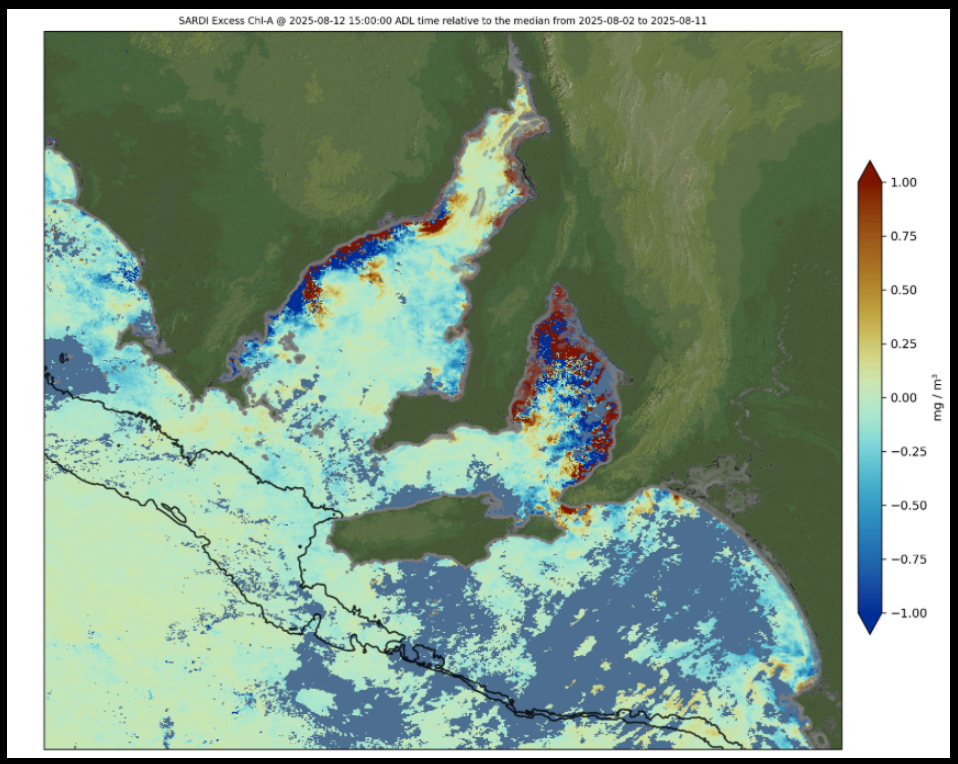
Animal Justice Party

Algal blooms in South Australia



Submission to the Senate Environment and Communications References Committee, August 2025

About the Animal Justice Party

The Animal Justice Party (AJP) is a political party established in 2009 to secure the interests of animals and nature through Australia's democratic institutions of government.

Our vision is a planet on which animals and nature have the right to live and thrive free from negative human interference, and a human society which functions with kindness and compassion within its ecological limits as a responsible member of the Earth community. The AJP seeks to foster respect, kindness, and compassion towards all species, particularly in the way governments design and deliver initiatives, and the manner in which these initiatives function.

In New South Wales, the AJP has one elected representative in the Legislative Council of NSW, Emma Hurst MLC. In Victoria, the AJP has an elected representative in the Legislative Council, Georgie Purcell MLC, and one councillor in Local Government, Julie Sloan. In Western Australia, Amanda Dorn represents the AJP in the Legislative Council.

This submission was prepared by the South Australian Submissions Working Group within the AJP. The Working Group makes this submission on behalf of the AJP, with the approval and the endorsement of the Board of Directors.

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Introduction

This submission concerns items a), f) and g) of the Terms of Reference for the Inquiry by the Senate Environment and Communications References Committee into Algal Blooms in South Australia:

a) contributing environmental, land management or water quality factors;

f) the adequacy of long-term monitoring, forecasting and prevention strategies, including funding and institutional support for marine science and environmental data collection;

g) Other related matters.

This submission will put the land management factors contributing to the bloom in a global context and focus on systemic prevention strategies rather than short-term fixes. It will also compare and contrast the impacts of the bloom with business as usual in the fishing industry.

