
THE CORAL SEA MARINE RESERVE:

CENTRE FOR CONSERVATION
GEOGRAPHY REPORT TO THE
AUSTRALIAN GOVERNMENT'S MARINE
RESERVES REVIEW

VERSION 1.0

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Report prepared by Daniel Beaver, Joel Turner, Thomas Keily and Lucinda Douglass

This report is an independent research paper commissioned by the Save Our Marine Life Alliance.



Strategic Tools and Conservation Innovation

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CENTRE FOR CONSERVATION GEOGRAPHY

The Centre for Conservation Geography is a research group established to provide expert technical support and advice to government and non-government decision makers and stakeholders. The centre's focus is to apply world's best practice in decision support to planning for biodiversity conservation and indigenous land management. Based in Australia, our goal is to build a multi-disciplinary team capable of providing support to decisions being made across the world's ecoregions.

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KEY FINDINGS

In reviewing the available data on the Coral Sea the Centre for Conservation Geography makes five key findings relating to a review of the zoning plan for the Coral Sea Marine Reserve (the Coral Sea Marine Reserve and its zoning was passed into law by the Abbott Government in December 2013¹):

1. **Marine National Park Zones:** Are critical to the protection of the Coral Sea's marine life with the weight of scientific evidence showing that partially protected zones do not deliver the broad ranging and significant benefits for marine life of highly protected zones. Making more than minor changes to improve the extent of protection offered by the Marine National Park Zones risks destabilising the shape of the broad compromise between competing interests that has been largely welcomed by commercial and recreational fishers.
2. **Social and economic impacts:** The information compiled by the Centre for Conservation Geography shows that the net social and economic value of the Coral Sea Marine Reserve to the Australian community is \$1.2 billion. Within this, positive impacts on nature-based tourism and recreational fishing are found to outweigh any possible negative impacts on commercial fishing by at least \$5 million per annum. The Coral Sea Marine Reserve is predicted to result in a net increase of 100 jobs, particularly in North Queensland. Community support for the marine reserve is very strong with over 99% of the nearly half a million submissions to the public consultation process supportive of increased protection for the Coral Sea. There is significant international interest in the Coral Sea Marine Reserve as an example of how to protect intact marine life at the large ecosystem scale. The zoning plan could be improved so as to enhance the positive social and economic impacts of the Coral Sea Marine Reserve by providing more secure protection to the key regional economic assets of the dive tourism industry and by extending the area protected from pelagic longlining down to 22°S as recommended by key members of the Eastern Tuna and Billfish Fishery during the public consultation process.
3. **Coral reef protection:** Scientific evidence published by Edgar et al (2014)⁷² after the declaration of the reserves by the Abbott Government in December 2013 suggests that a number of minor changes are needed to the Marine National Park Zones around some of the key coral reefs targeted for protection.
4. **Unprotected habitats:** Major concerns exist within the scientific community about the low level of protection for the unique habitats of the western and southern Coral Sea, particularly its deep water troughs, pelagic ecosystems and unique coral reefs. The review should consider increasing the protection for these features.
5. **Destructive commercial fishing practices:** The Government's risk assessment process found eight commercial fishing practices to be incompatible with the conservation values of the Coral Sea. The zoning plan should be adjusted to ensure that these eight fishing practices are fully removed from the Coral Sea Marine Reserve.

¹ Commonwealth of Australia, 2013. *Environment Protection and Biodiversity Conservation (Commonwealth Marine Reserves) Proclamation 2013*
<<http://www.comlaw.gov.au/Details/F2013L02108>>

INTRODUCTION

On the 11th of September, 2014 the Australian Government announced a review of the Coral Sea Marine Reserve (Figure 1). In the announcement of the review the Government stated that it desired to get the balance of zoning right and to work out what system of zoning would “best protect our marine environment and accommodate the many activities that Australians love to enjoy in our oceans.”² The Government further stated that “Our aim is to have a sensible balance, which protects the environment, supports a sustainable fishing industry, attracts tourism and provides cultural, recreational and economic benefits for coastal communities.”²

This report takes the form of a brief submission to the expert scientific panel and the bioregional advisory panel on the Coral Sea Marine Reserve established by the Government's terms of reference for the marine reserves review.³ The report aims to briefly address each of the items on which the Government has requested the panels to report. If either of the two panels desire more in depth information from the Centre for Conservation Geography (CCG), the centre is open to providing further assistance to the panels.

This report represents the independent scientific opinion of the researchers at the Centre for Conservation Geography. The report was commissioned by the Save Our Marine Life Alliance <<http://www.saveourmarinelife.org.au/>> as an input to the Australian Government's marine reserves review.

REPORT STRUCTURE

This report is structured to address directly and briefly the items on which the expert scientific panel and the bioregional advisory panel for the Coral Sea have been asked to report on outlined by the terms of reference for the marine reserves review.³ For the bioregional advisory panel these are:

1. Advice on areas of contention with the marine reserves.
2. Advice on options for zoning boundaries to address those areas of contention.
3. Recommendations for improving the inclusion of social and economic considerations into decision-making for marine reserves, with particular regard for their management.
4. Suggestions for ongoing engagement of regional stakeholders.

While the expert scientific panel has been asked to advise on:

5. Options for zoning, and zoning boundaries, and allowed uses consistent with the Goals and Principles.
6. Future priorities for scientific research and monitoring relating to marine biodiversity within the marine reserves, especially any relating to the understanding of threats to marine biodiversity within the marine reserves.
7. Options for addressing, the most significant information gaps hindering robust, evidence based decision-making for the management of the marine reserves.

² Hunt, G., and Colbeck, R., 2014. *Review of Commonwealth marine reserves begins*, joint media release <<http://www.environment.gov.au/minister/hunt/2014/mr20140911a.html>>

³ Commonwealth of Australia, 2014, *Marine Reserves Review – Terms of Reference*, <<http://www.environment.gov.au/system/files/pages/931ca952-fdd2-4e14-a512-0a5278d22c71/files/commonwealth-marine-reserves-review-terms-reference.pdf>>

The Coral Sea Marine Reserve

One of the only places in the world where relatively intact tropical marine life can be protected at a large scale.

Making more than minor changes the Marine National Park Zones risks destabilising the shape of the broad compromise between competing interests that has been largely welcomed by commercial and recreational fishers.

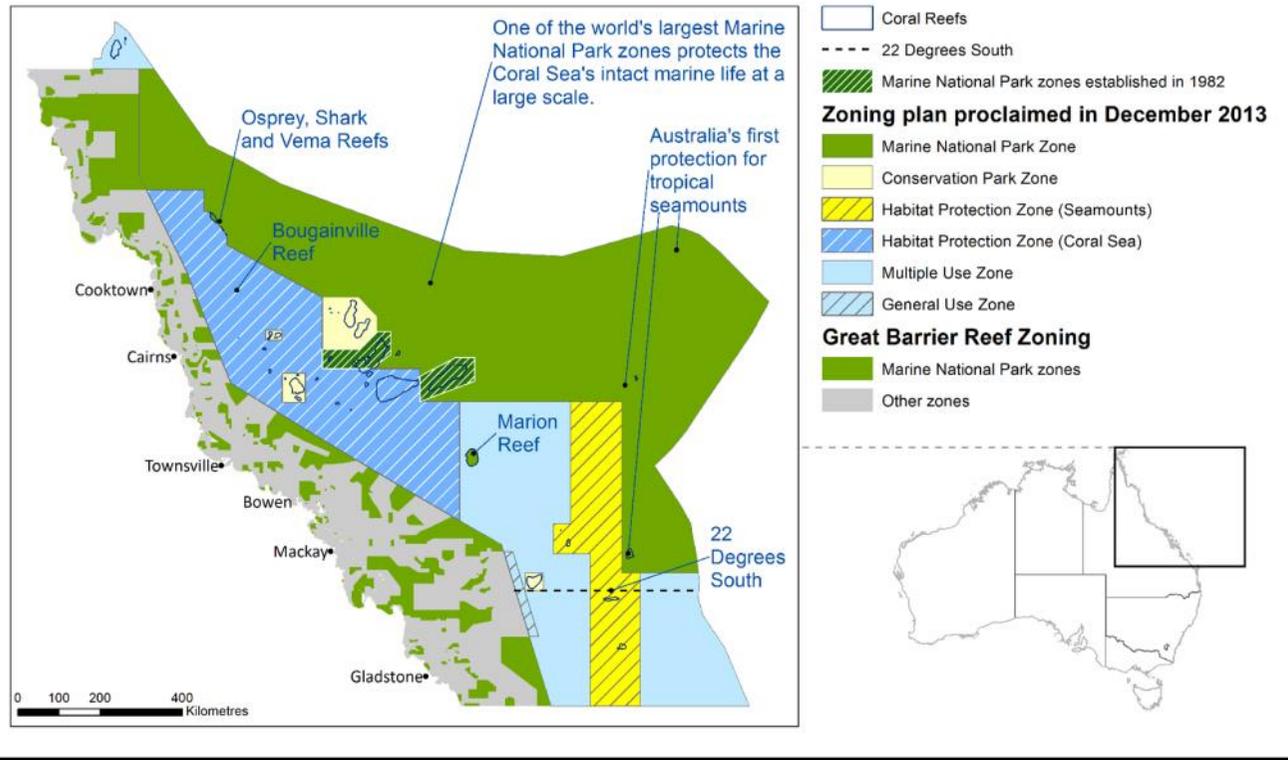


FIGURE 1: THE CORAL SEA MARINE RESERVE PROCLAIMED BY THE GILLARD GOVERNMENT IN 2012 AND BY THE ABBOTT GOVERNMENT IN 2013.

1. AREAS OF CONTENTION IN THE CORAL SEA

1A. MARINE NATIONAL PARK ZONES

The Coral Sea Marine Reserve contains Australia's largest Marine National Park Zone which extends over 51% of the Marine Reserve (Figure 1). This is one of the few places in the world where such a large marine sanctuary for relatively intact tropical marine life can be established making the conservation values of the area of global significance.^{4, 5, 6, 77} The Marine National Park Zones proclaimed by the Coalition Government in December 2013 represent a compromise between these globally significant conservation values and a desire to keep certain areas within the reserve open to commercial and/or recreational fishers.⁹⁴ The broad structure of this compromise was first outlined in 2011 with the release of the draft plan for the Coral Sea Marine Reserve where it was largely welcomed by both commercial and recreational fishers.

For example in 2011 recreational fishing magazine *Fishing World* welcomed the draft plan for the Coral Sea Marine Reserve as:

"...the best proposal for any marine reserve I have ever seen tabled in Australia"⁷

Equally representatives of over 70% of the commercial fishing interests displaced by the Coral Sea Marine Reserve (by historical \$ value) wrote in a submission that they would prefer to see simpler management arrangements involving increased protection down to 22°S provided adequate structural adjustment assistance was provided.^{8, 9} This desire to see greater protection of the Coral Sea is also reflected in the broader community with over 99% of the nearly half a million submissions to the draft zoning plan asking for an increase in Marine National Park Zones, particularly around coral reefs.¹⁰ The Marine National Park Zones proclaimed by the Coalition Government in December 2013 are 95% identical to those about which these comments were made. In fact they are slightly smaller (~5,000km²). In this context representations to the marine reserves review that the large Marine National Park Zones within the Coral Sea Marine Reserve are contentious are more likely to represent political opportunism

⁴ Halpern BS, Walbridge S, Selkoe KA, Kappel CV, Micheli F, D'Agrosa C, Bruno JF, Casey KS, Ebert C, Fox HE, Fujita R, Heinemann D, Lenihan HS, Madin EMP, Perry MT, Selig ER, Spalding M, Steneck R, Watson R (2008) A global map of human impact on marine ecosystems. *Science*, **319**(5865), 948.

⁵ Ceccarelli, D.M., 2011. Australia's Coral Sea: A biophysical profile.

⁶ CSIRO, 2012. Submission to the Draft Commonwealth Marine Reserve Proposal for the Coral Sea.

⁷ Harnwell, J., 2011. Fishos the big winners in Burke's Coral Sea Plan, *Fishing World*, <<http://www.fishingworld.com.au/news/fishos-the-big-winners-in-burke-s-coral-sea-plan>>

⁸ ABARES 2012, *Interim estimates of potential catch and gross value of production impacts of the proposed marine reserve in the Coral Sea*, ABARES report to client prepared for the Department of Sustainability, Environment, Water, Population and Communities, Canberra, February.

⁹ De Brett Seafood Pty Ltd, 4 Seas Pty Ltd, Whan and Boxsell Pty Ltd and Great Barrier Reef Tuna Pty Ltd, 2012. Submission to the Draft Commonwealth Marine Reserve Proposal for the Coral Sea.

