
THE TEMPERATE EAST MARINE
RESERVE NETWORK:

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.



**CENTRE FOR
CONSERVATION
GEOGRAPHY**

Strategic Tools and Conservation Innovation

ABOUT THE AUTHORS

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 Temperate East Marine Reserve Network the Centre for Conservation Geography makes five key findings relating to a review of the zoning plans for the Temperate East Marine Reserves (the Temperate East Reserve Network and it's zoning was passed into law by the Abbott Government in December 2013¹):

1. **Marine National Park Zones:** Are critical to the protection of the Temperate East Marine Region's marine life with the weight of scientific evidence showing that partially protected zones don't deliver the broad ranging and significant benefits for marine life of highly protected zones. The Centre for Conservation Geography recommends expanding the number and size of Marine National Park Zones in the Temperate East Marine Reserve Network.
2. **Social and economic impacts:** The information compiled by the Centre for Conservation Geography shows that the net social and economic value of the Temperate East Marine Reserve Network to the Australian community is upwards of \$1.8 billion. Within this positive impacts on nature based tourism and recreational fishing are expected to outweigh any possible negative impacts on commercial fishing. Community support for the marine reserves is very strong with over 95% of the more than 5,000 submissions to the public consultation process supportive of increased protection for the Temperate East Marine Region. The zoning plan could be improved so as to enhance the positive social and economic impacts by establishing Marine National Park Zones on the shelf and upper slope and by extending the area protected from destructive fishing practices like trawling.
3. **Destructive fishing practices:** The Government's risk assessment process found nine commercial fishing practices to be incompatible with the conservation values of the Temperate East Marine Reserve Network. The zoning plan should be adjusted to ensure that these five fishing practices are fully removed from the Temperate East Marine Reserve Network.
4. **Seabed mining:** The Temperate East Reserve Network leaves 86% of the Temperate East Marine Region open to seabed mining including high conservation locations like around Jervis Bay, Port Stephens and the Solitary Islands. Australian's do not want to see mining across such large swathes of our oceans. The zoning plan for the Temperate East Reserve Network needs to play a more significant role in helping to find a better balance between mining and the other values of the ocean.
5. **Unprotected habitats:** Major concerns exist within the scientific community about the low level of protection for the unique habitats of the shelf and upper slope environments of the Temperate East Marine Region. Marine National Park Zone protection of the shelf in the Temperate East Marine Region stands at 0.01% (continental slope:0%) and the current zoning plan for Temperate East Marine Reserve Network establishes no new Marine National Park Zones. The review should consider addressing this issue.

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 Temperate East Reserve Network (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 Temperate East Reserve Network 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 Temperate East Reserve Network 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.

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>>

7. Options for addressing, the most significant information gaps hindering robust, evidence based decision-making for the management of the marine reserves.

This report aims to provide useful input towards meeting the Government's objective of "maximising marine biodiversity protection while also minimising the social and economic impact."⁴

MAXIMISING MARINE BIODIVERSITY PROTECTION

The Marine Reserve Network for the Temperate East proclaimed by the Coalition Government in December 2013 maximises the protection of marine life by:

1. **Establishing the first protection for the Eastern Seamounts:** The Marine National Park Zone established over the Derwent Hunter Guyot in the Tasmanid Seamount Chain establishes the first ever protection within Marine National Park Zones for these underwater mountains which are a key ecological feature for the marine life of Australia's Temperate East (Figure 1).⁵
2. **Expanding protection for Lord Howe Island and Elizabeth and Middleton Reefs:** Established in 1987 Elizabeth and Middleton Reefs are long standing Commonwealth Marine National Park Zones protecting these unique coral reef systems. Lord Howe Island is a world heritage area contain the world's southernmost coral reef ecosystems and supporting biologically important areas for numerous seabirds.⁶ Both of these areas form part of the Lord Howe Seamount Chain, one of the key ecological features for the marine life of Australia's Temperate East (Figure 1).⁵
3. **Establishing the first protection for the ecosystems of the Norfolk Island Province:** The Marine National Park established in the Norfolk Marine Reserve provides the first ever protection within Marine National Park Zones for the ecosystems of the Norfolk Island Province.⁷ The location chosen includes unique seafloor habitats⁸ and is adjacent to a high conservation seamount system within the New Caledonian Exclusive Economic Zone (Figure 1).

