven to the Victorian border has a history of employment in primary production, including fishing, farming and forestry.

The coastal and marine zone of the NSW South Coast is arguably the most significant economic asset in the region. The natural beauty and pristine waters of this ocean environment draw visitors from around the globe and underpin a crucial tourism industry. The ocean environment also supports multimillion-dollar fisheries and aquaculture sectors and is central to the leisure and recreation of residents.

Overall, the employment in the region has increasingly shifted towards the service economy, with health care, retail trade, education, and hospitality now the biggest employers. Unemployment in the region was 4.1% (compared to 4.9% in NSW) in 2021, significantly down from the previous census, when unemployment was above the state average in the region. Table 6 summarises the main socio-economic and demographic information for the South Coast region from the 2021 Census. The South Coast region has lower incomes than the median in NSW reflecting agriculture, light industry, and seasonal tourism. All three LGAs also have higher than the state average rates of Aboriginal and Torres Strait Islander heritage.

¹⁵ <https://www.abs.gov.au/census>

Table 6: Socio-economic and demographic characteristics of the research (by LGA)

	Shoalhaven	Eurobodalla	Bega Valley
Population	108,531	40,593	35,924
Gender	49.5% male 50.5% female	49% male 51% female	49.1% male vs 50.9% female
Median age (NSW median: 39)	48	54	52
Aboriginal or Torres Strait Islander (NSW 3.4%)	6.5%	6.1%	3.9%
Median weekly household income (NSW: A\$1,829)	A\$1,250	A\$1,167	A\$1,200
Total employment (over 15)	44,471 (48.8%)	15,744 (45%)	15,523 (50.9%)
Full-time employment	50.1%	7,501	7,613
Part-time employment	37.5%	6,360	6,233
Families	30,043 (50% without children)	11,318 (56.5% without children)	9,945 (53.5% without children)

The relevant townships for the case study areas are Bermagui, Pambula, and Eden. Table 7 summarises the main socio-economic and demographic information for these townships from the 2021 Census. There is a reasonably high level of consistency across the three localities, with high degree of employment in the tourism and service sectors, lower than average income and higher than average median age and levels of education below year 9.

Table 7: Socio-economic and demographic characteristics of the case study areas (by township)

	Shoalhaven	Eurobodalla	Bega Valley
Population	1,798	1,627	3,227
Gender	47.6% male 52.4% female	49% male and 51% female	48.8% male 51.2% female
Median age (NSW median: 39)	58	54	53
Aboriginal or Torres Strait Islander (NSW 3.4%)	48 (2.7%)	40 (2.5%)	268 (8.3%)
Median weekly household income (NSW: A\$1,829)	A\$1,019	A\$1,231	A\$1,001
Total employment (over 15)	42.3% (41.6% full-time, 45.4% part-time)	48.9% (50.6% full-time, 41% part-time)	44% (46.6% full-time, 38.5% part-time)
Level of education bachelor or higher	19.6%	19.3%	10.4%
Level of education below Year 9 (NSW 7.4%)	8.3%	10.8%	12.9%
Retirement age (65+)	37.8%	32.6%	32%

The South Coast region benefits from marine-based industries including tourism, commercial fishing, and aquaculture. The economic output associated with commercial fishing from state-based fisheries is estimated at about A\$25.6 million, with commercial fishing generating around 418 jobs (directly and indirectly) (BDO, 2022 Table 3.8).

Economic output from existing aquaculture operations on the South Coast has been estimated at A\$25.38 million, with 182 jobs generated (Barclay et al., 2016; BDO EconSearch, 2023). In 2017 a state wide assessment of the threats and risks to the NSW Marine Estate noted that climate change may negatively impact local economies in the South Coast disproportionately, due to the reliance on natural resource-based industries including fisheries, agriculture, forestry and tourism and ecosystem decline resulting from sea level rise or changes in sea temperature (BMT-WBM, 2017, p. 198).

All three LGAs, and the three case study townships, are popular tourist destinations. The gross value added (GVA) generated by tourism on the South Coast was estimated at A\$1.5 billion in 2021/22 and generated around 12,386 jobs (ABS, 2023). The region attracts many visitors annually and also see high rates of holiday homes. For example, in Eurobodalla 38% of property owners live primarily outside of the LGA and there are 31% of dwellings that are not occupied permanently¹⁶. Each LGA has a unique sense of composition, cohesion, and character and residents of the region report a strong sense of place.

Local planning authorities and regional development organisations have expressed a strong interest in diversification of business and industry, to assist in smoothing the peaks and troughs of the seasonal tourism industry.

Interviews revealed insights into how participants perceived their community. For example, one participant talked about disparity following periods of influx and potential gentrification on the South Coast.

Participants drew on local events such as the Black Summer Bushfires of 2019/2020 and the ramifications of the COVID 19 pandemic, suggesting that such community hardships led to a greater sense of community.

“It’s become impossible to find housing here as a young family or somebody on a lower income either rental or purchase. Prosperity is here, but it’s not flowing through the community, the entire community. Its flowing on through some of the community, and you can see that through boutiques and cafes and quality food, but for some, the standard of living is difficult (Local Resident 1).”

“We’ve been through a lot of trauma in the last few years with bush fires, flood events, COVID, the lockdown, et cetera, economic struggles... and what happens to one here happens to everyone.”

I see the community as a big basket that needs to support itself and each other in thriving (Local Resident 1).

3.4.2. Impacts on the composition of community and community structure (including employment)

The perceived benefits associated with employment from the development of regenerative aquaculture activities were explored through the research.

By way of comparison, interviews were held with established regenerative aquaculture business, particularly Blue Harvest Group and South Coast Mariculture located in Jervis Bay and Eden (see also Report 4).

¹⁶ <https://profile.id.com.au/eurobodalla/home>

These farms are dedicated to the sustainable cultivation and processing of mussels, extending its operations to include oysters, scallops, and seaweed its licensed marine leases in Eden. The company has emerged as a prominent employer in the region with approximately 22 FTEs (full-time equivalent) staff at its Jervis Bay farm and processing facility.

On the farm, seven individuals, comprising four locals and three non-locals are engaged in day-to-day operations. The processing facility employs an additional fifteen staff members. The workforce exhibits a diverse skill set, including individuals with skipper licenses (3), forklift and truck licenses, and expertise in food handling.



South Coast Mariculture has played a pivotal role in job creation within the regions it operates, prioritising employment opportunities. The company has prioritised using local talent, which has contributed to local livelihoods and has also generated positive economic spill-over effects within the local construction industry. Notably, South Coast Mariculture has invested A\$1 million in enhancing its processing facility, a venture that not only bolsters its operational capabilities but employs local tradespeople including electricians, builders and hydraulic experts. Beyond the immediate economic impact, South Coast Mariculture's contribution extends to the local culinary businesses. Mussels cultivated by the company feature on the menus of local restaurants, creating a link between regenerative aquaculture and local dining experiences.

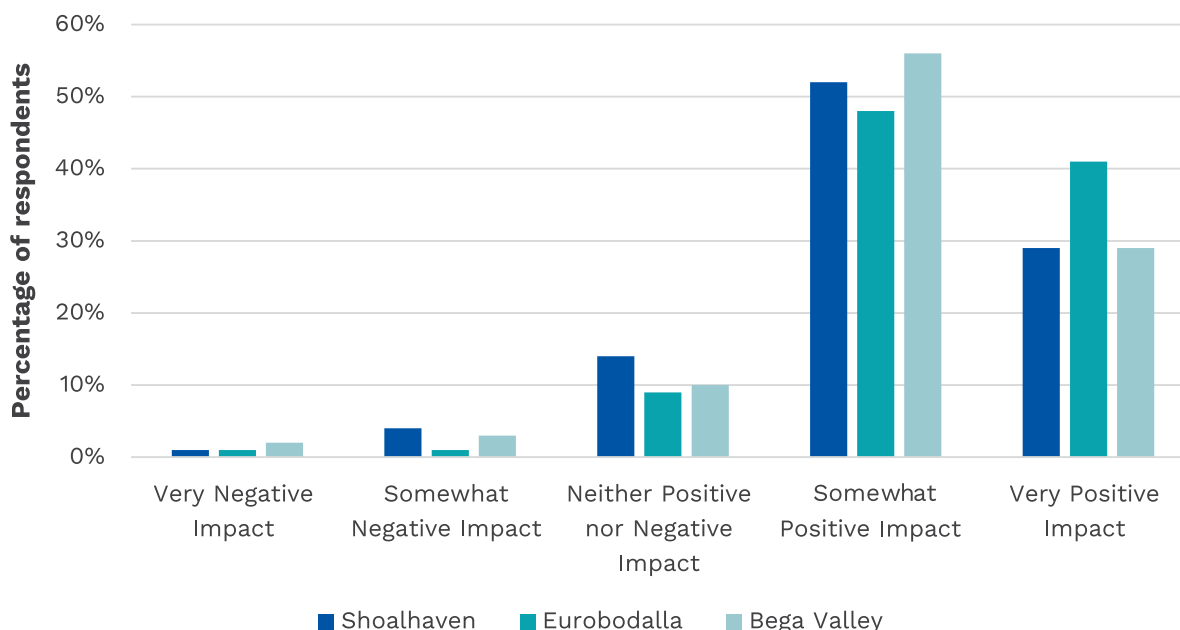
The co-location of the company's mussel farm with a sought-after holiday destination in Jervis Bay and Eden presents additional avenues for social impact and economic growth through tourism. Tourists are offered the opportunity for first-hand experience with mariculture processes, potentially fostering a deeper connection with regenerative and sustainable aquaculture practices. The recent investment in infrastructure presents an opportunity to leverage partnerships with local industries, including diving, whale watching and dining. As a result, a joint blue marketing strategy is under consideration, aiming to maximise the economic benefits derived from collaboration with these industries. This collaborative approach not only enhances the company's reach within the community but also contributes to the development of a robust and interconnected local economy.

South Coast Mariculture is not only committed to sustaining livelihoods but also fostering community integration beyond the regions of Jervis Bay and Eden. The company actively engages in collaborative efforts with strategic partners, such as SeaPerfect for spat and Phycocohealth for research and development (R&D) in pet food products. The established partnership with SeaPerfect ensures a sustainable supply of spat, encouraging local business growth opportunities, and contributing to the resilience of regenerative aquaculture in the area. Furthermore, South Coast Mariculture is actively engaged in ongoing collaboration with the kelp industry, pioneering seaweed farming at their Eden farm. The collaborative endeavours go beyond the immediate operational scope of South Coast Mariculture, illustrating the links to broader local industry partnerships and community collaboration.

The South Coast Mariculture example demonstrates the potential for diverse economic and employment flow-on impacts associated with the development of a regenerative aquaculture industry.

The potential for positive economic impacts was recognised by survey participants, with an average of 85% of respondents across the three LGAs believing that the development or expansion of the regenerative aquaculture industry would have a somewhat positive or very positive impact on employment in the local area (Shoalhaven, 81%, Eurobodalla 89%, and Bega Valley 85%) (Figure 19).

Figure 19: Survey respondents' responses to the question "do you believe the expansion or establishment of new regenerative aquaculture sites could have a positive or negative impact on – employment in your local LGA" (n=540, and n=180 in each LGA).



Interview respondents discussed the idea that this new industry would boost employment opportunities, which some felt may work towards keeping people, particularly young people, living in the area.

Some participants recognised that the traditional industries in the towns of the far South Coast, such as fishing and forestry, were in decline and saw potential for regenerative aquaculture to be a new industry that would increase employment in the industry and boost the local economy in an industry that was in keeping with the established community structure as a primary production region. This was especially prevalent in Eden.

“Yeah, I don’t know. We just need something to keep the kids here. As soon as they leave school, everyone’s gone. There’s no work. We’re lacking it, because lost a lot of industry too... ..Timbers gone... go back a few years, we lost the cannery (Fisher 1).”

