

Save the Skate

Reconsideration of Marine Farming Expansion, Macquarie Harbour, Tasmania (EPBC 2012/6406)

Recognised as one of the values of Tasmania's Wilderness World Heritage Area, the endangered Maugean skate is heading for extinction without Australian Government intervention. The science is clear: fish farming in Macquarie Harbour must end to save the skate. New scientific evidence has resulted in a substantial change in circumstances since the decision that allowed large-scale fish farming. Environment Minister Plibersek should revoke this decision and replace it with one that recognises the clearly unacceptable impacts of this foreign-owned industry that provides few jobs and pays less tax.

Submission

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Contents

Introduction.....	1
New evidence and changed circumstances	3
National Recovery Team.....	13
Captive breeding program	13
Macquarie Harbour reoxygenation trial	14
Tasmanian Government’s Conservation Action Plan.....	15
What Tasmanians want	16
Few Jobs, Less Tax	18
Conclusion and recommendation	20
Next steps and urgency	21

Introduction

On 3 October 2012, it was determined under section 75(1) of the *Environmental Protection and Biodiversity Protection Act 1999* (the EPBC Act) that the proposed Marine Farming Expansion, Macquarie Harbour, Tasmania (EPBC 2012/6406) was not a controlled action if undertaken in a particular manner (the Decision). A range of monitoring actions were outlined as conditions for the Decision, including “[t]o ensure there are no significant impacts on the Tasmanian Wilderness World Heritage Area and the Maugean Skate as a result of water quality changes”.¹

The endangered Maugean skate is the world’s only brackish water skate, a micro-endemic species found only in Macquarie Harbour on Tasmania’s west coast. The species has been listed as endangered under both Tasmanian and federal legislation since 2002² and 2004,³ respectively.

The Tasmanian Wilderness World Heritage Area (TWWHA) is a declared World Heritage property under the EPBC Act. It contains approximately one-third of Macquarie Harbour. The world heritage values include natural, Gondwana era values, including the Maugean skate, as described by the Tasmanian and Commonwealth governments in the TWWHA Management Plan.⁴ UNESCO’s World Heritage Committee also recognises ancient taxa with links to Gondwana as one of the criteria contributing to the Outstanding Universal Values of the TWWHA.⁵

The skate has languished on state and federal endangered species lists for two decades, without plans to address threats or recovery, or even rating a mention in State of the Environment Reports at either level of government.⁶ However, in November 2022 and May 2023, scientists broke ranks to provide new evidence of skate population decline, and renewed calls for urgent action to prevent the extinction of the species. Thanks to them, the salmon industry is now recognised as having a “catastrophic” impact on the Maugean skate.⁷

¹ Australian Government EPBC Act Public Portal (2012) *Marine Farming Expansion, Macquarie Harbour, Tasmania (EPBC 2012/6404) – Notification of Referral Decision*, <https://epbcpublicportal.awe.gov.au/all-referrals/project-referral-summary/project-decision/?id=83705633-7e67-e511-b4b8-005056ba00ab>, p 3.

² Threatened Species Section (2024) *Maugean Skate (Zearaja maugeana): Species Management Profile for Tasmania's Threatened Species*, <https://www.threatenedspecieslink.tas.gov.au/Pages/Maugean-Skate.aspx>

³ Australian Government (2023) *Conservation Advice for Zearajan maugeana (Maugean skate)*, environment.gov.au/biodiversity/threatened/species/pubs/83504-conservation-advice-06092023.pdf, p 4.

⁴ Tasmanian Wilderness World Heritage Area Management Plan (2016). P 47.

https://nre.tas.gov.au/Documents/TWWHA_Management_Plan_2016.pdf

⁵ UNESCO World Heritage Committee, 2023. Adoption of retrospective Statements of Outstanding Universal Value WHC/23/45.COM/8E, Criterion X, p. 17, <https://whc.unesco.org/archive/2023/whc23-45com-8E-en.pdf>

⁶ Australia Institute Tasmania (2023). *Get you skates on: Tasmania's next State of the Environment Report* [Get-your-skates-on-Tasmanias-next-State-of-the-Environment-Report-WEB.pdf \(australiainstitute.org.au\)](https://australiainstitute.org.au); p 3.

⁷ Australian Government (2023) *Conservation Advice for Zearajan maugeana (Maugean skate)*, environment.gov.au/biodiversity/threatened/species/pubs/83504-conservation-advice-06092023.pdf, p 18.

On 8 June and 31 July 2023, the Australia Institute Tasmania wrote to the Minister for the Environment and Water with substantial new information about the impacts of fish farming on the endangered Maugean skate (*Zoaraja maugeana*) and the Tasmanian Wilderness World Heritage Area.⁸ The letters provide substantial new evidence about these impacts and the change in circumstances that were not foreseen at the time of the Decision, and requested reconsideration of the Decision, in accordance with section 78A of the EPBC Act.

The now foreign owned, multinational industry has responded to the new scientific evidence, calls for change, and legal obligation to reconsider the Decision by seeking to avoid regulation and refusing to 'concede one single fish'.⁹ Publicising dodgy economic modelling and exaggerated jobs figures has long been a favourite and effective tactic of the mining industry, and now the Tasmanian salmon industry is following suit. ABS and ATO data do not support the industry's claims of economic importance. That's not to say even a small number of jobs are not important, obviously they are. But few jobs are so important as to be worth the extinction of an entire species.

