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)

The Jervis Bay Community CruiseShip Coalition (JBCCC) would like to take this opportunity to request an independent or Marine Park researcher led study into the spread of *Mytilus galloprovincialis* in Jervis Bay and Currambene Creek. We see this as an appropriate opportunity to apply the precautionary principle, as per the Marine Estate Management Act 2014 No 72, which oversees this activity[i].

The abundance of mussels in Currambene Creek is an indicator of a greater potential threat in the Bay itself and given that the State has a legal obligation that:

> threats of serious or irreversible environmental damage or lack of full scientific certainty, should not be used as a reason for postponing measures to prevent environmental degradation

we request that permission for expansion should not be given until adequate research has been undertaken which removes all doubt about the impacts, and provides solutions to the problems. The modification application is a great opportunity 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.

Jervis Bay Marine Park (JBMP) main concern is that the mussel farm could be compromising the ecological integrity of JBMP, and is contradictory to the primary purpose of the marine park, which is:

> to conserve the biological diversity, and maintain ecosystem integrity and ecosystem function, of bioregions in the marine estate;

All 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.

Our concern is raised because:

1. The mussels being farmed are *Mytilus galloprovincialis,* which is a known invasive species, and there have been reports of mussels growing vigorously on the hulls of boats in Currambene Creek
2. The spat is being brought from Eden, a waterway which is known to have other invasive aquatic species, and has/with the potential for more being brought in by cruise ships.

As per the conditions for the Mussel farm they are only allowed to stock:

B9. The Proponent shall ensure that the Leases are only stocked with the following species:
- (a) Blue Mussel (*Mytilus galloprovincialis*);
- (b) Scallops (*Pecten fumatus and Chlamys asperrima*);
- (c) Akoya Pearl Oyster (*Pinctada imbricata*);
- (d) Sydney Rock Oyster (*Saccostrea glomerata*)
- (e) Angasi / Flat Oysters (*Ostrea angasi*);
- (f) naturally occurring algae; and
- (g) other species approved for by the Secretary for culture.

We understand that DPI considers *Mytilus galloprovincialis* to be a 'native' species. We have heard them state that mussel shells have been found in middens. From our reading of the scientific literature it is probable that any mussel shells in middens are from the native *Mytilus planulatus* (also a Blue Mussel).

Growing a known invasive species

1. *Mytilus galloprovincialis*, a mediterranean species, is recognised as an invasive species in other countries, for example in Japan, North Korea and Russia, and is also being called an introduced species in Australia. It appears that the Australian / New Zealand native mussel is *Mytilus planulatus* (see Zbawicka, Wenne, Dias & Gardner 2022, Borschmann 2022, Popovic, Bierne, Gaiti, Tanurdzic & Riginos 2020).
2. The original EIS discusses the farming of Mytilus edulis, not *Mytilus galloprovincialis*. Mytilus edulis is known as the Atlantic Blue Mussel. *Mytilus galloprovincialis* is known as the Mediterranean Blue Mussel. The EIS did not ascertain the status of M. *galloprovincialis* s in Jervis Bay prior to SCM commencement.

> ***3.3.1 Blue Mussel (Mytilus edulis)***
>
> *Description*
>
> Mussels are bivalves (two shelled molluscs) which have a shell that is held together by a ligament (adductor muscle) (Figure 6). Mussels also have a 'foot' and byssal threads which are used to move around and to attach to hard surfaces. Males have cream or white flesh and females have orange flesh.
>
> EIS 2013 P. 14

3. One formal complaint was made regarding concern about mussel spat spread. This was discussed in the Independent Audit Report:

- Another complaint was received on 20/5/21 from a member of the public who raised concerns of mussel spatfall in Currambene Creek and increased biofouling on their boats hull since commencement of SCM operations. The complainant suspects spat/mussels may be falling from the Blue Revolution vessel when it is traversing Currambene Creek. SCM consulted with the complainant, DPI Fisheries, The Nature Conservancy and the local Jerrinja community. These discussions confirmed that there are natural blue mussel populations in Jervis Bay and there is no indication that SCM operations are causing an increase in Currambene Creek. During the inspection, the process of transporting spat and harvested mussels was reviewed. Once mussels are harvested, they are placed in large bags which are completely sealed and then transported back to shore where it is then processed at the processing facility. The washing of vessels after operations was observed during the site inspection to be within the existing lease to ensure no spat/mussels fall off the vessel outside leased areas, including Currambene Creek. (our emphasis)

No genetic testing was done on the species to identify if they were from the mussel farm or endemic populations *Mytilus planulatus* which is known to be endemic to the southern coast of Australia. Whilst not reported directly to SCM, in the community there are multiple reports that the abundance of mussels in Currambene Creek has occurred since SCM set up operations. There is actually no evidence to indicate that it is NOT SCM mussels that are populating boats hulls in Currambene Creek. If the mussels are harvested prior to reproduction as suggested in the Audit report the chance of populating Currambene Creek is reduced but SCM has admitted that it is 'not always possible' to do this. It is clear then that the interpretation in the Independent Audit Report is incomplete.

