



Australian Government

Department of the Environment and Energy

Submission

Senate Environment and Communications References Committee

*Inquiry into the Impacts of Climate Change on Marine
Fisheries and Biodiversity*

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INTRODUCTION

On 14 September 2016, the Senate referred the following matter to the Environment and Communications References Committee for inquiry and report by 30 June 2017:

Inquiry into the impacts of climate change on marine fisheries and biodiversity

Terms of reference

The current and future impacts of climate change on marine fisheries and biodiversity, including:

- (a) recent and projected changes in ocean temperatures, currents and chemistry associated with climate change;*
- (b) recent and projected changes in fish stocks, marine biodiversity and marine ecosystems associated with climate change;*
- (c) recent and projected changes in marine pest and diseases associated with climate change;*
- (d) the impact of these changes on commercial fishing and aquaculture, including associated business activity and employment;*
- (e) the impact of these changes on recreational fishing;*
- (f) the adequacy of current quota-setting and access rights provisions and processes given current and projected climate change impacts;*
- (g) the adequacy of current and proposed marine biodiversity protections given current and projected climate change impacts;*
- (h) the adequacy of biosecurity measures and monitoring systems given current and projected climate change impacts; and*
- (i) any other related matters.*

The Department of the Environment and Energy welcomes the opportunity to provide this submission to the Senate Environment and Communications References Committee.

The Department designs and implements the Australian Government's policies and programs in relation to climate change and energy and to protect and conserve the environment and heritage. This is critical to all areas of the Department's work, including on marine biodiversity and fisheries.

The Department of Agriculture and Water Resources has responsibility for Commonwealth fisheries policy.

This submission highlights how the Department is delivering on its responsibilities and is responding to the risks of climate change in relation to marine biodiversity and fisheries. These responsibilities include protecting marine life and ecosystems listed under national environment law, managing a world-class marine reserve network, assessing the environmental impacts of commercial fisheries, and supporting rigorous scientific research.

The Department supports actions to conserve and protect Australia's biodiversity by promoting the recovery and resilience of threatened species and ecosystems, and by managing other threats to the environment that may compound the effects of climate change.

This submission highlights how the Department's policies and programs enable it to fulfil its unique responsibilities for two of the world's most remarkable marine environments – the Great Barrier Reef Marine Park and the Southern Ocean.

PROTECTING AND MANAGING THE MARINE ENVIRONMENT

The Department has responsibility for environmental policy in the Commonwealth marine environment, which extends beyond state waters from three to 200 nautical miles offshore. State and the Northern Territory governments are responsible for management of the coastal and marine environment out to three nautical miles from the shore.

The Australian Government collaborates with the State and the Northern Territory governments to manage land-based impacts on the marine environment, and shares management responsibilities for the Great Barrier Reef Marine Park with the Queensland Government.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is Australia's primary piece of national environmental legislation. It provides a legal framework for the Australian Government to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places defined in the EPBC Act as matters of national environmental significance. In relation to the marine environment, the Department has legislative responsibility for:

- the protection of Commonwealth marine areas
- conservation and protection of nationally listed marine species, threatened species and ecological communities, and listed migratory species
- assessment of commercial fisheries under the EPBC Act.

The Director of National Parks has separate, additional responsibility under the EPBC Act for the management of Commonwealth reserves established in Commonwealth marine areas, and for the protection and conservation of biodiversity and heritage in those reserves.

The Department's role in these areas is outlined below.

Protection of Commonwealth Marine areas

Through the EPBC Act's assessment and approval process, the Australian Government ensures that activities in Commonwealth marine areas do not have unacceptable impacts on the environment.

A person must not, without first receiving approval under the EPBC Act, take an action:

- in a Commonwealth marine area that is likely to have a significant impact on the environment
- outside a Commonwealth marine area that is likely to have a significant impact on the environment in a Commonwealth marine area.

Substantial work has been done to improve our understanding and management of Commonwealth marine areas. For example, the bioregional planning process, initiated in 2006, helped improve our understanding of the marine environment and support better informed decision making about future development and conservation activities. The four Marine Bioregional Plans that were developed as part of the process aim to strengthen the operation of the EPBC Act – including in relation to the protection of marine biodiversity and

the sustainable use of our oceans and their resources by our marine-based industries – to help ensure that the marine environment remains healthy and resilient.