Global context: Increasing blooms in a warming world

Most of the local media coverage of South Australia's algal bloom has focused on the impacts to two groups of people. First, to consumers of fish and oysters and second to the associated businesses who normally kill and supply them. This is exemplified in Channel 7's Special Program featuring Premier Malinauskas with RecFish Executive Officer Asher Dezsery and SA Chief Medical Officer Professor Nicola Spurrier. On 4th August, the Government issued a Press Release: Backing SA's recreational fishers and supporting fish stocks, announcing $300,000 for the creation of "recreational fishing reefs" and a further $200,000 in a direct grant to RecFish SA.

While Premier Malinauskas has mentioned "climate change" as a part of the cause of the algal bloom, along with an influx of nutrients from the 2022/3 inland flooding coming down the Murray and into the ocean, he has not acknowledged that this bloom is part of a growing global problem. This problem of more harmful algal blooms (HAB) is certainly exacerbated by the changing climate, but is mostly driven by a disruption of the global nitrogen cycle by human activities.

The nitrogen study just mentioned, contains the following map showing the global extent of the problem, with dark colours indicating where safe levels of nitrogen losses to the environment are being exceeded; either to groundwater, surface water or in deposits on land.

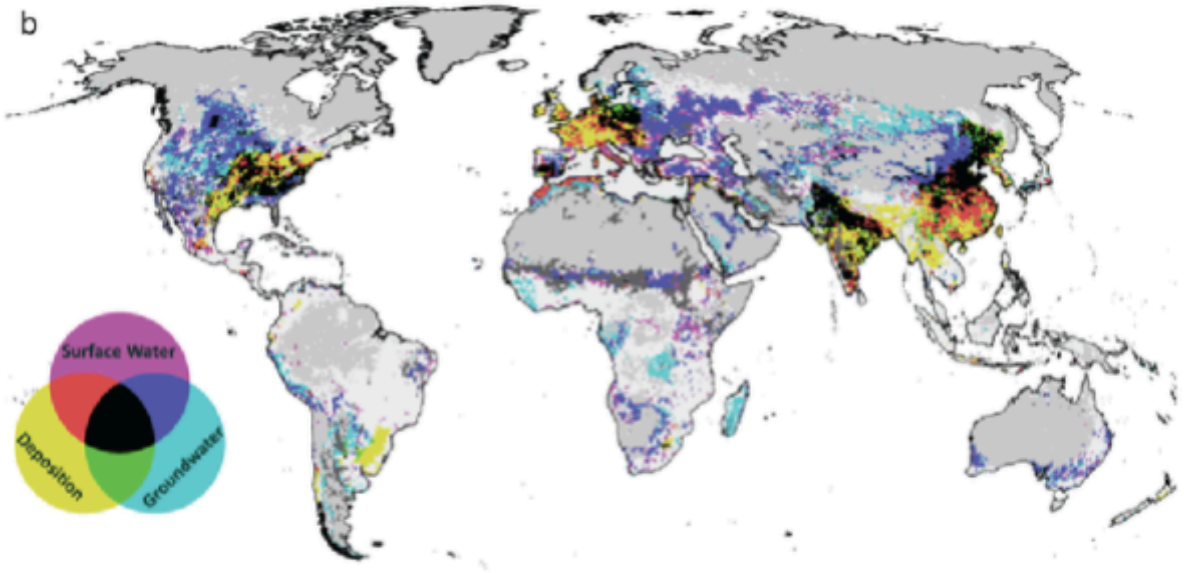

Figure 1. Type of N-related threshold (critical N deposition, critical N load to surface water and critical N leaching to groundwater) that has been exceeded. Colors indicate exceedance of none (white), one, two or all three thresholds (see legend). Areas with no agricultural land are light gray, areas where critical inputs could not be calculated are dark gray.

