OUR FUTURE SHOALHAVEN

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A joint submission from Our Future Shoalhaven in conjunction with Keep Jervis Bay Unspoilt, Treading Lightly Inc., National Parks Association – Milton Branch, and Nature Coast Marine Group Inc.

Table of Contents

Thank you for this opportunity to comment on Modification application SSI-5657-Mod-1.

The modification application seeks to:

- Move the plots at Callala Beach 100m and 200m closer to the beach because they are currently incorrectly located in a Navy safety trace. This I believe was due to DPI Fisheries providing incorrect location co-ordinates when the lease was first approved.
- Move the Vincentia 10ha plot to a site between the existing 2 plots at Callala Beach
- Expand the overall size of the farm from 50ha to 70ha (Note that the DPI Fisheries website headline does not mention this expansion in area)

There is undoubtedly some level of economic benefit of the mussel farm in Jervis Bay, and we appreciate the effort that Fisheries and South Coast Mariculture has taken in communicating to the community about this application. We acknowledge that in the past Jervis Bay has been host to the farming of native scallops and oysters.

However, Our Future Shoalhaven (OFS) with the support of Nature Coast Marine Group Inc., Keep Jervis Bay Unspoilt, Treading Lightly Inc. and National Parks Association – Milton Branch, jointly raise the following concerns regarding the mussel farm:

- The species being farmed is recognised internationally as an introduced species to Australia.
- The species is considered a significant invasive species internationally by the IUCN.
- The transference of spat from Eden to Jervis Bay poses a biosecurity threat, recognised in the preparatory reports for setting up the farm.
- As the farm is located in a marine park it is timely that marine park researchers examine the ecological impacts.
- The mussel farming currently has a reported cost to the community that needs to be factored in, with the potential for the costs to increase.

As a consequence we strongly believe that:

1. An increase in size should not be approved until:
   i) research independent of Fisheries and SCM is undertaken to establish the level of spread of *Mytilus galloprovincialis* that is occurring as a result of the mussel farm; and
   ii) review of management steps required to prevent these impacts.
2. the financial costs to the community from mussel spread be considered in evaluating the modification application.
3. the biosecurity risk be reassessed considering new pest species and increased national and international boat traffic to Eden.
4. further work should be undertaken to understand the impact of the mussel farm on fish assemblages, benthic communities, and that Marine Park ecologists must be included in the analysis as they have high levels of national and locally relevant expertise.

Detailed submission

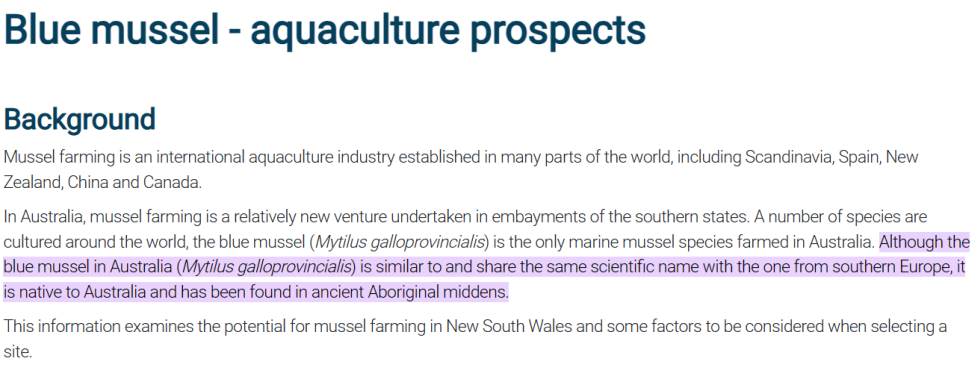
Our concerns are that:

1) the mussel farm is compromising the ecological integrity of Jervis Bay Marine Park, and is contradictory to the primary purpose of the marine park, which is:
2) to conserve the biological diversity, and maintain ecosystem integrity and ecosystem function, of bioregions in the marine estate;
3) activities within the park, including commercial operations such as the mussel farm, can only be undertaken where they are consistent with the primary purpose i.e. "maintains ecosystem integrity", and it is unclear if this ecosystem integrity is being maintained.