The plans describe the marine environment and conservation values of each marine region, identify the pressures acting on these values, set out broad biodiversity objectives, identify regional priorities and outline strategies and actions to address these priorities. The plans identify climate change-related pressures, including changes in sea temperature, oceanographic processes, ocean acidification and sea level and storm intensity as being of concern for a range of conservation values in all four regions.

Conservation and protection of nationally listed marine species, threatened species and ecological communities, and listed migratory species

The EPBC Act protects species and ecological communities that are listed as ‘marine’, ‘migratory’ or ‘threatened’. Any action that is likely to have a significant impact on a listed species or ecological community, or listed migratory species, must be referred to the Australian Government for assessment and approval under the EPBC Act.¹ Many species, such as the white shark, the green turtle, the eastern curlew and a number of whale species appear in more than one of these categories.

The EPBC Act also contains offences relating to the killing, injury and taking of all cetaceans in Commonwealth waters, which provides an additional level of protection for those species.

Threatened marine species include some species of fish, sharks and rays, marine turtles, seal and sea lions, whales, sea snakes, and seabirds. There are two marine ecological communities listed as threatened under the EPBC Act, including the *Posidonia australis* seagrass meadows of the Manning-Hawkesbury ecoregion and the Giant Kelp Marine Forests of South East Australia.

Listed threatened species and ecological communities such as these have conservation advices or recovery plans in place that set out actions to stop their decline and support their long-term recovery. Many of these conservation advices and recovery plans recognise changes in ocean temperature, salinity, water clarity, ocean acidification, sea level and/or the frequency or severity of cyclones and storms as potential threats.

For example, the conservation advice in place for the Giant Kelp Marine Forests of South East Australia outlines the key climate change driven threats faced by this ecological community, including increasing sea surface temperatures, changes in nutrient availability in warmer waters, changes in weather patterns and large scale oceanographic conditions, and the associated range expansion of invasive species. The conservation advice lists high priority recovery and threat abatement actions that can be taken to support the recovery of this ecological community, such as actions to minimise habitat loss and disturbance.

Managing the impacts of climate change on listed species and ecological communities remains a significant challenge, as there is limited information on the full extent of the impacts and limited options to directly alter marine ecosystems. Recovery efforts therefore focus on increasing the resilience of species and ecological communities by reducing the human impact on the marine environments, such as by minimising disturbance to coastal and beach environments and managing any significant impacts of commercial and recreational fishing.

¹ Assessment under the EPC Act applies to any action that is likely to have a significant impact on a listed ‘threatened’ or ‘migratory’ species in all Australian waters, including state and Northern Territory waters. For listed ‘marine’ species, the EPBC Act only applies where the significant impact will occur in Commonwealth waters.

Assessment of commercial fisheries under the EPBC Act

The Department assesses the impacts of commercial fisheries on fisheries species, protected marine species, and the broader marine environment as part of its regulatory responsibilities under the EPBC Act for all fisheries in Commonwealth waters.

Assessments are conducted using the Australian Government's *Guidelines for the ecological sustainable management of fisheries*. The Guidelines note that, in order to satisfy the Commonwealth Government's requirements for a demonstrably ecologically sustainable fishery, the fishery or fisheries must operate under a management regime that meets two principles:

- the fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stocks will recover
- fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem.

The Guidelines help ensure that assessments are rigorous, transparent, consistent and conducted in close cooperation with fisheries management agencies, the fishing industry and the wider community.

Management and protection of Commonwealth Marine Reserves

Commonwealth Marine Reserves have been established under the EPBC Act to help conserve Australia's spectacular marine life. The Director of National Parks is responsible for 59 Commonwealth marine reserves, not including the Great Barrier Reef Marine Park, which are situated in Commonwealth waters and cover over 2.8 million square kilometres.

The creation and effective management of marine reserves is widely regarded, both nationally and internationally, as one of the most effective ways to maintain the long-term health and productivity of our oceans. The reserves play an important role in managing the impacts of climate change on marine biodiversity. They represent the diversity of marine life and habitats in our oceans and protect important environmental features and habitats, such as reefs, canyons and seamounts, at various depths and locations around Australia.

Under the EPBC Act, once a marine reserve has been proclaimed, the Director of National Parks develops a management plan for the reserve. Management plans provide for the protection and conservation of the marine reserves. Management plans have a maximum life of 10 years and set out how the reserves are to be managed and provide certainty about the activities that will be allowed in the reserves.

