WWF
SUBMISSION

Submission to the Senate Inquiry into the current and future impacts of climate change on marine fisheries and biodiversity

November 2016

Contact Details

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INTRODUCTION

WWF-Australia welcomes the opportunity to make this submission to the Senate Inquiry into the current and future impacts of climate change on marine fisheries and biodiversity.

WWF-Australia is part of the WWF International Network, the world's largest and most experienced independent conservation organisation. We have over 300,000 active supporters in Australia and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural resources and to build a future in which humans live in harmony with nature.

WWF has been an advocate for national and international action to avoid dangerous climate change for more than two decades.

This submission is divided into the following sections:

- Key Points and Recommendations
- Biophysical Impacts
- Social Impacts
- References

WWF would welcome the opportunity to discuss the details of our submission further as part of the process of stakeholder consultations following the written submission stage.

KEY POINTS & RECOMMENDATIONS

- Climate change presents one of the greatest threats to Australian and global marine fisheries and biodiversity. Climate change also poses significant social pressures given the reliance of Australian industries on the long term health and predictability of fish stocks and distributions.
- It is critical Australia develops strategies to ensure the future sustainability and efficiency of fisheries and aquaculture and work towards Australia's long-term food security. This should include;
    - An assessment and adoption of adaptation options that reduce risk exist for both fisheries and aquaculture, at the production end, and further up the supply chain.
    - New access rights to be considered and to be flexible enough to adapt to both positive and negative changes in stocking rates.
    - Supporting the sustainable management and adaptive capacity of fisheries within the south-east Asia and Pacific region through strengthened support alongside of industry.
- Australia must also address the wider implications of climate change with stronger action to reduce carbon pollution in line with commitments made under the Paris Agreement. This must be underpinned by a significant strengthening of carbon pollution reduction targets out to 2030 to at least 65% reductions on 2005 levels.

BIOPHYSICAL IMPACTS

- Climate change is already having measurable impacts on marine habitats including seagrass, corals, mangroves and kelp forests around Australia. Loss of these habitats diminishes the ecosystem services these habitats provide within the environment. Not only have these changes impacted important fisheries target species like rock lobster[i], abalone[ii], scallop[iii] , barramundi and prawns[iv], but they have also had direct impacts on many wildlife species like dugong which were one of the natural values identified in the designation of the Great Barrier Reef World Heritage Area.
- Some of the key environmental changes driven by climate change that are effecting and will continue to effect Australian fisheries and aquaculture are:
    - Rising ocean temperature, which are already causing large-scale changes in the distribution of Australia's fish stocks[v].
        - The 2010-11 marine heat wave in Western Australia (the 'Ningaloo El Nino') caused widespread mortality of cool-water habitat forming species[vi]. The Great Barrier Reef (GBR) also experienced the highest temperatures on record in 2015/16 resulting in catastrophic coral bleaching of which the long term implications are still being measured.
    - Changing ocean chemistry as the ocean becomes more acidic. This can affect a number of biological relationships, most notably its impact reducing the calcification rate of corals and other calcifying organisms[vii]. Changes to ocean chemistry have also already had material impacts on the spread of harmful viruses, bacteria and microalgae in the last 10 years, resulting in temporary closure of several fisheries.
        - The 2016 outbreak of the ostreid herpesvirus causative organism put the entire $53M Australian oyster industry at risk by triggering devastating oyster mortalities in Tasmania and promoted a ban on stock trade to NSW. Although the cause of the virus is still being investigated, the event correlated with unusually high summer temperatures.

- Sea levels are expected to rise by 0.3-0.5 meters by 2030 (not including the influence of melting ice sheets), greatly altering fish habitat in coastal and estuarine environments[viii] [ix].
- Australia's ocean currents are changing with the most notable change being the strengthening of the Australian East Australian current reaching as far south as Tasmania[x].
- Stronger winds and reduced average precipitations are forecasted, affecting variables such as nutrient runoff[xi]. Extreme events can also compound the impacts of weakened reef systems due to warming water temperatures and have already had an impact on fisheries production in Western Australia.
- More extreme weather events can interrupt the activities of commercial fishing vessels and aquaculture operations as well as destroy infrastructure and fragile marine ecosystems, such as coral reefs and mangroves[xii].

- The coral bleaching event in 2016 of Australia's Great Barrier Reef (GBR) highlighted the catastrophic impact of global warming on the long term health of marine ecosystems. The event also highlighted the vulnerability of Reef ecosystems from other external stresses such as nutrient run off and the spread of pests and diseases (e.g. the Crown of Thorns Starfish) which act to weaken the adaptive capacity of marine ecosystems during marine heat wave events.
- The magnitude of climate impacts on Australia's fishing industries will be highly variable depending on the region in which they operate.
  - As climate change alters the frequency and intensity of precipitation events, the resulting variation in freshwater run-off is expected to have a significant impact on Australia's Northern Prawn Fishery, where target stocks are located along the coastline [xiii] [xiv]. Alternatively, for Australia's east-coast offshore pelagic fisheries, changes in run-off isn't expected to have a large impact on fish stocks relative to increasing surface temperatures and the southern advection of the Eastern Australian Current[xv].