By way of contrast in Bermagui, respondents often argued that tourism was the primary economic asset of the region and that this should be protected.

Some argued that there are more jobs that are available in regeneration/conservation and tourism industries, and to them, this was where the opportunity lay to create more jobs and boost the local economy:

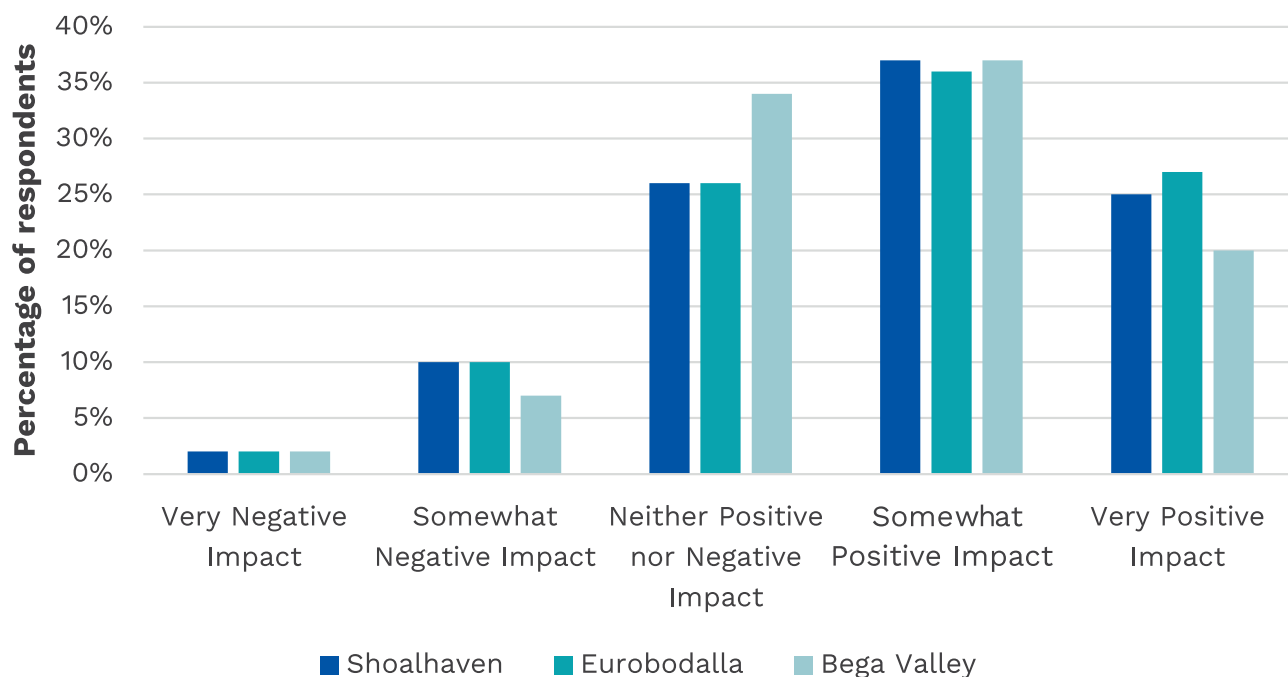
“Look, don’t get me wrong. I’m not totally against it, but this is trying to be sold as a great for jobs and this and that, and it may create some jobs, but our whole basis of our tourism industry down here is the Wilderness Coast. It seems like a bit of oxymoron – is that the word? Where we’re trying to advertise the wilderness coast, and we’re saying we put aquafarms all up and down the coast which are highly – we can see them, they’ve got to be – we have industry here (Resident 3).”

However, there was also some speculation about how many jobs would be created if it was a small-scale industry, and some skepticism about the promises of proponents.

3.4.3. Impacts on community's shared identity and attributes

A high proportion of participants across the three LGAs reported that they believed there would be a somewhat positive, or very positive impact, on the character and sense of community in their local area (Shoalhaven 62%, Eurobodalla 63% and Bega Valley (61%) (See Figure 20).

Figure 20: Survey respondents' responses to the question "do you believe the expansion or establishment of new regenerative aquaculture sites could have a positive or negative impact on – the character and sense of community in your local area?" (n=540, and n=180 in each LGA).



Throughout the interviews, it was clear that communities on the South Coast have experienced difficult times and have showed great resilience. Tourism, which is an important industry in the region, has suffered through COVID 19 and the Black Summer Bushfires.

For some, this translated to concern at a local scale in the case study areas over the potential impacts of the proposed farms on the character of community and tourism assets such as beaches.

Look, don't get me wrong. I'm not totally against it, but this is trying to be sold as a great for jobs and this and that, and it may create some jobs, but our whole basis of our tourism industry down here is the Wilderness Coast. It seems like a bit of oxymoron – is that the word? Where we're trying to advertise the wilderness coast, and we're saying we put aquafarms all up and down the coast which are highly – we can see them, they've got to be – we have industry here (Resident 3).

Other participants recognised that local industries could add economic value to communities, such as through local product marketing. One interview participant, a local Council staff member, suggested that 'it could be a whole kind of sustainability story that they try and tell with it, have the gourmet food trails and local provenance'.



3.4.4. Impacts on interactions in community

This impact includes consideration of trust and cooperation in community activities and institutes and potential for harmony or conflict. The consultation exercises uncovered significant differences between sections of all the case study communities around what constitutes sustainability and sustainable practices.

Whilst some respondents embraced a narrative of positive environment benefits from the proposed kelp farms, others rejected any or most claims of benefit (see also section 3.2). For example, for some residents, conservation involved preservation and reducing or eliminating all forms of potential impact.

“I’m nervous. As the climate crisis escalates, small rural communities like ours here in Bermagui are suffering increased ecological loss (e.g., Bushfires 2019/2020). Ocean farming doesn’t feel like a service to humanity, it feels like we are being extracted from. It feels like we will have to endure more loss. That’s the feeling in my heart. I want to preserve our wilderness coast (Research workshop participant - Bermagui).

”

Other participants had more interventionist ideas about sustainability, and were open to trialling or attempting new and different approaches to environmental conservation:

“...compared with conventional existing & potential agri-systems, we need to invest in blue technologies. Moving forward into climate change we need to test new strategies. If we don’t the conventions will prosper. This project is ‘different’, and yet has ‘potential’ to champion new ways to sustain humans whilst bolstering ecologies. Rather than repel such projects, alternative viewpoints have an opportunity to contribute their experience - this is ‘regenerative’ thinking (Research workshop participant - Bermagui).

”

These ideas about what constitutes conservation and sustainable practice came into direct conflict with each other, particularly in Bermagui, causing debate within the community which was at times heated, confrontational, and distressing.

The public consultations were often dominated by voices with concerns about negative impacts and were on occasion quite hostile in nature, with participants framing the debate as a 'fight' or a 'battle' to save their coastal areas. However, community members who were supportive or undecided were also present.

These fundamental differences in opinion are likely based on underlying values and worldviews that are beyond the scope or capacity for an individual project or proposal to resolve. However, it provides important context to the nature and scale of perceived and actual social impacts that proponents will be required to navigate.

3.4.5. Impacts on sense of place and a sense of belonging

The impacts on sense of place and sense of belonging were some of the most passionately communicated throughout the research.

Interviews, focus groups and survey results illustrated that participants had a high degree of emotional connection both to place and to the ocean. Participants spoke of feeling pride about their local area, particularly in relation to the notion that it was 'pristine' or 'wilderness'.

I spent a lifetime fishing down there, and it's the best place on earth. Stunning. But it's brutal (Fisher 2).

Wild ocean at Bermagui plays enormous role in mental health, education, sense of belonging (Research workshop participant, Bermagui).

Concerns around whether the aquaculture farms would complement the existing sense of place, were evident, particularly in Bermagui.

For example, community members in Bermagui discussed the idea that the beach was a place of refuge and healing in the wake of the Black Summer bushfires and were concerned that industrial uses would impact their sense of place in that regard.

For example, one research workshop participant in Bermagui stated:

It doesn't feel right to me personally. I'm nervous about perceiving our 'Sapphire Coast' as an opportunity for private farming enterprises, in a shared space – valued for its wildness. How many more applicants may come? Will our ocean still 'feel' wild? Where is the value of wild coast in our plan for climate? (Research workshop participant, Bermagui)

Similarly, for participants in Eden, the sense of place that was spoken about often centred on the idea of Eden as a fishing town, with established maritime industries, such as fisheries and aquaculture. In this regard, the proposed developments were seen to be in keeping with the culture of the region as a primary production area.

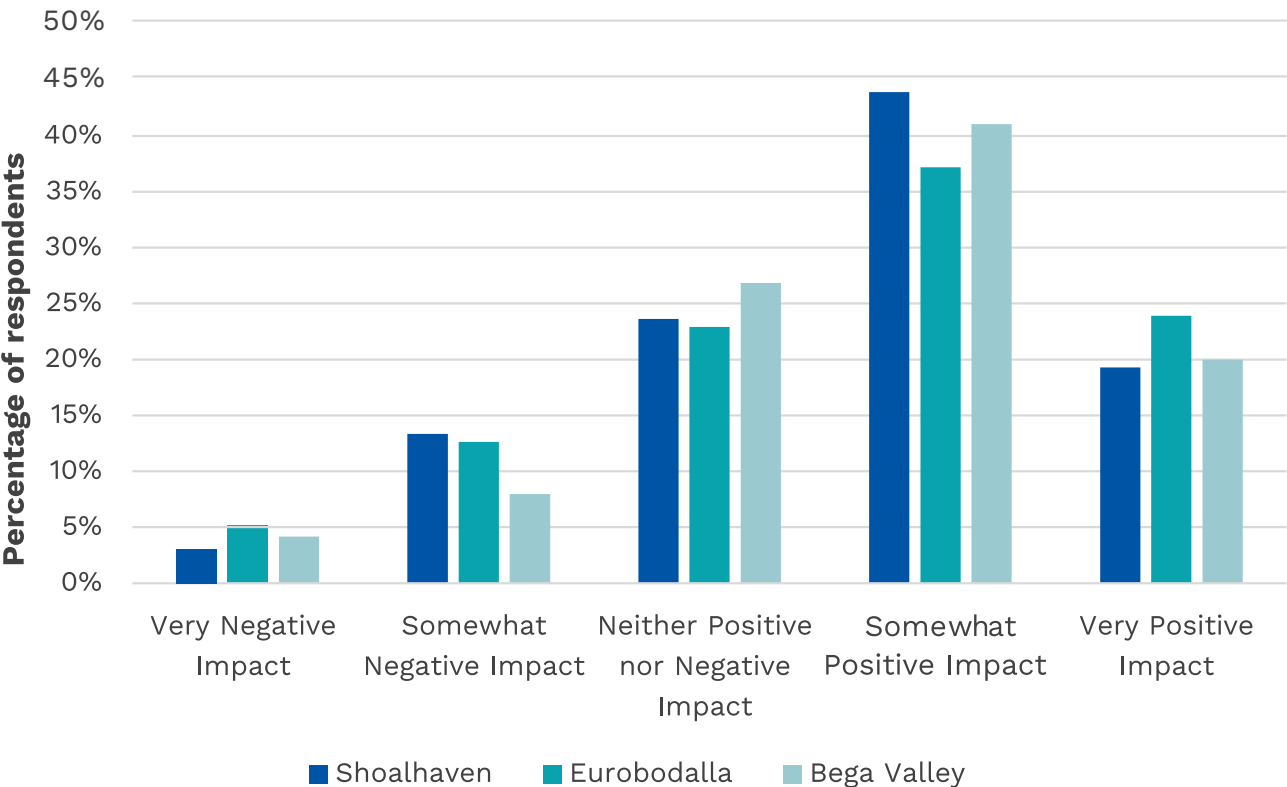
3.5. Livelihoods

Livelihoods includes people’s capacity to sustain themselves through employment or business. The research explored the perceived impacts and benefits of regenerative aquaculture on other maritime users, especially maritime tourism and commercial fishing.