The Australia Institute Tasmania appreciates the opportunity to contribute to the consultation now underway as part of the reconsideration process. Our letters dated 8 June and 31 July may also be referred to, as evidence to support our submission.

⁸ Atlantic salmon and trout (salmonids) are both grown in open cage fish farms in Macquarie Harbour.

⁹ Salmon Tasmania (2023). 400 Macquarie Harbour Salmon Jobs Under Threat, www.linkedin.com/posts/salmontasmania_media-release-12-october-2023-400-macquarie-activity

New evidence and changed circumstances

Several significant pieces of new scientific research have emerged since the Decision that have changed understanding of fish farming impacts on Macquarie Harbour and the Maugean skate. The substantial new information available (or change in circumstances) establishes that the impacts of the actions are having (or will have, or is likely to have) significant impacts on matters protected by Part 3 of the EPBC Act.

The overall picture and chronology of the research is, at a high level, as follows:

- 1) Ross et al (2016) identified that finfish cages lead to elevated oxygen consumption, which may result in lower levels of dissolved oxygen (DO) in surrounding waters;¹⁰
- 2) Ross and McLeod (2017) highlighted the very low levels of DO in Macquarie Harbour, and the possibility of indirect interactions between fish farming and the Maugean skate by virtue of decreased DO;¹¹
- 3) Moreno et al (2020) examined the sensitivity of the Maugean skate to decreased oxygen levels, and found that chronic exposure to hypoxic conditions leads to (inter alia) deleterious effects on reproduction;¹²
- 4) Wild-Allen et al (2020) modelled DO in Macquarie Harbour without fish farming and found a 50 per cent reduction in the area of hypoxic water, and a 43 per cent increase in healthy water, would result from eliminating fish farming;¹³
- 5) *Zearaja maugeana* – Maugean skate – Tasmanian Threatened Species Listing Statement (2022) also references recent studies, (including Moreno et al. 2022) and concludes that the Maugean skate is at risk from the aquaculture industry.¹⁴

¹⁰ Ross et al (2016) *Understanding the Ecology of Dorvilleid Polychaetes in Macquarie Harbour: Response of the benthos to organic enrichment from finish aquaculture*, imas.utas.edu.au/__data/assets/pdf_file/0010/905752/2014-038-DLD-Dorvs.pdf

¹¹ Ross and McLeod (2017) *Environmental Research in Macquarie Harbour: Interim Synopsis of Benthic and Water Column Conditions*, https://www.imas.utas.edu.au/__data/assets/pdf_file/0019/940303/IMAS-Technical-Report-on-Macquarie-Harbour-Condition.pdf

¹² Moreno et al (2020) *Vulnerability of the endangered Maugean Skate population to degraded environmental conditions in Macquarie Harbour* <https://www.frdc.com.au/sites/default/files/products/2016-068-DLD.pdf>

¹³ Wild-Allen et al (2020) *Macquarie Harbour Oxygen Process model (FRDC 2016-067)*, <https://publications.csiro.au/publications/publication/PIcsiro:EP204274>

¹⁴ *Zearaja maugeana* – Maugean skate – Tasmanian Threatened Species Listing Statement, v2 (December 2022), p9: <https://nre.tas.gov.au/Documents/Maugean%20skate%20-%20Listing%20Statement%20-%20final.pdf>

- 6) The Final Report of the Parliamentary Inquiry into Fin Fish Farming in Tasmania (2022) highlights the many impacts of the salmon industry. It made 194 findings and 68 recommendations.¹⁵
- 7) Moreno and Semmens (2023) found a 47% decline from 2014 to 2021 in Maugean skate numbers in Macquarie Harbour. It attributes recent severe declines in dissolved oxygen levels caused by ‘anthropogenic inputs’. It concluded:¹⁶

The scale of the overall decline and the scarcity of new recruits creates significant concern for the conservation of the species and implies the need for immediate action.

- 8) Australian Government (2023) Conservation Advice for *Zearaja maugeana* (Maugean skate) recognised reduced water quality due to salmonid aquaculture operations as having an “almost certain” and “catastrophic” impact on the Maugean skate.¹⁷

2016: FINFISH CAGES, ELEVATED OXYGEN CONSUMPTION & LOWER DISSOLVED OXYGEN

Ross et al (2016) was predominantly concerned with Dorvilleid Polychaetes (marine worms) whose presence has been used as an indicator for nutrient enrichment around marine farm leases. In the context of an examination of the ecology of those species in Macquarie Harbour, however, the authors made findings about environmental characteristics of the harbour, including in relation to DO. The authors found:¹⁸

At the lease scale, there was also a pattern in bottom water dissolved oxygen saturation with distance from cages at two of the leases. Dissolved oxygen at leases 266 and 219 showed a gradient of lower dissolved oxygen saturation at cage sites that increased to background levels by approximately 100m... These two leases also had more sites with low (<25%) or extremely low (<5%) bottom water dissolved oxygen. At lease 133 and 267 there was no clear pattern with distance.

¹⁵ Legislative Council Sessional Committee Government Administration A (2022) Final Report, [Sub-Committee Fin Fish Farming in Tasmania Inquiry | Parliament of Tasmania](#)

¹⁶ Moreno and Semmens (2023) *Interim report – Macquarie Harbour Maugean skate population status and monitoring*, https://www.imas.utas.edu.au/data/assets/pdf_file/0007/1655611/Maugean-skate-2021-interim-report-FINAL.pdf, pp 1, 9.