¹⁰ SEWPaC, 2012. *Marine Bioregional Planning in the Coral Sea region: Overview of Public Consultation*, Department of Sustainability, Environment, Water, Population and Communities, Commonwealth Government, Canberra, Australia.

than genuine concern. This is because at the time of the release of the draft plan, recreational fishing interest groups strongly endorsed larger Marine National Park zoning noting that "Under the draft plan, significant areas of the outer Coral Sea will be closed to all fishing, providing important protection for iconic species and habitats."⁷

This submission aims to provide useful input towards meeting the Government's objective of "maximising marine biodiversity protection while also minimising the social and economic impact."¹¹

The Marine National Park Zones proclaimed by the Coalition Government in December 2013 maximise the protection of marine life by:

1. **Protecting tropical marine life at a large scale:** The Coral Sea's Marine National Park Zones represent "probably the only tropical pelagic environment not markedly impacted by fishing where an area of very large scale can be established and effectively managed."⁵
2. **Protecting Marion Reef:** The Marine National Park Zone at Marion Reef (Figure 1) increases the protection of the reefs, cays and herbivorous fish of the Marion Plateau (one of the three key ecological features of the Coral Sea)¹² within Marine National Park Zones from 0% to a scientifically respectable 33%.^{13, 6}
3. **Protecting Osprey, Shark and Vema Reefs:** One of the world's iconic dive sites, the shark dive at North Horn on Osprey Reef, is the main drawcard for the Coral Sea dive tourism industry (worth over \$6 million per annum in direct sales)¹⁴, and these reefs have a different evolutionary history to almost all other reefs in the Coral Sea.¹⁵ The Marine National Park Zones over these reefs (Figure 1) are a key piece of regional economic infrastructure for tourism.
4. **Protecting Bougainville Reef:** Host to a spawning aggregation of endangered Maori Wrasse¹⁶ and the only mapped biologically important whale shark aggregation site in eastern Australia¹⁷ Bougainville Reef has unique conservation values (Figure 1).

¹¹ Coalition, 2013. *The Coalition's policy for a more competitive and sustainable fisheries sector*, August 2013 <<http://lpaweb-static.s3.amazonaws.com/13-08-26%20The%20Coalition%E2%80%99s%20Policy%20for%20a%20More%20Competitive%20and%20Sustainable%20Fisheries%20Sector%20-%20policy%20document.pdf>>

¹² Commonwealth of Australia, 2012. *Key Ecological Features*, <http://www.environment.gov.au/metadataexplorer/full_metadata.jsp?docId={093A2086-7DE3-41A7-B407-5BCCA7F400A5}&loggedIn=false>

¹³ The Ecology Centre, University of Queensland (2009) *Scientific Principles for Design of Marine Protected Areas in Australia: A Guidance Statement*. 29pp. <http://www.uq.edu.au/ecology/docs/Scientific_Principles_MPAs.pdf>

¹⁴ KPMG, 2010. *Economic analysis of a Coral Sea Marine Park*, KPMG Econtech.

¹⁵ IMCRA, 2006. *A Guide to the Integrated Marine and Coastal Regionalisation of Australia Version 4.0*. Department of the Environment and Heritage, Commonwealth of Australia, Canberra, Australia.

¹⁶ Rivett X., 2011. *Reefs of the Coral Sea*. Protect Our Coral Sea, Cairns, Queensland, Australia.

¹⁷ Commonwealth of Australia, 2011. *Biologically important areas for sharks of the Coral Sea*, <http://www.environment.gov.au/metadataexplorer/full_metadata.jsp?docId={8A0BEEDF-3982-4DE3-904E-F3C7E0A345BF}&loggedIn=false>

5. **Establishing the first protection of seamounts in tropical Australia:** The protection of Mellish Reef, Kenn Reefs and three unnamed seamounts within Marine National Park Zones establishes the first ever protection for seamounts in Australia's tropical waters (Figure 1).¹⁸
6. **Protecting turtles and seabirds:** The Marine National Park Zones meet the minimum Australian science community recommendations for protection¹³ for the biologically important areas of endangered (IUCN red list) green turtles¹⁹ and for seven of the seabirds²⁰ that breed and feed in the Coral Sea.
7. **Protecting a diversity of marine habitats:** The Marine National Park Zones meet the minimum Australian science community benchmarks for protection¹³ for 236 of the 547 different seafloor environment types mapped by the Centre for Conservation Geography within the Coral Sea. These habitats are home to more than 300 of the animal species currently list by the IUCN on its red list of threatened species.⁴⁷
8. **Protection from seabed mining and oil and gas mining:** Protects the Coral Sea and Great Barrier Reef from oil spills and the impacts of seabed mining by excluding mining and exploration for oil and gas from the entire Coral Sea.

This report addresses the social and economic impacts of the Coral Sea Marine Reserve in a later section titled 1B. Social and Economic Impacts.

ENGAGING WITH PHILOSOPHICAL OBJECTIONS TO MARINE NATIONAL PARK ZONES IN THE CORAL SEA

For some individuals the Coral Sea Marine Reserve may be controversial simply because it has ceased to be a matter of government policy and has become a reality. It is understandable and expected that a small number of individuals with libertarian viewpoints may continue to oppose the Coral Sea Marine Reserve on this basis. However, the Coral Sea Marine Reserve and the boundaries of its zones now exist in law as a part of the National Representative System for Marine Protected Areas (NRSMPA). The national framework for the development of the NRSMPA, agreed to by all Australian Governments, was established under the Howard Government in 1998.²¹ Under this agreement Australia's governments established a principle for the development of the NRSMPA that each Australian marine bioregion will contain Marine National Park Zones. The Coral Sea Marine Reserve spans six Australian marine bioregions. There has been a community consensus across governments and political parties that these bioregions will contain Marine National Park Zones since at least 1998. For example, recent polling from NSW shows that 91% of recreational fishers, now support the establishment of Marine National Park Zones across Australia's oceans.²² The review panel needs to keep this

¹⁸ Beaman R., 2012. *Great Barrier Reef and Coral Sea Geomorphic Features*, School of Earth and Environmental Sciences, James Cook University, Cairns, Queensland, Australia.

¹⁹ Commonwealth of Australia, 2011. *Biologically important areas for Green Turtles in the Coral Sea*, <http://www.environment.gov.au/metadataexplorer/full_metadata.jsp?docId={7F0D577D-217E-4DB8-88D7-285DF801FEBC}&loggedIn=false>

²⁰ Commonwealth of Australia, 2011. *Biologically important areas for seabirds of the Coral Sea*, <http://www.environment.gov.au/metadataexplorer/full_metadata.jsp?docId={0591FFD2-AA3A-4214-83A1-75341E843E37}&loggedIn=false>

²¹ ANZECC TFMPA 1998. *Guidelines for Establishing the National Representative System of Marine Protected Areas*. Australian and New Zealand Environment and Conservation Council, Task Force on Marine Protected Areas. Environment Australia, Canberra.

²² Galaxy Research, 2014. *Community Attitude Survey*. Prepared for Dive Industry Association of Australia.

broad community consensus in mind when considering representations that merely object to the very existence of Marine National Park Zones and fail to contribute towards ensuring that the Marine National Park Zones satisfy the Coalition's policy of "maximising marine biodiversity protection while also minimising the social and economic impact."¹¹ The use of the term minimising denotes a critical policy difference between minimising impacts and avoiding impacts. The creation of the National Representative System of Marine Protected Areas has been a major reform of the management of Australia's oceans to establish the world's first ever national network of protected places in the ocean. It was always envisaged that this reform would have some impacts on existing users. In the case of the Coral Sea Marine Reserve these impacts these impacts happen to be relatively small.

The review panel should note that while there was also ideological opposition from some recreational fishing interest groups when the adjacent Great Barrier Reef Marine Park was rezoned in 2004, subsequent empirical science demonstrates that a majority of recreational fishers have since perceived benefits from the rezoning, and a lack of real negative effects on their fishing activity.^{23, 24} If the review panel is interested in incorporating the views of the Australian recreational fishing community, it could also note that a majority of Queensland recreational fishers have supported Marine National Park Zones following their establishment in areas of much higher recreational fishing effort and participation along the Queensland coast, as well as the fact that 30% of the supporter base of the Save Our Marine Life alliance are recreational fishers.

WHY ARE MARINE NATIONAL PARK ZONES ARE CRITICAL?

Marine National Park Zones are critical as they are the only zones that scientific research consistently shows are capable of delivering broad ranging and significant benefits for marine life.^{25, 26, 13, 39, 27, 6} All other zones, including recreational fishing zones, or those that include vertical zoning²⁸ like benthic protection zones only offer partial protection²⁹ and are designed either to achieve particular social, or economic outcomes, or to act as buffers to the Marine National Park Zones which play the fundamental role in conserving marine life and increasing the health of the ocean.

²³ Arias, A., and S. G. Sutton, 2013. Understanding recreational fishers' compliance with no-take zones in the Great Barrier Reef Marine Park, *Ecology and Society* 18(4): 18.

²⁴ Sutton, S. and Li, O., 2008. Attitudes of Recreational Fishers to the Rezoning of the Great Barrier Marine Park, *Great Barrier Reef Research news special edition*, Edition 5, May 2008, DEWHA, Government of Australia

²⁵ Australian Marine Science Association, 2011. Submission to the Draft Commonwealth Marine Reserve Network Proposal for the North-west Marine Region.

²⁶ Possingham, 2011. *Developing Australia's national system of marine reserves: A statement of concern about the proposal for Australia's South West Marine Region*, Submission to the Draft Commonwealth Marine Reserve Network Proposal for the South-west Marine Region.

²⁷ Lester SE, Halpern BS, Grorud-Colvert K, Lubchenco J, Ruttenberg BI, et al. (2009) Biological effects within no-take marine reserves: a global synthesis. *Marine Ecology Progress Series* 384: 33-46.

²⁸ Under current IUCN guidelines any zone containing vertical zoning is considered to have the level of protection of the least protected zone.^{29, 27}

²⁹ Dudley, N., 2008. *Guidelines for Applying Protected Area Management Categories*, International Union for the Conservation of Nature (IUCN), Gland, Switzerland.

Complementing their role in biodiversity conservation there are very strong economic, social and scientific arguments for establishing extensive Marine National Park Zones as key regional economic infrastructure for nature based tourism, particularly dive tourism and whale watching^{14, 73, 74, 30, 31} to maintain ecosystem services³² and to realise the economic and social value of community aspirations for healthy oceans.^{30, 33} Marine National Park Zones are critical to scientific research to understand Australia's oceans. They are the baselines against which it then becomes possible to understand and improve the management of current and future impacts on the Australia's oceans.⁶

To guide the development of Australia's national network of marine reserves the Australian marine conservation science and planning community produced a set of guidelines on best practices for the establishment of Australia's marine reserves in 2009.¹³ Science community submissions to the public consultation process for the Coral Sea Marine Reserve from the CSIRO⁶ and the ARC Centre of Excellence for Coral Reef Studies⁷⁷ each focussed on the need for the Coral Sea Marine Reserve to contain more Marine National Park Zones.

The majority of recreational fishers are now in support of Marine National Park Zones to protect marine life.²² However, there is a hopeful belief amongst a small proportion of recreational fishers that their activities have little or no impact on marine life and that marine life can be effectively protected with no restrictions on recreational fishing. Unfortunately, this is not true. The scientific evidence is now clear that zones which allow recreational fishing do not protect

³⁰ The Allen Consulting Group, 2009. *The economics of marine protected areas*, The Allen Consulting Group, Melbourne, Victoria.

³¹ Australian Institute of Marine Science, 2012. Submission to the Draft Commonwealth Marine Reserve Proposal for the Coral Sea.

³² Eadie, L., and Hoisington, C., 2011. *Stocking Up: Securing our marine economy*, Centre for Policy Development, Sydney, New South Wales, Australia.

³³ Borger, T., Hattam, C., Burdon, D., Atkins, J.P., and Austen, M.C., 2014. Valuing conservation benefits of an offshore marine protected area, *Ecological Economics*, Vol. 108: 229-241.

marine life as effectively Marine National Park Zones do.^{34, 35, 36, 37, 38, 39, 40} This is because it is not unusual for recreational fishing catch to be significant, or to even exceed commercial fishing.⁴¹ Additionally recreational fishing has the capacity to cause trophic cascades through the removal of older individuals in a population, or through the removal of top order predators.⁴¹ This is particularly so where there are resident populations of predators, such as the mesopredator populations of reef sharks at Osprey Reef.