A significant majority of survey respondents (average of 79%) felt that expansion of ocean industries would benefit local economies directly or indirectly through increased jobs and incomes in those industries (81% Shoalhaven, 77% Eurobodalla, and 80% Bega Valley) (see Figure 19 in Section 3.4.2).

Survey data also showed that the majority of respondents (an average of 61%) believed that the expansion or development of the regenerative aquaculture industry would have a somewhat positive or very positive impact on other ocean industries, such as tourism and commercial fishing (Shoalhaven 62%, Eurobodalla 61%, Bega Valley 61%) see Figure X. Across the three LGAs there was still concern that the development or expansion of regenerative aquaculture would have a somewhat negative or very negative impact on existing industries (Shoalhaven 16%, Eurobodalla 17% and Bega Valley 12%).

Figure 21: Survey respondents’ responses to the question “do you believe the expansion or establishment of new regenerative aquaculture sites could have a positive or negative impact on – other ocean industries e.g., commercial fishing and tourism?” (n=540, and n=180 in each LGA).



For some research participants, there was excitement in the community about the potential that this industry has as an alternative and sustainable source of employment. There was enthusiasm for the potential of this industry providing employment opportunity for Indigenous community members and the younger generation.

Hopeful for the kids, business opportunity for them. Feels like an industry that gives back to the environment compared to fishing (Research workshop participant, Bermagui),

Income diversification & sustainable all year business – economic sustainability with the right concerns – it could be regenerative social, economic & environment (Research workshop participant, Bermagui).

...I'm all for other industries. Several reasons, fishing's dying, and we don't have a trawler in the town anymore. There's just - it is shrinking. I worry about the value of the lives of the people in these communities. It's getting hard to get work.

It's getting hard to find somewhere to live and with the depleting stocks in the industries, everything's collapsing in the fishing world (Fisher 3).

However, other participants expressed concerns that the developments may impact on established businesses such as tourism and fishing.

Eden's on the map for whales. It's not on the map for seaweed (Tourism operator).

You feel like you're getting pushed out (Fisher 1).

Interviews revealed that members of the commercial fishing industry were particularly concerned about the impacts of the industry because of the cumulative impacts they have faced as an industry. For example, one participant stated:

Well at the end of the day, us as fishermen, we've taken enough kicks in the guts, if you know what I mean? ... At the end of the day, it's a dying art and ... if we take any more kicks in the guts, people won't be able to buy fresh fish (Fisher 4).

3.6. Accessibility

The impact category of 'accessibility' includes consideration of how people access and use infrastructure, services and facilities, whether provided by a public, private, or not-for-profit organisation.

Across the study area, boating is a popular recreational past-time along with other on water activities such as kayaking, surfing and fishing, as demonstrated in Figure 14 (Section 3.3).

3.6.1. Impacts on vehicle and boat movement, navigation and marine traffic

The research found there were some concerns amongst stakeholders relating to access, infrastructure and continued upkeep to sites.

As highlighted in Section 3.3.2, survey data revealed almost half of respondents across all three LGAs believed industry expansion (broadly) would change how they engaged with the ocean and the coast (45% of respondents in Eurobodalla and 49% in Bega and Shoalhaven, respectively).

Impacts on access usually related to competition for space with other, established users such as commercial fishers, who were concerned that access to fishing grounds would be detrimentally impacted, leading to a loss of income.



'...through various acts of attrition – there's not much left of it [fishing industry]. As you seen down on the wharf – there's not much left of the industry full stop' (Fisher 2).

Having that access to an option taken away, then it... might be the difference between him [other fisher] being profitable, or not profitable for the whole year' (Fisher 2).



Other fisher participants stated that they did not have an issue with the proposals, so long as access and subsequent income was not lost.



Do I have any issues with it? No. None. The only issue is probably just possibility with any other activity that you lose access to an area. I suppose that's why I'm here, just to say, we don't want to lose any access. If you look at what we can and can't do and just add another layer to something, it's just like I said, it's like losing a little bit of infrastructure (Fisher 1).

I'm for it as long as it doesn't go out on that big zone where they've said (Fisher 5).

It's not a really good area for fishing. To me you're utilising wasted space. You're commercialising a dead zone, which is fantastic (Fisher 3).



Furthermore, focus group and interview data raised concerns regarding the accessibility of proposed sites and the required upkeep of these sites. Concerns related to the difficulties in accessing sites due to swell conditions and the remoteness of these case study areas. For example, participants, particularly fishers, discussed the impact that intensive weather systems such as east coast lows can have on ocean and coastal industries in NSW. One participant expressed concern that in periods of large swell there would be a chance that lost gear/infrastructure would wash up on remote beaches. They stated:



See the other thing, where they're going to put it down there, if there is a disaster, right, we get a sou-east gale. It all ends up on the beaches between... or even where it is. That's wilderness. It's not national park. It's wilderness. That's got more sort of grunt in the government than what a bloody national park has got (Fisher 5).



Another concern raised in relation to the fishing industry and fishers more generally, was the increase in boats using shared infrastructure and how this potentially would or could be managed.

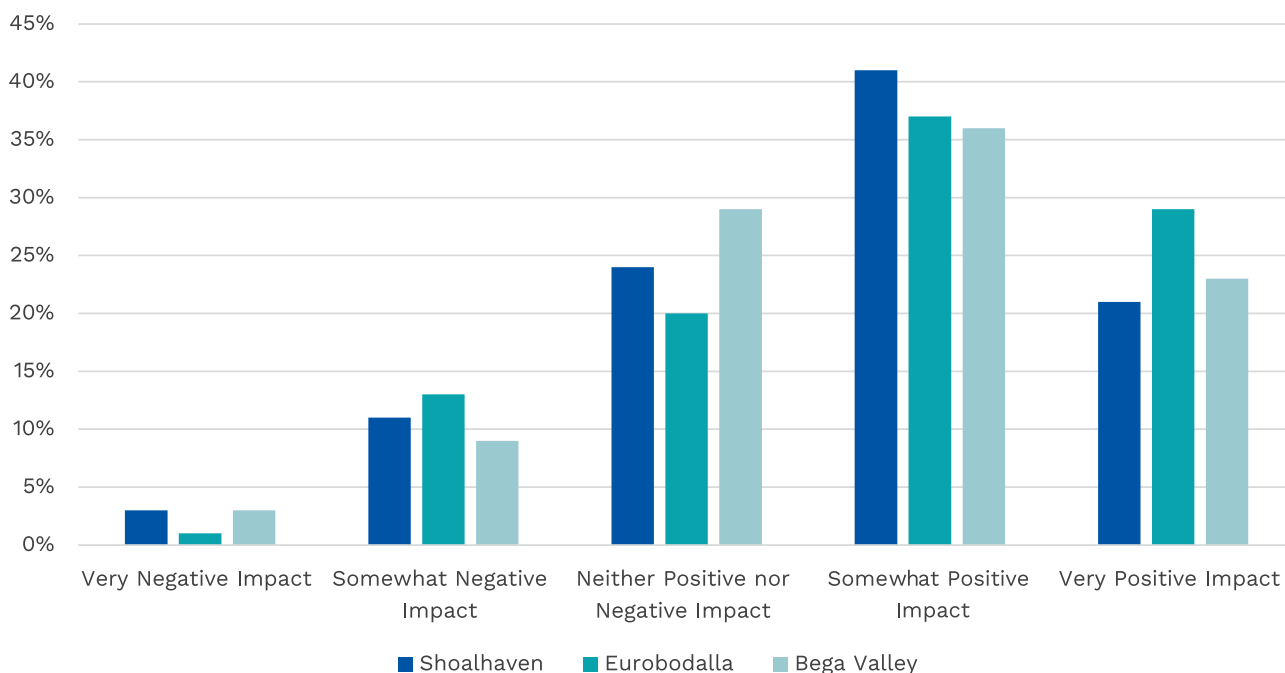
Participants also expressed concern that the remote nature of the sites would also impact the ability to respond (and respond in timely way) to loss of gear or potential whale entanglements.

3.6.2. Community perceptions of likely impacts on beach usage

Community perceptions were divided regarding impacts on beach usage.

As shown in Figure 22 survey data showed the majority of respondents across the three LGAs believed regenerative aquaculture would have a somewhat positive impact on recreational activities, such as fishing and boating (43% Shoalhaven, 37% Eurobodalla, 36% Bega Valley).

Figure 22: Survey respondents' responses to the question "do you believe the expansion or establishment of new regenerative aquaculture sites could have a positive or negative impact on – other recreational activities including fishing and boating?" (n=540, and n=180 in each LGA).



This was supported by some participants in the research workshops who saw the planned farms as a positive for commercial and recreational fishers, through the provision of habitat and food for target species.

“Will help to self-feed the area with natural kelp – which brings the abalone, the gummy sharks.
Structure in environment – bait fish – gamefish – gummy sharks – good for that industry .
(Research workshop participant, Eden).”

However, other interview and focus group data revealed a level concern regarding the potential contribution to pollution from the industry, with a particular focus on how infrastructure would cope during periods of large swell. For example,

“We get one decent southeast sea, and it's going to wash up the beach and then who's going to pay to get the infrastructure off a national park beach? It's just madness (Fisher 4).”



Concerns also related to industry restricting public use of beach areas at certain times or completely due to infrastructure on the beach and/or in the water. There were also concerns relating to restrictions within the water of ocean activities, such as surfing.

Another participant, a local Council member, also raised concerns about the levels of resilience of the infrastructure, however, they also noted that the current proposals had included contingency plans for pollution related scenarios, suggesting that the issue could be mitigated.



How resilient are they to coastal processes, coastal storms, et cetera. I note both proposals have considered emergency clean up scenarios (Local Council Member).



3.7. Health and Wellbeing



Health and wellbeing include physical and mental health especially for people vulnerable to social exclusion or substantial change, psychological stress resulting from financial or other pressures, or access to open space and effects on public health.

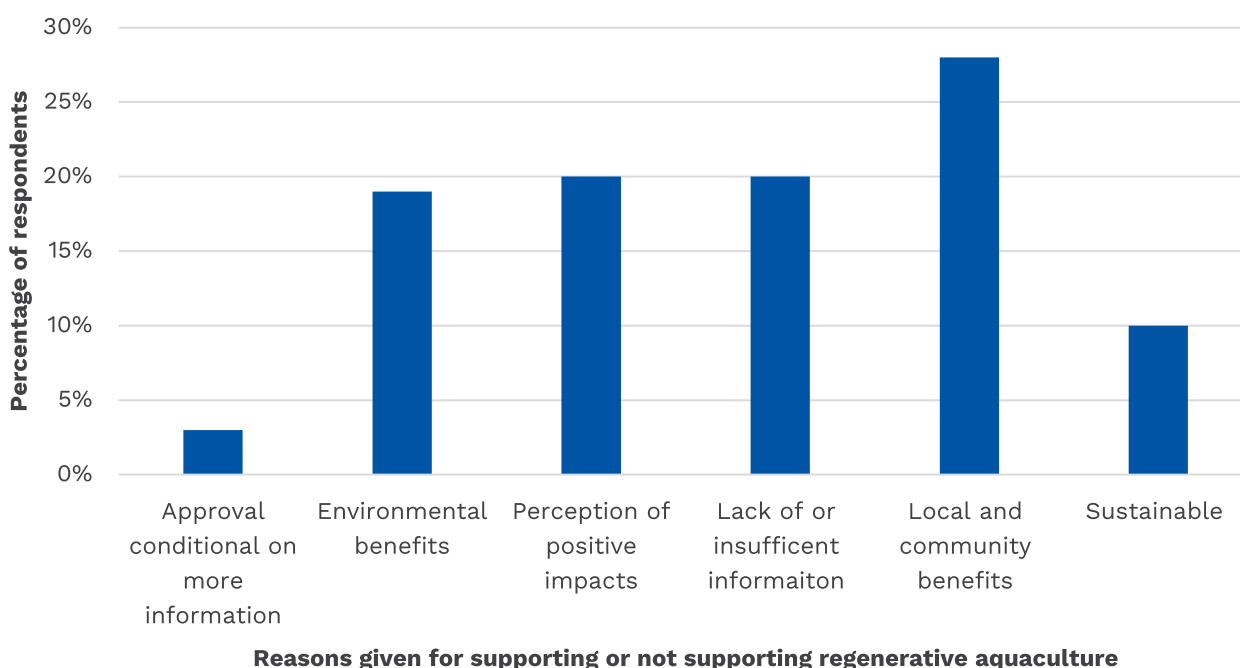
Given the high degree of emotional attachment to coastal and ocean spaces (see Section 3.3) any significant changes to those spaces have the potential to impact emotional wellbeing.