¹⁷ Australian Government (2023) *Conservation Advice for Zearaja maugeana (Maugean skate)*, <https://environment.gov.au/biodiversity/threatened/species/pubs/83504-conservation-advice-06092023.pdf>, p18.

¹⁸ Ross et al (2016) *Understanding the Ecology of Dorvilleid Polychaetes in Macquarie Harbour: Response of the benthos to organic enrichment from finish aquaculture*, [imas.utas.edu.au/data/assets/pdf_file/0010/905752/2014-038-DLD-Dorvs.pdf](https://www.imas.utas.edu.au/data/assets/pdf_file/0010/905752/2014-038-DLD-Dorvs.pdf), p 21.

They also observed that:

it is not surprising, and in fact expected that the enrichment under finfish cage will lead to elevated oxygen consumption, and as a consequence, in areas where there is reduced water exchange or high levels of enrichment this could result in localised drawdown of bottom water oxygen concentrations.¹⁹

2017: VERY LOW DISSOLVED OXYGEN & INDIRECT INTERACTIONS BETWEEN FISH FARMING & THE SKATE

Ross and McLeod (2017) is an interim synopsis of the science and current status of the benthic and water column environments in Macquarie Harbour.²⁰ It was undertaken in a context of a steady increase in caged finfish in the harbour.

The critical finding in Ross (2017), in the context of the reconsideration, is that although direct interactions between the Maugean Skate and aquaculture operations appear to be limited, there may be indirect interactions—including that the production of organic wastes from the farming activities increase biological oxygen demand and hence decreased DO.²¹

Further, Ross and MacLeod found the following in relation to DO levels in comparison with past levels:²²

In mid-2014 there was some respite from the steady decline in bottom water DO levels that had been occurring since 2009 (Figure 23). However, DO levels were and still remain well below the levels recorded between 1993 and 2009 (Figure 23). DO levels are now extremely low throughout the Harbour, but most notably in the southern part of the Harbour. All of the independent data sets (industry, EPA, Sense-T, Parks, IMAS and CSIRO) are providing the same picture; DO levels in bottom waters are now worryingly low.

Even small fluctuations in DO levels are important:²³

The study also shows that very small changes in DO, particularly at low levels, can have a major effect on the ecological response – this is particularly relevant to the levels of DO currently seen in Macquarie Harbour, suggesting that even

¹⁹ Ibid, 43.

²⁰ Ross and McLeod (2017) *Environmental Research in Macquarie Harbour: Interim Synopsis of Benthic and Water Column Conditions*, https://www.imas.utas.edu.au/__data/assets/pdf_file/0019/940303/IMAS-Technical-Report-on-Macquarie-Harbour-Condition.pdf, p 3.

²¹ Ibid, p10.

²² Ibid, p23.

²³ Ibid, 29.

slight declines/ improvements where levels are so low can have quite marked consequences.

Figure 28 (reproduced below) shows that even short-term reductions in DO levels lead to behavioural modification and death:

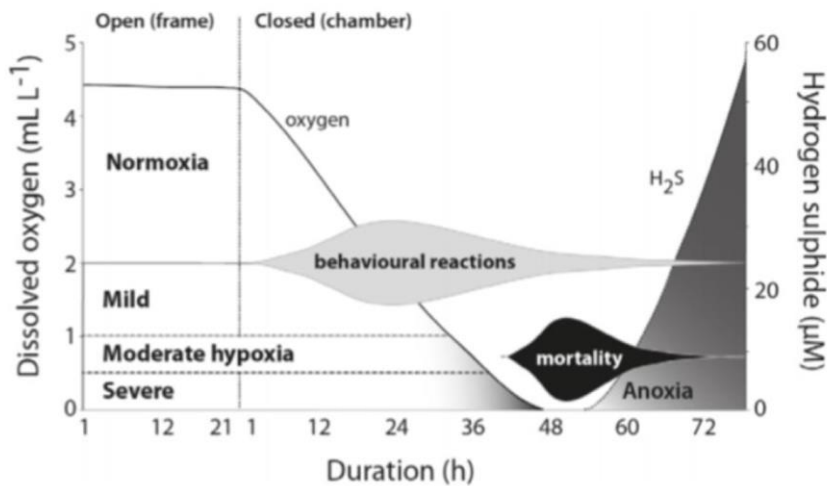


Figure 28 Schematic diagram reproduced with permission from Riedel et al. (2014) highlighting the effects of DO concentrations and exposure duration on behaviour and mortality.

Ross and McLeod (2017) proposed further research in relation to the effect of farming on DO levels in the Harbour.²⁴

2020: MAUGEAN SKATE SENSITIVITY TO DECREASED OXYGEN & IMPLICATIONS FOR REPRODUCTION

Moreno et al (2020) is an examination of “the vulnerability of the Maugean Skate, across all its life history stages, to a range of environmental stressors” in the context of “anthropogenic activities in and around the estuary (e.g. mining, forestry, hydro-electricity generation, and marine farming operations) as well as the more general effects of climate change”.²⁵

As background, deoxygenation is likely to be of particular importance for elasmobranchs (such as the Maugean Skate), because of their comparatively high oxygen demands.²⁶ Furthermore, elevated water temperatures result in higher oxygen consumption rates in elasmobranchs, making the Maugean skate vulnerable to climate-driven warming of Macquarie Harbour.²⁷

²⁴ Ibid, p33.