Equally, commercial fishers often argue against Marine National Park Zones to avoid changes in where they are and are not allowed to fish. There is a belief amongst some commercial fishers that when fisheries management is good enough, Marine National Park Zones are not required.⁴² Unfortunately, this is not true. While Marine National Park Zones have both positive and negative impacts on fisheries in Australia they are rarely established to achieve fisheries management objectives. Rather Marine National Park Zones in Australia are put in place to protect marine life, improve the health of our oceans and to achieve the social, scientific and economic benefits that flow from their establishment. Just as best practice logging is an illogical argument against the community's desire for some forests to be protected within National Parks, the Australian communities desire for⁴³ and the long-standing community consensus⁴⁴

³⁴ Babcock, R., C., Phillips, J., C., Lourey, M., and Clapin, G., 2007. Increased density, biomass and egg production in an unfished population of Western Rock Lobster (*Panulirus cygnus*) at Rottne Island, Western Australia, *Marine and Freshwater Research*, Vol: 58, p. 286-292.

³⁵ Sheers NT, Grace RV, Usmar NR, Kerr V, Babcock RC (2006) Long term trends in lobster populations in a partially protected vs. no-take marine park, *Biological Conservation*, 132, 222-231.

³⁶ Frisch AJ, Cole AJ, Hobbs J-PA, Rizzari JR, Munkres KP (2012) Effects of Spearfishing on Reef Fish Populations in a Multi-Use Conservation Area. *PLoS ONE* 7(12): e51938. doi:10.1371/journal.pone.0051938

³⁷ Sciberras M, Jenkins S, Kaiser M, Hawkins S, Pullin A (2013) Evaluating the biological effectiveness of fully and partially protected marine areas. *Environmental Evidence* 2: 4.

³⁸ Lester SE, Halpern BS (2008) Biological responses in marine no-take reserves versus partially protected areas. *Mar Ecol Prog Ser* 367: 49-56.

³⁹ Edgar GJ, Stuart-Smith RD, Willis TJ, Kininmonth S, Baker SC, Banks S, Barrett NS, Becerro MA, Bernard ATF, Berkhout J, Buxton CD, Campbell SJ, Cooper AT, Davey M, Edgar SC, Forsterra G, Galvan DE, Irigoyen AJ, Kushner DJ, Moura R, Parnell PE, Shears NT, Soler G, Strain EMA, Thomson RJ (2014) Global conservation outcomes depend on marine protected areas with five key features, *Nature*, **506**, 216-220.

⁴⁰ Kelaher BP, Coleman MA, Broad A, Rees MJ, Jordan A, et al. (2014) Changes in Fish Assemblages following the Establishment of a Network of No-Take Marine Reserves and Partially-Protected Areas. *PLoS ONE* 9(1): e85825. doi:10.1371/journal.pone.0085825

⁴¹ McPhee, DP; Leadbitter, D and Skilleter, GA. 2002. Swallowing the Bait: Is Recreational Fishing in Australia Ecologically Sustainable? *Pacific Conservation Biology*, Vol. 8, No. 1: 40-51.

⁴² For example see West Australian Fishing Industry Council chief executive John Harrison's comments to ABC program PM on the 14/11/2014 <<http://www.abc.net.au/pm/content/2014/s4128961.htm>>

⁴³ Of the more than half a million submissions to the public consultations on marine reserves 99.5% were in favour of higher levels of Marine National Park Zones. This is consistent with the very high levels of public support for Marine National Park Zones found in community attitude surveys. For example: Galaxy Research, 2014. *Community Attitude Survey*. Prepared for Dive Industry Association of Australia.

⁴⁴ In 1998 all Australian Governments agreed to establish a national network of Marine National Park Zones to protect marine life with a minimum of one Marine National Park Zone in each Australian marine bioregion. See: ANZECC TFMPA 1998. *Guidelines for Establishing the National Representative System of*

that some parts of Australia's oceans be included within Marine National Park Zones has little to do with whether the management of particular fisheries is either good or bad.

Commercial fishers also consistently argue that Marine National Park Zones are having too great an impact on their activities.⁴⁵ This position is hard to support in the Coral Sea where representatives of over 70% of the commercial fishing interests displaced by the Coral Sea Marine Reserve (by historical dollar value) have been seeking greater, not lesser protection provided that adequate structural adjustment assistance is provided.^{8,9} Total displacement of commercial fishers in the Coral Sea is just 2.3% of the commercial fisheries active in the Coral Sea with some of the fisheries promoted as being heavily impacted being displaced as little as 0.1%.^{48,46}

2A. ADVICE ON OPTIONS FOR ZONING BOUNDARIES TO ADDRESS THIS AREA OF CONTENTION:

Centre for Conservation Geography advice: Adding large areas to the Marine National Park Zones would risk destabilising the shape of the broad compromise between competing interests that has been largely welcomed by commercial and recreational fishers. The Centre for Conservation Geographer advises some minor improvements while keeping to this broad compromise (see sections 1C. Protection of Coral Reefs, 1D. Unique and Unprotected Coral Reefs, and 1E. Science Community Concerns below).

Marine Protected Areas. Australian and New Zealand Environment and Conservation Council, Task Force on Marine Protected Areas. Environment Australia, Canberra.

⁴⁵ For example see
<http://www.seafoodforaustralia.com.au/marine_bioregional_planning/marine_bioregional_planning.html>

⁴⁶ National Seafood Industry Alliance:
<http://www.seafoodforaustralia.com.au/meet_the_fishers/east_fishers.phtml> viewed 12/12/2014.

1B. SOCIAL AND ECONOMIC IMPACTS

The information compiled by the Centre for Conservation Geography and presented below shows that the net social and economic value of the Coral Sea Marine Reserve to the Australian community is \$1.2 billion. Within this, positive impacts on nature-based tourism and recreational fishing are found to outweigh possible negative impacts on commercial fishing by at least \$5 million per annum. The net increase in employment associated with the implementation of the Coral Sea Marine Reserve is predicted to be over 100 jobs, particularly in North Queensland. This is made possible by the zoning plan for the Coral Sea Marine Reserve proclaimed by the Coalition Government in December 2013, which successfully minimises potential negative social and economic impacts while maximising potential positive social and economic impacts:

1. **Recreational fishing:** The remote nature of the Coral Sea means that it supports some of Australia's lowest levels of recreational fishing activity. For example less than 1% of recreational and game fishing in Queensland occurs in the Coral Sea.⁴⁷ The Coral Sea Marine Reserve not only minimises potential negative impacts on recreational fishers it also provides significant recreational fishing benefits.⁷ The two environments of most interest to recreational fishers in the Coral Sea are the black marlin spawning grounds in the Queensland Trough and Coral Reefs.
 - a. **Black Marlin Spawning Grounds:** The Coral Sea Marine Reserve increases recreational fishing opportunities in the black marlin spawning grounds of the Coral Sea by placing the area within the Habitat Protection Zone (Coral Sea). This zone maintains access for recreational fishers to 100% of the Queensland Trough while completely removing commercial fisheries that target black marlin. The Queensland Trough is the only known black marlin spawning ground in the world.⁹⁷
 - b. **Coral Reefs:** The Coral Sea Marine Reserve minimises the impact on recreational fishers seeking to fish remote coral reefs by maintaining recreational fishing access to 24 of the 36 coral reefs of the Coral Sea (Table 1). This includes all of the coral reefs most accessible to recreational fishers, i.e. Saumarez Reef and the inner reefs of the Queensland Plateau. Additionally, the Coral Sea Marine Reserve zoning plan creates enhanced recreational fishing opportunities on the eight reef systems within Conservation Park zones by removing commercial fishing other than hand collection and hand line fishing.
2. **Charter fishing:** Commercial charter fishing operations have previously been supportive of the zoning plan for the Coral Sea Marine Reserve. For example, Damon Olsen the owner of Nomad Sport Fishing described the draft zoning plan as offering "a solution that not only protects the Coral Sea, but one that allows (recreational fishing) to be actively promoted and to benefit from the new zoning." The Centre for Conservation Geography predicts that the Coral Sea Marine Reserve will have a positive economic impact on the Coral Sea Charter Fishing Industry. The permanent removal of competing commercial fisheries from the black marlin spawning grounds and from Saumarez Reef (the only reef in the Coral Sea where there are five or more charter operators⁴⁷) is expected to provide a boost to these operations ability to market the Coral Sea as a

⁴⁷ Pew Environment Group, 2012. Submission to the Draft Commonwealth Marine Reserve Proposal for the Coral Sea.

unique recreational fishing experience. Charter fishing in the Coral Sea is currently estimated to be worth \$1.2 million per annum.¹⁴ This is likely to increase once the zoning plan is implemented and the Charter Fishing Industry has the opportunity to promote the creation of unique sports fishing opportunities.⁷

3. **Commercial fishing:** The Coral Sea Marine Reserve is extremely successful at minimising the displacement of commercial fishing activities with the maximum potential negative impact estimated to be \$4.2 million.⁴⁸ The Coral Sea Marine Reserve extends over 100% of the Coral Sea and includes 51% of the Coral Sea in Marine National Park Zones but displaces only 2.3% of the commercial fisheries active in the region.⁴⁸ The Coral Sea Marine Reserve zoning plan achieves this by maintaining access for each commercial fishery to their key areas of operation.
 - a. **Eastern Tuna and Billfish Fishery:** Over 85% of the total commercial fishing displaced is from the Eastern Tuna and Billfish Fishery (ETBF). Key operators in the ETBF fishery are supportive of the marine reserve and wanted to see the zoning plan simplified and extended, with restrictions on longlining down to 22 degrees south, provided that adequate structural adjustment funding is provided.⁹
 - b. **Coral Sea Fishery:** The zoning plan completely removes the more damaging aspects of the Coral Sea Fishery (demersal trawl and longline)⁴⁹ as recommended by the risk assessment process,⁷⁹ while having minimal impact on the other aspects of the fishery. The combined total catch displaced for all other aspects of the Coral Sea Fishery outside of the trawl and longline elements has a gross annual value of less than \$0.1 million spread across the dive, trap, dropline and handline fisheries.^{48,49}
 - c. **Queensland Trawl Fishery:** The zoning plan minimises the impact on the Queensland Trawl fishery by creating a General Use zone that allows trawling to continue in a small area on the western edge of the Coral Sea Marine Reserve to the west of Saumarez Reef. This reduces the displacement of the fishery down to 0.1%.⁴⁸
 - d. **Queensland Deepwater Finfish:** This fishery is now mostly based in south Queensland.⁵⁰ The Coral Sea Marine Reserve nominally displaces 8% of the fishing effort, however this represents an annual amount of only around \$0.1 million and is likely to be mostly historical.^{48, 49, 50}
 - e. **Other Queensland Fisheries:** The total displacement across all other Queensland Fisheries is less than \$0.1 million representing significantly less than 1% of the total effort within these fisheries.^{48,49}

⁴⁸ Commonwealth of Australia, 2012. *Completing the Commonwealth marine reserves network: Regulatory impact statement*, Department of Sustainability, Environment, Water, Population and Communities, Canberra, ACT, Australia.

⁴⁹ ABARES 2012, *Interim estimates of potential catch and gross value of production impacts of the proposed marine reserve in the Coral Sea*, ABARES report to client prepared for the Department of Sustainability, Environment, Water, Population and Communities, Canberra, February.

⁵⁰ Queensland Government, 2012. *Annual status report 2011: Deep water finfish*, Queensland Department of Employment, Economic Development and Innovation, Brisbane, QLD, Australia.

4. **Dive Tourism:** The creation of the Coral Sea Marine Reserve is predicted to enable the dive tourism industry to expand by 150%, which is a gain in direct sales of \$9 million.¹⁵ This will have important flow on effects for the economy and employment of North Queensland. The Coral Sea Marine Reserve creates this economic opportunity by creating a globally iconic marine reserves that includes at least some permanent Marine National Park Zone protection for key dive tourism reefs like the Osprey Group of reefs (Osprey, Shark and Vema reefs). Previously the dive tourism industry and the Coral Sea Fishery had a Memorandum of Understanding (MOU) that protected Osprey, Bougainville, Flora, Dart and Heralds Surprise reefs from fishing.⁷⁵ This MOU has now lapsed and the Coral Sea Marine Reserve currently fails to protect Flora, Dart and Heralds Surprise reefs from fishing. The Coral Sea Marine Reserve appears to attempt to provide secure long term protection to the Osprey and Bougainville reef systems however in the light of more recent scientific studies into coral reef protection the zoning of these areas needs to be slightly updated to achieve this (see section 1C. Protection of Coral Reefs).
5. **Employment:** The creation of the Coral Sea Marine Reserve is estimated to create a net increase in employment, particularly in North Queensland of over 100 jobs.¹⁴ The Coral Sea Marine Reserve is predicted to cause an estimated 39 job losses in fishing and related industries.^{14+4, 48+49} This is more than offset by the jobs estimated to be created in dive tourism (60), monitoring and management (69) and the sectors that support these activities (68).¹⁴⁺⁴
6. **Environmental Services:** Australia's oceans also provide services that are not always accounted for in the national economy. In 2011 the Centre for Policy Development estimated that unaccounted services to the Australian economy from our oceans exceeded \$25 billion per annum.³² The establishment of the Coral Sea Marine Reserve Network, in particular its Marine National Park Zones is a critical aspect of ensuring that at least \$0.9 billion of these economic benefits continue and grow.
7. **Community benefits:** One of the most common methods for assessing the total social and economic value of non-market benefits to communities is to use surveys to assess a community's willingness to pay for some future environmental change.³³ For example, in a recent choice modelling study McCartney (2009)⁵¹ estimates an average willingness to pay of \$140 per annum for a modest set of environmental outcomes for the Ningaloo Marine Park. No equivalent modelling exercise exists for Australia's oceans in their entirety but if used as a lower bound and extended across Australia's marine regions then the community valuation of the social benefit of protecting the Coral Sea are in the order of \$370 million per annum.