SOCIO-ECONOMIC IMPACTS

- Climate change presents new socio-economic challenges for Australian fisheries and aquaculture.
- Australia's fisheries and aquaculture industry was valued $2.5 billion in 2013-14, directly employing 8,705 people in commercial production[xvi]. These levels of employment and revenue will be affected as climate change begins to influence productivity and sustainability.
  - Under current management in Tasmania the forecasted increases in water temperature are expected to impinge on this regions productivity, especially in its $543 million salmonid aquaculture operations[xvii]. This will impact revenue, both from exports and domestic consumption as well as put great economic stress onto this region, which relies heavily on the industry and employs 2,265 people in commercial operations[xviii]. In the absence of adaptive management strategies it can be expected that many more fisheries will be similarly affected[xix].
- Climate change will also adversely affect regional communities that rely heavily on local fisheries for income and food. Early consultation and community driven adjustment strategies need to be facilitated by Government to educate these communities and ensure they have the ability to adapt to the inevitable changes.
- Similarly, Australia has a responsibility to provide assistance to nearby international communities such as the Pacific Islands Countries and Territories (PICT's), which are extremely dependent on fisheries as an industry and protein source and may not have the capacity to develop targeted and informed strategies. Australia has already dedicated $45 million to 'Fisheries Development Assistance in the Pacific' between 2015-2018[xx]. Existing platforms such as this could be utilised to facilitate the education of adaptive strategies targeted at climate change. Additionally, there will be an opportunity for the private sector to provide funding and education to PICT's that also interact with tuna stocks in the Pacific Ocean. Relationships designed at sharing

information and developing targeted strategies could be extremely valuable in helping these small scale fisheries adapt to long term environmental change and maintain the sustainability of the fish stocks that both entities depend on[xxi].

References

[i] https://www.researchgate.net/publication/274704020_Management_implications_of_climate_change_effect_on_fisheries_in_Western_Australia_Part_1_Environmental_change_and_risk_assessment_FRDC_Project_2010535_Fisheries_Research_Report_260_Department_of_Fish

[ii] https://www.researchgate.net/publication/301622709_Management_adaptation_of_invertebrate_fisheries_to_an_extreme_marine_heat_wave_event_at_a_global_warming_hot_spot

[iii] https://www.researchgate.net/publication/301622709_Management_adaptation_of_invertebrate_fisheries_to_an_extreme_marine_heat_wave_event_at_a_global_warming_hot_spot

[iv] https://www.researchgate.net/publication/301622709_Management_adaptation_of_invertebrate_fisheries_to_an_extreme_marine_heat_wave_event_at_a_global_warming_hot_spot

[v] Perry, A., et. al., (2005), Climate change and distribution shifts in marine fishes, science, 308(5730), pp.1912-1915, 14

[vi] Hobday, A. et. al. (2016). A hierarchical approach to defining marine heatwaves. Progress in Oceanography 141 (2016) 227–238

[vii] Orr, J., et. al., (2005), Anthropogenic ocean acidification over the twenty-first century and its impact on calcifying organisms. Nature, 437(7059), pp.681-686.

[viii] Gordon, H., et. al., (2010), CSIRO Mk3.5 Climate Model, CAWCR Technical Report No. 021, Bureau of Meteorology

[ix] Hobday, A., Poloczanska and E., Matear, R., (2008), Implications of Climate Change for Australian Fisheries and Aquaculture: A Preliminary Assessment, Report to the Department of Climate Change, Canberra

[x] Hobday, A., Poloczanska and E., Matear, R., (2008), Implications of Climate Change for Australian Fisheries and Aquaculture: A Preliminary Assessment, Report to the Department of Climate Change, Canberra

[xi] Gordon, H., et. al., (2010), CSIRO Mk3.5 Climate Model, CAWCR Technical Report No. 021, Bureau of Meteorology

[xii] Easterling, D., et. al., (2000), Climate extremes: observations, modeling, and impacts. science, 289(5487), pp.2068-2074

[xiii] Hobday, A., Poloczanska and E., Matear, R., (2008), Implications of Climate Change for Australian Fisheries and Aquaculture: A Preliminary Assessment, Report to the Department of Climate Change, Canberra

[xiv] Garnaut, R., (2008), The Garnaut Climate Change Review, Cambridge, September
Government of Tasmania, (2012), Adapting to Climate Change in Tasmania Issues Paper, Tasmanian Climate Change Office

[xv] Hobday, A., Poloczanska and E., Matear, R., (2008), Implications of Climate Change for Australian Fisheries and Aquaculture: A Preliminary Assessment, Report to the Department of Climate Change, Canberra

[xvi] Savage, J., and Hobsbawn, P., (2015), Australian fisheries and aquaculture statistics 2014, Fisheries Research and Development Corporation Project 2014/245, ABARES, Canberra

[xvii] Savage, J., and Hobsbawn, P., (2015), Australian fisheries and aquaculture statistics 2014, Fisheries Research and Development Corporation Project 2014/245, ABARES, Canberra

[xviii] Savage, J., and Hobsbawn, P., (2015), Australian fisheries and aquaculture statistics 2014, Fisheries Research and Development Corporation Project 2014/245, ABARES, Canberra

[xix] Hobday, A., Poloczanska and E., Matear, R., (2008), Implications of Climate Change for Australian Fisheries and Aquaculture: A Preliminary Assessment, Report to the Department of Climate Change, Canberra

[xx] Department of Foreign Affairs and Trade, (2015), Pacific Regional—Economic growth: fisheries assistance, Development Assistance in the Pacific

[xxi] Department of Climate Change, (2009), Climate Change Risks to Australia's Coasts, A First Pass National Assessment