²⁵ Moreno et al (2020) *Vulnerability of the endangered Maugean Skate population to degraded environmental conditions in Macquarie Harbour* <https://www.frdc.com.au/sites/default/files/products/2016-068-DLD.pdf>, p viii.

²⁶ Ibid, p 47.

²⁷ Ibid, p 48.

In this context, critical findings in Moreno et al (2020) include that the Maugean Skate is vulnerable to degraded and variable environmental conditions in Macquarie Harbour,²⁸ and has little ability to tolerate low DO.²⁹ Skates in Macquarie Harbour move through areas that are severely oxygen deprived,³⁰ and are capable of surviving chronic exposure to hypoxic (*i.e.*, inadequate oxygen) conditions (<20% DO) only by using metabolic depression as a survival strategy.³¹ This cannot be sustained long-term, because it occurs at the cost of other energy-intensive life history processes such as growth, foraging, and reproduction.³² Accordingly, levels of DO in bottom waters in Macquarie Harbour is likely to represent a crucial factor in the future well-being of the skate population.³³

Given the skate's maturation and asynchronous reproductive strategy, lengthy periods of depressed metabolic rates could "greatly reduce its growth/maturation rate and capacity to reproduce, limiting any increases in the population under these conditions".³⁴

A factor contributing to the environmental conditions in Macquarie Harbour, in particular to the levels of DO in bottom waters, is aquaculture (*i.e.*, salmonid farming).³⁵

2020: HEALTHY WATER INCREASES WITHOUT FISH FARMING & HYPOXIC WATER REDUCES

Moreno and Semmens (2023) and Moreno et al (2020) both find that aquaculture contributes to environmental conditions (*i.e.*, lower DO levels in Macquarie Harbour). Wild-Allen et al (2020) discusses modelling performed to identify the degree to which DO would improve were it not for salmonid farming.

Farmed fish respiration is the third greatest contributor to loss in DO in Macquarie Harbour (accounting for 3% of loss).³⁶ Modelling based on reduced anthropogenic loads (*i.e.*, omission of fish farm respiration and nutrient loads) resulted in a 50% reduction in hypoxic water and a 40% reduction in hypoxic sediment.³⁷ Various other scenarios were modelled;³⁸ the "reduced anthropogenic load scenarios showed a larger reduction in hypoxia under comparable ocean oxygen influx c.f. all other scenarios".³⁹

²⁸ Ibid, p 43.

²⁹ Ibid, p 1.

³⁰ Ibid, p 47–48.

³¹ Ibid, pp x, 43, 51, 55.

³² Ibid, pp x, 52, 55. See also Ross (2017) at 8.

³³ Ibid, pp 1, 55.

³⁴ Ibid, pp 52.

³⁵ Ibid, pp 56.

³⁶ Ibid, pp 6, 43

³⁷ Ibid, pp 6, 51..

³⁸ See the list of modelled scenarios at Wild-Allen et al (2020), p 52.

³⁹ Wild-Allen et al (2020), 7.

It is worthwhile quoting from the discussion of Harbour water quality under reduced anthropogenic load at some length (emphasis added):⁴⁰

To explore the impact of anthropogenic loads on dissolved oxygen conditions in the harbour, a scenario simulation was run omitting fish farm oxygen drawdown and dissolved and particulate waste. [Note that the small amount of waste from Strahan sewerage treatment plant remained in the simulation.] To investigate persistent changes in the environment the simulation was also extended for a further 2 years by repeating the 2017-18 hydrodynamic conditions.

Monthly mean distributions of dissolved oxygen (Figure 4.40) show an increase in dissolved oxygen in all seasons, particularly in mid water for the simulation with reduced anthropogenic load. The extended model scenario showed a greater increase in dissolved oxygen (>2mg/l) in a similar pattern throughout the harbour in particular in the mid and southern part of the harbour.

Classification of oxygen conditions as anoxic (<1% oxygen saturation), hypoxic (1-30% oxygen saturation), intermediate (30-80% oxygen saturation) and healthy (>80% oxygen saturation) showed a 50% reduction in hypoxic volume and a 40% reduction in hypoxic sediment area under reduced anthropogenic loads c.f. conditions in 2017-18 (Figure 4.41). For the extended scenario run hypoxia was further reduced; healthy water volume increased from 46% in 2017-18 to 56% and healthy sediment area increased from 32% in 2017-18 to 36% of the total harbour area.

These improvements can be visually discerned in Figure 4.40,⁴¹ which shows actual DO levels in the left-hand column, modelled DO levels over the same 2017–2018 period but with “no farms” in the middle column, and modelled DO levels over an extended two-year period, again with “no farms,” in the right-hand column. The degree of improvement in the “no farms” scenario is obvious.

These differences were “primarily due to the omission of fish farm oxygen drawdown.”⁴² “[R]educed anthropogenic load scenario and persistent reduced anthropogenic load scenario suggest that the net oxygen deficit would be reduced by >50% compared to 2017-18 conditions” (emphasis added).⁴³

⁴⁰ Ibid, pp 62–63.

