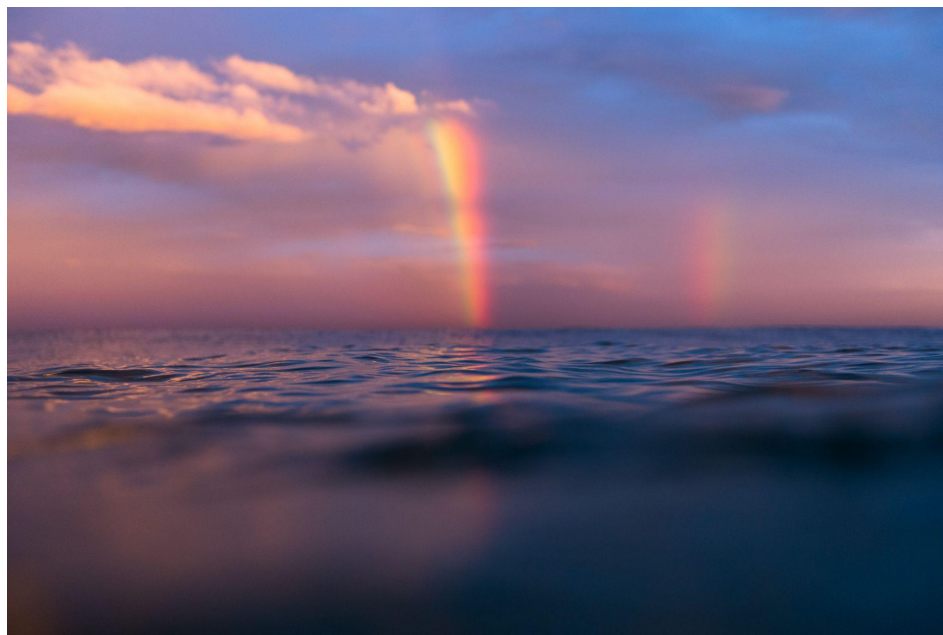


SURFRIDER FOUNDATION AUSTRALIA SUBMISSION TO THE ENVIRONMENTAL PROTECTION (SEA DUMPING) AMENDMENT (USING NEW TECHNOLOGIES TO FIGHT CLIMATE CHANGE) BILL 2023



Submission to
The Hon Tanya Plibersek, Minister for the Environment and Water
July, 2023



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1 of 1	A. Ford	-	-	-

¹ Cover photo, east Australian waters (image by Nathan Hemshaw, 2021).

1 SUBMISSION SUMMARY

Surfrider Foundation Australia has been invited by the Australian Federal Government to submit our opinion to the proposed amendments to the *Environment Protection (Sea Dumping) Act 1981*. The purpose of this submission is to summarise the viability of proposed amendments to fight climate change, identify key concerns relating to carbon capture and storage (CCS) and marine geoengineering activity, and propose solutions or alternatives.

Based on existing research, there is overwhelming evidence to indicate the risks pertaining to the proposed amendments significantly outweigh any perceived benefits. Environmental and societal concerns relate to both CSS and marine geoengineering activities, and are summarised in Table 1.

**Table 1. Summary of risks pertaining to proposed amendments to the
*Environment Protection (Sea Dumping) Act 1981***

<i>Proposed Amendment</i>	<i>Risks</i>
Carbon capture and storage (CCS)	<ul style="list-style-type: none">● Carbon dioxide leakage and ground-water contamination● Impacts to marine flora and fauna through pipeline construction● Injuries to marine ecosystems● Harm to human health● Induced seismicity● Damage caused from enhanced oil recovery operations● Further encouragement of the production of greenhouse gas emissions, without addressing systemic issues of production● Inadequate research to implement CCS in the marine environment
Marine geoengineering	<ul style="list-style-type: none">● ocean acidification● harmful algal blooms● changes in the phytoplankton and bacteria assemblages, and subsequent larger predators● Risk of increase in methane and nitrous oxide (potent greenhouse gases)● depletion of oxygen both diurnally and in deep water● indirect effects on other nutrient cycling through the ocean● impacts to human health

Surfrider Australia is of the strong conviction that the proposed amendments are significant enough to warrant a Public Hearing. Surfrider Australia opposes the proposed amendments without further clarification and provision of relevant information via a Public Hearing. This would enable proponents to discuss the proposed amendments, given we - and other relevant stakeholders - have received insufficient time to fully understand the implications of the proposed changes, and do not feel fully informed to adequately represent our communities.

2 INTRODUCTION

Surfrider Foundation Australia has been invited by the Australian Federal Government to develop a submission for the *Environmental Protection (Sea Dumping) Amendment (Using New Technologies To Fight Climate Change) Bill 2023*, herein referred to as “the Bill”, to amend the *Environment Protection (Sea Dumping) Act 1981*, herein referred to as “the Act”.

The Bill relates to two broad areas of concern, including 1) carbon capture and storage (CCS) and 2) marine geoengineering activity.

The purpose of this submission is to summarise the viability of proposed amendments to fight climate change, identify key concerns relating to CCS and marine geoengineering activity, and propose solutions or alternatives.