We request that, as per the Marine Estate Management Act 2014 No 72 overseeing this activity, the precautionary principle is applied. That is, permission for expansion is not given until adequate research has been undertaken which removes all doubt about the impacts and provides scientifically proven and enforceable solutions to the problems. The modification application is an important step in the management cycle (plan, do, review) to ensure that problems are not increased, and that should the mussel farm continue it does so in a way that truly is consistent with the primary purpose of marine parks.

An introduced and invasive species

The mussel farm uses the species *Mytilus galloprovincialis*. Fisheries is adamant that this species is 'native' and state so on their website[1] (Figure 1)



Blue mussel - aquaculture prospects

Background

Mussel farming is an international aquaculture industry established in many parts of the world, including Scandinavia, Spain, New Zealand, China and Canada.

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 (*Mytilus galloprovincialis*) 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 middens.

This information examines the potential for mussel farming in New South Wales and some factors to be considered when selecting a site.

Figure 1: DPI website stating that *Mytilus galloprovincialis* is native to Australia.

It appears that some years ago there was confusion around Australian Blue Mussels because it isn't possible to visually distinguish between the two species currently found in Australian waters. The work by Zbawicka *et al*. (2022) clearly distinguishes the two Mytilus species:

> "We employed a panel of 51 single nucleotide polymorphism (SNP) markers to examine genetic interactions between Australian native smooth-shelled mussels, *Mytilus planulatus*, and invasive and cryptic Northern Hemisphere *M. galloprovincialis* along 4400 km of coastline from the Pacific to the Indian Ocean." p. 1194.
> they go on to say:
> "Based on the samples investigated here, and in general agreement with other reports of high frequencies of non-native mussels at multiple sites in Australia (Westfall & Gardner, 2010, 2013; Colgan & Middelfart, 2011; Dias *et al.*, 2014; Ab Rahim *et al.*, 2016), the

[1] Blue mussel - aquaculture prospects (nsw.gov.au)

Australian mussel aquaculture industry is largely based on the production of Northern Hemisphere *M. galloprovincialis*, rather than the native *M. planulatus*." p. 1206

The recent work by the University of Queensland has used genetics to understand the origin of mussels in Australia. On the UQ website[2], it states "School of Biological Sciences researcher Dr Iva Popovic said the mussel *Mytilus galloprovincialis*– identified as one of the '100 World's Worst Invasive Species' by the IUCN Global Invasive Species Database – had steadily taken over the country's coastlines." Note however, that Dr Popovic says in an interview[3] that "… right now we really cannot determine whether or not *Mytilus galloprovincialis* is a threat to Australia's marine biodiversity – there's more work to do."

There is more work to do: This is exactly what we request happens prior to the mussel farm being given an extension, through an application of the Precautionary Principle.

Our concerns are heightened by reports of mussels in Jervis Bay in places and amounts that haven't been seen before:

1. Boat owners who keep their boats in Currambene Creek report large amounts of biofoul caused by mussel growth on their hulls and intakes. They state that this did not occur prior to the SCM mussel farm.

   Independent Audit Report (2022) acknowledges one formal complaint regarding concern about mussel spat spread. However, it seems that the complaint was dismissed on the grounds that 'there are natural blue mussel populations in Jervis Bay'. This ignores the scientific understanding that Australia's native blue mussel is a different species to that being farmed. And without genetic testing there is no substantial evidence to indicate that the origin of the problems mussels is not the SCM operations.