⁴¹ Ibid, p 63.

⁴² Ibid, p 64.

⁴³ Ibid, p 64.

2022: PARLIAMENTARY INQUIRY INTO FIN FISH FARMING IN TASMANIA

The final report of the Parliamentary Inquiry into Fin Fish Farming in Tasmania amounts to a scathing critique of the industry. It reported that significant concern was held in the community in relation to environmental harm caused by the industry, the proposed expansion of finfish farming and the adequacy of regulation. It mentions Macquarie Harbour 120 times, including collating evidence of the problems in the harbour that commenced soon after the Decision.⁴⁴

The 2017-18 mass fish deaths in the Harbour, when 1.35 million fish died, have been well document elsewhere and are referred to throughout the Final Report, including as one of the most notable problems the industry has faced. The blatant non-compliance by the industry and the subsequent legal action is also covered. Other concerns raised during the Inquiry included:⁴⁵

1. a lack of opportunity for public involvement in licensing decisions, lack of appeal rights and a lack of transparent criteria for decision-making;
2. the industry purchasing social licence through local sponsorship arrangements;
3. competing claims about the value of the industry to the economy and employment, and that the returns to the Government and community are insufficient relative to social and environment impact;
4. the adequacy and transparency of monitoring and reporting;
5. marine debris, including safety risks and environmental impact;
6. seal management, including the efficacy and safety of seal management devices; and
7. noise and light pollution.

The Inquiry's Recommendation 3 is of particular relevance to the Harbour, that is, to 'Develop a plan, in consultation with industry, scientific and community stakeholders, to reduce inshore fin fish farming sites, with priority given to ceasing operations in sensitive, sheltered and biodiverse areas.'

Concerns about this industry are long held. For example, a Senate Inquiry in 2015 revealed that there is an 'ongoing perception that the industry is not sustainable and that a steady degradation of the waterways is occurring', that approval processes are predetermined and the industry is monitoring itself.⁴⁶

⁴⁴ Legislative Council Sessional Committee Government Administration A (2022) Final Report, [Sub-Committee Fin Fish Farming in Tasmania Inquiry | Parliament of Tasmania](#)

⁴⁵ Ibid, pp 5-9.

⁴⁶ Environment and Communications References Committee (2015). Regulation of the fin-fish aquaculture industry in Tasmania, The Senate, p 18, www.aph.gov.au/parliamentary_business/committees/senate/environment_and_communications/fin-fish

2023: 47% LOSS OF SKATE, SCARCITY OF NEW RECRUITS AND CALL FOR IMMEDIATE ACTION

In May 2023, Moreno and Semmens interrupted a three year monitoring program to release an interim report which found that the Maugean skate population had declined by 47% between 2014 and 2021.⁴⁷ The interim report found the decline in skates was primarily as a result of significantly low dissolved oxygen levels, particularly in the specific depth range that the Maugean skate inhabits. It states that “[t]here is mounting evidence that these low DO conditions are impacting the Maugean skate population, including inducing mortality events”. The report attributes the recent decline in DO to be caused by anthropogenic inputs and correlates the decline with the rapid expansion of marine farming operations. It states:⁴⁸

The unique hydrology of Macquarie Harbour results in a naturally challenging habitat. While anthropogenic activities since European colonisation have long impacted the harbour, in the past 15 years altered river flows (growing reliance on hydroelectric generation and production demand) and large-scale development of salmonid aquaculture have resulted in considerable changes to the environment. The Maugean skate has been shown to have behavioural and physiological mechanisms that allow it to survive in the challenging conditions of Macquarie Harbour. However, recent changes to the environment (particularly DO levels and mixing dynamics) mean that high impact environmental events have increased in duration, magnitude, and frequency (e.g., duration and severity of low DO periods).

For further examples of substantial new evidence or change in circumstances, the report states:⁴⁹

The physicochemical conditions in Macquarie Harbour have changed markedly since European settlement, influenced by anthropogenic activities in and around the estuary (e.g., mining, forestry, hydro-electricity generation, and marine farming operations), as well as the more general effects of climate change. Of recent concern, has been a significant decline in deep water (>10 m) dissolved oxygen (DO) conditions in the Harbour (Ross et al., 2020).

There is mounting evidence that these low DO conditions are impacting the Maugean skate population, including inducing mortality events (Moreno et al., 2020). Furthermore, analysis of research gillnet data collected between 2012 and 2018 strongly suggests that this changed environment has reduced the relative abundance

⁴⁷ Moreno and Semmens (2023) *Interim report – Macquarie Harbour Maugean skate population status and monitoring*, https://www.imas.utas.edu.au/_data/assets/pdf_file/0007/1655611/Maugean-skate-2021-interim-report-FINAL.pdf.

⁴⁸ Moreno et al (2020), *Vulnerability of the endangered Maugean Skate population to degraded environmental conditions in Macquarie Harbour*, www.frdc.com.au/sites/default/files/products/2016-068-DLD.pdf, p 1.

⁴⁹ Ibid, p 2.

of juvenile and sub-adult individuals, likely due to lower egg hatching success and/or juvenile survival (Moreno et al., 2020).