⁴ 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>>

⁵ Commonwealth of Australia, 2012. *Key Ecological Features*. <<http://www.environment.gov.au/webgis-framework/apps/ncva/ncva.jsf>>

⁶ Commonwealth of Australia, 2014. *Biologically important areas of regionally significant marine species*, <<http://www.environment.gov.au/fed/catalog/search/resource/details.page?uuid={2ed86f5a-4598-4ae9-924f-ac821c701003}>>

⁷ Commonwealth of Australia (2006). *A Guide to the Integrated Marine and Coastal Regionalisation of Australia Version 4.0*. Department of the Environment and Heritage, Canberra, Australia.

⁸ Commonwealth of Australia, 2004. *Geomorphic features of the EEZ*. <http://www.environment.gov.au/metadataexplorer/full_metadata.jsp?docId={45B47601-DFDD-4A33-AA58-59E4AF14F369}&loggedIn=false>

4. **Protecting a diversity of marine habitats:** The Temperate East Reserve Network increases the level of Marine National Park Zones within the Commonwealth waters of the Temperate East Marine Region from less than 1% up to 4%. These Marine National Park Zones include 83 of the 383 unique seafloor environments mapped by the Centre for Conservation Geography within the Temperate East Marine Region. For 35 of these unique seafloor environments the Temperate East Reserve Network meets the minimum Australian science community benchmarks for protection.⁹
5. **Protection from destructive fishing practices:** The Temperate East Reserve Network protects 26% of the Temperate East Marine Region from gillnetting and Danish seining. A smaller 4% of the Temperate East Marine Region is protected from the fishing practices determined to be incompatible with marine reserves by the Government's fishing gear risk assessment (Figure 3).¹⁰
6. **Protection from oil, gas and mining:** The Temperate East Reserve Network protects 14% of the Temperate East Marine Region from oil, gas and other mining activities including major parts of the Tasmantid, Lord Howe and Norfolk Island Seamount Chains. (Figure 2).

⁹ 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>

¹⁰ 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.

Temperate East Marine Reserve Network

- Temperate East
- Marine National Park Zone
- Seamounts
- Zoning plan proclaimed in December 2013**
- Habitat Protection Zone
- Multiple Use Zone
- Recreational Use Zone
- Habitat Protection Zone (Lord Howe)
- Special Purpose Zone

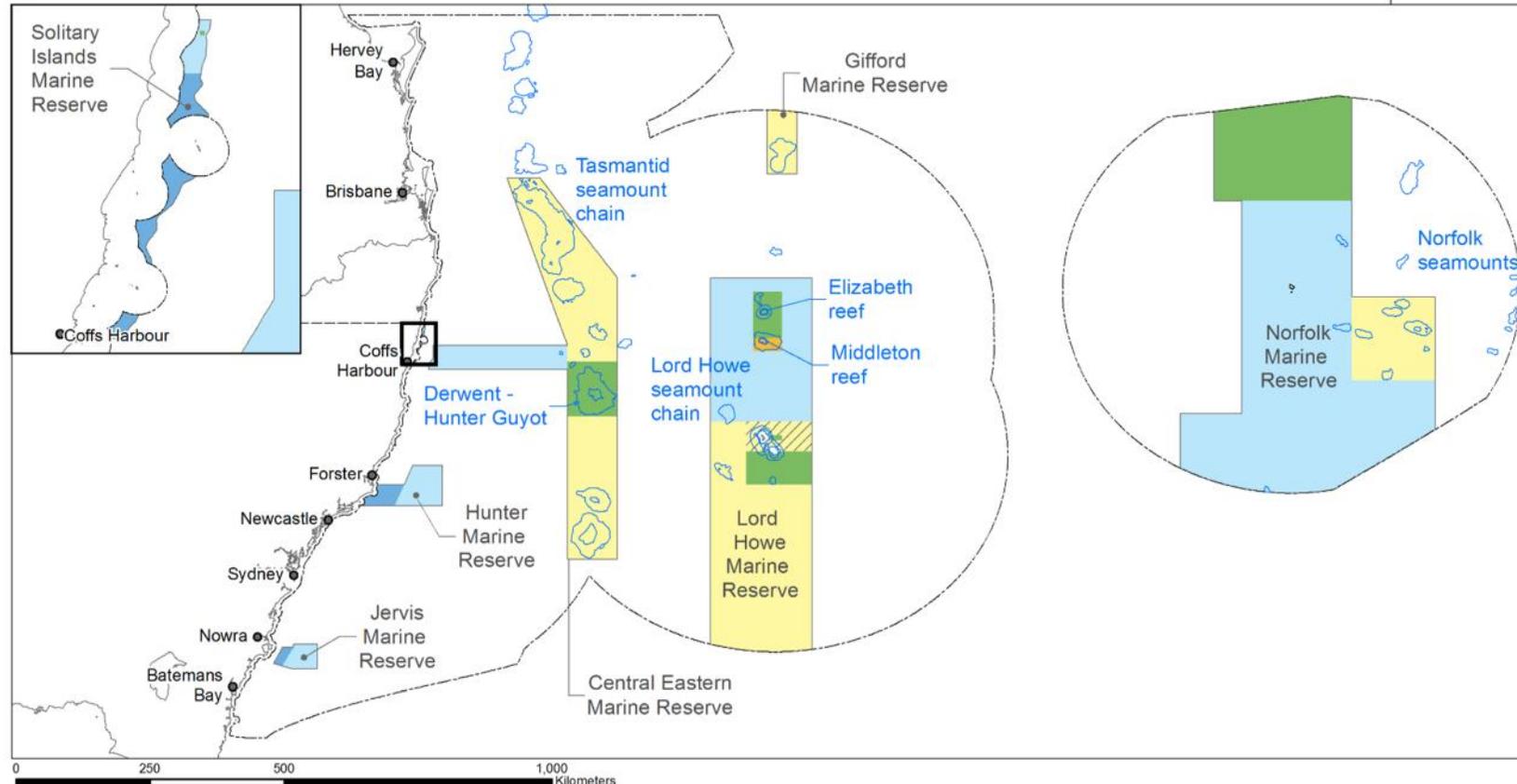
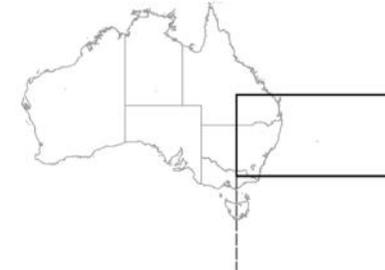