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FORGOTTEN SOCIAL BENEFITS

An aspect which has received relatively little attention within debates around marine protection, yet which is emerging as critical, is the role marine national park zones can play in enhancing what may broadly be termed social wellbeing. Social wellbeing incorporates a wide range of benefits communities experience through the presence of healthy natural

⁵¹ McCartney, A., 2009. *The Policy Relevance of Choice Modelling: An Application to the Ningaloo and Proposed Capes Marine Parks*. Research Paper, School of Agricultural and Resource Economics, University of Western Australia. Not seen. Referenced in: The Allen Consulting Group, 2009. *The economics of marine protected areas*, The Allen Consulting Group, Melbourne, Victoria.

environments, through their interactions and connections with these areas, and through the collective process of stewardship.

Recent research from within the emerging disciplines of eco-health research and disease ecology reveal for example that effective protection of the environment can contribute to improved human health outcomes, including related to both mental and physical wellbeing, and also enhancing social cohesion among citizens. In addition to the obvious benefits of provision of clean air, water and other resources, this is perhaps most compellingly shown in research demonstrating that the drivers of environmental change and subsequent declines in biodiversity also drive the emergence of infectious diseases, which impact 'by disrupting "natural" host-pathogen dynamics and/or by exposing humans to a novel pool of pathogens from wildlife reservoirs.⁵²

Social wellbeing also relates to the positive benefits of interacting with the natural environment, such as improved fitness and physical health, higher perceptions of wellbeing and quality of life, and better overall mental health and wellbeing among groups regularly interacting with natural areas.^{53, 54, 55, 56} Observation of the effects of environmental degradation on communities also reveals the sense of security derived from adequate protection of natural environments, with higher levels of stress, anxiety, depression and social conflict occurring in communities experiencing high levels of environmental change and degradation.^{57, 58, 59, 60}

These findings also point to intangible aspects of wellbeing related to the long-term protection of Australia's marine environment. Given the central role healthy oceans and beaches play in an iconic Australian way of life, the important role marine national park zones can play in ensuring the long term survival of this uniquely Australian culture and identity deserves attention. Connections between conservation and present day cultural expression and social identity have been explicitly explored in Australia in research literature on Indigenous communities. -In this context, protecting marine and aquatic ecosystems is a key aspect in fulfilling many Indigenous

⁵² Olival et al. (2013) 'Linking the Historical Roots of Environmental Conservation with Human and Wildlife Health' *Ecohealth* 10: 224-227

⁵³ Maller, C., M. Townsend, L. St Leger, C. Henderson-Wilson, A. Pryor, L. Prosser and M. Moore (2009). "Healthy parks healthy people: The health benefits of contact with nature in a park context."

⁵⁴ Bratman, G. N., J. P. Hamilton and G. C. Daily (2012). "The impacts of nature experience on human cognitive function and mental health." *Annals of the New York Academy of Sciences* 1249(1): 118-136.

⁵⁵ Husk, K., R. Lovell, C. Cooper and R. Garside (2013). "Participation in environmental enhancement and conservation activities for health and well-being in adults." *The Cochrane Library*.

⁵⁶ Johnston, F. H., Jacups, S. P., Vickery, A. J., & Bowman, D. M. (2007). Ecohealth and Aboriginal testimony of the nexus between human health and place. *EcoHealth*, 4(4), 489-499.

⁵⁷ Warsini, S., J. Mills and K. Usher (2014). "Solastalgia: living with the environmental damage caused by natural disasters." *Prehospital and disaster medicine* 29(01): 87-90.

⁵⁸ Albrecht, G., G.-M. Sartore, L. Connor, N. Higginbotham, S. Freeman, B. Kelly, H. Stain, A. Tonna and G. Pollard (2007). "Solastalgia: The distress caused by environmental change." *Australasian Psychiatry* 15(S1): S95-S98.

⁵⁹ Speldewinde, P. C., A. Cook, P. Davies and P. Weinstein (2009). "A relationship between environmental degradation and mental health in rural Western Australia." *Health & Place* 15(3): 880-887.

⁶⁰ McNamara and Westoby (2011) 'Solastalgia and the Gendered Nature of Climate Change' *Ecohealth* 8: 233-236

community aspirations for active stewardship and connections with their traditional country- and this is an expression of a unique and highly cherished cultural identity and way of life.⁶¹

This under-explored theme is also highly relevant to discussions relating to mainstream Australian society and marine reserves. The broad support for long established marine reserves that exists among a range of user groups, including recreational fishers,^{62, 63, 64, 65, 66} and the maintenance of high usage, and in some cases increases in visitation,^{64, 67, 68, 69, 70} of areas following the establishment of marine reserves, suggest that marine reserves are already helping to maintain, rather than erode, the Australian coastal way of life. Marine reserves are an important part of the social fabric of Australia, protecting our iconic and much cherished way of life by protecting the integrity of the places and environments that make it possible. This contribution should not be underestimated when considering the long term wellbeing of Australian society.

⁶¹ see eg Dhimurru (2006) Dhimurru Yolngu Monuk Gapu Wānga Sea Country Plan: A Yolngu Vision and Plan for Sea Country Management in North-East Arnhem Land, Northern Territory Dhimurru Land Management Aboriginal Corporation;

⁶²McGregor Tan research (2008), Solitary Islands Marine Park Community Survey Final Report, Prepared for: NSW Marine Parks Authority Project No: 8353

⁶³ McGregor Tan research (2008), Jervis Bay Marine Park Community Survey Final Report, Prepared for: NSW Marine Parks Authority Project No: 8353

⁶⁴ NSW Marine Parks Authority, 2010, Lord Howe Island Marine Park Summary of Research and Monitoring. NSW Government, Sydney.

⁶⁵ See also comments from Fishing Australia presenter Rob Paxevanos discussing the value of marine sanctuaries and support for them from the fishing community - Fishing Australia 28th November 2014.

⁶⁶ Sparks, M and Munro M. 2011. Fisheries Research and Development Corporation Recreational Fishing Survey. Intuitive Solutions, Docklands, Victoria.

⁶⁷ Smallwood, C. B., & Beckley, L. E. (2012). Spatial distribution and zoning compliance of recreational fishing in Ningaloo Marine Park, north-western Australia. *Fisheries Research*, 125, 40-50.

⁶⁸ Sutton, S. G. and R. C. Tobin 2009 "Recreational fishers' attitudes towards the 2004 rezoning of the Great Barrier Reef Marine Park." *Environmental Conservation* 36(03): 245-252.

⁶⁹ Northcote, J and McBeth, J. 2008 Socio-economic Impacts of Sanctuary Zone Changes in Ningaloo Marine Park: A preliminary investigation of effects on visitation patterns and human usage. CRC for Sustainable Tourism, Brisbane.

⁷⁰ Beckley, L. E., Smallwood, C. B., Moore, S. A., & Kobryn, H. T. (2010). Ningaloo collaboration cluster: human use of Ningaloo Marine Park (No. 2, p. 166). Ningaloo Collaboration Cluster Final Report

2B. ADVICE ON OPTIONS FOR ZONING BOUNDARIES TO ADDRESS THIS AREA OF CONTENTION:

Centre for Conservation Geography advice: The Coral Sea Marine Reserve zoning plan successfully minimises negative social and economic impacts, but fails to maximise positive impacts. The two major lost opportunities to maximise positive social and economic impacts are (a) increasing social and economic benefits by taking up commercial fishers on their suggestion to simplify the zoning scheme by excluding longlining down to 22 degrees south and providing adequate structural adjustment to fishers, and (b) increasing social and economic benefits by providing greater protection to the key economic assets of the dive tourism industry (see sections 1C. Protection of Coral Reefs and 1D. Unique and Unprotected Coral Reefs below for more details).

TABLE 1: MAJOR RECREATIONAL FISHING BENEFITS OF THE CORAL SEA MARINE RESERVE AND ACCESS TO CORAL REEFS.

Locations with greatly enhanced recreational fishing opportunities	Coral reefs open to recreational fishing
<ol style="list-style-type: none"> 1. Black marlin spawning grounds in the Queensland Trough. 2. Coral reefs within Conservation Park zones: <ol style="list-style-type: none"> i. Dart Reef ii. Diane Bank iii. Heralds Surprise iv. Holmes Reefs v. Moore Reefs vi. North Flinders Reefs vii. Saumarez Reef viii. South Flinders Reefs ix. Willis Islets 	<ol style="list-style-type: none"> 1. Abington Reef 2. Ashmore Reef 3. Boot Reefs 4. Cairns Seamount 5. Calder Bank 6. Cato Reef 7. Dart Reef 8. Diane Bank 9. Flora Reef 10. Frederick Reef 11. Heralds Surprise 12. Holmes Reefs 13. Malay Reef 14. McDermott Bank 15. Moore Reefs 16. North Flinders Reefs 17. Saumarez Reefs 18. South Flinders Reefs 19. Tregrosse Reefs 20. Diamond Islets 21. Unnamed reef between Flinders Reefs and Herald Cays 22. Unnamed reef east of Tregrosse Reefs 23. Willis Islets 24. Wreck Reefs

1C. PROTECTION OF CORAL REEFS

In 1982 the Fraser Government protected 30% of the Coral Sea's coral reefs in two of Australia's oldest Marine National Park Zones.⁷¹ Thirty years later the proclamation of the Coral Sea Marine Reserve by the Gillard Government in 2012 and by the Abbot Government in 2013 has increased the protection of coral reefs within Marine National Parks zones in the Coral Sea from 30% to 40% by targeting an additional eight reefs for protection (Table 2). With the exception of the unnamed reef to the east of the Coringa Islets each of these coral reefs is known to be unique and a very high priority for protection. This increase in protection for unique coral reefs is a critical element of the compromise between global conservation values, tourism and fishing inherent within the zoning plan. It would be absurd, highly controversial and economically naïve to proclaim one of the largest tropical marine reserves in the world without substantially increasing the protection of coral reefs. This was highlighted during the public consultation process with increasing the protection for coral reefs a major theme of the submissions to the public consultation process.¹⁰

A scientific study of marine reserves across the world, released earlier in 2014 now shows that to be effective new Marine National Park Zones need to be greater than 100km² in size and include whole coral reefs within their boundaries in addition to a buffer zone of deep water or sand.⁷² **In light of this new information the Marine National Park Zones for Coringa Islets, Magdelaine Cays, Bougainville Reef, Marion Reef and the Osprey Group of reefs should be updated or the protection provided to these reefs may not prove effective.** By updating the protection of these reefs the Federal Government has an opportunity to signal to the Australian community (and the international community) that Australians are genuine in their desire and capacity to effectively protect and manage globally significant coral reef ecosystems.

2C. ADVICE ON OPTIONS FOR ZONING BOUNDARIES TO ADDRESS THIS AREA OF CONTENTION:

Centre for Conservation Geography advice: Scientific evidence that has come to light after the declaration of the reserves by the Abbott Government in December 2013 requires four minor changes to the Marine National Park Zones around key coral reefs (Table 3, Figure 2).

Each of the four suggested changes is described on page 20 below.

⁷¹ Mapping of coral reefs in the Coral Sea is sourced from Beaman R., 2012. *Great Barrier Reef and Coral Sea Geomorphic Features*, School of Earth and Environmental Sciences, James Cook University, Cairns, Queensland, Australia.

⁷² Edgar GJ, Stuart-Smith RD, Willis TJ, Kininmonth S, Baker SC, Banks S, Barrett NS, Becerro MA, Bernard ATF, Berkhout J, Buxton CD, Campbell SJ, Cooper AT, Davey M, Edgar SC, Forsterra G, Galvan DE, Irigoyen AJ, Kushner DJ, Moura R, Parnell PE, Shears NT, Soler G, Strain EMA, Thomson RJ (2014) Global conservation outcomes depend on marine protected areas with five key features, *Nature*, **506**, 216–220.

Protecting Coral Reefs: CCG suggested changes

Four minor changes are suggested to bring the proposed protection of coral reefs into accord with the recommendations of recent scientific research.