Local implications and proximate causes

While the global increase in algal blooms and ocean acidification can be partially attributed to climate change, any particular HAB will have local causes. Just shouting "fix climate change" ignores the critical local problems. A South Australian study of seagrasses showed that nutrient runoff can kill seagrasses and the effect has clear thresholds. Seagrasses typically underpin the ability of an area to handle other environmental stressors. Later in the submission we'll point to bottom trawling for prawns as being a key activity reducing the capacity of the area to handle the stressors of high temperatures and added meat industry nutrient runoff. Calling these nutrients 'meat industry' nutrients rather than agricultural nutrients avoids misleading with a generic term when a particular sector dominates the production of the nutrient runoff. Australians consume about 3 million tonnes of grain, while our livestock consume about 13 million tonnes in addition to grazing fertilised pasture.

Attributing the bloom to nutrients coming down the Murray as a result of the 2022/23 flooding makes it sound like a purely natural event. It isn't. Fertiliser runoff isn't natural; it is a direct result of the intensification of agriculture. We may not be able to avoid it entirely, but we can minimise it.

The 1956 flooding event was much larger. It pushed nearly twice the amount of water across the border from Victoria and down the Murray River, 341 gigalitres/day as opposed to just 186

gigalitres per day in the 2022/3 flooding. The only algal bloom following this flood was a small bloom at the top of Lake Bonney. This was trivial compared to the current catastrophe.

Currently, Australia runs a meat and dairy-heavy food system. This maximises our adverse impact on the planet. We not only fertilise much of our 27 million hectares of dry-land cropping land, but also the 71 million hectares of "modified pasture". Along the Murray, in particular, dairy farms irrigate and fertilise intensively, producing some 20% of Australia's milk, about 1.5 billion litres. In 1956, there were more than twice the dairy cattle in Australia that we have today (3.2m in 1956 compared with 1.3m today), but producing just 4.5 billion litres of milk compared with 8.3 billion litres today. The productivity difference is driven by nitrogenous fertiliser and intensive breeding to push the physiology of the animals to extremes; dairy cows live fast and die young.

The dark nitrogen excess areas in Figure 1 correlate well with Australia's dairy production areas along the Murray and in Western Australia. As climate change delivers more extreme weather, there will be more flooding and more movement of excess nutrients into oceans. It isn't just the coal industry that will disappear in the long run; other industries are also damaging the climate and the wider environment, particularly the dairy industry. The environmental externalities, like nutrient-driven algal blooms, of any industry reliant on broad-scale nitrogenous fertiliser application will also make them vulnerable.

A 2017 study describes the implications of our increased disruption of the nitrogen cycle for harmful algal blooms (HAB):

> "*The global HAB problem is on a trajectory for more blooms, more toxins, more often, in more places.*"

The more general changes in bloom frequency over the past two decades are becoming clear. A 2023 study using satellite data found algal blooms in 126 of 153 coastal countries. The 2.19% annual increase (see following image) found by this study implies a 30-year doubling. Global warming may accelerate this.