FIGURE 1: THE TEMPERATE EAST RESERVE NETWORK PROCLAIMED BY THE FEDERAL LABOR GOVERNMENT IN 2012 AND BY THE FEDERAL COALITION GOVERNMENT IN 2013.

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 Temperate East Reserve Network to the Australian community is more than \$1.8 billion. Within this positive impacts on nature-based tourism and recreational fishing are expected to outweigh possible negative impacts on commercial fishing. This is made possible by the zoning plan for the Temperate East Reserve Network 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. **Benefits to communities and industries:** The economies and communities of the North stand to reap substantial benefits from the Temperate East Reserve Network. The importance of Marine National Park Zones to the regional economies of NSW and southern Queensland can be seen in the response of local businesses to proposals from the NSW and Queensland Government's to remove Marine National Park Zones.^{15, 16, 17, 18}
 - a. **Healthy marine life:** The population of New South Wales and Queensland are made of numerous small and large coastal communities with strong connections to and a deep love for their marine environment. These communities are overwhelming in support of Marine National Park Zones to protect marine life.⁴⁹ This is reflected in the popularity of the establishment of the new marine reserves. Of the more than 5,000 submissions to the public consultation process for the Temperate East Reserve Network over 95% of submissions called for more not less Marine National Park Zones.¹¹ One of the most common methods for assessing non-market economic and social benefits to communities is to use surveys to assess a community's willingness to pay for some future environmental change.¹² For example, in a recent choice modelling study McCartney (2009)¹³ 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 Temperate East Marine Region are in the order of \$1.3 billion per annum per annum to the local communities of the Temperate East Marine Region.¹⁴

¹¹ Commonwealth of Australia, 2012. *Marine Bioregional Planning in the North-west marine region: Overview of Public Consultation (August-November 2011)*, Department of Sustainability, Environment, Water, Population and Communities, Commonwealth Government, Canberra, Australia.

¹² 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.

¹³ 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.

¹⁴ The Allen Consulting Group, 2009. *The economics of marine protected areas*, The Allen Consulting Group, Melbourne, Victoria.

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- b. **Tourism:** Nature-based tourism is a major industry on the NSW and south Queensland coast. The importance of Marine National Park Zones in sustaining regional economic communities can be seen in the backlash to the NSW and Queensland Government's proposal to wind back Marine National Park Zones along the NSW coast.^{15, 16, 17, 18} Dive tourism in NSW contributes over \$500 million per annum to the NSW economy.¹⁹ The long term future and growth of this industry is reliant on a healthy and abundant marine life protected within a network of Marine National Park Zones. Likewise the NSW whale watching industry contributes over \$80 million per annum to the NSW economy.²⁰ The ability of these nature based industries to market themselves is improved by the presence of world class networks of Marine National Park Zones as whale watchers and divers will almost always choose to travel to an area where marine life is protected over another area where it isn't making the presence of Marine National Park Zones a key factor when competing against alternative destination interstate or internationally. The Temperate East Reserve Network, particularly its Marine National Park Zones are a piece of critical regional economic infrastructure for maintaining and growing the nature-based tourism industry in NSW and southern Queensland. Additionally their role in protecting marine life and providing opportunities to market the health of Australia's oceans globally is critical to attracting visitors not just to the Temperate East Marine Region but to Australia as a global destination for nature-based tourism.²¹
- c. **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