2. *Mytilus galloprovincialis*, a mediterranean species, is recognised as an invasive species in other countries, for example in Japan, Brazil, South Africa, North Korea and Russia. It is incredibly unfortunate that a species with known invasive characteristics has been allowed to be farmed in a marine park habitat protection zone. *M. galloprovincialis* has been known to hybridise with other mussel species and should that happen in Jervis Bay we may lose the endemic *Mytilus planulatus*. Indeed, it might be too late as Zbawicka, Wenne, Dias & Gardner (2022) state "Extensive hybridization characterizes nearly (all) the mussels from all sites and the native Australian mussel, *M. planulatus*, is now much threatened by the presence of the invasive Northern Hemisphere mussels." p. 1207.
3. The spread of *Mytilus galloprovincialis* is intended to be limited by a condition of consent that requires the mussels to be harvested prior to reproduction. However, the operator is only obliged to do this 'where possible'. We have been unable to find any public records of when or why the operator might not have been able to harvest prior to reproduction. We do know that weather events and water quality have prevented harvesting at times, which would likely have resulted in the mature mussels releasing their spat into the Jervis Bay waters. SCM has stated that it wants to do more research on this.
4. The Environmental Impact Statement[4] prepared by Bushell and the Aquaculture Management Unit (DPI) in 2013 refers to the farming of the species *Mytilus edulis*, another

[2] Australia's got mussels (but it could be a problem) - UQ News - The University of Queensland, Australia
[3] The great mussel mystery: Ecological threat or just a great lunch? (thenewdaily.com.au)
[4] Environmental Impact Statement (southcoastmariculture.com.au)

Blue Mussel. No where in the EIS is *Mytilus galloprovincialis* mentioned. Perhaps the original intention was to farm *Mytilus edulis?* (Figure 2)

Figure 2: Excerpt from page 15, Bushell et al. 2013)

Biosecurity threat

OFS and supporting organisations believe that there is an increased biosecurity threat to the Jervis Bay Marine Park from the mussel farm operation and practice of bringing spat from Eden. This practice is contrary to the advice of Joyce, Rubio & Winberg (2010) in their report regarding the viability of aquaculture in Jervis Bay[5]:

> "Formerly, mussel seed was collected in Twofold Bay and moved to Jervis Bay, though in future, this type of translocation from Twofold Bay may be inadvisable, as Eden is a primary port of call for international vessels." p 23.

We believe the biosecurity threat has increased as a result of increased shipping in Eden with international cruise ships, and with the more recent addition of *Clavelina lepadiformis, the* Lightbulb ascidian as a pest species in Eden. When discussing the European fanworm DPI state that a 'possible vector could include the accidental translocation of species attached to aquaculture gear …' [6] . We understand that SCM must follow protocols to help ensure that the movement of spat from Eden to Jervis Bay is disease and pest free, but the disastrous consequence of infecting a marine protected habitat warrants a reassessment of risk and process.

[5] A. Joyce, A. M. Rubio-Zuazo & P. C. Winberg (2010). *Environmental and Socio-Economic Considerations for Aquaculture in Jervis Bay, NSW*. Canberra: Fisheries Research and Development Corporation

[6] https://www.dpi.nsw.gov.au/fishing/aquatic-biosecurity/pests-diseases/marine-pests/other-marine-pests/european-fan-worm

This is a threat that SCM, no doubt, works hard to prevent, but as pest species numbers increase so too does the overall risk rating.

We request that the biosecurity risk be reassessed considering new pest species, and increased boat traffic to Eden.

Ecological impacts

The biosecurity threats mentioned above are also ecological threats. The monoculture of *Mytilus galloprovincialis* farms in marine ecosystems, as with any monoculture, is highly likely to have an impact on its surrounding environment.

1. A study undertaken by Borschmann (2022) found that:

the intense farming of the single species *Mytilus galloprovincialis* results in:

- Reduced species richness
- Increased larval supply to other parts of the bay
- *Mytilus galloprovincialis* outcompetes other epifaunal organisms
- *Mytilus galloprovincialis* from increased larval supply is not being controlled by predation.