Collectively these four suggested changes affect 1% of the Coral Sea Marine Reserve

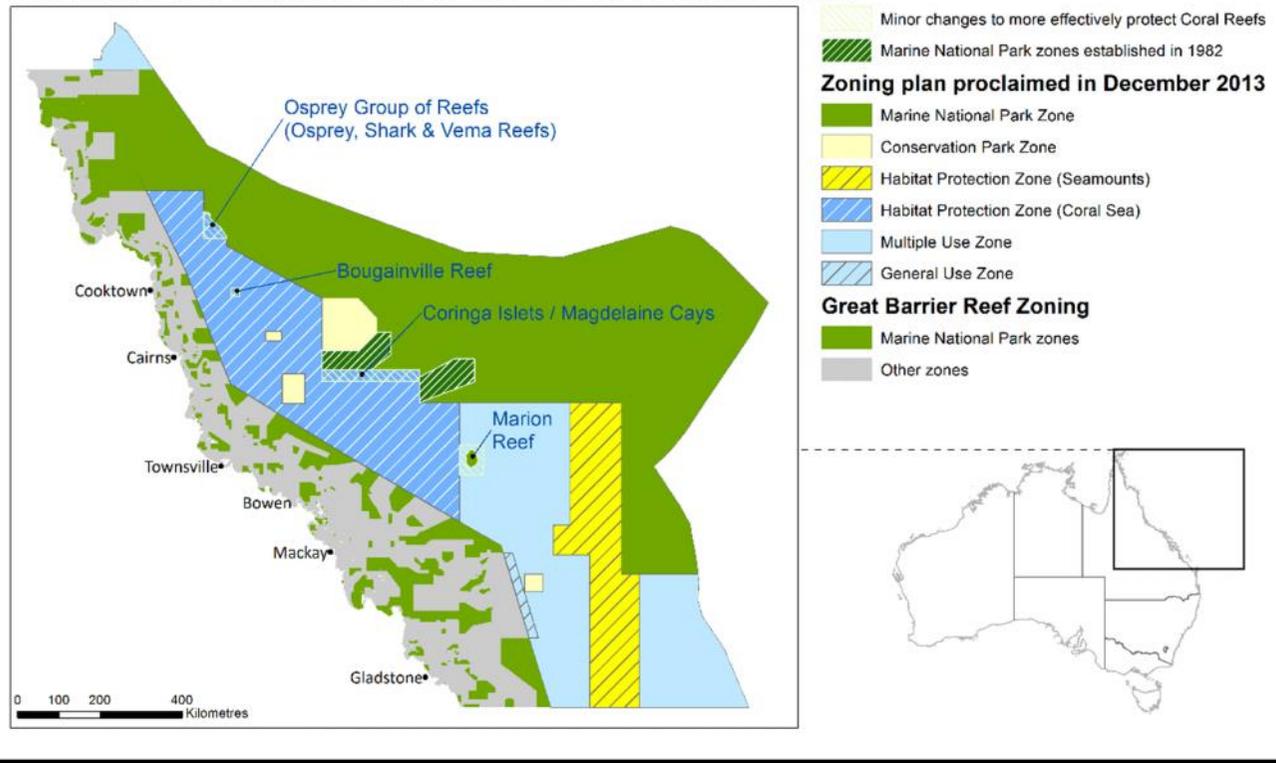


FIGURE 2: CHANGES TO MARINE NATIONAL PARK ZONES SUGGESTED BY THE CENTRE FOR CONSERVATION GEOGRAPHY TO BRING THE ZONING PLAN INTO LINE WITH RESEARCH SCIENTIFIC RESEARCH.

TABLE 2: REEFS TARGETED FOR PROTECTION IN THE CORAL SEA BY THE FRASER AND ABBOTT GOVERNMENTS.

Reefs targeted for protection by 1982 Fraser Government	Reefs targeted for protection by 2013 Abbott Government	Reefs outside Marine National Park Zones.
<ol style="list-style-type: none"> 1. Coringa Islets 2. Herald Cays 3. Lihou Reef 4. Magdelaine Cays 	<ol style="list-style-type: none"> 5. Bougainville Reef 6. Kenn Reefs 7. Marion Reef 8. Mellish Reef 9. Osprey Reef (Osprey Group of Reefs) 10. Vema Reef (Osprey Group of Reefs) 11. Shark Reef (Osprey Group of Reefs) 12. Unnamed reef to the east of Coringa Islets. 	<ol style="list-style-type: none"> 13. Abington Reef 14. Ashmore Reef 15. Boot Reefs 16. Cairns Seamount 17. Calder Bank 18. Cato Reef 19. Dart Reef 20. Diane Bank 21. Flora Reef 22. Frederick Reef 23. Heralds Surprise 24. Holmes Reefs 25. Malay Reef 26. McDermott Bank 27. Moore Reefs 28. North Flinders Reefs 29. Saumarez Reefs 30. South Flinders Reefs 31. Tregrosse Reefs 32. Diamond Islets 33. Unnamed reef between Flinders Reefs and Herald Cays 34. Unnamed reef east of Tregrosse Reefs 35. Willis Islets 36. Wreck Reefs

TABLE 3: MINOR CHANGES TO MARINE NATIONAL PARK ZONES AROUND CORAL REEFS ADVISED BY THE CENTRE FOR CONSERVAITON GEOGRAPHY.

Suggested Change	Area effected (proportion of the Coral Sea Marine Reserve)
Osprey Group of reefs	0.2%
Marion Reef	0.3%
Bougainville Reef	0.04%
Coringa Islets / Magdelaine Cays	0.6%
Total	1.2%

OSPREY GROUP OF REEFS

The Marine National Park Zone at the Osprey Group currently includes over 99% of Osprey, Shark and Vema Reefs. Expanding the Marine National Park Zone to the boundaries of the Habitat Protection Zone proposed in the 2011 draft zoning plan would establish full protection for the reefs, plus a buffer zone capable of protecting the vulnerable shark populations that make these reefs a globally iconic dive location (Figure 2).^{73,74} The lapse of the Memorandum of Understanding between divers and fishers over Osprey, Bougainville, Flora, Dart and Heralds Surprise reefs emphasises both the vulnerability and importance of these reefs to the dive tourism industry.⁷⁵ This change is critical to ensuring the Coral Sea Marine Reserve is effective as a key piece of regional economic infrastructure for tourism and will bring the boundaries into line with the recommendations of recent scientific research.⁷²

MARION REEF

The Marine National Park Zone at Marion Reef currently includes 97% of the coral reef. To include the whole reef and associated banks, terraces, aprons and fans, including a buffer zone of sand and deep water around the reef the Marine National Park Zone should be expanded to the boundaries of the Habitat Protection Zone proposed in the 2011 draft zoning plan (Figure 2). Expanding the Marine National Park Zone around Marion Reef is necessary to bring the boundaries into line with the recommendations of recent scientific research.⁷²

BOUGAINVILLE REEF

The Marine National Park Zone at Bougainville Reef is currently 27km². Bougainville Reef itself is 100% contained within the Marine National Park Zone however the current Marine National Park Zone is not large enough to isolate the reef from extractive pressures occurring outside the Marine National Park Zone. This isolation is one of the five key factors for effective protection identified by Edgar et al. in 2014.³⁹ Expanding this small Marine National Park Zone to include all of the mapped whale shark aggregation site¹⁷ would be a major improvement to the protection of whale sharks and will bring the boundaries into line with the recommendations of recent scientific research (Figure 2).⁷² This whale shark aggregation is a potential high value tourism asset and the potential economic value of including it within Marine National Park Zones was highlighted by the submission of the Australian Institute of Marine Science.⁷⁶

CORINGA ISLETS / MAGDELAINE CAYS

One of the original coral reefs targeted for protection in 1982, the Coringa Herald Marine National Park Zone covered 84% of the Coringa Islets / Magdelaine Cays reef system. This has now increased to 88% with the 2013 extension of the original zone eastwards. A minor extension of the marine national park zone southwards in this area from 17°11' to 17°26' will bring the boundaries into line with the recommendations of recent scientific research (Figure 2).⁷²

⁷³ Association of Marine Park Tourism Operators, 2012. *AMPTO Submission*, Submission to the Draft Commonwealth Marine Reserve Proposal for the Coral Sea.

⁷⁴ Professional Association of Diving Instructors, 2012. *Proposed Coral Sea Commonwealth Marine Reserve*, Submission to the Draft Commonwealth Marine Reserve Proposal for the Coral Sea.

⁷⁵ Coral Sea Fishers Association Inc., 2009. *Memorandum of Understanding CSFA and CHARROA*.

⁷⁶ Australian Institute of Marine Science, 2012. Submission to the Draft Commonwealth Marine Reserve Proposal for the Coral Sea.

1D. UNIQUE AND UNPROTECTED CORAL REEFS

"Individual reefs of the Coral Sea are exceptionally distinctive. Unlike the reefs of the Great Barrier Reef where the corals present in one reef region are a good indication of those present in another, each reef of the Coral Sea has a highly individual suite of species." (Dr Charlie Veron)¹⁶

The uniqueness of its coral reefs and the very large number of unprotected reefs (Table 2) combine to create a number of unprotected reefs in the Coral Sea that are highly unique and/or constitute key regional economic infrastructure for the dive tourism industry. Unprotected reefs with high levels of uniqueness include:

Boot and Ashmore Reefs: The only reefs in the Coral Sea to occur in the Cape Province bioregion. Isolated by distance (> 400km), and deep waters, these reefs are also the only reefs in the Coral Sea to emerge out of the Australian continental slope.

Tregrosse Reef: Australia's largest reef platform Tregrosse Reef sits on the southern edge of the Queensland Plateau to the south of Coringa Islets. Canyons descend from the reef down into the deep waters of the Townsville Trough.

Wreck Reefs: One of only two coral reefs in the Kenn Transition bioregion, Wreck Reefs are perched on a seamount in the middle of the deep waters of the Cato Trough. Wreck Reefs are isolated by distance (>500km) from the only other coral reef in the Kenn Transition bioregion (Mellish Reefs).

Frederick Reef and Calder Bank: These two adjacent coral reefs perch at the top of the only two seamounts in the Northeast Province. These two seamounts, the only seamounts to the east of the Cato Trough are unique seamount and coral reef habitats.

Willis Islets: Contains 99% of the Coral Sea's red-footed booby biologically important breeding habitats and 79% of the biologically important breeding grounds for wedge-tailed shearwaters both of which currently have less than 1% of their breeding habitats protected within Marine National Park Zones.

Queensland Plateau Inner Reefs: Both the CSIRO and the ARC Centre of Excellence for Coral Reef studies submissions highlight the low level of protection (0.3%) for the 13 coral reefs of the inner Queensland Plateau.^{6,77} The CSIRO submission argues strongly for the protection of Queensland Plateau inner reefs to be increased from 0.3% to 33% to bring the protection of these coral reefs into line with the adjacent Great Barrier Reef Marine Park. A number of these unprotected inner Queensland Plateau coral reefs are also documented as existing key regional economic infrastructure for the dive tourism industry including: **Flinders Reefs, Flora Reef, Holmes Reefs, Heralds Surprise and Dart Reef.**^{14,75} Establishing Marine National Park Zones for one or more of these reefs would have significant economic advantages by creating a more diverse portfolio of dive infrastructure, mitigating against the potential loss of dive sites via catastrophic events (for example cyclones, ship strikes, coral bleaching or a crown of thorns outbreak).

2D. ADVICE ON OPTIONS FOR ZONING BOUNDARIES TO ADDRESS THIS AREA OF CONTENTION:

Centre for Conservation Geography advice: The current mix of protected and unprotected reefs is a compromise between the interests of all stakeholders, but does not reflect the overwhelming community consensus for greater protection of Coral Sea reefs. If greater protection of coral reefs is sought to improve the social, economic and scientific outcomes of the zoning plan, the reefs documented above represent the Centre for Conservation Geography's

advice on priority unprotected reefs for protection on ecological and economic grounds (see Figure 3 for the locations of these reefs).

Unique and Unprotected Coral Reefs

The Coral Sea contains a high number of coral reefs with unique conservation values and/or important economic values for dive tourism that remain unprotected.