The scope of this submission extends to a summarisation of available information regarding the proposed amendments to the Act proposed by the Bill and potential impacts to the marine environment and coastal communities. Please note that the scope does not extend to terrestrial environments or inland communities.

3 BACKGROUND

Surfrider Foundation Australia is a registered not-for-profit organisation dedicated to the protection of Australia’s waves and beaches. Our branches around Australia serve as a first response to local threats to coastal communities. Branches are made up of dedicated volunteers who collaborate on both the local and national level to carry out our mission. In total, we have 17 branches who are on the frontline of environmental impacts to our coastlines, and help our national branch stay close on environmental issues impacting local communities. It is through our strong connection to localised branches on the frontline, and through revision of literature and collaboration with marine and climate scientists, that we have reached the below submission.

Surfrider appreciates the opportunity to provide feedback to the Australian Federal Government for the export of carbon dioxide streams or placement of geoengineering wastes into the seabed. It is communities on the coastal frontlines who will be impacted by approved permits due to amendments to the Act.

4 KEY POINTS

4.1 Carbon Dioxide Capture and Sub-Seabed Storage

4.1.1 Viability of anthropogenic sub-seabed carbon dioxide sequestration

Globally, the export of carbon dioxide (CO₂) streams for the purpose of carbon sequestration in sub-seabed geological formations (also known as carbon capture and storage [CCS]) trials have been a resounding failure (Lipponen, 2017; Browne, 2018). The few projects that have been brought to fruition have grossly exceeded budget, schedule, substantially underdelivered on carbon promised to be captured, and have now mostly ceased.

America's CCS trials fail more than 80% of the time, attributing high capital costs, low levels of technological readiness and a low credibility of project revenues to these failures (Abdulla *et al.*, 2020). Further, companies implementing these technologies are utilising them to 'monetise' the carbon captured, by pumping it into oil wells to extract more fossil fuels. That process, known as 'enhanced oil recovery' (EOR), is a dominant reason fossil fuel companies are capturing CO₂ - ultimately driving higher Green House Gas (GHG) emissions in the process (Parker, 2009; Global CCS Institute, 2019; Abdulla *et al.*, 2020).

Australia's Gorgon LNG project by Chevron was the biggest attempted CCS project anywhere in the world, which the previous Federal Government had highlighted as "a flagship". Despite costing an estimated \$3.1 billion, the project was unsuccessful and captured just under 5 million tonnes total, or about 12 percent of the project's total targeted emissions (Climate Council, 2023).

4.1.2 Risks

Regions of interest for sub-seabed CO₂ sequestration are in close proximity to communities with Surfrider Branches within them. We know these regions, and their dependence on healthy and high quality waters for their lifestyles and local economies of tourism, aquaculture and commercial fisheries.

There are several risks and impacts associated with CCS, including:

- CO₂ leakage from offshore sub-seabed basins, including ground-water contamination
- Impacts to marine flora and fauna and sensitive deep sea species through pipeline construction
- Injuries to marine ecosystems
- Harm to human health
- Induced seismicity
- Damage caused from hydrocarbons, where CO₂ injection is linked with enhanced oil recovery operations
- Further encouragement of the production of greenhouse gas emissions, without addressing systemic issues of production

- Inadequate research to implement CCS in the marine environment

4.1.2.1 Carbon dioxide leakage from offshore sub-seabed basins

CCS presents a high consequence risk of leakage. Leakage from sub-seabed reservoirs into the surrounding ground water, water column and atmosphere contributes to climate change and contaminates the marine environment.

In the event of contamination of the marine environment, both marine species and coastal communities are at risk. Impacts are expected to be severe and extensive if prolonged leaks occurred, or if pipelines and wells were inadequately monitored and managed.

4.1.2.2 Impacts due to pipeline construction

Transporting and storing CO₂ involves the construction of an extensive pipeline network to connect underground injection sites, each with its own set of dangers. Pipeline within Australian waters are known to periodically leak or rupture, with the potential for toxic concentrations of compressed carbon dioxide to cause asphyxiation of humans or animals. Large-scale implementation of CCS would require “a massive buildout of pipelines and associated infrastructure” on top of the existing oil and gas pipeline network, which would have enormous environmental impacts and endanger the communities through which the pipelines would run (Parfomak, 2022).

4.1.2.3 Injuries to marine ecosystems

Many of the marine areas of interest for sub-seabed CO₂ sequestration include basins listed as Biologically Important Areas (BIA) for federally listed endangered species including the blue whale, humpback whale, whale shark and fragile ecosystems including the Great Southern Reef.

Drilling and laying pipelines in offshore locations may also pose significant threats to coastal and offshore ecosystems via hydrocarbon spill risk, CO₂ leakage risk, marine noise, direct loss of species within the development footprint and emissions during construction.

4.1.2.4 Induced seismicity

Stimulation of seismic activity by pressurising sub-seabed wells with compressed CO₂ may reactivate faults located some distance from the injection site.

Underground storage poses additional risks, such as potential leakage, contamination of drinking water, and stimulation of seismic activity.