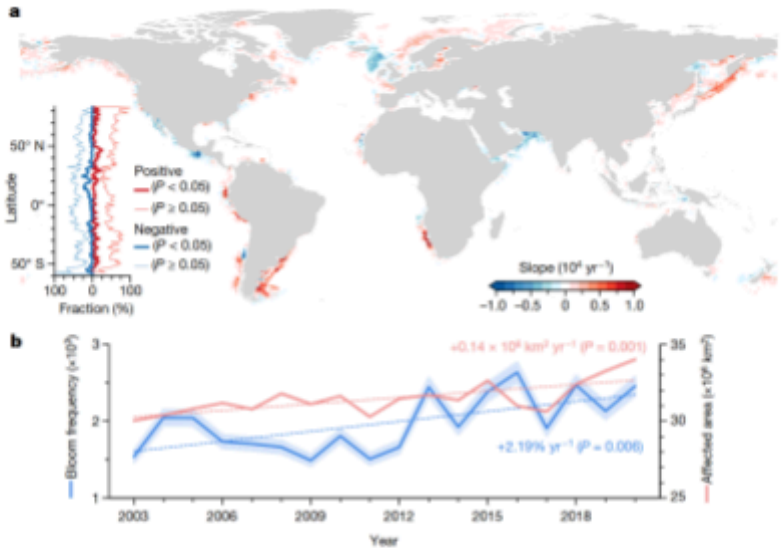

Fig. 2 | Trends of global coastal phytoplankton blooms between 2003 and 2020. a, Spatial patterns of the trends in bloom frequency at a 1° × 1° grid scale. The latitudinal profiles show the fractions of grids with significant and insignificant trends (positive or negative) along the east–west direction. **b**, Interannual variability and trends in annual median bloom frequency and total global bloom-affected area. The linear slopes and *P*-value (two-sided *t*-test) are indicated. The shading associated with the bloom frequency data represents an uncertainty level of 5% in bloom detection. Map created using Python 3.8.

Figure 2. Including caption from original article

It isn't just warming that promotes more and bigger blooms but also ocean acidification. Ocean acidification, as a consequence of rising carbon dioxide, also increases the embryotoxicity of Karenia mikimotoi, the particular species dominating the current South Australian bloom.

It isn't possible to determine if a bloom is harmful using satellite imagery. But more detailed ground studies confirm an increase in harmful blooms also, as would be expected.

Recommendations:

1. Establish an expert body to advise the Government on the creation of a food supply direction designed to minimise adverse impacts on the environment; meaning at both the climate and wider environmental level.

SARDI – and conflicts of interest

The primary scientific organisation with oversight of South Australia's fishery industries is SARDI. SARDI sits within the Department of Primary Industries, and its website landing page makes it abundantly clear that its focus is "increasing the productivity, adaptability and economy of SA's primary industries".

Sound management practice is to have policies scrutinised by independent bodies; often called "Red Teams". However, there is an apparent disconnect between the global views on eutrophication, nitrogen balance and deoxygenation presented in the introduction with the SARDI assessment that all is well with SA's marine industries. SARDI needs a red team and the Government needs to consider the future of our food supply in the context of a changing climate amid a biodiversity crisis.

A sustainable, climate-friendly food system

Nutrient wastage from aquaculture has been implicated in blooms elsewhere. But, given the location of the origin of this HAB, it is doubtful whether the major SA aquaculture production centres (meaning the tuna farms) played a direct role. But it seems highly likely that the eco-system degradation caused by the prawn industry was a key factor.

Nevertheless, aquaculture is an intrinsically inefficient and harmful form of ocean exploitation.

All industrially produced marine foods have a high carbon footprint. Tuna, in particular, tops the table with over 17 tonnes of carbon dioxide per kilogram. Aquaculture is part of an unsustainable food system. Quoting the most recent IPCC global climate assessment. Clark et al):

> *...even if fossil fuel emissions were eliminated immediately, food system emissions alone would jeopardise the achievement of the 1.5°C target and threaten the 2°C target.*

"Food system emissions" is just a way of identifying the meat, dairy and aquaculture industries without incurring the wrath of their powerful industrial lobby groups. It's similar to the tactic used by people who talk about "agricultural methane" to avoid mentioning cattle and sheep. In Australia, cattle and sheep generate over 99% of agricultural methane.

Recommendations:

2. Restructure SARDI to separate long-term policy development from any role as an indirect subsidy to industries exploiting marine animals.

Bottom trawling, destroying the capacity of the eco-system to cope

This HAB event has been running for months. There was hope that a massive storm would disperse the bloom and bring it to an end; it didn't. One of the factors allowing the bloom to persist is that the prawn industry, whose bottom trawling methods have totally disrupted natural ecosystems in the shallow gulfs of St Vincent and Spencer. Bottom trawling smashes everything on the sea floor and has reduced the filter feeders and other animals that can feed on algae.

A 2016 US Government global study on the impacts of bottom trawling put it this way:

> *"[bottom] Trawling destroys the natural seafloor habitat by essentially rototilling the seabed. All of the bottom-dwelling plants and animals are affected, if not outright destroyed, by tearing up root systems or animal burrows. Resuspending bottom sediment changes the entire chemistry of the water, including nutrient levels. Resuspended sediment can lower light levels in the water and reduce photosynthesis in ocean-dwelling plants, the foundation of the food web."*

What areas are impacted by bottom trawling in South Australia?