This is supported by the survey results which indicated that a section of survey participants (an average of 41%) felt that ocean industries affected their enjoyment of the sea (51% Shoalhaven, 36% Eurobodalla, and 37% Bega Valley).

It should be noted that this question did not specify the degree of impact or whether it was positive or negative, with subsequent questions suggesting that many respondents actually considered the impacts to be positive. For example, the majority of respondents (average 63%) across the 3 LGAs believed that the regenerative aquaculture industry would have a somewhat positive or very positive impact on recreational activities such as fishing and boating (62% Shoalhaven, 66% Eurobodalla and 59% Bega Valley) (See section 3.6.2).

Overall, the high level of support for regenerative aquaculture identified through the community survey suggests that survey participants had hopes that the industry would proceed in their area. As shown in Figure 22 local and community benefits were cited by the majority of participants as being the reason they are supportive of the industry (27% Shoalhaven, 30% Eurobodalla and 28% Bega Valley).

Figure 23: Summary of responses from survey respondents when they were asked ‘why do you say that’ in relation to their response to the question ‘would you like to see regenerative aquaculture in your local area (n=540).



The interview and focus group data revealed a somewhat more complex story. Despite the high rates of approval in the broader LGA, when actual sites are named and the proposal became tangible, there was a mobilisation of opposition in some communities.

Data from interviews revealed there is both hope and fear that project proposals will proceed. Some participants expressed considerable distress, anger and anxiety in relation to the proposals in the case study areas.

Longer term impacts on health and wellbeing cannot be predicted from these results but it is clear that for some the proposal did have some immediate impacts.

Bushfires had a lasting traumatic effect on community

- △ The ocean is critical to healing
- △ Losing our nature (Research workshop participant – Bermagui).

The interviews and research workshops uncovered a range of concerns relating to both the broader proposals and the individual processes relating to seaweed and regenerative aquaculture. Concerns relating to the broader proposal were strongly linked to view that the ocean was a place of refuge (which was particularly pertinent as a result of the Black Summer Bushfires) and alarm that industry might impact this environment.

In particular, the emotional responses related closely to concerns over perceived impacts on the natural environment, especially in relation to the issue of whale entanglement. This is discussed further in Section 3.2. Concerns about smell, visual impacts, and wider safety concerns were also raised.

On the other hand, some research participants responded passionately about the need for action on environmental issues of concern, including climate change and biodiversity loss, and were enthusiastic about the proposed farms as beacons of hope:

“

If done with sensitivity to the environment, it gives me great hope (Research workshop participant, Eden).

Yes! We have done too much damage to our Earth & need to explore ANY opportunities to stop any more decline & reverse the damage (Research workshop participant, Bermagui).

”

In interviews, aquaculture proponents spoke of the food related benefits that regenerative aquaculture could have but this was not prominently discussed by other participants.

The tourism potential of local foods that told a provenance story was discussed by one interview participant.

3.8. Culture

Culture refers to both Aboriginal and non-Aboriginal culture, including shared beliefs, customs, practices, obligations, values and stories, and connections to Country, land, waterways, places and buildings.

The Yuin Aboriginal Nation stretches along the south coast of NSW from the Shoalhaven River to Twofold Bay, north of the Victorian border and incorporates several language groups. These include the Jerringa, Walbanga and Djiringani people. Report 2 is a dedicated report on First Nation considerations and cultural values.

Report 2 specifically considers the rights and interests of Aboriginal people on the coast in relation to the development of regenerative aquaculture. The interview data and workshops clearly demonstrated a strong support from many non-Indigenous community members for Indigenous leadership and involvement in any current and future plans. There were concerns raised that the leases in the case study areas had been issued without the involvement of local elders or relevant Aboriginal organisations. For example, one research participant in the Bermagui consultations noted:

“

Traditional owner consultations before project commencement. No one owns the sea so making profit off it without regard for local custodians who have lived here for thousands of years is gross. The whole area is an ‘Aboriginal place’ and business has already polluted and taken enough. Native Title claim has been applied for in this area, so specific consultation must be made (Research workshop participant, Bermagui).

”

Report 2 outlines a high degree of interest amongst a number of Aboriginal groups in regard to future involvement in this emerging industry, and a strong commitment to guiding future site and species selection. This was supported by the non-Indigenous community, with several participants in the interviews and the research workshops highlighting that the farms should aim to ‘upskill & employ Indigenous communities (Research workshop participant, Bermagui).

3.9. Governance

Governance refers to decision-making systems, including the extent to which people can have a say in decisions that affect their lives, and have access to complaint, remedy, and grievance mechanisms.

The first section will outline the existing governance mechanisms, before looking at consultation and engagement processes utilised by industry. The findings captured in the data will then be outlined, in relation to community perspectives on consultation and engagement as well as levels of trust in existing governance mechanisms.

3.9.1. Current framework for consultation and engagement

In 2018, the NSW DPI (Department of Primary Industries) released the NSW Marine Waters Sustainable Aquaculture Strategy (MWSAS), which was designed to address the risks of site selection, design, operation and both environmental and community impacts of the emerging offshore aquaculture industry in the State (NSW Department of Primary Industries, 2018).

The MWSAS identifies as a first pass potentially suitable sites and has developed a widget which is used to guide proponents when considering potential areas. Some of the considerations incorporated into this process included:

- △ Constraints were used to reduce the areas of marine waters of NSW to areas of interest. The constraints included established protected areas, infrastructure, and operational areas of significance to other users which resulted in removing approximately half of the area of state waters as potential marine aquaculture sites.
- △ A number of 'suitability factors' were used to identify optimal areas for an aquaculture enterprise. These suitability factors included attributes such as proximity to infrastructure (ports) and physical conditions, such as the water depth. These factors were used to give a suitability score for different types of aquaculture(s). Regions of the coast with high suitability scores

Through this process the MWSAS identifies potentially suitable sites. It is envisaged that a potential aquaculture business would use these assessments to undertake their own specific studies to ensure a site satisfies the biological requirements for the optimal culturing of a species, the operational requirements, and cost of production.

As such, all areas which have undertaken this high-level suitability assessments have had a degree of social impact mitigation already undertaken.

For example, stage 1 aimed to reduce the likelihood of resource use conflict by considering the location and distance from existing marine uses. Stage 2 included guidance on the following areas of relevance when identifying suitability scores for the remaining waters:

- △ Aboriginal cultural heritage
- △ European heritage
- △ Commercial, recreational, and Aboriginal cultural fishing, recreational boating and tourism
- △ Noise
- △ Visual amenity

In addition to these social and cultural assessments, a range of environmental factors that would be of likely concern to local communities were also assessed. The MWSAS includes recommendations for proponents to undertake their own consultation as part of the process of site selection.

Aquaculture considerations are also incorporated into NSW Marine Estate Management (MEM). Under the MEM Act, the NSW marine estate is to be managed as a single continuous system for the greatest well-being of the community, which includes maximising current and future economic, social and environmental benefits.

The Marine Estate Management Authority (MEMA) is responsible for overseeing the management of the NSW marine estate consistent with the principles of ecologically sustainable development in a manner that promotes a biologically diverse, healthy, and productive marine estate, and facilitates:

- △ economic opportunities for the people of NSW, including opportunities for regional communities, and
- △ the cultural, social, and recreational use of the marine estate, and
- △ the maintenance of ecosystem integrity, and
- △ the use of the marine estate for scientific research and education,

Opportunities for community input into marine estate management include the following:

- △ Individual departmental engagement activities (for example, Local Land Services have community advisory committees)
- △ Marine Park advisory committees (where relevant)
- △ Consultation activities associated with specific activities, plans or strategies, including the MEMA Threat and Risk Assessment process and the Marine Estate Management Strategy¹⁷
- △ Contributions to the NSW Marine Estate Community Wellbeing Framework as part of the NSW Marine Integrated Monitoring Program¹⁸.

The Secretary's Environmental Assessment Requirements (SEARS) (Department of Planning and the Environment 2021) issued for the existing lease locations in Bermagui, Eden, and Pambula provide the foundations for future community engagement around regenerative aquaculture, including the need to develop comprehensive community engagement plans.

These plans, in accordance with NSW Planning Guidelines require comprehensive, local-level engagement, recognising the intrinsic importance of these communities in shaping the social, environmental, and regulatory landscape of the region. The Department of Planning is the consent authority who issue SEARS, assess EIS and ultimately approve or reject the decision to permit aquaculture in a proposed area.

Our review of existing regulatory and policy frameworks for regenerative aquaculture therefore confirmed that there is **no current, coordinated engagement strategy or plan to support the development of the regenerative aquaculture industry at either a local or regional scale at present.**

Consultation and engagement are primarily **conducted by individual proponents on a site-by-site basis.**

3.9.2. Industry approach to engagement

Interviews with proponents identified areas of uncertainty and concern when it came to community consultation. When asked about how they planned to conduct community consultation one proponent discussed that they were unsure of the best path forward, and they were concerned as to get it wrong would be a big risk for the future of their project.

You asked the question how was I going to do it. I'm trying to work out what it is I'm supposed to know, so that we can then answer the questions (Proponent).

There was considerable discussion and debate amongst proponents and the project teams about the best way to consult community and the timing of that engagement. Some expressed concern that did not have enough information to begin formal discussions with community whilst others recognised a need to begin conversations early. One proponent who has been through community consultation for previous projects reflected on the process that they undertook. This proponent discussed that initially it was very difficult, and there was a lot of community backlash, but they had slowly built a positive relationship with local councils and the local community.

¹⁷ <https://www.marine.nsw.gov.au/marine-estate-programs/marine-estate-management-strategy>

¹⁸ <https://www.marine.nsw.gov.au/marine-estate-programs/marine-integrated-monitoring-program>

The quote below is illustrative of some of the work they have done in the community to gain acceptance.



We've done demos at the local school where we've set up above the land what a mussel farm looks like so they can visualise it. We've done talks at the museum here on a couple of occasions. We've had food events, so mussel cook-ups and stuff, at the marathon and different sort of festivals they do here. All the cafes and restaurants, or most of them, buy Jervis Bay mussels, and the oysters as well. But it's something you have to work (at). (Proponent)



Part of the success of this engagement strategy was a focus on building relationships and ensuring community benefits are felt and understood:



We work with a recreational group. We've worked with local divers. We teach them how to tie up to our leases. We encourage them to go there, snorkelling and fishing. We just say, look, when you go there, just tie up this way so you don't damage your boat or our lease, because the more we can get support by those groups, the better... If we wanted any chance in the future of expansion anywhere, you need to have good social licence (Proponent).