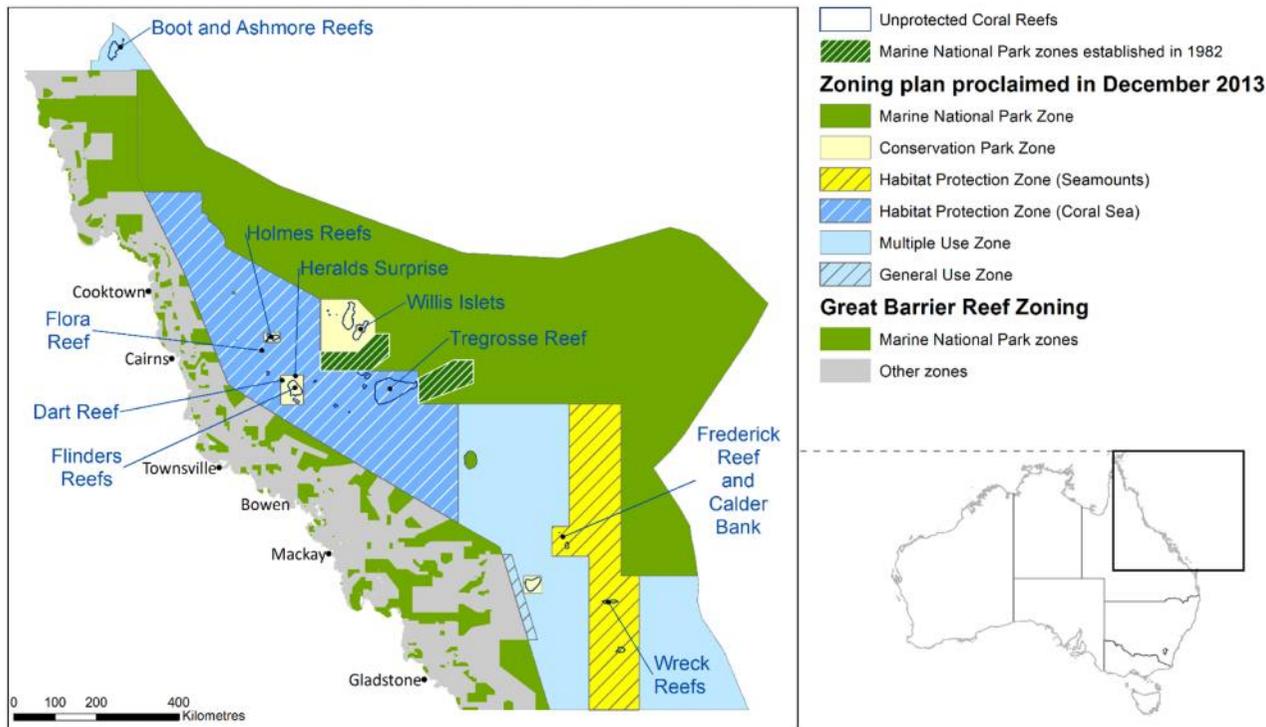


FIGURE 3: THE ZONING PLAN FOR THE CORAL SEA MARINE RESERVE LEAVES SOME OF THE MOST UNIQUE AND IMPORTANT CORAL REEFS FOR CONSERVATION AND DIVE TOURISM WITH LOW LEVELS OF PROTECTION.

1E. SCIENCE COMMUNITY CONCERNS

In 2012 a scientific consensus statement facilitated by the ARC Centre of Excellence for Coral Reef Studies and endorsed by the Australian Marine Sciences Association and over 300 scientists raised serious concerns over the inadequate protection for key habitats in the south and west of the Coral Sea.⁷⁷ This concern was also reflected in the submissions of other scientific institutions for example the CSIRO⁶ and the Australian Museum⁷⁸. The science community submissions call for greater protection within Marine National Park Zones for coral reefs, seamounts and the Queensland and Townsville Troughs and for greater protection for those coral reefs and pelagic ecosystems that remain outside Marine National Park Zones.

2E. ADVICE ON OPTIONS FOR ZONING BOUNDARIES TO ADDRESS THIS AREA OF CONTENTION:

Centre for Conservation Geography advice: The current zoning of the Coral Sea Marine Reserve represents a compromise between competing interests that leaves a high number of key features poorly protected. If the review is looking for ways to improve the protection of these features without altering the basic structure of the compromise between the various stakeholders, then the Centre for Conservation Geography suggests exploring the following options:

1. **Coral Reefs:** See section 1D. Unique and Unprotected Coral Reefs above.
2. **Townsville Trough:** The Townsville and Queensland Troughs are Australia's largest trough system attracting aggregations of mesopelagic fish and the apex predators that prey on them. The Queensland Trough contains the only known black marlin spawning aggregation in the world.⁹⁷ Maintaining recreational fishing access to key parts of the Queensland trough is a key element of the Coral Sea Marine Reserve's compromise between stakeholders. However Marine National Park Zones could be extended over the Townsville Trough with almost no additional impact on recreational or commercial fishers (Figure 4).
3. **Increased protection for pelagic ecosystems and seamounts:** Scientists are particularly concerned about the impact of longlining on the tropical pelagic ecosystems which are one of the key conservation values of the Coral Sea Marine Reserve.⁷⁷ While scientists would prefer to see the complete removal of longlining from the Coral Sea Marine Reserve there was agreement from the majority of longliners for the removal of longlining down to 22°S provided that appropriate structural adjustment is provided.⁹ In relationship to the zoning this would involve an extension of the Habitat Protection Zone (Coral Sea) south to 22°S (Figure 4).
4. **Greater connectivity with the Great Barrier Reef Marine Park** There are numerous Marine National Park Zones within the Great Barrier Reef Marine Park that end at the border with the Coral Sea Marine Reserve. Extending these Marine National Park Zones into the Coral Sea Marine Reserve in those locations where there would be minimal additional impact on recreational and commercial fishers could greatly increase the protection of the ecological systems of the western Coral Sea with little to no impact on other stakeholders (Figure 4).

⁷⁷ Australian Research Council Centre of Excellence: Coral Reef Studies, 2012. *Coral Sea Marine Reserve Proposal*, Submission to the Draft Commonwealth Marine Reserve Proposal for the Coral Sea.

⁷⁸ Australian Museum, 2012. Submission to the Draft Commonwealth Marine Reserve Proposal for the Coral Sea.

Science Community Concerns: CCG suggested changes

Potential changes to address the concerns of scientists without adversely impacting on other stakeholders include:

- 1) Extending Marine National Park zones over a greater area of the Townsville Trough,
- 2) Removing long line fishing down to 22 degrees South,
- 3) Extending some of the Great Barrier Reef Marine Park Marine National Park zones in the Coral Sea Marine Reserve.

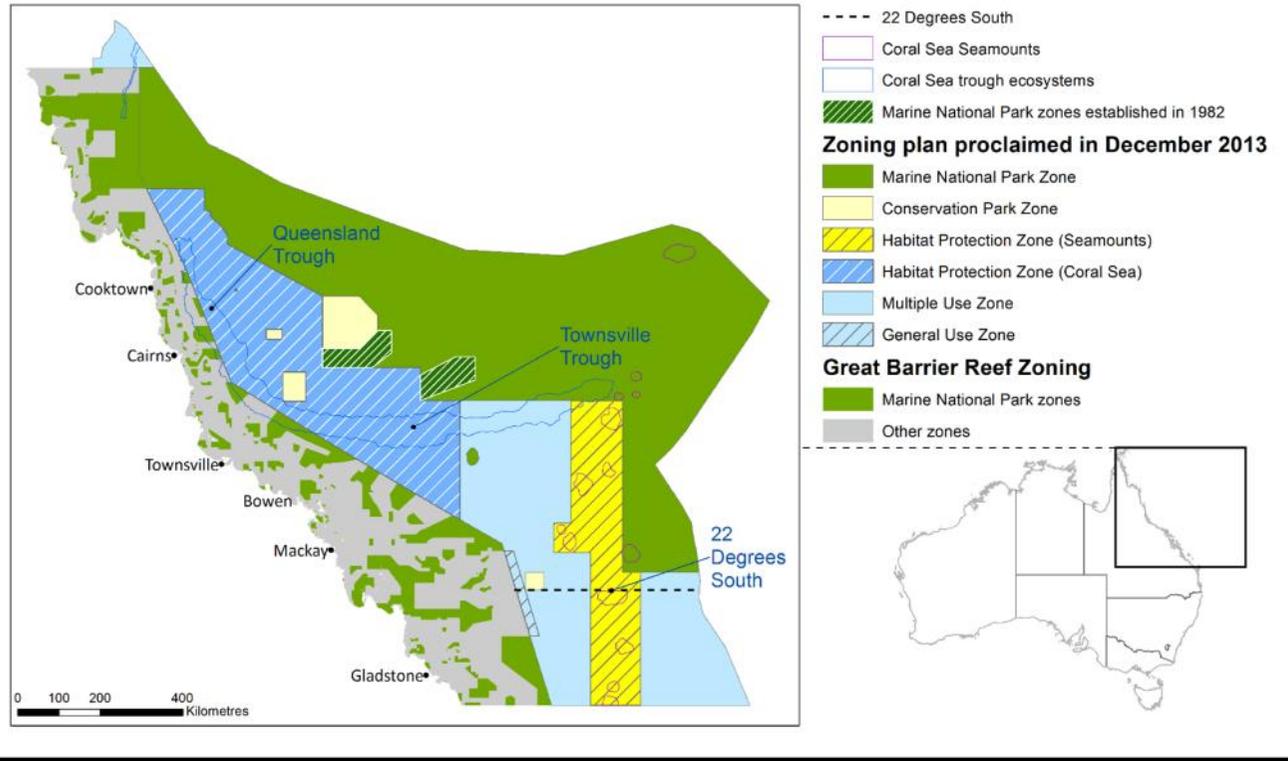


FIGURE 4: POTENTIAL CHANGES TO THE ZONING OF THE CORAL SEA MARINE RESERVE TO ADDRESS SCIENCE COMMUNITY CONCERNS OVER POOR PROTECTION FOR SOME OF THE KEY CONSERVATION FEATURES OF THE CORAL SEA.

1F. DESTRUCTIVE FISHING PRACTICES

The Government's risk assessment report categorizes eight fishing practices, demersal, mid-water, and beam trawling, pelagic and demersal longlining and gillnetting, purse seining and fish traps as being incompatible with Coral Sea Marine Reserve.⁷⁹ The zoning plan for the Coral Sea Marine Reserve successfully protects the entirety of the Coral Sea from mid-water trawling, beam trawling, gillnetting and demersal longlining, but a political decision to allow the four other fishing gear types into extensive areas of the marine reserves means that many areas remain at risk from destructive fishing practices. The zoning plan for the Coral Sea Marine Reserve could be substantially improved by the total removal of pelagic longlining, demersal trawling and fish trapping from the marine reserve as has been achieved with other destructive fishing practices and is recommended by the Government's risk assessment process.⁷⁹

This would significantly improve the protection of marine life and the social and recreational fishing outcomes of the Coral Sea Marine Reserve Network but have minimal impact on the three commercial fisheries that use these gear types. For example, the only fishery in the Coral Sea Marine Reserve to be allowed to continue to trawl in the Coral Sea is the Queensland Otter Trawl Fishery. However less than 1% of the fisheries catch occurs within the Coral Sea. Allowing this fishery to continue to operate in the Coral Sea undermines the integrity of the zoning plan for no major economic benefit. Equally removing fish traps from the Coral Sea Marine Reserve would increase commercial fishing displacement by less than \$0.2 million.⁴⁸

The fishery most advantaged by a decision to continue to allow destructive fishing practices within the Coral Sea Marine Reserve is the Eastern Tuna and Billfish Fishery (ETBF) which undertakes pelagic longlining. However the key Coral Sea operators within the ETBF requested in their submission for management arrangements to be simplified to only allow pelagic longlining below 22 degrees south, substantially increasing the area of the Coral Sea protected from longlining, provided that adequate structural adjustment funding was provided.⁹

2F. ADVICE ON OPTIONS FOR ZONING BOUNDARIES TO ADDRESS THIS AREA OF CONTENTION:

Centre for Conservation Geography advice: The zoning plan for the Coral Sea Marine Reserve Network could be substantially improved by removing pelagic longlining, demersal trawling and fish trapping from the marine reserve as recommended by the Government's fishing gear risk assessment.⁷⁹

⁷⁹ Morison, A.K., and McLoughlin, K., 2010. *Assessment of risks that commercial fishing methods may pose to conservation values identified in the Areas for Further Assessment of the East Marine Region*, Report to Department of the Environment, Water, Heritage and the Arts, Canberra, ACT, Australia.

3. IMPROVING SOCIAL AND ECONOMIC CONSIDERATIONS.

The most valuable contributions to the incorporation of social and economic considerations into decision making for marine reserves have been those reports which spatially quantify the social and or economic considerations. For example the *NSW Game Fishing Database*⁸⁰, or *The National Recreational and Indigenous Fishing Survey*⁸¹ for recreational fishing activities, or the *Atlas of Australian Marine Fishing and Coastal Communities*⁸² and ABARES reports^{49,49} for commercial fishing, *Tourism Potential of the Proposed Coral Sea Commonwealth Marine Reserve* by Prideaux (2012)⁸³ for the tourism industry or the *Economic analysis of a Coral Sea Marine Park* by KPMG¹⁴ for overall economic analysis. These reports, by providing publicly available evidence on the social and economic considerations, create the opportunity for stakeholders and decision makers to engage in an evidence-based dialogue using a common language. In the absence of this publicly available data it becomes too easy for vested interests and individuals to destabilise the decision making process with baseless assertions.

