The Ecological Society of Australia Ltd (ESA, www.ecolsoc.org.au) is the peak group of ecologists in Australia, with over 1000 members from all states and territories. Our members work in universities and other research institutions, government departments, NGOs, private industry and consultancies. We are a national not-for-profit organisation formed in 1959.

Submission to:
Environmental and Other Legislation (Reversal of Great Barrier Reef Protection Measures) Amendment Bill 2021

The Great Barrier Reef (GBR) Marine Park and World Heritage Area is known for its immense size, unique natural ecosystems, and biodiversity. Extending from the northern tip of Queensland south to Fraser Island and covering 344,400 km², the GBR is the largest reef system in the world with habitats, including coral reefs, seagrass meadows and mangrove forests (Kroon et al. 2016). These habitats are, to varying degrees, connected such that effects to one directly or indirectly affect others.

The UNESCO 2021 report recently recommended that the GBR be listed as a World Heritage Area 'in danger' due to deteriorating conditions from climate change and poor water quality.

Cumulative impacts of multiple stressors, including land-based agricultural run-off of nutrients, fine sediments and particulate matter, have negatively impacted the outer reef and inshore coastal environments over the past few decades (Ceccarelli et al. 2020, Kroon et al. 2016). These negative impacts include reduced coral resilience under heat stress due to increasing macroalgae abundance from increased nutrient loads (Donovan et al. 2021), lower photosynthetic capabilities of inshore coral reefs and seagrass meadows due to turbid water, and greater outbreaks of Crown-of-thorn starfish (COTS) feeding on corals (Matthews et al. 2020, Wooldridge and Brodie 2015).

1. Strengthening, not weakening, the governance of GBR protections is key to protecting the whole ecosystem

The *Environmental and Other Legislation (Reversal of Great Barrier Reef Protection Measures) Amendment Bill 2021* (GBR Reversal Bill) as proposed will significantly weaken the governance previously laid out by the Queensland and Commonwealth government to improve the GBR.

The GBR Reversal Bill will reduce the maximum penalty for failure to comply with agricultural Environmentally Relevant Activity (ERA). It will also absolve fault for a person of responsibility if an employee of the responsible person does not follow instructions when employing or engaging with agricultural ERAs associated with fertiliser application.

Additionally, the GBR Reversal Bill seeks to limit the required period of relevant primary documents for agricultural ERAs from 5 years to 2 years and transfer the power of making an ERA standard from the Chief Executive to the Minister and Minister alone.

Reducing governmental oversight of farm and land management, as proposed by the GBR Reversal Bill, is likely to lead to no change or increases in the amount of land-based pollution entering the GBR. While voluntary programs are often proposed to incentivise farmers to reduce pollution levels, the global pattern shows that substantial reductions in agricultural run-off in coastal environments has only been achieved using legislation and regulatory procedures (Kroon et al. 2016).

2. **Establish an independent regulator with charge to make and enforce ERA standards**

The GBR Reversal Bill supports establishing an independent regulator with extensive agricultural and scientific background to advise the Minister when making new ERA standards. However, the GBR Reversal Bill seeks to transfer the power of making an ERA standard from the Chief Executive to the Minister and Minister alone.

Improved governance and standards for the GBR could be achieved by establishing an independent regulator with the power to make and enforce ERA standards. As a result this independent regulator could ensure consistency in regulation of standards based on the scientific knowledge of reef water quality.

3. **Improve measures to meet the Reef 2050 Long-Term Sustainability Plan (Reef 2050 LTSP) targets to reduce nutrient, sediment, and particulate loads in the GBR**

While some targets from the Reef 2050 plan have been met, significant improvements are still needed to meet the biodiversity and water quality targets (UNESCO 2021).

Greater measures, not less, are needed to meet the water quality targets of the plan. The water quality targets for 2025, relative to the 2013 measures, from the plan include:

- 60% reduction in anthropogenic end-of-catchment dissolved inorganic nitrogen loads,
- 25% reduction in anthropogenic end-of-catchment fine sediment loads,
- 20% reduction in anthropogenic end-of-catchment particulate nutrient loads pesticide target.

4. **Reducing nutrient pollution is key to improving the health and resiliency of the GBR**

Intensive cropping activities such as sugarcane farming can contribute a disproportionately large proportion of nitrogen to the GBR lagoon (Kroon et al. 2016) with pollutants known to

remain in the lagoon for years to decades (Brodie et al. 2012). However, nutrient plumes can extend out to 50 km from the coast, with dissolved nutrients capable of dispersing even further, and elevated nutrient concentrations having been detected hundreds of kilometres from river mouths (Devlin and Brodie 2005). Nitrogen oxides from sugarcane fertilisation can also be transported to the outer GBR as atmospheric emissions (Paton-Walsh et al. 2011).

High nutrient pollution also contributes to COTS outbreaks which can devastate large areas of hard corals (Matthews et al. 2020, Wooldridge and Brodie 2015). Reducing pollutants could reduce COTS outbreaks which would help minimise coral stress and improve their resilience to climate change and poor water quality.

5. A biodiverse and healthy GBR supports greater economic returns

A resilient and biodiverse GBR can lead to economic gains for industries reliant on the reef while shortfalls in GBR protections can negatively impact industry returns. For example, failing to meet the current Government water quality by 1% could lead to losses of $22k/year to $6.9m/year depending on the industry (De Valck & Rolfe 2018). Meeting the water quality standards to improve the GBR will require incorporation of social and economic factors, better management options, and improvement of support and resources to communities and industries (2017 scientific consensus statement).

A healthy and diverse GBR, consisting of seagrass beds, mangroves, and coral reefs together, offers better protection against impacts of waves and storms compared to any single or coupled components of the reef (Guannel et al. 2016). The resiliency of this ecosystem benefits not just the living infrastructure, but also the built infrastructure.

The proposed changes in the GBR Reversal Bill would weaken protections for the inshore areas, which could lead to long term negative impacts of the outer reef and financial losses.

6. The GBR Reversal Bill will have long term negative impacts on the GBR ecosystem

Much of the rationale for implementing the reversal bill stems from an inherent misunderstanding regarding the difference between having little to no evidence of a relationship, and having evidence that such a relationship does not exist. One cannot use the former to infer the latter.

In this case, establishing a direct causal relationship between agricultural run-off and the outer GBR is very difficult from a methodological perspective. However, there is evidence of run-off and nutrient pollution negatively affecting inshore and coastal areas of the GBR. These areas are linked to the outer regions of the GBR such that events occurring inshore will have cascading effects further out from the coast. As such, although evidence of a direct

effect of nutrient pollution on the outer GBR is currently lacking, the evidence for indirect effects is available.

FOR FURTHER INFORMATION

The ESA welcomes the opportunity to provide further information to this inquiry or to discuss our submission in more detail. We may be contacted using the details below:

Email: [redacted]

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Submission prepared on behalf of the ESA by its Policy Working Group and approved by the President, 29 June 2021.

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