Borschmann (2022) states:

> Species richness was found to be reduced inside of mussel patches. This study provides strong evidence that *Mytilus galloprovincialis* larval supply influences the population abundance and distribution in embayments along the NSW coastline. Twofold Bay was found to have the highest mussel abundance, which was consistent with predictions as it has been exposed to an increased larval source for the longest period. Within Jervis Bay, there is evidence to support that the mussel culture is resulting in an increased larval supply, as greater subtidal recruitment of mussels was found closer to the mussel culture site. It is possible that the continued supply of larvae from the culture of mussels in Jervis Bay into the future may continue to seed new populations and may result in similar trends to Twofold Bay. Post-settlement predation and competition do not appear sufficient to control mussel population increases resulting from an increased larval supply, as evident by significantly greater shoreline abundances in Twofold Bay. Once populations establish, study results indicate *Mytilus galloprovincialis* can outcompete other epifaunal organisms for space, suggesting that an increase in *Mytilus galloprovincialis* populations due to increased larval supply may have long term impacts on the ecosystem structure through the reduction of species richness. Overall, this study demonstrates that post-settlement predation and competition are not capable of controlling large-scale supply-side ecological shifts that significantly alter the population distribution and abundance of the mussel *Mytilus galloprovincialis*. These findings provide new evidence of the effects of supply-side ecology, with a need for these findings to be incorporated in the management of anthropogenic influences on the marine environment. (p. III) (our emphasis)

2. The original report into the viability of aquaculture in Jervis Bay by Joyce et al (2010) raises questions around:
    a. 'ecological carrying capacity' of introduced mussels into Jervis Bay. This was reported as a potential issue by Joyce et al. and they recommended further assessment of this prior to commencement. It is not known publicly whether that occurred. The EIS report noted that where the farm had 'Appropriate stocking densities - below ecological carrying capacity' there would be a moderate risk of impacts on marine habitats.
    b. A concern that mussel farms can act as Fish attractant devices, and that the overall impact on the health of the ecosystem is not clear. They state, "Although

aquaculture is not being installed with the direct intent of acting as an FAD, the relevance of Marine Parks policies on FADs should be determined for proposed aquaculture installations." It would be useful to make public Marine Park ecologist's perspective on this point.

c. They also point out that 'cultivation of exclusively local species would be permitted under Marine Park regulations', that is, to cultivate a non-local species would not be permitted.

3. It was noted in the recent Environment report undertaken for SCM (Molino Stewart 2022) that there was a significant difference between fish assemblages between the Update 1 and Baseline but noted that not enough is known to assess the significance of this difference. Again, in the 2022 benthic survey they note a significant difference but say not enough is known to attribute cause to the mussel farm. As the condition of the benthos and impact on fish assemblages is an indicator of an impact on the marine ecosystem these two significant differences deserve further exploration, rather than being dismissed with a statement that 'not enough is known'. This alone should trigger the precautionary principle to not increase the lease and immediately start research.
4. It has been reported by divers that juvenile Port Jackson sharks can be found underneath the lease infrastructure. This is a significant change in fauna behaviour and yet has not been reported by SCM in their Environment reports.

We request that further work be undertaken to understand the impact on fish assemblages and benthic communities.

Economic impact of the mussel farm

Clearly there is a financial benefit from the mussel farm operation.

But there is also a reported financial cost.

Several people who moor their boats in Currambene Creek are having to clean their hulls of the mussel growth. Please note, these are only the people that we know about. We have heard from 5 people recently but know that only one has made a formal complaint. We can only wonder if there are not many more people who have mussels growing on their boat hulls. Hull cleaning can cost up to $2400 for a 30-foot boat, or 6 hours of your own intensive cleaning. If boat hulls are being colonised by *Mytilus galloprovincialis* then there is a high likelihood that moorings are also being colonised, and other equipment. Currently this issue might be considered 'hearsay', but the economic cost, should it be true, is significant and warrants further research.