4.1.2.5 Damage caused by enhanced hydrocarbon extraction

The EOR enabled by the export of CCS has stimulated much of the interest in this process by the fossil fuel industry. It is clear the fossil fuel representation in these processes anticipate the import of CSS, enabling the fossil fuel industry to be sustained in its current, extractive form. Notably, the United Nations Secretary-General has warned that “investing in new fossil fuel infrastructure is moral and

economic madness” and subsequent IPCC reports have emphasised we cannot afford to extract and burn further fossil fuels if we are to work towards a liveable planet.

4.1.2.6 Not addressing systemic issues of production

CCS is not a climate solution given it continues to prove itself expensive, unreliable, unsafe and unviable at the scale Australia needs to take rapid and meaningful action on climate change. Significant and immediate investment is required to shift away from fossil fuel extraction and consumption, with renewable energies a viable and important pathway forward.

4.1.2.7 Inadequate research

In the absence of successful CCS examples, there is a correlation to the lack of expertise as to the extent of environmental impacts posed by CCS. Appropriate mitigation methods may therefore not be properly identified or proposed, and a precautionary approach is essential.

The offshore marine environment is logistically difficult and expensive to operate within. Only with successful capture, storage and monitoring of carbon dioxide streams *onshore*, should Australia be considering *offshore* research. This has not occurred, with all CCS projects within Australia having failed.

4.1.3 Proposed Solutions and Mitigations

We recommend appropriate precautionary and preventive measures are taken when there is reason to believe that wastes or other matter introduced into the marine environment are likely to cause harm.

We support further onshore research into the viability and development of carbon sequestration. Surfrider is aware that the offshore environment is of specific value considering the locations are away from population centres, resulting in lower societal risks and fewer drinking water resources protection issues. However, technology is currently inadequate to safely and effectively store CO₂ in the marine environment.

To be considering failed, risky and expensive technology that enables further fossil fuel extraction (EOR) is not a pathway to achieving Australia’s commitment to the Paris Agreement.

4.2 Placement of wastes (or other matter) for geoengineering activity for scientific research

The proposed amendment to regulate the placement of wastes (or other matter) for scientific research activities into marine engineering, such as ocean fertilisation, contains insufficient information to adequately consult Australian people. Notably, the definition of “wastes or other matter” is omitted, resulting in a pathway to approve the artificial addition of unknown wastes into Australian waters. Surfrider Australia opposes all anthropogenic dumping into the sea, except for acceptable wastes with environmentally sound research and reasoning (e.g. dredged material, fish waste).

A known element likely to be included in the proposed scientific research is iron, a limiting nutrient within oceanic waters. Existing iron fertilisation studies have shown only modest success and have been very expensive.

4.2.1 Risks

Geoengineering activities, including ocean fertilisation, contain risks. Unwanted byproducts of iron fertilisation, for example, can be severe (Blaine *et al.*, 2007; Williamson *et al.*, 2012; Mayo-Ramsey, 2014), and include:

- ocean acidification
- harmful algal blooms
- likely changes in the phytoplankton and bacteria dominance, and subsequent larger predators (copepods, krill, salps, jellyfish, and fishes; Blaine, 2007)
- Risk of increase in methane and nitrous oxide to the atmosphere (both are potent greenhouse gases)
- depletion of oxygen both diurnally (during night) and in deep water, causing significant die-offs of marine life (fish, shellfish, and invertebrates)
- indirect effects on other nutrient cycling through the ocean
- impacts to human health

The Intergovernmental Oceanographic Commission (IOC) concluded that it is not yet known how iron-based ocean fertilisation might affect zooplankton, fish and seafloor biota (Wallace *et al.*, 2010). Further, it is unknown how the relatively low concentrations of carbon captured would stay out of the atmosphere, with models estimating 2-44% of the carbon delivered to the deep ocean could be returned to the atmosphere within a century (Gnanadesikan, 2003).

No research has been conducted into the long term consequences of geoengineering activities (such as ocean fertilisation) and, crucially, whether they will be worth it. This reflects the highly contested and relatively undetermined status of scientific evidence that suggests geoengineering could sequester carbon dioxide in significant volumes with any permanency (Cullen & Boyd, 2008; Williamson *et al.*, 2012).

The lack of transparency provided surrounding the proposed amendments, including the proposed matter to be placed into the marine environment, or design, implementation and data collection

processes, fuel many concerns, as does the lack of scientific certainty that the proposed amendments may have any meaningful impact to climate change.

In conclusion, there is no conclusive evidence to suggest that iron fertilisation is any more than pollution, whereby waste or other matter (e.g. iron) is dumped into the sea, with potentially significant impacts on marine life.

4.2.2 Proposed Solutions

Surfrider Australia recommends appropriate preventative measures are taken when there is reason to believe that wastes or other matter introduced into the marine environment are likely to cause harm. Surfrider also emphasises that geoengineering, such as ocean fertilisation, should not be considered as a substitute for mitigation measures to reduce carbon dioxide emissions.

Surfrider Australia would appreciate a Public Hearing to discuss the proposed amendment, given we have received insufficient information on geoengineering to adequately consult and thereby represent the communities we represent.

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