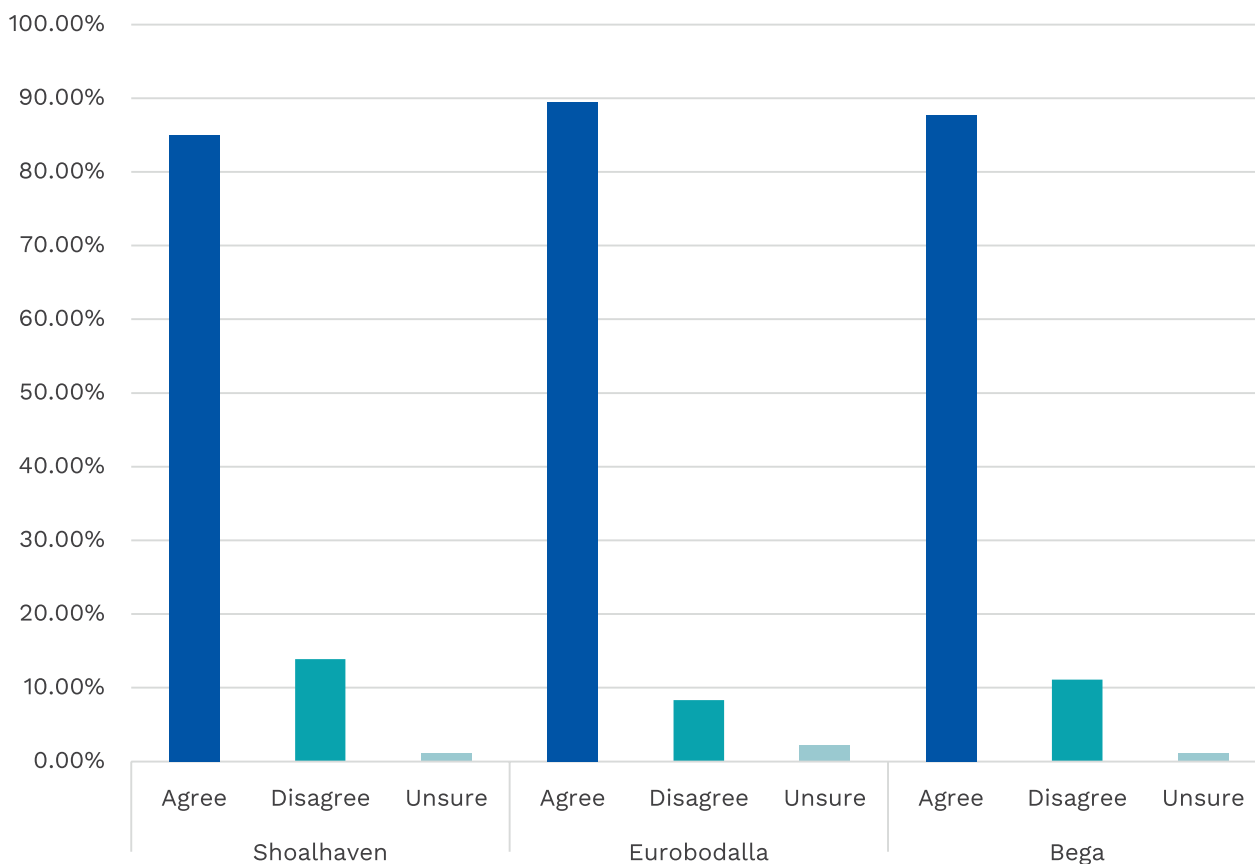


3.9.3. Community interest in engagement

The results of the regional survey clearly demonstrate a strong desire for communities to have a voice in the future of regenerative aquaculture and blue economy development more broadly.

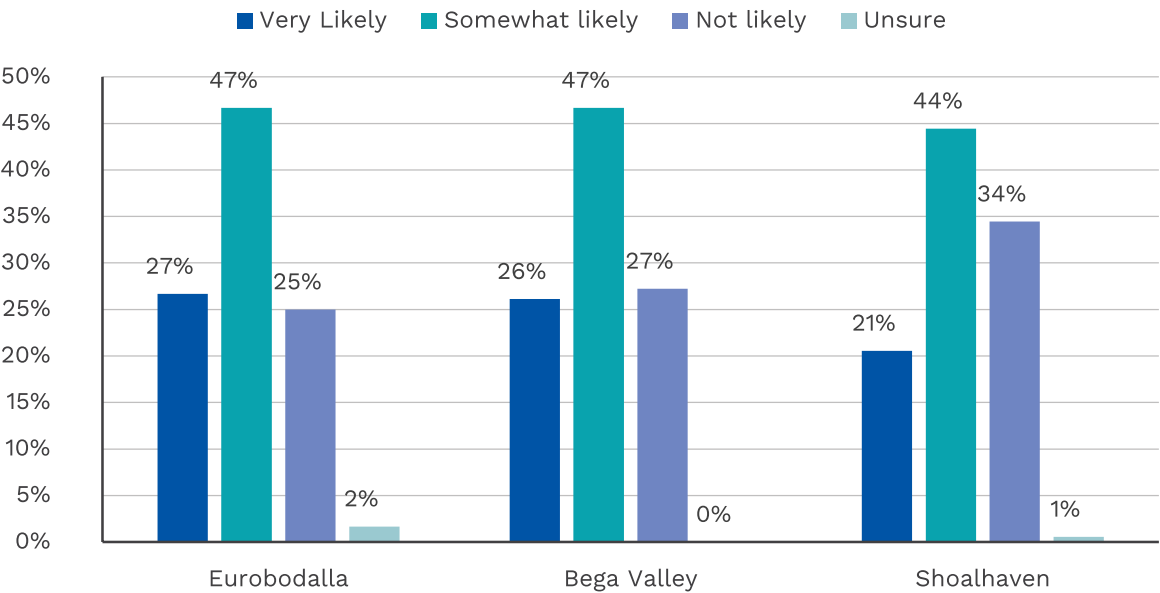
Across all three regions more than 85% of the respondents indicated that they would like to be better informed about existing and developing ocean industries in NSW (Figure 23).

Figure 24. Survey responses to the statements: I would like to be better informed about existing and developing ocean industries in NSW (n=540, and n=180 in each LGA).



The survey also suggested that residents were quite motivated to learn more about regenerative aquaculture, with more than 20% very likely and more than 44% somewhat likely to seek out additional information on this topic (Figure 24).

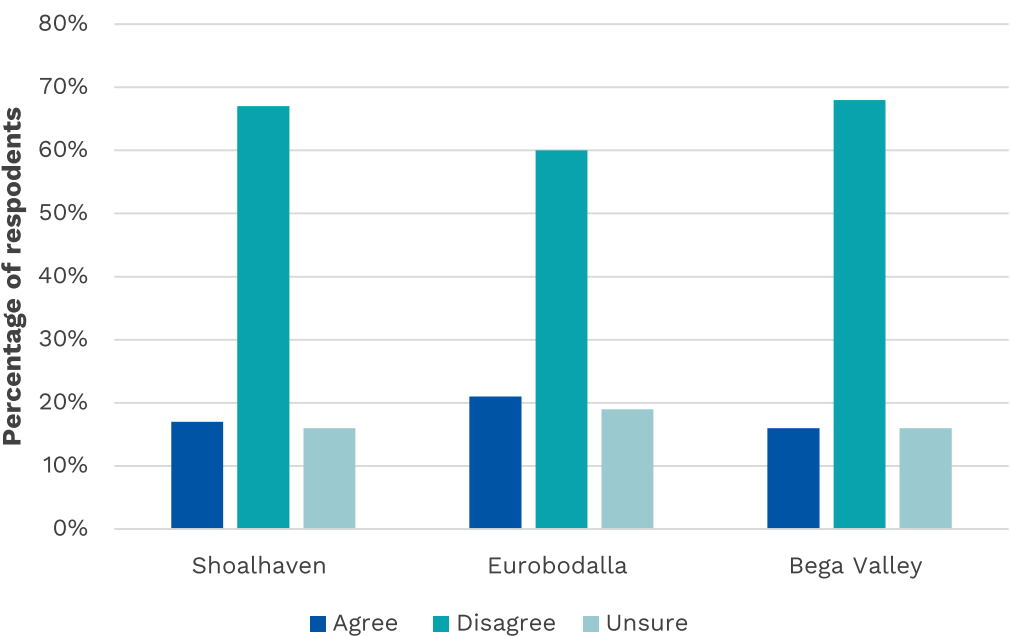
Figure 25. Survey responses to the question: How likely are you to seek out additional information about the potential of regenerative aquaculture? Results are shown by region (n=540, and n=180 in each LGA).



3.9.4. Level of Trust in Engagement

The survey data showed that the majority (an average of 65%) of participants across the LGAs did not believe that all relevant people were being adequately consulted in the development of regenerative aquaculture (see Figure 25).

Figure 26. Survey Respondent's response to the question 'please indicate if you agree or disagree – when it comes to decisions about ocean development, I believe all relevant people are being adequately informed and consulted (n=540, and n=180 in each LGA).



The research workshops and interviews suggested mixed views about who should be responsible for that consultation, including whose voices would be trusted within consultation exercises.



DPI & government officials responsible for the approvals should be here to own decision & goals (to explain reasoning behind targets) (Research workshop participant, Eden).

Well, I think council should have made the public aware a year ago when the conversation first started at a council level (Local Resident).



The issue of trust often related to the perception that proponents had ‘vested interest’ in the proposal and therefore the information they provided could not be believed. For some, the presence of the university at these events was also seen as evidence that the researchers were ‘biased’.

For some the issue of trust was strongly linked to prior experiences in dealing with developers, regulators, or researchers.

Respondents frequently referred to prior examples of incidences in which they felt consultation had been inadequate or decisions had been made in spite of community objections.



Then there was a turning point with community down there with the dredging. When they dredged that place ... folks were quite cross about that. It's been – I think it kind of made people a bit vigilant, over-vigilant and cross...’ (Fisher 3).



An engagement approach which focused on relationship building and a slow development of trust – was suggested by some research participants as a useful. For example, one local resident put forward suggestions such as rethinking the way communication is handled in consultation settings, drawing on accessible language, and allowing time for information sharing, relationship building and in-depth reflection throughout the engagement processes.

3.9.5. Level of trust in existing mechanisms

Both interview and focus group data indicated a level of distrust in existing mechanisms and the current processes. Frustration relating to the difficulty, lengthiness and riskiness of the process was discussed by proponents and other participants throughout the interviews.

Proponents, community members and government officials were united in their frustration that there was currently insufficient information available on which to base decision making around site selection, consultation, and impact mitigation strategies.

Whilst this was expressed in a variety of ways, including distrust of the planning approvals process, overall, there was a sentiment that the government and independent research bodies needed to play a more active role in research and development, consultation, and site selection.



Why isn't the initial research being done by non-industry bodies (gov, uni, etc.) instead of industry? (Research workshop participant, Eden).

If government are the ones saying we need make infrastructure, why aren't they here and why aren't they throwing themselves behind it? (Research workshop participant, Eden).



In another interview, a participant noted:



You know, the trouble is with governments these days, there's too much bullshit to go through before you can get anywhere. A lot of people that have good ideas, give up. They just walk away from it, because it just gets too hard (Fisher 1).



Other stakeholders also recognised the challenges proponents on the NSW coast have in developing a new industry because of governance processes.



If you're not savvy, it's a very inequitable playing field. You just won't – it's like chess, if you know how to play the game you can trade off slots of – and consultation in New South Wales is about denial as well.... I think if you're a new entrant to this space... you're really up against it unless you've got – it's really [trouble] – unless you've got the support of one of those larger pre-existing businesses or advocacy groups (Fisher 6).



In this same interview, participants went on to discuss how shocked they were by the number of regulations that were involved in the approvals process for proponents (as was shown on a slide on the consultation event the evening before the interview).

3.9.6. Emotion and timing

Prior to the two information sessions associated with this research, no formal consultation on the development of the industry had occurred either at a community or regional scale beyond local efforts by proponents.

These local efforts including one-on-one stakeholder meetings, attendance at public markets and community group presentations. No public consultation had been undertaken by government on future aquaculture development in the region apart from consultation on the Jervis Bay mussel farm some time ago.

As a result, many participants, especially in the Bermagui community, responded with shock to hearing of the proposed kelp farm in their area. They criticised the timing of the consultation, which they considered should have happened earlier (e.g., at the site selection stage) and included key stakeholders, regulatory bodies, and Indigenous and other community leaders.