In September 2016, an independent review of the Commonwealth Marine Reserves in the South-West, North-west, North, Temperate East and Coral Sea was released. The review was commissioned as part of the Government's commitment to establish a world class management program for the reserves. Two expert panels thoroughly examined the science behind marine reserves and consulted with local communities, Indigenous groups, scientists and commercial and recreational fishers.

The review found that the creation of the Commonwealth marine reserve system was based on the best available science. Within its broader scope, the review acknowledged climate change as one of the most significant threats to marine biodiversity and the need to closely monitor this threat. The review noted the need for management plans to provide flexibility so that an adaptive management approach can be taken to address climate impacts.

Following the release of the review, the Director of National Parks commenced the statutory process of developing new management plans for those reserves that were subject to the review. This process involves two periods of public consultation and provides opportunities for all interested parties to have a say on how Commonwealth marine reserves are managed. The first consultation period closed on 31 October 2016 with the second consultation period, on draft management plans, expected to commence in early 2017.

The final management plans will reflect sound science, protect the environment and support sustainable industries and community activities and are anticipated to be finalised by mid-2017. The Government has committed \$56.1 million over four years from 2016-17 to implement the new management plans and support engagement with and assistance for reserve users such as community groups, recreational and commercial fishers and dive operators.

PROTECTING AND CONSERVING THE GREAT BARRIER REEF

The Australian and Queensland governments are world leaders in marine park management. The Great Barrier Reef Marine Park Authority was created 40 years ago to protect and manage the reef. The first agreement between the Australian and Queensland governments to jointly manage the reef was signed in 1979, and two years later the reef received World Heritage listing.

Australia's environmental laws provide strict rules and regulations about what activities can take place in the Reef. For example, activities such as mining, oil drilling and gas extraction are banned by law in the Great Barrier Reef Marine Park and this ban is strictly enforced.

The Department is also responsible for the management and delivery of programs and policies designed to protect and conserve the Reef. These include the Reef 2050 Plan, the Reef Trust and the new \$1 billion Reef Fund which complement and build on the work of the Great Barrier Reef Marine Park Authority.

Reef 2050 Plan

The Reef 2050 Plan was released by the Australian and Queensland governments in March 2015 and is the overarching framework for protecting and managing the Reef until 2050. The Plan is a world-first document that outlines concrete management measures for the next 35 years to ensure the Outstanding Universal Value of the Reef is preserved now and for generations to come. The Plan sets clear actions, targets, objectives and outcomes to drive and guide the short, medium and long-term management of the Reef. The Plan firmly responds to the pressures facing the Reef, will address cumulative impacts, and increase the Reef's resilience to longer term threats such as climate change.

A Reef Water Quality report card is released annually to measure progress towards the Plan's water quality targets. The report card for 2015, released on 20 October 2016, highlighted some positive outcomes, as well as areas where more effort is required. For example, almost half of the horticulture and grains farming land across the Great Barrier Reef catchments is already managed using best practice management systems, while work is needed in the sugarcane and grazing industries. Results also indicate that progress for reductions in sediment and pesticides are more than halfway towards the Plan's 2018 targets.

The report card results did not include impacts from the mass coral bleaching event which occurred after the reporting period. These results will be reported in the next report card, anticipated for release in September 2017. Future report cards will include results from other actions, including Australian and Queensland governments and the investments under the Reef Trust.

It is projected that the Australian and Queensland governments will jointly invest more than \$2 billion over the next ten years to protect the Reef. Actions include improving connectivity through the protection, restoration and management of priority coastal ecosystems. A number of Queensland local governments are already preparing coastal hazard management plans and other initiatives to respond to the anticipated effects of climate change.

The Government is also moving to implement the new Clean Energy Finance Corporation's \$1 billion Reef Fund which will provide concessional loans to address the two greatest threats to the Reef – climate change and water quality. This Fund is an innovative and cost effective way to engender the infrastructure, practice and cultural changes necessary to improve the health of the Great Barrier Reef.

Reef Trust

The Australian Government has allocated a total of \$210 million across eight years from 2014-15 to implement the Reef Trust. The Reef Trust is delivered in phases, with each phase supported by an investment strategy outlining the projects to be delivered and the outcomes being sought. Reef Trust projects contribute to addressing the key threats to the Reef, primarily run-off from land use, damage caused by crown of thorns starfish and human impacts, such as marine debris.

Under its third phase, the Reef Trust is supporting a pilot to restore and repair priority wetlands and coastal ecosystems which contribute to the biodiversity of the Reef. This will see \$2 million from private investors matched, dollar-for-dollar, by the Australian Government's Reef Trust. This project, the first Reef Trust project supported by private investment, has been developed by Greening Australia in partnership with Birdlife Australia, Conservation Volunteers Australia and Wetland Care Australia.