4. One Condition of the licence designed to prevent the invasive spread of *Mytilus galloprovincialis* – an obligation to harvest the mussels prior to reproduction - has been worded in such a way that the operator has no real obligation to harvest the mussels prior to reproduction because they are only obliged to do this 'where possible'. They are not obliged to publicly record when they have failed to do this, or why they have failed to do this. Hence we have no real understanding of the failure of SCM or DPE conditions. The Independent Audit Report states: "As detailed in Section 8.2.2.2 of the EIS, Blue mussels are generally harvested between 10-14 months in age. At this age, the mussels are considered to have low reproductive capacity. Harvesting after a spawning event is not preferred as the quality of the mussel will be much lower therefore harvesting occurs prior to spawning wherever possible for both ecological and quality purposes." The EIS actually states that "cultured mussels in Jervis Bay were previously harvested between about 10 and 14 months of age". There is no information provided in this report or by SCM as to when the mussels are harvested.

5. The Environment Impact Statement (2013) states "that recruitment from cultured stocks is unlikely to be a problem and that the potential increase in populations arising from farm spawnings was less than the background variation in natural spawning of mussels" but there is no reference for this statement, and it is contradicted by the work of Borschmann (2022) who also found that there is lower species richness in areas of mussel patches. The study reports that this Mediterranean mussel outcompetes other organisms for space and may have long term impacts on ecosystem structure. (Borschmann 2022)

   "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)

That is, Borschmann concludes 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

Potential to introduce pest species into Jervis Bay Marine Park

JBCCC is concerned about the biosecurity threat to the Jervis Bay Marine Park from the translocation of mussel spat from Eden to Jervis Bay.

An early report into the viability of aquaculture in Jervis Bay undertaken by Joyce, Rubio & Winberg, states:

> "The risk of introducing foreign pests or pathogens is much greater with translocation of wild spat collection than with hatchery produced seed. 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. A source of hatchery spat is preferable from both a biological and production standpoint." 2009, P.23. (our emphasis)

As recently as 28th November 2023 a cruise ship (P&O Pacific Adventure) was prevented from entering New Zealand water due to its dirty hull and biosecurity risk. This same ship diverted to Hobart and will then travel to Eden. Clearly ships that enter Eden port are potential vectors for pest and disease.

It is known that the invasive species the 'light-bulb ascidian' is in the Eden / Twofold Bay waters. It is again a European species and was possibly brought to the NSW coast via cruise ships. It will form colonies that will stop the growth of other species, including mussels. It is a known pest species in New Zealand. [1]

Conservation Auckland, regarding the light bulb ascidian, state:

> This species is relatively newly documented as an invasive species, so its potential impacts are still uncertain. However, given its ability to form large colonies, it is likely to be able to outcompete native species and may impact upon the mauri of the moana.[2]

It is also known that the pest species Green shore crab, New Zealand Screwshell, and European fanworm are in Twofold Bay. The transference of spat from these waters present a very real threat to the biodiversity of Jervis Bay.

NSW DPI state:

> It is not known exactly how the European fan worm was introduced into Twofold Bay or Botany Bay, NSW. There are many vectors that may have been responsible for its translocation, including international shipping or domestic commercial or recreational vessel movements. Marine pests can be translocated as larvae in the ballast water of ships. However, as the larvae of this species are short lived they would not have been capable of surviving long periods of transport in ballast water. It is possible that translocation occurred as a result of the species attaching itself to the hulls of vessels as 'biofouling'. Another possible vector could include the accidental translocation of species attached to aquaculture gear (ropes, cages, etc).[3] (our emphasis)

Summary

This is a serious concern. We suggest there should be an independent (not funded by SCM) examination and reporting before extending the mussel farm, and an examination of the management approaches to ensure that the mussel farm is not a source of spat that colonises other parts of the bay.

We also request that the translocation of mussel spat from Eden be reconsidered.

[1] Marine Biosecurity - Gulf Harbour Marina takes pragmatic, positive approach to marine biosecurity (sail-world.com)
[2] Lightbulb ascidian (tiakitamakimakaurau.nz)
[3] https://www.dpi.nsw.gov.au/fishing/aquatic-biosecurity/pests-diseases/marine-pests/other-marine-pests/european-fan-worm

Sources

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Mediterranean mussel - Wikipedia

I.Popovic, N.Bierne, F.Gaiti, M.Tanurdzic & C.Riginos (2021) Pre-introduction introgression contributes to parallel differentiation and conctrasting hybridization outcomes between invasive and native marine mussels. Journal of Evolution Biology. 34: 175-192.

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[i] (2) For the purposes of subsection (1) (a), ecologically sustainable development requires the effective integration of social, economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs—

(a) the **precautionary** principle—namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
In the application of the **precautionary** principle, public and private decisions should be guided by—

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

(ii) an assessment of the risk-weighted consequences of various options,

(b) inter-generational equity—namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

(c) conservation of biological diversity and ecological integrity—namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,

(d) improved valuation, pricing and incentive mechanisms—namely, that environmental factors should be included in the valuation of assets and services, such as—

(i) polluter pays—that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.