Number one is fisheries; go and have a look at what people catch for a start and say,

this is going to affect our fishermen. It shouldn't even get off the table.... At the end of the day, they didn't consult none of us until now...That's crazy (Fisher 4).

What does good consultation look like? step by step with each element given time for community members to absorb & fully understand impacts versus benefits. Have impact into EIS review, with experts given opportunity to review & questions outcomes (Research workshop participant, Bermagui).



This initial shock reaction is common when new developments are proposed and often triggers a range of strong emotional responses.

The research workshops and interviews deliberately aimed to create space for people to express their emotional responses to the proposals in their community. This was in recognition of the often-hidden role emotion plays in influencing the ways in which individuals and groups respond to information and evidence. The emotions expressed ranged significantly from hope, anger, fear, distress, and excitement.

Despite the attempt to acknowledge the importance and legitimacy of emotion within public consultation, ongoing engagement is required to allow these emotions to be worked through.



The meeting gave a hint of some of the sentiment, but the meeting didn't provide an adequate venue for having more in-depth conversations about that first and foremost concern... I think the format of last night's meeting was very restrictive.

When you have a new proposal that's going to generate an emotional response, there has to be room to receive the curiosity and emotional response of the audience (Local Resident 1).

What does good consultation look like? Empathy, patience, understanding, listening (Research workshop participant, Bermagui)



While criticisms of timing were common from community members opposed to the projects, others were frustrated by the slow pace of change and willingness of the government to take risks with novel approaches to ocean governance. Some participants discussed flaws in the current mechanisms for marine management in NSW. For example, one respondent discussed the idea that governance of the NSW marine estate does not allow for the progress necessary to keep up with the rapid speed and scale of change.



This is where I actually think we going to end up, based on my experience over the last 30 years and how things have changed in New South Wales around resource sharing and resource conflict. I actually think that the ability to do anything worthwhile in the marine estate is so difficult that it's lagging behind the actual speed of change you need.

We're heading for a point – a reflex point where it either – we either let things absolutely collapse or we all hold hands and say, kumbaya and just get on with it' (Fisher 6).



Please note a detailed assessment and recommendations can be found in the accompanying Community Engagement Report (Report 3).



4. Discussion and Conclusions

This research uncovered a nuanced and complex community response to regenerative aquaculture at both a regional and localised scale. The significant research findings are found below.

4.1. Summary of social impacts and benefits with options for responses

Table 8 summarises the primary impacts and benefits of regenerative aquaculture industry identified through our research on the South Coast of NSW.

It also highlights options for mitigation of social impacts and opportunities for maximising potential benefits. These options and opportunities are classified according to Government, individual proponent, and broader industry opportunities.

Table 8. Summary of impacts and benefits identified through the research, with options and opportunities for mitigation and benefit enhancement (on the following page).

Social impact categories	Potential impacts identified	Potential benefits identified	Mitigation options (I: Industry, G: Government, R: Research Institutions, P: Proponents)	Benefit enhancement opportunities (I: Industry, G: Government, R: Research Institutions, P: Proponents)
Environment	Community concern over potential impacts on wildlife, especially whales, coastal processes, and marine debris/ pollution	Community support for potential benefits to water quality, biodiversity, fish stocks, and carbon capture	<p>Develop statewide cetacean management guidance for offshore industries (G)</p> <p>Develop Code of practice standards for wildlife interactions (I)</p> <p>Develop site specific wildlife management plans (P)</p> <p>Establish collaborative research projects which explore whale and bird interactions with offshore industries (R)</p>	<p>Use nature-positive design principles in farm planning (I, P)</p> <p>Collaborate with Indigenous Sea Ranger programs to maximise on- water monitoring and surveillance of wildlife interactions (I, P, G)</p> <p>Co-locate regenerative aquaculture with high need restoration sites and activities where suitable (e.g., areas of high nutrient loading, urchin barrens, etc.) (G, I, P)</p>
Way of Life	<p>Impacts on visual amenity</p> <p>Noise pollution</p> <p>Impacts on recreational uses (e.g., surfers)</p>	Maintenance of historic way of life and character through growing a new maritime industry in a region historically a primary production/ maritime area	<p>Explore novel technologies (e.g., bottom-up farming approaches) or innovations in colour and size of buoys to reduce visual impacts (I, R)</p> <p>Establish demonstration sites to familiarize the community with farm practices (G, I, R)</p> <p>Establish noise mitigation techniques through good neighbour arrangements e.g., time restraints on boat usage (P)</p> <p>Avoid high residential areas in site selection (G, I, P)</p>	<p>Promote maritime contribution to community, including character and way of life, as part of regional development and tourism strategies (G)</p> <p>Embed regenerative aquaculture into existing way of life through relationship building with local communities, supply chain businesses and education and training facilities (I)</p>
Community	<p>Conflict between users and uses.</p> <p>Deeper intangible conflicts based on values and worldviews, e.g., different conceptualisations of sustainability</p>	<p>Job creation</p> <p>Support for local economies and supply chains</p>	<p>Make use of spatial management and conflict resolution over shared use of ocean spaces (G, I, P)</p> <p>Develop strategies to maximise access to other users in lease areas (G, I)</p> <p>Develop complaints handling procedures (I, P, G)</p> <p>Engage dedicated mediation support to navigate underlying conflicts within the community, based on values and worldviews (R, I, P)</p>	<p>Maximise co-design and opportunities for community input into blue economy and regenerative aquaculture planning – including local content and employment plans and site selection (R, I, G, P)</p> <p>Establish independent consultative mechanisms to provide a forum for community input into marine planning (See Report 3) (R, G)</p>

Social impact categories	Potential impacts identified	Potential benefits identified	Mitigation options (I: Industry, G: Government, R: Research Institutions, P: Proponents)	Benefit enhancement opportunities (I: Industry, G: Government, R: Research Institutions, P: Proponents)
Livelihoods	Potential impacts on tourism and fisheries industries	Income diversification in regional areas Employment opportunities for youth and First Nations' community	Explore co-location and co-existence opportunities with fisheries (G, P) Engage with tourism industry to develop tourism products based around regenerative aquaculture (G, I)	Establish skills development pathways and training mechanisms (ideally through a dedicated facility and using integrated learning approaches) to grow industry capacity, especially for youth and First Nations' communities (R, I, G, P)
Accessibility	Competition for space with established users, including concerns over public use of beach areas Increased boat traffic and use of shared infrastructure (e.g., boat ramps) Concern about lost infrastructure on remote beaches Concerns about safe navigation	Opportunities to maximise use of ocean spaces through co-location and cooperation between different users	Develop community education materials about myths and misconceptions – i.e., that restrictions to public use are not permitted under lease conditions (G, I) Develop accountability safeguards for marine debris pollution (e.g., floating gear register) (G, I) Explore lessons learnt from mature aquaculture industries around marine debris management (I) Develop site specific vessel management and navigation plans (P)	Develop a Maritime Cluster to harness opportunities for sharing resources, infrastructure (e.g., processing plants) and boat fleets
Health and Wellbeing	Impacts on emotional connections to place, especially in response to natural disasters	Feelings of hope associated with proactive response to environmental threats	Explore models for trauma informed consultation and planning (R, G, I)	Engage with proactive and community led co-design processes to build on hopeful solutions, including through social entrepreneurial activities, nature positive solutions, and First Nations-led approaches (G, R, I, P)

Social impact categories	Potential impacts identified	Potential benefits identified	Mitigation options (I: Industry, G: Government, R: Research Institutions, P: Proponents)	Benefit enhancement opportunities (I: Industry, G: Government, R: Research Institutions, P: Proponents)
Culture	Potential impacts on cultural heritage	Opportunities for First Nations' leadership and involvement in new industry development	Develop robust underwater cultural heritage assessments (G, R, I, P) Encourage co design of future proposals with First Nations' communities (G, R, I, P)	Support leadership and partnerships with First Nations (see report 2) (G, R, I, P)
Governance	Lack of trust in existing mechanisms Disjointed and disconnected opportunities for community participation in marine planning Concern over private use of public assets ('thin edge of the wedge') Regulatory processes which disincentivises early engagement	High level of interest and engagement in being involved in ocean governance	Establish an industry peak body to provide a mechanism to assist governance and consultation Establish Government led processes of site selection incorporating spatial assessment and marine mapping, community consultation, broad scale environmental assessments and investigation of best practice/approaches (G) Enhance community ocean literacy, and readiness and awareness of new and growing Blue Economy industries (G, R, I) Establish shared community advisory groups or other regular consultative mechanisms with representatives across community. (G, R, I, P) Explore options to support early movers to allow them to work with community to develop proposals without fear of losing their competitive advantage (eg 'Certificate of preference' models used in Tasmania)	Embrace innovations in community engagement, including co-design (See Report 3) Establish a Maritime Cluster to create a hub through which Blue Economy industries can engage with local communities in a collaborative way (G, R, I, P) Identify and support key knowledge brokers (e.g., universities or independent bodies) to act as trusted voices or mediators between the needs of community and industry/government and provide a mechanism to build relationships across industry, government, proponents, and research bodies, from the site selection phase onwards (G, R, I) Develop a Government and industry-wide strategy for growth of regenerative aquaculture industry (G, R, I, P)



4.2. Key findings

4.2.1. There is widespread support for regenerative aquaculture on the NSW South Coast – but inadequate support for site selection is creating unacceptable risk to both communities and proponents.

The NSW South Coast community has expressed a broad degree of interest, enthusiasm, and passion for the issue of ocean use and governance, and regenerative aquaculture in particular.

Most participants across the survey, interviews and workshops expressed a desire and need to learn more about the industry. Strong enthusiasm for the industry can be seen in the **76% of survey respondents that expressed a desire for the industry in their LGA.**

While the survey results indicate a high level of support for the industry, it is **highly conditional upon the assurance of strong environmental protections** especially in relation to impacts on marine mammals. There is a clear need for industry, government and independent research to work together to conduct and share the baseline information required to meet these expectations.

Concern around negative environmental impacts, were among the main issues raised by community members throughout the research.

There was a notable difference between the high level of support for the regenerative aquaculture identified through the community survey and the at times, quite hostile response from local communities in the case study areas, most notably, Bermagui. This may in part reflect the notion of an ‘vocal/engaged’ minority, and a ‘quiet majority’, where it is often the minority who are either strongly opposed or strongly supportive who are the most vocal in meetings related to natural resource management (Fleming et al. 2022).

Reasons for strong levels of opposition or support may include factors such as place attachment, perception of impacts, levels of trust and perceived transparency in the process and levels of awareness (Fleming et al. 2022).

However, it should also be noted that due to the lack of support and guidance in site selection in the existing governance processes, there may be occasions where the suitability of a particular site is not fully known by proponents until after critical decisions have been made about lease location. At present, the existing processes provides minimal guidance on site selection and largely leaves this in the hands of individual proponents.

Decision making around site selection often tends to focus on technical aspects of suitability, such as proximity to safe harbours, water temperature and other feasibility constraints. Social and cultural considerations are best understood through participatory

processes and consultation, yet the existing system disincentivizes early engagement with communities before site selection, leading to potential conflicts and setbacks (See Report 3). This is due to a competitive tender process that discourages industry from ‘showing their hand’ on the sites they are considering prior to lease areas being offered to the market (See Section 1.3).

To mitigate these issues, meticulous region-wide planning is imperative, ensuring equitable distribution of costs, and benefits throughout the region. It is essential to involve Indigenous communities from the outset in this planning process, designating areas for their future development and use, as discussed in Report 2. Tapping into local knowledge through participatory planning processes may also assist to identify suitable sites. This inclusive and systematic approach will foster industry success, community harmony, and environmental sustainability.

4.2.2. Inclusive and participatory regional planning is required to address environmental and social concerns for future site selection

It is clear that, at present, the regenerative aquaculture industry has the potential to harness community support and pride, if conducted correctly.