2023: AUSTRALIAN GOVERNMENT CONSERVATION ADVICE

The Conversation Advice was unequivocal in its assessment of the threats to the Maugean skate. The Advice states:

The primary threat to the species is degraded water quality, in particular substantially reduced levels of dissolved oxygen throughout Macquarie Harbour. There is a significant correlation between the reduction in dissolved oxygen levels and increases in salmonid aquaculture due to the bacterial degradation of organic material introduced into the water column from fish-feed and fish-waste.⁵⁰

Australian Government Conservation Advice recognised reduced water quality due to salmonid aquaculture operations as having an “almost certain” and “catastrophic” impact on the Maugean skate.⁵¹

The Conservation Advice recommends the fastest and simplest way to alleviate pressure on the Maugean skate population is to significantly reduce fish biomass to “eliminate or significantly reduce the impacts of salmonid aquaculture on dissolved oxygen concentrations”.⁵² It highlighted this intervention as the highest and most urgent priority to be actioned “before summer 2023/24”.⁵³

While the regulation of water flow through hydroelectric dams in Macquarie Harbour has altered water circulation patterns by moderating extremes in river flow, dissolved oxygen concentrations across Macquarie Harbour were relatively consistent from 1993 until 2009, indicating that alteration in flow regimes had little impact on dissolved oxygen levels, nor on the subpopulation of Maugean skate. However, the progressive decline in dissolved oxygen levels from 2009 – 2015 coincided with a substantial increase in salmonid aquaculture.⁵⁴

⁵⁰ Ibid, p 2.

⁵¹ Australian Government (2023) *Conservation Advice for Zearaja maugeana (Maugean skate)*, environment.gov.au/biodiversity/threatened/species/pubs/83504-conservation-advice-06092023.pdf, p18.

⁵² Ibid, p29.

⁵³ Ibid, p 29.

⁵⁴ Ibid, p 14.

CONCLUSION AS TO FURTHER SCIENTIFIC MATERIAL

In short, the conclusions that are to be drawn from the material summarised above, are:

1. Maugean Skate are vulnerable to lower levels of DO in Macquarie Harbour, in the sense that it may cause behaviour modification, may reduce reproduction, and may lead to death;
2. Without fish farming, there would be a dramatically higher volume of healthy DO water in the harbour, and (correspondingly) a dramatically lower volume of hypoxic water;
3. Accordingly, without fish farming, there would be a dramatically less harmful environment for the Maugean Skate.

National Recovery Team

The Tasmanian and Australian Government established the National Recovery Team for the Maugean skate, which is intended to “facilitate the implementation of the Tasmanian Conservation Action Plan and Commonwealth Conservation Advice for the species and thereby contribute to the recovery and conservation of the Maugean skate”.⁵⁵ The Recovery Team is composed of a range of stakeholders, including representatives from local, state and national governments, industry, the local community, scientific experts, a national environmental NGO, and the Tasmanian Aboriginal community.⁵⁶ It has been criticised for not including any Tasmanian environmental NGOs.⁵⁷

The Recovery Team published their second public communique in October 2023, following the release of the Commonwealth Conservation Advice. While the communique detailed the formation of working groups, which included Environmental Remediation and Dissolved Oxygen working groups,⁵⁸ it failed to mention the key, urgent action identified in the Conservation Advice: to eliminate or significantly reduce the impacts of salmonid aquaculture on dissolved oxygen concentrations. The communique also stated that a “draft road map of actions was discussed and will be finalised in the next two weeks”⁵⁹, but at the time of writing, no such road map has been published.

CAPTIVE BREEDING PROGRAM

In December 2023, IMAS established a captive breeding program for the Maugean skate to create an insurance population for the species. Unfortunately, since then, two of the four endangered Maugean skates taken from the wild have died in captivity.⁶⁰ Fifty eggs were also collected and some have hatched successfully, with the rest anticipated to hatch in coming months.

⁵⁵ Tasmanian Government (2023) *National Recovery Team for the Maugean Skate Terms of Reference*, nre.tas.gov.au/Documents/Terms%20of%20Reference_Maugean%20Skate%20Recovery%20Team.pdf, p 2.

⁵⁶ Ibid.

⁵⁷ Mercury Newspaper, 7 September 2023. Tasmanian environmental groups claim they were excluded from Maugean recovery plan, <https://www.themercury.com.au/news/tasmania/tasmanian-environmental-groups-claim-they-were-excluded-from-maugean-recovery-plan/news-story>

⁵⁸ Australian and Tasmanian Governments (2023) *National Recovery Team for the Maugean Skate Meeting 2: Public Communique 12 October 2023*, https://nre.tas.gov.au/Documents/National%20Recovery%20Team%20for%20the%20Maugean%20Skate%20Meeting%2012%20October%202023_Public%20Communique.pdf.pdf

⁵⁹ Ibid, p 3.

⁶⁰ Adam Holmes, ABC Hobart (2024) ‘Endangered Maugean skate die in captive breeding program after being removed from Macquarie Harbour’, *ABC News*, <https://www.abc.net.au/news/2024-01-16/maugean-skate-insurance-population-issues/103321266>.

MACQUARIE HARBOUR REOXYGENATION TRIAL

Salmon Tasmania and the Australian Government have jointly funded a \$7 million reoxygenation trial in Macquarie Harbour, which commenced in January 2024.⁶¹ The trial is planned to run over two years. According to Salmon Tasmania, the oxygenation trial is the “industry’s contribution to the Maugean Skate Conservation Recovery Plan”,⁶² with the aim to test “whether it could be a long term solution to improve the Macquarie Harbour environment for the Skate”.⁶³

⁶¹ FRDC (2023) Macquarie Harbour oxygenation trial, <https://www.frdc.com.au/project/2023-087>

⁶² Salmon Tasmania (2023) *Macquarie Harbour Oxygenation Project*, <https://salmontasmania.au/wp-content/uploads/2023/10/MHOP-Info.pdf>

⁶³ Ibid.