The fourth phase of the Reef Trust commits \$46 million to projects that improve the quality of water entering the Reef. This phase will continue efforts to reduce the impact of coral eating crown-of-thorns starfish. Phase four projects will be delivered over the period 2016-17 to 2021-22.

ANTARCTIC SCIENCE

The Australian Antarctic Division leads the Australian Government's scientific program in Antarctica. Its research addresses critical issues relevant to the terms of reference for this Inquiry, including climate change research, the conservation of Antarctic and Southern Ocean wildlife, and the sustainable management of the Southern Ocean fisheries in the face of increasing demands for food security caused by human population growth.

Climate change research

Climate research through the Australian Antarctic Science Program investigates the role of Antarctica and the Southern Ocean in the global climate system, building on more than 50 years of climate research in Antarctica.

The main focus of the research is to generate climate data for the Southern Ocean, the sea ice zone and Antarctica more generally. This research provides a greater understanding of the role the Antarctic region may have in slowing the rate of climate change and the future behaviour of the ice sheet and its contribution to sea level rise.

Climate research undertaken by the Australian Antarctic Science Program contributes to the assessments and reports undertaken by the Intergovernmental Panel on Climate Change,

such as its update on the state of climate change as part of its Fifth Assessment Report in 2014 and informs Australia's broader climate change priorities.

The conservation of Antarctic and Southern Ocean wildlife

Antarctic research informs the conservation and management of Antarctic wildlife including whales, seals, penguins, seabirds and other biota, and assists with understanding the threats these populations face. Research shows that these species face a number of threats to their long-term viability including:

- oceanic and environmental changes on their feeding grounds, including ocean warming, decreases in salinity and acidification caused by increased carbon dioxide levels
- environmental changes at breeding sites such as changes in sea ice, precipitation, wind and run off caused by climate change
- habitat degradation
- direct and indirect interactions with commercial fisheries
- other human activities causing disturbance or interference.

For example, 2013 research led by scientists at the Australian Antarctic Division showed that by 2100 a large part of the Southern Ocean would be too acidic for krill larvae to complete their development if CO₂ emissions continue on their current trajectory. This would likely have dramatic consequences for krill abundance and distribution, the predators that depend on it, and the krill fishery. It is important to note that this research did not account for future actions that will be taken to reduce carbon emissions and lessen the impacts of climate change on the marine environment.

In addition to undertaking research into Antarctic wildlife and the threats they face, Australia supports mitigation of these threats through its involvement in international bodies, including the Committee for Environmental Protection of the Antarctic Treaty, the Commission for the Conservation of Antarctic Marine Living Resources, the International Whaling Commission, the Scientific Committee for Antarctic Research and the Agreement on the Conservation of Albatrosses and Petrels.

The sustainable management of the Southern Ocean fisheries

Fishing in the Southern Ocean is managed by the Commission for the Conservation of Antarctic Marine Living Resources (the Commission) which is made up of 25 Members, including Australia, and the European Union. The Australian Antarctic Division leads Australia's engagement in the Commission.

The Commission was established in 1982 under the Convention on the Conservation of Antarctic Marine Living Resources Convention (the Convention) in response to increasing commercial interest in Antarctic krill resources, a keystone component of the Antarctic ecosystem, and a history of over-exploitation of several other marine living resources in the Southern Ocean.

The Commission meets annually to, among other matters, adopt conservation measures and other decisions which apply to harvesting activities. This includes deciding on catch limits and measures aimed at minimising the potential impact of fishing activities. The Commission's three principles of conservation are:

- preventing a decrease in the size of any harvested population to unsustainable levels
- maintaining the ecological relationships between harvested, dependent and related populations and restoring depleted populations

- preventing changes or minimising of the risk of changes in the marine ecosystem which are not potentially reversible over two or three decades.

In making its decisions, the Commission takes into full account the recommendations and advice of the Scientific Committee for the Conservation of Antarctic Marine Living Resources established under the Convention. The Scientific Committee provides the best available scientific information on harvesting levels and other management issues to the Commission.