Building on a solid foundation of broad scale community support should give the industry and government confidence that this is an industry that communities will be proud of if it can be done in a way that ensures ongoing social licence. **Building and maintaining this social licence is a shared responsibility of significance to the community, the local environment, and the long-term viability of the industry.**

Relying on the current ad hoc and industry-led approach in NSW is inadequate. Instead, the industry requires comprehensive support to assess the full spectrum of cultural, social, environmental, and technical constraints and opportunities associated with various sites and approaches.

The acceptance of the community hinges on the application of thorough science and careful planning and governance.

Communities want to see careful and thoughtful site selection, genuine partnerships with community and Indigenous peoples, rigorous environmental standards (see below) and a focus on returning benefits to local communities and local environments. The need to minimise visual impacts was also highlighted across the survey, interviews and research workshops. However, our research also highlights the presence of various social and cultural values that significantly influence community acceptance. These values trigger and are triggered by deeply held emotional attachments to coasts and oceans.

Acknowledging and actively working with communities to express and share their thoughts, ideas, feelings and values in productive and respectful ways can foster deeper listening and can open up opportunities for collaboration and co-design.

Opportunities for co-design solutions to issues of concern, may emerge by actively involving local communities in site selection and the development of impact mitigation strategies. The South Coast community possesses the required intellect, knowledge, skill set, and passion to ensure the success and sustainability of the regenerative aquaculture industry.

By harnessing these local resources and insights, industry can foster innovation.

Achieving this objective will demand patience, a steadfast commitment to building and maintaining relationships, and an ethic of care and social responsibility in order to establish a foundation of trust and cooperation. However, it should also be acknowledged that achieving community consensus on controversial issues of this nature is not always possible and ultimately the final decision on whether to support the development and growth of this emerging industry is a political one.

4.2.3. Social impacts are strongly linked to environmental impacts and benefits – and perceptions of sustainability

The results of our analysis have been collated into an assessment of the social impacts that will require consideration in any planning approvals process (see Table 8).

Our primary findings underscore the intrinsic connection between the social impacts of greatest concern and community perceptions of possible environmental values and impacts. In other words, the social impacts of regenerative aquaculture will be heavily dependent on the extent and nature of environmental impacts. Therefore, effectively managing social impacts necessitates the parallel management of environmental impacts. Recognising this interdependence is essential for the sustainable development of regenerative aquaculture.

Currently, the regenerative potential of this emerging industry is acknowledged but remains largely implicit or assumed. In our examination of the case studies, farm design did not explicitly incorporate active restoration or regeneration techniques; instead, it relied on the notion of ‘flow-on’ benefits to the surrounding areas.

Our research suggests that the regenerative capacity of this industry seems pivotal in securing community support and advocacy, particularly given the contested ways in which environmental benefits were understood and accepted by local communities. Therefore, making these regenerative links more explicit, and built into the design process, would be highly beneficial.

Creating standards around regenerative farming, in order to demonstrate environmental credentials, would also be beneficial. This could involve adopting strategies such as multi-trophic aquaculture approaches, siting farms alongside degraded areas, and actively contributing to restoration projects, ideally in partnership with citizen science and Indigenous groups.

References

- Australian Bureau of Statistics (ABS). 2023. Regional Tourism Satellite Account. [Australian Bureau of Statistics. <https://www.tra.gov.au/en/economic-analysis/tourism-satellite-accounts/regional-tourism-satellite-account>.
- Andrew, N 2022, 'Sea urchins have invaded Tasmania and Victoria, but we can't work out what to do with them', *The Conversation*, 22 Dec 2022, viewed 23 May 2022 < <https://theconversation.com/sea-urchins-have-invaded-tasmania-and-victoria-but-we-cant-work-out-what-to-do-with-them-194534> >
- Barclay, K, Mcilgorm, A, Mazur, N, Voyer, M, Schnierer, S, & Payne, A. M 2016, *Social and Economic Evaluation of NSW Coastal Aquaculture*, Fisheries Research and Development Corporation and University of Technology Sydney, Sydney.
- Barrett, LT, Theuerkauf, SJ, Rose, JM, Alleway, HK, Bricker, SB, Parker, M, Petrolia, DR & Jones, RC 2022, 'Sustainable growth of non-fed aquaculture can generate valuable ecosystem benefits', *Ecosystem Services*, vol. 53, p. 101396.
- BDO. 2022. *Economic and Social Indicators for New South Wales Commercial Fisheries in 2019/2020*. A report for the NSW Department of Primary Industries
- BDO EconSearch 2023. *Economic Contribution of Aquaculture to New South Wales: A report for NSW Department of Primary Industries*. BDO EconSearch. Adelaide, SA
- Bjerregaard, R, Valderrama, D, Radulovich, R, Diana, J, Capron, Mark, Mckinnie, CA, Cedric, M, Hopkins, Ke, Yarish, C, Goudey, C & Forster, J 2016, *Seaweed aquaculture for food security, income generation and environmental health in Tropical Developing Countries (English)*, viewed 12 November 2023, <<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/947831469090666344/seaweed-aquaculture-for>>.
- BMT-WBM (2017). *New South Wales Marine Estate Threat and Risk Assessment Report*. Broadmeadow NSW, Marine Estate Management Authority.
- Buck, B 2017, 'Offshore and Multi-Use Aquaculture', paper presented at 2nd Harald Rosenthal Symposium, Neu Wulmstorf, Germany.
- Campbell, I, Macleod, A, Sahlmann, C, Neves, L, Funderud, J, Øverland, M, Hughes, AD & Stanley, M 2019, 'The Environmental Risks Associated with the Development of Seaweed Farming in Europe - Prioritizing Key Knowledge Gaps', *Frontiers in Marine Science*, vol. 6, p. 107.
- Campbell, LM, Fairbanks, L, Murray, G, Stoll, JS, D'Anna, L & Bingham, J 2021, 'From Blue Economy to Blue Communities: reorienting aquaculture expansion for community wellbeing', *Marine Policy*, vol. 124, p. 104361.
- Costello, C, Cao, L, Gelcich, S, Cisneros-Mata, MÁ, Free, CM, Froehlich, HE, Golden, CD, Ishimura, G, Maier, J, Macadam-Somer, I, Mangin, T, Melnychuk, MC, Miyahara, M, De Moor, CL, Naylor, R, Nøstbakken, L, Ojea, E, O'Reilly, E, Parma, AM, Plantinga, AJ, Thilsted, SH & Lubchenco, J 2020, 'The future of food from the sea', *Nature*, vol. 588, no. 7836, pp. 95–100.
- Demel, S, Longo, A & Mariel, P 2020, 'Trading off visual disamenity for renewable energy: Willingness to pay for seaweed farming for energy production', *Ecological Economics*, vol. 173, p. 106650.
- Department of Agriculture and Water Resources 2017, *National Aquaculture Strategy*.
- Filbee Dexter, K, Wernberg, T, Barreiro, R, Coleman, MA, De Bettignies, T, Feehan, CJ, Franco, JN, Hasler, B, Louro, I, Norderhaug, KM, Staehr, PAU, Tuya, F & Verbeek, J 2022, 'Leveraging the blue economy to transform marine forest restoration', in M Edwards (ed.), *Journal of Phycology*, vol. 58, no. 2, pp. 198–207.
- Fleming, CS, Gonyo, SB, Freitag, A & Goedeke, TL 2022, 'Engaged minority or quiet majority? Social intentions and actions related to offshore wind energy development in the United States', *Energy Research & Social Science*, vol. 84, p. 102440.
- FRDC. 2022. *Seaweed Aquaculture in Australia*. Viewed 20th October 2023 < <https://www.frdc.com.au/seaweed-aquaculture-australia> >
- Forbes, H, Shelamoff, V, Visch, W & Layton, C 2022, 'Farms and forests: evaluating the biodiversity benefits of kelp aquaculture', *Journal of Applied Phycology*, vol. 34, no. 6, pp. 3059–3067.
- Gentry, RR, Alleway, HK, Bishop, MJ, Gillies, CL, Waters, T & Jones, R 2020, 'Exploring the potential for marine aquaculture to contribute to ecosystem services', *Reviews in Aquaculture*, vol. 12, no. 2, pp. 499–512.

- Gollan, N., Voyer, M., Jordan, A. & Barclay, K. 2019, 'Maximising community wellbeing: Assessing the threats to the benefits communities derive from the marine estate', *Ocean and Coastal Management*, 168, 12–21.
- Hasselström, L, Visch, W, Gröndahl, F, Nylund, GM & Pavia, H 2018, 'The impact of seaweed cultivation on ecosystem services - a case study from the west coast of Sweden', *Marine Pollution Bulletin*, vol. 133, pp. 53–64.
- Hawkins, SJ, Allcock, AL, Bates, AE, Firth, LB, Smith, IP, Swearer, SE & Todd, PA 2019, *Oceanography and Marine Biology, An Annual Review, Volume 57*, viewed 2 October 2023, <https://library.oapen.org/bitstream/handle/20.500.12657/24721/9780367134150_oachapter6.pdf?sequence=1&isAllowed=y>.
- Hurd, CL, Law, CS, Bach, LT, Britton, D, Hovenden, M, Paine, ER, Raven, JA, Tamsitt, V & Boyd, PW 2022, 'Forensic carbon accounting: Assessing the role of seaweeds for carbon sequestration', *Journal of Phycology*, vol. 58, no. 3, pp. 347–363.
- Kelly, J 2020. *Australian Seaweed Industry Blueprint – A Blueprint for Growth*, Agri Futures Australia.
- Kelly, J & Macleod, C 2023, *Seaweed aquaculture governance in Australia, A review of state and Northern Territory seaweed aquaculture policy*, January, AgriFutures Australia, viewed 5 December 2023, <<https://agrifutures.com.au/wp-content/uploads/2023/02/23-014.pdf>>.
- Layton, C, Coleman, MA, Marzinelli, EM, Steinberg, PD, Swearer, SE, Vergés, A, Wernberg, T & Johnson, CR 2020, 'Kelp Forest Restoration in Australia', *Frontiers in Marine Science*, vol. 7, p. 74.
- Lindell, S & Kite-Powell, H 2021, 'Meeting Protein and Energy Needs for 10 Billion People While Restoring Oceans', *Marine Technology Society Journal*, vol. 55, no. 3, pp. 124–125.
- Ling, SD & Keane, JP 2024, 'Climate-driven invasion and incipient warnings of kelp ecosystem collapse', *Nature Communications*, vol. 15, no. 1, p. 400.
- Löhr, K, Weinhardt, M & Sieber, S 2020, 'The "World Café" as a Participatory Method for Collecting Qualitative Data', *International Journal of Qualitative Methods*, vol. 19, p. 1–15.
- McClenachan, L & Moulton, A 2022, 'Transitions from wild-caught fisheries to shellfish and seaweed aquaculture increase gender equity in Maine', *Marine Policy*, vol. 146, p. 105312.
- Mizuta, DD, Froehlich, HE & Wilson, JR 2023, 'The changing role and definitions of aquaculture for environmental purposes', *Reviews in Aquaculture*, vol. 15, no. 1, pp. 130–141.
- Mongin, M, Baird, ME, Hadley, S & Lenton, A 2016, 'Optimising reef-scale CO₂ removal by seaweed to buffer ocean acidification', *Environmental Research Letters*, vol. 11, no. 3, p. 034023.
- National Marine Science Committee 2015. *National Marine Science Plan 2015–2025: Driving the Development of Australia's Blue Economy*, Australian Institute of Marine Sciences, Townsville.
- New South Wales Department of Primary Industries 2018, *NSW Marine Waters Sustainable Aquaculture Strategy*, NSW Department of Industry.
- New South Wales Department of Planning and the Environment. 2021. *Environmental Planning and Assessment Regulation 2021 – Secretary's environmental assessment requirements*.
- Rimmer, MA, Larson, S, Lapong, I, Purnomo, AH, Pong-Masak, PR, Swanepoel, L & Paul, NA 2021, 'Seaweed Aquaculture in Indonesia Contributes to Social and Economic Aspects of Livelihoods and Community Wellbeing', *Sustainability*, 19, vol. 13, no. 19, p. 10946.
- Ross, FWR, Boyd, PW, Filbee-Dexter, K, Watanabe, K, Ortega, A, Krause-Jensen, D, Lovelock, C, Sondak, CFA, Bach, LT, Duarte, CM, Serrano, O, Beardall, J, Tarbuck, P & Macreadie, PI 2023, 'Potential role of seaweeds in climate change mitigation', *Science of The Total Environment*, vol. 885, p. 163699.
- Spillias, S, Cottrell, RS, Kelly, R, O'Brien, KR, Adams, J, Bellgrove, A, Kelly, B, Kilpatrick, C, Layton, C, Macleod, C, Roberts, S, Stringer, D & McDonald-Madden, E 2022, 'Expert perceptions of seaweed farming for sustainable development', *Journal of Cleaner Production*, vol. 368, p. 133052.
- Spillias, S, Kelly, R, Cottrell, RS, O'Brien, KR, Im, R-Y, Kim, JY, Lei, C, Leung, RWS, Matsuba, M, Reis, JA, Sato, Y, Sempert, K & McDonald-Madden, E 2023a, 'The empirical evidence for the social-ecological impacts of seaweed farming', in MNI Sarker (ed.), *PLOS Sustainability and Transformation*, vol. 2, no. 2, p. e0000042.