Tasmanian Government's Conservation Action Plan

Tasmanian Government's recently released Conservation Action Plan (CAP) for the Maugean skate comprehensively fails to deal with the primary threat to the skate: fish farming. The CAP is meant to better manage threats to the health of Macquarie Harbour and the skate; however, it fails to identify any measures to reduce the scale of aquaculture.⁶⁴ Instead, the Plan includes additional environmental monitoring, potential technological solutions such as the reoxygenation trial currently underway. It identifies actions for hydropower waterflow regulation, the captive breeding program, changes to commercial and recreational fisheries, including gillnetting, cultural and community engagement activities, and continued efforts to address heavy metal pollution.

It is clear from this document that the Tasmanian Government plans to monitor the Maugean skate into extinction rather than address fish farming impacts, which we know is the number one threat to the species.

⁶⁴ Tasmanian Government (2024) *Conservation Action Plan for the Maugean Skate*, <https://nre.tas.gov.au/Documents/Maugean%20Skate%20Conservation%20Action%20Plan.pdf>

Tasmanians support the science

Voters in the electorate of Franklin voiced their concern about fish farming in a survey undertaken by the Australia Institute on 2-3 August 2023.⁶⁵ Waters adjacent to Franklin - the Huon Estuary and D'Entrecasteaux Channel - are host to the highest proportion of fish farms in Tasmania.

- Three in four Franklin voters (76%) were concerned about the health of Tasmania's coastal marine environment. Concern ranged from 59% of Liberal voters to 99% of Greens voters.
- Three in four Franklin voters (72%) support the Parliamentary Inquiry recommendation to reduce inshore salmon farming, with priority given to ceasing operations in sensitive, sheltered, and biodiverse areas. Just one in six (17%) oppose this recommendation.
- A majority of Franklin voters (56%) support stopping fish farming where it risks the extinction of the Maugean skate.
- Salmon farming impacts were ranked as the most urgent priority that needs action to protect Tasmania's marine life, with one in three Franklin voters (34%) choosing this option.

This research supports previous nationwide research, which found that three in five respondents (61%) support stopping fish farming where it puts the endangered Maugean skate at risk of extinction, while one in six (17%) oppose it.

Tasmanians' concern about the health of their coastal waters was also demonstrated in a state-wide survey undertaken by the Australia Institute on 4 and 5 April 2023.⁶⁶

- Three quarters (76%) of respondents were concerned or very concerned about the health of their coastal environment.
- More than 7 in 10 (72.1%) Tasmanians support the Parliamentary Inquiry recommendation to reduce inshore salmon farming sites, with priority given to ceasing operations in sensitive, sheltered, and biodiverse areas.
- Despite most respondents (59.3%) being unaware of just how bad the situation is for some of Tasmania's most popular fish stocks, almost half of Tasmanians surveyed (49.8%) were nevertheless not confident that the State Government's legal reforms would do enough to protect the health of Tasmania's coastal waters.

⁶⁵ Australia Institute, 2023. Support For Tasmanian Salmon Motion Would Ignore Voters, Economics and Science, australiainstitute.org.au/post/support-for-tasmanian-salmon-motion-would-ignore-voters-economics-and-science/

⁶⁶ Australia Institute, 2023. Reduce Inshore Salmon Farming to Protect Tassie Coast: Research australiainstitute.org.au/post/reduce-inshore-salmon-farming-to-protect-tassie-coast-research/

- Over 80% of respondents supported one or more key management actions to strengthen protection of marine life:
 - 19% supported reducing catch limits;
 - 22.3% supported protecting fish nurseries;
 - 10.1% supported an immediate ban on recreational gill netting; and
 - 30.2% supported all the above actions.

Only 5.6% of respondents did not support any of these management actions.

It is clear that Tasmanians want to protect their marine life, and that they have little confidence in the Tasmanian Government to undertake meaningful environmental protection.

The message from this research is clear: public opinions back science, and an overwhelming number of Tasmanians support what scientific evidence is telling the government to do.

Few Jobs, Less Tax

The Tasmanian salmon industry never misses an opportunity to declare itself a vital contributor to the Tasmanian economy. But for an industry claiming economic importance, one word is rarely mentioned – tax. The reason is simple – the big three salmon companies don't pay much.

The industry is comprised of three foreign owned, multinational companies: Tassal, Huon Aquaculture and Sealord Australia. Between them they reported \$7,023 million in income and paid just \$51 million in tax between 2013-14 and 2020-21.^{67, 68} Across the 9 years from 2013-14 to 2021-22 the total tax paid by the three major Tasmanian companies equalled just 8.8% of their *taxable* income and a miniscule 0.7% of their *total* income.

The only Tasmanian salmon company to report company tax payments in the last three data years has been Sealord. However, our analysis suggests that these payments are likely based not on its salmon farming, but on other parts of its diversified seafood business. It is likely, therefore, that the Tasmanian salmon industry paid zero company tax in 2019-20, 2020-21 and 2021-22.