Since its establishment, the Commission has achieved a number of significant outcomes including:

- a substantial reduction in incidental seabird mortality caused by longline fishing
- a considerable reduction in illegal, unreported and unregulated fishing in the Southern Ocean
- improvements in the orderly development of krill fisheries
- measures to identify and prevent impacts to vulnerable marine ecosystems
- establishment of the Ross Sea region Marine Protected Area, which includes a scientific reference zone where fishing is limited to better gauge the ecosystem effects of climate change and fishing
- establishment of special areas for scientific research of newly exposed marine areas, for up to 10 years, following ice-shelf retreat or collapse.

The Convention, while not specifically mentioning climate change as a threat to marine life, requires that the Commission consider environmental variability to achieve its objectives. In 2009, the Commission adopted a Resolution that recognised global climate change as one of the greatest challenges facing the Southern Ocean. This was followed by the establishment of an Intersessional Correspondence Group of Climate Change in 2015. This group is led by Australia and Norway and facilitates the consideration and integration of climate change implications in the Commission's work.

CLIMATE CHANGE RESEARCH, INFORMATION AND REPORTING

The Department supports scientific research and the dissemination of climate information, including through its funding of the National Climate Change Adaptation Research Facility and the National Environmental Science Program. It provides information on the impact of climate change on the marine environment through the State of the Environment Report. These initiatives are outlined in further detail below.

National Climate Change Adaptation Research Facility

The National Climate Change Adaptation Research Facility, based at Griffith University in Queensland, works to support decision makers throughout Australia as they prepare for and manage the risks of climate change and sea-level rise. The Facility is currently implementing a three year program, over the period 2014-17, to address the information needs of decision makers and practitioners. This includes a focus on coastal zone impacts such as more frequent and more intense heatwaves, increasing risk of flooding from rivers and the sea, and increasing coastal erosion.

To support relevant decision makers in adaptation and resilience planning and help them to balance a wide range of risk factors – environmental, legal, economic and social – in an integrated way, the Facility has developed a draft version of CoastAdapt. It is an online tool designed to help local governments and other organisations understand and manage coastal

climate risks of sea-level rise, storm surges and other coastal hazards to Australia's marine environment of fisheries, aquaculture and ecosystem biodiversity. The tool is now available for user-testing and feedback before the final version is released in early 2017.

The Facility is synthesising and translating adaptation research information into useful communications products. For example, it has developed a factsheet on the impacts of climate change on marine biodiversity and resources.

The Facility has responsibility for maintaining the Australian Climate Change Adaptation Research Network for Natural Ecosystems, hosted by James Cook University. The network supports decision makers throughout Australia as they prepare for and manage the risks of climate change and sea-level rise.

The network is currently updating the publicly available National Climate Change Adaptation Research Plan for Marine Biodiversity and Resources which was developed by the Facility in 2010. The updated plan will identify priority research areas and resources that decision makers – such as marine, tourism and fishery industries – will need to effectively respond to the impacts of climate change.

National Environmental Science Program

The National Environmental Science Program is an ongoing research program with a current allocation of \$142.5 million over the six years from 2015 to 2021. The program's research is undertaken through six research hubs based out of Australian universities and research organisations. The annual budget for these hubs is matched or exceeded by research partners. Four of the program's hubs are delivering research relevant to the marine environment, including:

- the Marine Biodiversity Hub, which is researching Australian oceans and marine environments, including temperate coastal water quality and marine species, with funding of \$23.9 million through the University of Tasmania, led by Professor Nic Bax
- the Tropical Water Quality Hub, which is researching coastal water quality and coastal management focused on the Great Barrier Reef and other tropical waters with funding of \$31.2 million through the Reef and Rainforest Research Centre, led by Professor Damien Burrows
- the Earth Systems and Climate Change Hub, which is researching Australia's land, ocean and atmospheric climate change drivers, including their impacts on changing oceans with funding of \$23.9 million through CSIRO, led by Dr Helen Cleugh
- the Northern Australia Environmental Resources Hub, which is researching floodplain and coastal productivity in the Gulf of Carpentaria, including future research on mangrove dieback, with funding of \$23.9 million through Charles Darwin University, led by Professor Michael Douglas of University of Western Australia.

Through its research hubs, the program will enable environmental decision makers to respond to the impacts of climate change with policies and programs that are underpinned by the best available science.

State of the Environment

The Australian State of the Environment provides a national assessment of the current state, recent trends and future outlook of the Australian environment. Compiled by independent subject matter experts, Australian State of the Environment 2016 will be available from early 2017 through an interactive online platform. It will build on the 2011 report, which included detailed information on the condition of the marine environment, the existing impacts of

fisheries, oil and gas extraction and coastal development, and the potential impacts of climate change.