Spillias, S, Valin, H, Batka, M, Sperling, F, Havlík, P, Leclère, D, Cottrell, RS, O'Brien, KR & McDonald-Madden, E 2023b, 'Reducing global land-use pressures with seaweed farming', *Nature Sustainability*, vol. 6, no. 4, pp. 380–390.

Stenton-Dozey, JME, Heath, P, Ren, JS & Zamora, LN 2021, 'New Zealand aquaculture industry: research, opportunities and constraints for integrative multitrophic farming', *New Zealand Journal of Marine and Freshwater Research*, vol. 55, no. 2, pp. 265–285.

Stewart, W 2020, 'Under the sea: a traditional owner perspective on the Marine Estate Management Act, by Wally Stewart, traditional owner and native title applicant, south coast, New South Wales (NSW).', *Native Title Newsletter*, Issue 2`, January.

Theuerkauf, SJ, Barrett, LT, Alleway, HK, Costa Pierce, BA, St. Gelais, A & Jones, RC 2022, 'Habitat value of bivalve shellfish and seaweed aquaculture for fish and invertebrates: Pathways, synthesis and next steps', *Reviews in Aquaculture*, vol. 14, no. 1, pp. 54–72.

Visch, W, Layton, C, Hurd, CL, Macleod, C & Wright, JT 2023, 'A strategic review and research roadmap for offshore seaweed aquaculture—A case study from southern Australia', *Reviews in Aquaculture*, vol. 15, no. 4, pp. 1467–1479.

Würsig, B & Gailey, GA 2002, 'Marine mammals and aquaculture: conflicts and potential resolutions.', in RR Stickney & JP McVey (eds), *Responsible marine aquaculture*, 1st edn, CABI Publishing, UK, pp. 45–59, viewed 18 May 2023, <<http://www.cabidigitallibrary.org/doi/10.1079/9780851996042.0045>>.

Appendices

Appendix A: The Survey Questionnaire

PROJECT NAME: South Coast Blue Economy, Regenerative Aquaculture Survey

DOCUMENT TYPE: Questionnaire

CREATED BY: Taverner Research and University of Wollongong

Introduction

Good afternoon/evening, my name is [NAME] and I'm calling from Taverner Research. We are conducting a survey on behalf of the University of Wollongong with residents from the South Coast aged 18 or over to understand community attitudes toward ocean industries. The survey will take about 12 minutes.

This survey will be recorded and/or monitored for quality assurance and training purposes. Participation is voluntary. You can choose to not participate at any time.

To start, I will need to confirm your eligibility.

D1. How old are you?

- △ Under 18 – THANK AND TERMINATE
- △ 18-24
- △ 25-34
- △ 35-44
- △ 45-54
- △ 55-64
- △ 65-plus

D2. What gender do you identify with?

- 1. Male
- 2. Female
- 3. Other (specify)
- 4. (Prefer not to say)

D3. What is your postcode?

RECORD POSTCODE

D4. Is your primary place of residence located in Eurobodalla, Bega Valley or Shoalhaven?

- 5. Eurobodalla
- 6. Bega Valley
- 7. Shoalhaven
- 8. None of these

D5. Do you visit Eurobodalla, Bega Valley or

Shoalhaven for a month or more every year?

- 1. Eurobodalla
- 2. Bega Valley
- 3. Shoalhaven
- 4. None of these – THANK AND TERMINATE

PART 1 - THE BLUE ECONOMY AND OCEAN INDUSTRIES ON THE NSW SOUTH COAST

Q1. This part of the survey aims to understand community preferences around the use of ocean space and the development of ocean-based industries -or a blue economy. Are you familiar with the concept of the blue economy?

- 1. Yes
- 2. No

ASK Q1A IF Q1 = 2 (NO). ALL OTHER SKIP TO Q2

Q1A. A blue economy is 'the sustainable use of ocean resources for economic growth, improved livelihoods and jobs while preserving the health of the ocean'. The blue economy encapsulates the many ways we use the ocean.

Please note, there are no right or wrong answers throughout this survey.

Q2. How often do you visit the beach, coastline or ocean?

1. Daily
2. Twice weekly
3. Weekly
4. Monthly
5. Rarely
6. Never

Q2A. You said that you never visit the beach – would you still consider the beach to be important to you?

1. Yes – (Go to Q4)
2. No – (Go to Q5)

Q3. Can you briefly describe what you do when you visit the beach, coastline or ocean?

MULTIPLE RESPONSE

1. Swim
2. Surf
3. Fish
4. Walk
5. Other types of fishing
6. Sunbathe
7. Picnic/BBQ
8. Play in the sand/Children's activities
9. Relax
10. Snorkel or dive
11. Kayak or SUP
12. Look for shells
13. Other (specify)

Q4. Can you please briefly explain what makes the local coast/ocean important or special to you?

MULTIPLE RESPONSE

1. Appreciate being in nature
2. Grew up going to the beach
3. Enjoy having a space to be with family and friends

4. Spiritual connection with nature
5. Being a part of local community or culture
6. Health and wellbeing
7. Education opportunity (to learn about biodiversity and local species)
8. Is a source of employment for me (or members of my family)
9. Other (specify)

ASK ALL

Q5NEW. I am going to read out some sectors of the Blue Economy currently operating on the South Coast. Please tell me whether you think it is important or not important for you or your community: now, in the future or both.

1. Marine tourism
2. Boat hire and whale watching
3. Recreational Fishing
4. Recreational boating
5. Non-feed Aquaculture e.g. mussels and oysters
6. Commercial fishing
7. Abalone Collection
8. Urchin Collection
9. Mining e.g. sand mining and dredging
10. Conservation e.g. marine parks
11. Shipping,
12. Cruise ships
13. Defence

COLUMNS

1. Now only
2. Future only
3. Both now and in the future
4. Not important
5. Unsure

Q8. And now we are going to focus on some of the newer blue economy activities that are happening, or in development, around Australia and also around the world. For each activity can you please indicate whether you feel comfortable or uncomfortable with these industries being developed on the South Coast of NSW.

1. Offshore wind
2. Defence expansion
3. Fish farming requiring feed
4. Seaweed aquaculture not requiring feed
5. Oyster and mussel aquaculture not requiring feed
6. Abalone Ranching (wild abalone farm)
7. Ecotourism
8. Cruise ships

Q9. Do you have any concerns about the development of blue economy activities? If so, please elaborate these concerns.

Q10. Please indicate if you agree or disagree with the following statements. Please note there is no right or wrong answer.

1. Expansion of ocean industries will benefit local economies directly or indirectly through increased jobs and incomes in those industries.

2. Industry expansion in ocean spaces will change the way I engage with the ocean and coast
3. Ocean industries affect my enjoyment of the sea.
4. Permanent Industrial operations in ocean spaces should have minimal visual effect from the shoreline (give examples if need – offshore wind turbines, aquaculture sites, shipping etc).
5. When it comes to decisions about ocean development, I believe all relevant people are being adequately informed and consulted.
6. The expansion of ocean industries has the potential to contribute to a sustainable future.
7. The ocean is a source of pleasure and relaxation to me
8. I am frustrated by a lack of action on climate change
9. I am worried about the health of the ocean in my area
10. I would like to be better informed about existing and developing ocean industries in NSW
11. The benefits of expanded or emerging ocean industry should be focused on local communities.

PART 2 – REGENERATIVE AQUACULTURE ON THE SOUTH COAST

Q11. Have you heard of the term “regenerative aquaculture”?

1. Yes
2. No

Q11A. Regenerative aquaculture: Includes emerging and existing types of aquaculture such as seaweed and shellfish farming. These types of farms rely on nature to provide the feed needed for the products to grow, so they do not require feed inputs. As seaweed and shellfish are filter feeders, these farms can assist in improving water quality and they can also provide habitat for other marine species. Regenerative aquaculture farms may also contribute to carbon storage efforts. Regenerative aquaculture largely occurs underwater, with some surface buoys visible.

ASK Q12 IF Q11=1 (YES). ALL OTHER SKIP TO Q13.

Q12. Do you think existing regenerative aquaculture operations, such as oyster and mussel farming, have a positive or negative impact on:

1. The economy in your LGA (direct or indirect)
2. Employment in your LGA (direct or indirect)
3. Other ocean industries e.g., commercial fishing, tourism
4. Other recreational activities e.g. fishing, boating
5. The local environment
6. Overall ocean health, including mitigating climate change
7. Water quality
8. The visual amenity of the ocean in your local area
9. The character and sense of community in your local area

ASK ALL

Q13. Do you believe the expansion or establishment of new regenerative aquaculture sites, such as seaweed farms, could have a positive or negative impact on:

1. The economy in your LGA (direct or indirect)
2. Employment in your LGA (direct or indirect)
3. Other ocean industries e.g., commercial fishing, tourism
4. Other recreational activities e.g. fishing, boating
5. The local environment
6. Overall ocean health, including mitigating climate change
7. Water quality
8. The visual amenity of the ocean in your local area
9. The character and sense of community in your local area

Q14. How likely are you to seek out additional information about the potential of regenerative aquaculture?

1. Very Likely
2. Somewhat likely
3. Not likely
4. Unsure – DO NOT READ OUT

Q15. Would you like to see regenerative aquaculture in your local area?

1. No
2. Unsure

Q16. Why do you say that?

PART 3 – DEMOGRAPHICS

D6. Finally, I have a series of questions about you that will help us understand the data we're collecting and ensure that we are consulting with a representative group from across the region. We will be grateful if you are willing to answer these questions, but you don't need to if you're not comfortable doing so.

What is your occupation?

D7. What is the highest level of education you have attained?

1. Did not complete High School
2. High School up to Year 10 level or equivalent
3. High School up to Year 12 level or equivalent
4. College / University but not yet graduated
5. Bachelor's Degree
6. Postgraduate Degree (Master's, Doctorate)
7. TAFE or technical training/Diploma or similar
8. Other (specify)
9. (Prefer not to say)

D8. Do you own your primary residence? (either with mortgage or without).

1. Owned or mortgaged
2. Renting
3. Other (specify)
4. (Prefer not to say)

D9. Approximately how many kilometres do you have to travel to reach the coastline?

1. <5km
2. 6-10km
3. 11-15km
4. 16-20km
5. >21km
6. (Prefer not to say)



ISBN: 978-1-922822-10-9

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Proudly funded by