Future ATO data releases may not include data for the Tasmanian salmon producers as they are now all owned by foreign multinationals and may not be required to report this data. This latest data release could be the last time the public can see how little benefit they receive from this industry, which has significant environmental impacts.

The Tasmanian government continues to stand by the salmon industry, citing its inaccurate jobs figures and overstated economic contribution to Tasmania. The salmon industry has claimed that a third or up to half of jobs on Tasmania's west coast are linked to the salmon industry. The industry's economic modelling has never been published, and estimates appear to be based on methods criticized by the ABS and the Productivity Commission as being regularly "abused".

Australian Bureau of Statistics data suggests that salmon farming in Tasmania provides between 1,100 and 1,700 jobs – less than 1% of the state's employment. Over 80% of these jobs are in Hobart and the Southeast, with just 11% of salmon industry jobs in the Macquarie Harbour area.

⁶⁷ Note that not all companies were covered by the ATO data in all years, see *Small Fish, Big Pond* for details.

⁶⁸ Australia Institute (2023). *Small Fish, Big Pond: Tasmanian salmon industry job numbers & tax payments* <https://australiainstitute.org.au/report/small-fish-big-pond/>

The industry's references to '1 in 3 full time jobs [being] linked to salmon' on the west coast is misleading and deceptive.⁶⁹ Census data for employment on Tasmania's west coast shows that likely employment in the salmon industry is 54 and the best-case employment is 76. This equates to 2.5-3.6% of total employment in the area.⁷⁰

All jobs are important, especially in regional communities, and workers should be supported to transition to sustainable employment. But the government needs to be making decisions based on fact, not fiction. Data from Australian Government agencies shows that the salmon industry could be restructured to create a sustainable industry without significant impacts on employment or government revenues.

⁶⁹ Salmon Tasmania (2023). 400 Macquarie Harbour Salmon Jobs Under Threat, www.linkedin.com/posts/salmontasmania_media-release-12-october-2023-400-macquarie-activity

⁷⁰ Australia Institute (2023). *Small Fish, Big Pond: Tasmanian salmon industry job numbers & tax payments* <https://australiainstitute.org.au/report/small-fish-big-pond/>

Conclusion and recommendation

It is apparent from the Decision that the then-Minister proceeded on the basis that the associated conditions set out would enable fish farming to occur without any significant impacts on the Maugean Skate.

The research summarised above, and in our letters, shows that this basis was wrong. Assuming (which we do for the sake of this submission) that the conditions in the Decision have been complied with, the only available conclusion is that, despite this, fish farming has had a significant impact on the Maugean Skate.

All the research referred to in this submission and our letters, is “new information” in the sense that it was published after (in most cases long after) the Decision. It is “substantial” because it is the product of serious scientific inquiry and goes directly to the correctness (or otherwise, as the case has turned out to be) of the Minister’s assumption that the conditions imposed would prevent a significant impact on the Maugean skate and the TWWHA.

The new information shows that the adverse impacts of the action are very substantially greater than the Minister thought at the time of making the Decision. That may be concluded with a high degree of certainty. Alternatively, the circumstances as at today’s date are materially different from the circumstances in place at the time of the Decision, in at least two respects: first, as Ross and McLeod (2017) shows, there has been a continued decline in the DO levels in Macquarie Harbour such that they were “worryingly low” (lower than they were as at the time of the Decision). Second, as Moreno and Semmens (2023) shows, the Maugean Skate population has decreased by nearly half. That is, the population that may be (or, we submit, is) affected by the relevant activity of salmonid farming is now very much more vulnerable than it was at the time of the original Decision.

These matters were plainly unforeseen: the Decision is precisely predicated on the notion that, as long as conditions are complied with, there should be no significant impact on the Maugean Skate. There has now, as Moreno and Semmens (2023) shows, been a very significant effect on the Skate. For reasons articulated above, the change in circumstances is substantial, and relates to the adverse impacts of the action (fish farming) on the protected matter (the Maugean Skate).

In these circumstances, both of the grounds stated in section 78(1)(a) and (aa) exist. Revocation of the original Decision, and substitution with an appropriate Decision, is plainly warranted: unless the effect of fish farming on the Maugean Skate is arrested (and reversed), it is very likely to become extinct.

NEXT STEPS AND URGENCY

Tasmanian waters are warming, a trend which is only going to intensify as climate change continues. Australian Government Conservation Advice recognises the waters of Macquarie Harbour are likely to be particularly susceptible to projected increases in sea surface temperature. As stated above, higher water temperatures result in increased oxygen demand in elasmobranchs (like the Maugean Skate). If anything, the past several years of La Niña weather patterns (with cooler, wetter, weather) may have prevented even worse declines in Maugean Skate populations. The likelihood of this occurring is almost certain, consequences major and will affect the skate's entire range.⁷¹

In these circumstances, we urge the Minister to reconsider the original Decision, and make a new 'clearly unacceptable' decision precluding salmonid aquaculture in Macquarie Harbour, as a matter of the highest urgency, to prevent the extinction of the Maugean skate.

⁷¹ Tasmanian Government (2024) *Conservation Action Plan for the Maugean Skate*, <https://nre.tas.gov.au/Documents/Maugean%20Skate%20Conservation%20Action%20Plan.pdf>, p. 22.