Jervis Bay has a reputation as being an outstanding SCUBA diving site and snorkelling site and is constantly marketed as a pristine bay. Should the *Mytilus galloprovincialis* take over the Jervis Bay coastline, as it appears to have done in other countries there is the potential to have a significant negative impact on tourism in the Bay.

In addition, scientists have predicted an 'underwater bushfire' or marine heatwave this summer to peak between December and February. Should this result in a 20 percent decline in habitat it will lead to a $30 billion loss to the Australian economy over the next two decades.[7]

[7] Great Southern Reef funding urged as severe heatwave looms (smh.com.au)

There are too many unknowns about the impact of *Mytilus galloprovincialis* on the Jervis Bay ecosystem at a time when we need to ensure our sanctuaries and marine parks have the highest chance of recovery and are as resilient as possible. Our submission is a call for significant investment into research around *Mytilus galloprovincialis* and urgent need not to increase the area and to regulate for sustainability.

We request that the financial costs are also considered in evaluating the modification application.

Summary

Treading Lightly succinctly sum it up: After reading through all the documentation and supporting evidence we strongly support a rigorous examination before approving the proposed muscle farming aquaculture expansion in Jervis Bay Marine Park. The chosen species, internationally recognised as invasive, poses a biosecurity threat in its spat transference from Eden. Given the marine park's ecological importance, it is imperative for researchers to scrutinise potential ecosystem impacts. Additionally, reported community costs necessitate thorough financial consideration.

Therefore, we advocate for a halt to size expansion until independent research assesses the environmental impact, outlines management steps, and ensures financial costs are integral to the evaluation. Reassessment of biosecurity risks, considering new pest species and increased boat traffic in Twofold Bay, is crucial. In-depth exploration of the mussel farm's impact on fish assemblages and benthic communities, with the input of Marine Park ecologists, is imperative.

Our paramount concern is the threat to the marine park's ecological integrity, conflicting with its primary purpose. Adhering to the Marine Estate Management Act 2014 No 72, we urge application of the precautionary principle. Permission for expansion should only be granted post-comprehensive research and consultation with local First Nations Sea Country people, ensuring adherence to the marine park's primary purpose while fostering inclusivity and respect for traditional knowledge.

Yours sincerely

Our Future Shoalhaven in conjunction with Keep Jervis Bay Unspoilt,
Treading Lightly Inc.,
National Parks Association – Milton Branch, and
Nature Coast Marine Coast Inc.

Sources

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Submitted by:

Our Future Shoalhaven is an organisation concerned with the future of Shoalhaven and aims to promote a future that is environmentally, economically and socially sustainable, with an economy that offers long-term and diverse jobs, promotes Indigenous rights to land and resources, and where each decision considers future generations. It currently has over 1300 followers through Keep Jervis Bay Unspoilt, and over 300 supporters.

Treading Lightly Inc. is a grassroots environmental organisation that brings people together to build resilient communities and make positive, long-lasting change towards a regenerative future. Treading Lightly Inc. acknowledges the land we stand on, being the country of the Dhurga Language Group known as Yuin. We acknowledge and respect the people, the culture and the values of this land that has been nurtured and managed for tens of thousands of years so that we can learn and continue to support this practice. Through this we can benefit all for the future.

The National Parks Association – Milton Branch is concerned with the preservation and protection of our natural environment and its enjoyment by current and future generations. As an organisation, the National Parks Association aims to present a balanced and fact-based commentary on key matters of interest to us and our community. The Milton Branch has over 240 members and families and conducts regular bush walks, kayak excursions and bike rides in the Shoalhaven region and in NSW and organises educational events with a focus on the environment.

The Nature Coast Marine Group Inc. is a community organisation established to protect the marine environment in the Eurobodalla area on the NSW south coast.