Throughout the planning process, the Federal Government has explicitly aimed to minimise any potential negative social or economic impacts on fishing communities and recreational fishers. Unfortunately there has generally been a failure on the part of Government to attempt to measure the potential positive impacts of marine reserves on fishing communities and recreational fishers. The assumptions around and focus on potential negative impacts has offered little scope for investigating in a comprehensive way whether fishers think that marine reserves are positive or negative in the first place, or assess the actual impacts marine reserves are having on fishers.

For example, at the present time there is very little published evidence of negative impacts of marine reserves on recreational fishers. Indeed claims that marine reserves have a negative economic impact on the recreational fishing industry have yet to be backed up with credible evidence. This is in spite of marine reserves having existed in Australia for well over 40 years.

Research investigating the effects of marine national park zones on recreational fishing in Australia up to the present time has in fact displayed either positive effects or trends, such as increased participation in fishing within marine reserves and overall support for well established marine reserves. Even in cases where recreational fishing lobby groups have been the most opposed to proposed marine reserve management, research has largely displayed an absence of any significant or sustained negative impacts.

⁸⁰ See <http://www.dpi.nsw.gov.au/fisheries/recreational/saltwater/gamefish-tagging> for more information.

⁸¹ Henry, G.W., and Lyle, J.M., 2003. *The National Recreational and Indigenous Fishing Survey*, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, ACT, Australia.

⁸² Larcombe J., Charalambou, C., Herreria, E., Casey, A.M. and Hobsbawn, P., 2006. *Marine Matters National: Atlas of Australian Marine Fishing and Coastal Communities*, Department of Agriculture, Fisheries and Forestry, Canberra, ACT, Australia.

⁸³ Prideaux, B., 2012. *Tourism Potential of the Proposed Coral Sea Commonwealth Marine Reserve*, Report to the Coral Sea Campaign by Professor Bruce Prideaux, Cairns, Queensland, Australia.

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In Ningaloo Marine Park, for example, overall visitor numbers have skyrocketed since the implementation of the marine park in 2004, with recreational fishers reporting 98% satisfaction with their experience, and no evidence has yet been gathered of fishers choosing to travel to other parts of Australia to fish as a result of the implementation of the park.⁶⁹ Researchers in fact found considerable evidence of both return and new visitors engaging in recreational fishing within the marine park.⁶⁷ In Moreton Bay Marine Park, both independent research and studies commissioned by recreational fishing peak bodies found that marine park zonings had virtually no impact on fishing effort, did not spatially displace this effort over a 20 year period, and did not lead to any decline in participation. An empirical study of real impacts and displacement of recreational fishing found that the recreational fishing industry expanded by \$1.3-2.1m per year since the rezoning of the Moreton Bay Marine Park in 2009, and that while 'perceived' displacement was significant, actual displacement was minimal.^{84, 85, 86}

Even if these trends are not attributed directly to the presence of the marine park, they demonstrate at the very least that marine parks do not have the devastating impact on local economies as has been claimed. Such predictions include a study claiming that an annual negative economic impact of \$6-48m would arise from the rezoning of the Moreton Bay Marine Park. The obvious gulf between such predictions and the actual impacts demonstrates that the methodologies used to assess marine park impacts on recreational fishing have been seriously flawed, and that approaches which do not account for the latent strong support for, and perceived benefits of protection among recreational fishers, are not credible.

Research on attitudes toward marine parks among fishers across the country also demonstrate high levels of genuine support for marine reserves among recreational fishers.^{68, 69, 86, 62, 67, 63, 87, 64,}⁸⁸ Of particular interest is recent research documenting at length the concerns of a focused sample of local recreational fishers in two controversial marine reserves in NSW, considered by researchers to be those community members most likely to oppose marine reserves.⁸⁸ Results from interviews noted that for 75% of respondents there had been no decrease in fishing effort since implementation of marine park zoning, and that approximately 5-6 years after zoning restrictions being in place, 63% of respondents were either supportive of the marine reserve, or acknowledged it had not greatly affected their fishing.⁸⁸ Again, it should be stressed these figures are for a sample expressly recruited for their likelihood to oppose marine reserves.

Similarly research from the Great Barrier Reef found that 5 years after the implementation of the 2004 management plan, a majority of fishers were supportive of the zoning restrictions put in place.⁶⁸ Rather than being dissuaded from fishing, recreational fishers were able to creatively

⁸⁴ Pascoe, Sean, et al. "Economic value of recreational fishing in Moreton Bay and the potential impact of the marine park rezoning." *Tourism Management* 41 (2014): 53-63

⁸⁵ Infofish (2014) 'Moreton Bay Marine Park and Tagging' Report prepared for Australian National Sportfishing Association <http://suntag.org.au/wp-content/uploads/2014/06/Moreton-Bay-Marine-Park-and-tagging.pdf>

⁸⁶ DERM (2012) *Moreton Bay Marine Park monitoring program February 2012*, DERM, State of Queensland

⁸⁷ Prior, S.P and Beckley, L.E. (2007), *Characteristics of recreational anglers in the Blackwood Estuary, a popular tourist destination in southwestern Australia*, *Tourism in Marine Environments*, Vol. 4, Number 1, pp. 15-28

⁸⁸ Voyer, Michelle, William Gladstone, and Heather Goodall. "Understanding marine park opposition: the relationship between social impacts, environmental knowledge and motivation to fish." *Aquatic Conservation: Marine and Freshwater Ecosystems* 24.4 (2014): 441-462

adapt where and how they fished. In fact, effort was mostly redistributed into inshore areas, not into more dangerous open ocean waters further offshore as was feared.⁸⁹

These local trends are also reflected in industry-wide surveys. A 2011 survey commissioned by the Fisheries Research and Development Corporation, for example, found that when fishers were asked to cite examples of advancement in the management Australian fisheries, the establishment of marine reserves was the second most common answer, and a reason for optimism regarding the future of recreational fishing. In contrast, only a subset of the 14% of fishers who felt pessimistic about future fishing opportunities, felt that spatial restrictions on fishing were a significant threat to the future of recreational fishing.⁶⁶

These various studies taken together strongly suggest that marine reserves do not have the negative impacts commonly feared, and moreover that the views of vocal anti-marine reserve lobby groups do not adequately represent the views of the wider recreational fishing community.

Related to this is that the absence of hard evidence of sustained negative economic impacts on the recreational fishing industry, or of declines in recreational fishing participation and effort in marine reserves over the medium to long term, also raises the prospect that anecdotal reports of economic downturns upon zoning implementation may not be a function of zoning restrictions themselves. By their very nature, zoning restrictions take time to have an observable effect, either environmentally or in terms of their impact on human use. In the latter case, people test out the new arrangements and adjust their behaviour according to whether the restrictions do in fact substantially improve or degrade their experience. Fluctuations in use and expenditure on visitation in the first year or two of a marine park's life are better explained as the result of the expectations of how marine parks will effect visitor experiences. In the case of immediate visitation or fishing participation downturns where they have occurred, it is highly likely they are due as much to negative perceptions of marine reserves generated by vocal anti-marine reserve lobby groups as to any other factor. It is also clear from the longer term trends that recreational fishers do not continue to pay attention to these views once their own experiences demonstrate that marine reserves do not adversely affect their ability to go fishing.

Consideration of any potential impacts should therefore be weighed against actual evidence from studies investigating these impacts in existing marine reserves, and evidence of the views of the wider recreational fishing community should be taken into account, rather than focusing on the views of particularly vocal minority groups. Any decision making process on existing marine reserves should also be based on comprehensive monitoring of the ecological, social and economic aspects, and any decisions to wind back protections in the absence of credible, widely accepted evidence demonstrating the need for such measures would be an extremely negative development.

This emphasises the need for the development of a research program that assesses and analyses the actual social and economic impacts of the reserves and compares them to the claimed, or estimated impacts prior to the establishment of the marine reserves. Such research will be critical to assisting future decision making processes around marine reserves.

⁸⁹ De Freitas, Débora M., et al. "Spatial substitution strategies of recreational fishers in response to zoning changes in the Great Barrier Reef Marine Park." *Marine Policy* 40 (2013): 145-153.

CONCLUSIONS

With regard to the deliberations of the Government's marine reserves review the Centre for Conservation Geography draws the following four conclusions:

1. The review should consider the extensive evidence that Australian recreational fishers support, and perceive benefits from, the Marine National Park Zones already established around the Australian coastline in areas of well-documented importance for recreational fishing. In considering arguments that recreational fishers oppose or are negatively impacted by marine parks and sanctuaries, the review should seek supporting empirical evidence of a quantity and quality of that presented here in order for those arguments to be considered credible within the scientific underpinnings of the review.
2. The review's consultation with the recreational fishing community is unlikely to be adequate or credible if it cannot demonstrate that it has effectively consulted and considered the views of the grass roots community beyond peak bodies, clubs and lobby groups. It is clear from recent studies that the views and attitudes of these groups are divergent from the broader recreational fishing community and tend to represent the attitudes of a particular minority. For example the Save Our Marine Life Alliance who commissioned this report includes tens of thousands of Australian recreational fishers among their active supporters.
3. The review should question the credibility of modelling or impact prediction studies that consider only negative impacts, or do not fully incorporate the evidence of perceived positive benefits, to recreational fishing caused by Marine National Park Zones. Recent experience from other planning processes has demonstrated that these approaches produce spurious results and they are directly contradicted by the empirical, peer-reviewed science on the impacts of Australia's marine reserves; even where Marine National Park Zones have been established in far closer proximity to areas of major importance to recreational fishers than those being reviewed by the Government's marine reserves review.

Centre for Conservation Geography Recommendations: That the Government establish a research program that monitors and assesses the social and economic impacts of the Commonwealth Marine Reserves and increases its investment in the publishing and periodic updating of spatial datasets on the existing patterns of use in the marine environment to improve the incorporation of social and economic considerations into decision making in future marine planning and management.

4. ONGOING ENGAGEMENT WITH REGIONAL STAKEHOLDERS

A key aspect of ongoing engagement with regional stakeholders should be the development of accessible and credible community science programmes. Community science enables regional communities to be involved and invested in the collection of robust data for use in the ongoing monitoring and management processes of the marine reserve. In addition to providing data critical for management, it provides communities with an opportunity to better understand, and contribute towards, the functioning of the marine reserve. Members of the recreational fishing and diving communities are already involved in data collection in the Coral Sea Marine Reserves for example in dive based surveys for Edgar et al. (2014)⁷² and for the NSW Game Fishing Tagging Database⁹⁰. The Reef Life Survey program has now surveyed over 150 sites in the Coral Sea providing new information on the conservation values of the Coral Sea.⁹⁰ These opportunities for involvement should be expanded as part of the ongoing engagement with regional stakeholders in the management of the Coral Sea Marine Reserve.

Centre for Conservation Geography Recommendation: That the Government provide support to existing community science programs in the Coral Sea and consider the establishment of additional community science programs to increase the capacity of regional stakeholders to have ongoing engagement with the management of the Coral Sea Marine Reserve.

⁹⁰ See <<http://www.nerpmarine.edu.au/news/global-scuba-survey-reveals-new-ocean-diversity-%E2%80%98hotspots%E2%80%99>>

5. ZONING OPTIONS

Over more than two decades Australian and international scientists have compiled a huge body of evidence on the value and science of Marine National Park Zones (e.g. Edgar et al. 2014⁷²; Lubchenco et al. 2003⁹¹; Ballantine 1991⁹²). Currently Marine National Park Zones are the only zones within the Coral Sea Marine Reserve for which definitive scientific evidence exists for their effectiveness in protecting marine life. Studies into partially protected zones have shown that they don't deliver effective protection for marine life^{34, 35, 36, 37, 38, 39, 40} but can be useful for achieving other social, economic, or scientific objectives. Monitoring effort will need to be focussed on the status of marine life in partially protected zones to ensure adaptive management.

In 2009 the Australian marine conservation science and planning community developed a consensus statement to provide scientific guidance to the development of Australia's National Representative System of Marine Protected Areas.¹³ These guidelines establish the Australian scientific benchmarks for the protection of conservation features within Marine National Park Zones at between 30% and 100%.