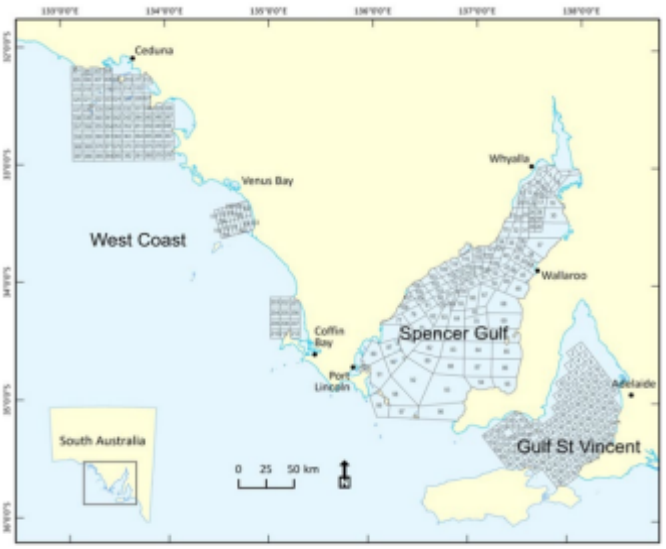

Figure 1: Locations of the three prawn fisheries in South Australia with fishing blocks illustrated

The algal bloom's marine destruction isn't unique

Australians in general, and South Australians in particular, have been horrified at seeing dead marine animals washed up on our beaches. Many will not appreciate that dead marine animals, in addition to those they consume, are a normal part of our wild fisheries, including the sardine fisheries which feed the Port Lincoln tuna farms.

There is, of course, one significant difference: the dead from wild fisheries aren't counted as individuals washed up on beaches, but are measured in tonnes discarded from nets; sometimes thousands of tonnes. Bottom trawling for prawns (see previous section), not only destroys ecosystems, but produces dead and dying fish as a byproduct. It is the cause of hundreds and perhaps thousands of tonnes of bycatch and vast areas of smashed ecosystems. If the bycatch from South Australia's three prawn fisheries were displayed on local beaches, I'm sure it would cause more than a little concern and support for both fishing and aquaculture would decline in keeping with what is required to reduce eco-system impacts. But these side effects of prawn (and all other) fishing are hidden from the general public.

David Attenborough's "Ocean" documentary contained vivid film footage of the destructive force of bottom trawling for prawns. The following images are from that documentary, but can't really

capture the true horror and destructive nature of this industry.

Bycatch reporting

Reports from SARDI about fishing efforts are clear about the tonnage of fish killed. For example the report on the Spencer Gulf King Prawn fishery reports that there were 1,373 tonnes of prawns caught in 2021/2. But there is no such clarity on bycatch numbers. Instead, you get figures for some individual species in grams per hour. But it isn't clear if this is "fleet hour" or "trawler hour" or perhaps "grams per trawl hectare". The report also likes to mix lbs and kilograms, hours and hectares in a way which is probably clear to experts, but not to anybody wanting an authoritative aggregate. It's almost as if SARDI don't want anybody to know the aggregate bycatch cost of those 1,373 tonnes of prawns while also wanting to claim they report transparently.

Recommendations:

3. Immediately cease all bottom trawling.
4. As an interim measure, bycatch reports should always report aggregate totals for comparison with the target species aggregates.

Conclusion

This submission has explained why the long-term solution to the global increase in algal blooms will lie with climate action and changes to the global food system. It will mean steep reductions in meat, dairy and fish, whether wild or farmed.

We won't prevent the next HAB without understanding the mechanisms behind this one; and taking action. As big floods become more common in a warmer, wetter world, HABs will also become more common. We have multiple reasons to reform our food system. The meat component is damaging the climate as well as putting more Australians in hospital with bowel cancer. The current system is heavy on the meat and dairy, and the latter, especially, is reliant on massive fertiliser use, which makes HABs more likely during flood events.

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