In general, the zoning plan for the Coral Sea Marine Reserve contains too many zones, unnecessarily increasing management and enforcement costs in what is a particularly remote part of Australia.⁹³ Three of these zones are unnecessary to achieving the policy objective of "maximising marine biodiversity protection while also minimising the social and economic impact."¹¹ The Centre for Conservation Geography considers that all of the areas within the Habitat Protection (Seamounts), Habitat Protection (Coral Sea) and General Use Zones could be reallocated to one of the other three zones without changing the fundamental nature of the zoning scheme that has been supported by commercial and recreational fishers. This would significantly simplify the management arrangements reducing the costs associated with effectively managing the reserve. It would also provide an opportunity to address the fact that three of the current zones, covering 47% of the reserve, allow fishing techniques which the Government's risk assessment process categorized as being incompatible with the Coral Sea Marine Reserve.⁷⁹

MARINE NATIONAL PARK ZONES

The boundaries of the Marine National Park Zones of the Coral Sea Marine Reserve are designed primarily to fulfil the following policy objectives:

1. Maximise the protection of biodiversity (see section 1A. Marine National Park Zones).
2. Maximise potential social and economic benefits to the Australian community, by securing valuable non-market benefits and providing secure key economic infrastructure for one of the major industries active in the Coral Sea (Dive Tourism).
3. Minimise potential negative social and economic impacts particularly on recreational and commercial fishers.

⁹¹ Lubchenco J, Palumbi SR, Gaines SD, Andelman S (2003) Plugging a hole in the ocean: the emerging science of marine reserves, *Ecological Applications*, 13(1), S3-S7

⁹² Ballantine WJ (1991) *Marine Reserves for New Zealand*, University of Auckland, Auckland, New Zealand.

⁹³ Ban, N.C., Adams, V., and Pressey, R.L. 2009. *Marine protected area management costs: an analysis of options for the Coral Sea*, Australian Research Council Centre of Excellence for Coral Reef Studies, James Cook University.

Minor changes are needed to the Marine National Park Zones to bring them into line with the recommendations of recent scientific research (see section 1C. Protection of Coral Reefs above). Small changes to Marine National Park Zones could also help resolve some of the science community and dive tourism industry concern over the poor level of protection for some key features in the west and south of the Coral Sea Marine Reserve (see sections 1D. Unique and Unprotected Coral Reefs and 1E. Science Community Concerns above).

Centre for Conservation Geography advice:

1. Maintain the existing Marine National Park Zones that play the critical role in achieving the Coalition's policy objective of maximising marine biodiversity protection while minimising negative social and economic impacts.¹¹
2. Make small changes to improve the protection of coral reefs already targeted for protection as outlined in section 1C. Protection of Coral Reefs.
3. Consider expanding Marine National Park Zones to address science community concerns and improve the economic infrastructure available to the dive tourism industry as outlined in sections 1D. Unique and Unprotected Coral Reefs and section 1E. Science Community Concerns.

CONSERVATION PARK ZONES

The Coral Sea Marine Reserve currently contains three Conservation Park zones at Willis Islets, Holmes Reefs and Flinders Reefs. The boundaries of the Conservation Park zones appear designed to fulfil two objectives. Firstly they provide some increased protection for locations that clearly qualify on economic or ecological grounds for Marine National Park Zone protection but to which Government desires to maintain access to particular extractive users. Secondly they provide enhanced recreational fishing opportunities to fishers targeting remote coral reefs by excluding all commercial fishing other than operators using hand collection and hand line techniques.

For example the Willis Islets Conservation Park zone contains 99% of the Coral Sea's biologically important breeding habitats for red-footed boobies and 79% of the biologically important breeding habitats for wedge-tailed shearwaters. However the Government's desire to maintain access to the area for the Coral Sea aquarium fishery has led to it becoming a Conservation Park zone rather than a Marine National Park Zone.⁹⁴

Equally the Holmes Reefs and Flinders Reefs Conservation Park Zones contain coral reefs that constitute key regional economic infrastructure for the dive tourism industry. However it appears that the Government's desire to keep these reefs open to recreational fishing has led to them becoming Conservation Park zones rather than Marine National Park Zones.

The Conservation Park Zones are the only zone other than the Marine National Park Zones to not allow the types of fishing practices assessed by the Government's risk assessment process as being incompatible with the Coral Sea Marine Reserve. As such they should be used in preference to any other zones in locations where it has been determined that the potential negative social or economic costs of a Marine National Park Zone are too high. As outlined in section 1F. Destructive Fishing Practices there is significant scope for further removal of destructive fishing practices while still minimizing potential social and economic impacts on commercial fishers. Taking up these opportunities would significantly improve the zoning plan

⁹⁴ Commonwealth of Australia, 2011. *Detailed analysis of the Proposed Coral Sea Commonwealth Marine Reserve*, Department of Sustainability, Environment, Water, Population and Communities, Canberra, ACT, Australia.

for the Coral Sea Marine Reserve. It would increase the integrity and credibility of the zoning plan by not unnecessarily allowing destructive fishing practices to continue in high conservation value areas. It would significantly increase the potential positive social, economic and conservation outcomes of the zoning plan, by increasing the benefits to recreational fishers⁷ and by reducing the risk of management failure and the associated monitoring requirements in what is a very remote part of Australia.^{6, 31}

Centre for Conservation Geography advice:

1. North of 22°S: All non Marine National Park Zones be changed to Conservation Park Zones.
2. South of 22°S: The Habitat Protection Zone (Seamounts) be changed to Conservation Park Zone.

HABITAT PROTECTION ZONE (SEAMOUNTS)

The Coral Sea Marine Reserve contains one Habitat Protection Zone (Seamounts) that extends over the nine seamounts in the Coral Sea that lie outside of the Marine National Park Zones. Many of these seamounts contain unique conservation values that warrant protection within Marine National Park Zones. For example Wreck Reefs is home to one of only two coral reefs in the Kenn Transition bioregion while Frederick Reef and Calder Bank are the only seamounts within the Northeast Province. This zone draws attention to the extremely high conservation values of these nine seamounts while maintaining access for the Eastern Tuna and Billfish Fishery and the Eastern Skipjack Tuna Fishery.⁹⁵ These seamounts are key habitats and aggregation sites within the global biodiversity hotspot for oceanic predators of the southern Coral Sea.⁵ Pelagic longlining and purse seining both continue to be allowed within the Habitat Protection Zone (Seamounts) despite being assessed as being incompatible with these conservation values.^{95, 79} This is a matter of major concern.⁷⁷ Allowing these fishing practices to continue over these high conservation value seamounts against the advice of the Government's risk assessment process seriously undermines the integrity of the zoning plan for the Coral Sea Marine Reserve.

The two fisheries that benefit from this decision are the Eastern Skipjack Tuna Fishery (purse seining) and the Eastern Tuna and Billfish Fishery (pelagic longlining). The Eastern Skipjack Tuna Fishery has not operated in the last five years.⁹⁶ Why is the Government choosing to potentially endanger the conservation values of the Coral Sea's seamounts by allowing future purse seining by a fishery that is not currently operating? Removing purse seining by converting the Habitat Protection Zone (Seamounts) to a Conservation Park Zone would have no significant negative impact on the Eastern Skipjack Tuna Fishery.

The Eastern Tuna and Billfish Fishery is a fishery in decline with the number of active vessels declining over the last decade from around 150 in 2002 to 41 in 2013.⁹⁶ This is an average annual rate of decline of around 9 vessels per year due to the frequently negative economic returns of the fishery.⁹⁶ An economically sustainable fishery in the future is reliant on fewer operators catching high value species closer to port.⁹⁶ In this context closing the remote Coral Sea seamounts to pelagic longlining and providing structural adjustment funding to affected

⁹⁵ Director of National Parks 2013, *Coral Sea Commonwealth Marine Reserve Management Plan 2014–24*, Director of National Parks, Canberra.

⁹⁶ Georgeson, L, Stobutzki, I & Curtotti, R (eds) 2014, *Fishery status reports 2013–14*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra.

commercial fishers is more likely to have a positive, than a negative economic impact on the fishery.

Centre for Conservation Geography advice:

1. Change the Habitat Protection Zone (Seamounts) Zone to a Conservation Park Zone.

HABITAT PROTECTION ZONE (CORAL SEA)

The Coral Sea Marine Reserve contains one Habitat Protection Zone (Coral Sea) that extends east from Marion Reef to the Queensland Trough. This zone contains some extraordinary conservation features like the world's only known black marlin spawning ground⁹⁷, the only biologically important aggregation site for whale sharks in eastern Australia¹⁷ and most of the spectacular coral reefs of the inner Queensland Plateau⁹⁴. This zone protects these features from longlining, gillnetting and trawling but continues to allow fish traps to operate against the advice of the Government's risk assessment process which assessed this fishing method as having an unacceptable risk (pending further assessment) to the demersal fish species of the Coral Sea.⁷⁹ Over the past five years the only year in which there has been any trap fishing in the Coral Sea was the 2010/2011 fishing season. Completely removing fish traps from the Coral Sea Marine Reserve would increase commercial fishing displacement by less than \$0.2 million.⁴⁸ Why is the Government choosing to potentially endanger the conservation values of this part of the Coral Sea by allowing future fish traps to be used by a low value fishery that is largely not currently operating? Allowing this fishing practice to continue over these high conservation value features against the advice of the Government's risk assessment process seriously undermines the integrity of the zoning plan for the Coral Sea Marine Reserve.

Centre for Conservation Geography advice:

1. Change the Habitat Protection Zone (Coral Sea) Zone to a Conservation Park Zone.

MULTIPLE USE ZONES

The Coral Sea Marine Reserve contains three multiple use zones. One in the very north that extends over Ashmore and Boot Reefs and two in the south one extending from the Townsville Trough southwards over the Marion Plateau and one to the east of the Habitat Protection Zone (seamounts) and south of the large Marine National Park Zone. The main purpose of these zones is to maintain access for the Eastern Tuna and Billfish Fishery. These zones are unnecessary north of 22 degrees south where the majority of Eastern Tuna and Billfish operators were prepared to receive structural adjustment funding in return for increased protection.⁹

Centre for Conservation Geography advice:

1. North of 22°S: Change Multiple Use Zones to Conservation Park Zones.
2. South of 22°S: Retain Multiple Use Zones

GENERAL USE ZONES

The Coral Sea Marine Reserve contains a single General Use Zone on the Marion Plateau to the east of Saumarez Reef along the boundary between Coral Sea Marine Reserve and the Great Barrier Reef Marine Park. The purpose of this zone is to maintain access for the Queensland

⁹⁷ Domeier ML, Speare P (2012) Dispersal of Adult Black Marlin (*Istiompax indica*) from a Great Barrier Reef Spawning Aggregation. PLoS ONE 7(2): e31629. doi:10.1371/journal.pone.0031629

Trawl Fishery reducing the displacement of this fishery from 0.5% to 0.1% of its annual catch.^{48,49} This zone unnecessarily undermines the integrity of the zoning plan for the Coral Sea Marine Reserve by allowing trawling within the marine reserve against the advice of the Government's risk assessment process.⁷⁹ Additionally creating an additional zone in order to allow trawling within the Coral Sea Marine Reserve unnecessarily increases management and monitoring costs.⁹³ The impact of the Coral Sea Marine Reserve on the Queensland Trawl Fishery is minimal regardless of whether trawling is allowed to continue in this part of the Coral Sea or not.⁴⁸ Allowing trawling to continue in this area unnecessarily endangers the 13 benthic habitats mapped within this area, none of which have met scientific benchmarks for protection within Marine National Park Zones set by the Australian scientific.¹³

Centre for Conservation Geography advice:

1. North of 22°S: Change General Use Zones to Conservation Park Zones.
2. South of 22°S: Change General Use Zones to Multiple Use Zones.

6. RESEARCH PRIORITIES

Future priorities for scientific research and monitoring on marine biodiversity for the Coral Sea Marine Reserve should focus on the status of those key conservation assets for which protection remains low.^{6,76} The top priorities for increased research and monitoring within the Coral Sea Marine Reserve are:

1. Coral Reefs.
2. Seamounts.
3. Top order pelagic predators.
4. Deep water trough ecosystems.

Research priorities should be on documenting the diversity and abundance of marine life of each of these four conservation assets. Research needs to be targeted towards a capacity to monitor changes in condition of these key conservation assets across every zone within the Coral Sea Marine Reserve to allow for adaptive management if it becomes clear that a zone is not effectively protecting marine life within it.

7. ADDRESSING INFORMATION GAPS

Australia's science community has done an outstanding job of delivering high quality, world leading science to provide a robust, evidence based decision making environment for the development of Australia's National Representative System of Marine Protected Areas (NRSMPA). Going forward the two key areas for future research will be in monitoring the ecological, social and economic impacts of the NRSMPA and continuing to develop Australia wide and regional ecological, social and economic datasets to support the future additions to the NRSMPA.

FOOTNOTES

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2. Hunt, G., and Colbeck, R., 2014. *Review of Commonwealth marine reserves begins*, Joint media release
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