¹⁵ For example business opposition to the removal of Marine National Park Zones in Jervis Bay: <http://www.southcoastregister.com.au/story/2164614/push-for-marine-park-protection/?cs=203>

¹⁶ For example Byron Council's concerns about the economic impacts of the proposed removal of Marine National Park Zones: <http://www.echo.net.au/2014/03/byron-council-lobbies-govt-on-marine-sanctuaries/>

¹⁷ For example opposition from the Manly Chamber of Commerce and the Northern Beaches business community to the proposed removal of Marine National Park Zones: <http://www.dailytelegraph.com.au/newslocal/northern-beaches/manly-chamber-of-commerce-launches-petition-against-fishing-in-sanctuary-zones/story-fngr8hax-1226847052803?nk=3699f6f5c426694e186db876240e3ad9> and <http://www.dailytelegraph.com.au/newslocal/northern-beaches/petition-against-fishing-in-marine-sanctuaries-has-attracted-150-endorsements-from-northern-beaches-business-community/story-fngr8hax-1226861370623>

¹⁸ Dive industry concern over proposals to remove Marine National Park Zones in NSW and Queensland: http://www.diveindustry.com.au/default2.asp?active_page_id=132, http://www.couriermail.com.au/news/queensland/dive-industry-crabby-over-government-plan-to-open-up-green-zones-to-recreational-fishers/story-fnihsrf2-1226875724467?from=public_rss&nk=3699f6f5c426694e186db876240e3ad9,

¹⁹ CCG analysis of the Australian Dive Industry to be published in March 2015.

²⁰ IFAW, 2004. *The growth of the whale watching tourism in Australia*, International Fund for Animal Welfare, Sydney, New South Wales, Australia.

²¹ 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.

from our oceans exceeded \$25 billion per annum.²² Within this the Temperate East Reserve Network is estimated to provide environmental services of greater than \$0.5 billion per annum with the Marine National Park Zones in particular having a value of more than \$0.8 million per annum.

- d. **Fishery benefits:** Marine reserves have potential positive as well as potential negative impacts on recreational and commercial fisheries. Unfortunately the Government's impact assessment process has focussed only on potential negative impacts and the potential positive benefits like more stable catches, or insurance against stock depletion have not been estimated for the Temperate East Reserve Network.
2. **Oil, Gas and Mining:** The Temperate East Reserve Network has no impact on the Oil and Gas industry. This has been achieved by having 0% overlap between marine reserves and oil and gas production, or retention leases and 0% overlap between Marine National Park Zones and any current oil and gas lease of any kind.
3. **Recreational fishing:** The Temperate East Reserve Network has no negative impacts on recreational fishers with Marine National Park Zones established exclusively outside of the areas utilised by recreational fishers. The Centre for Conservation Geography considers that the Temperate East Reserve Network will have a net positive impact on recreational fishing in the Temperate East Marine Region.
4. **Commercial fishing:** The Temperate East Reserve Network is very effective at minimising the displacement of commercial fishing activities. The Temperate East Reserve Network extends over 26% of the Temperate East Marine Region but displaces only 0.3% of the commercial fisheries active in the region.²³ Some commercial fishers are claiming that the marine reserves will have too great of an impact on their businesses.²⁴ However this does not appear to be true with the maximum potential displacement of commercial fishers within the Temperate East Marine Region less than 1% for all commercial fisheries operating in the region.²³

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 pay 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 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

²² Eadie, L., and Hoisington, C., 2011. *Stocking Up: Securing our marine economy*, Centre for Policy Development, Sydney, New South Wales, Australia.

²³ Commonwealth of Australia, 2012. *Completing the Commonwealth marine reserves network: Regulatory impact statement*, Department of Sustainability, Environment, Water, Population and Communities, Canberra, ACT, Australia.

²⁴ National Seafood Industry Alliance, 2014. *East: meet the fishers*, <http://www.seafoodforaustralia.com.au/meet_the_fishers/east_fishers.phtml>

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'.²⁵

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.^{26, 27, 28, 29} 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.^{30, 31, 32, 33}

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

²⁵ Olival et. al. (2013) 'Linking the Historical Roots of Environmental Conservation with Human and Wildlife Health' *Ecohealth* 10: 224-227

²⁶ 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."

²⁷ 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.

²⁸ 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*.

²⁹ 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.

³⁰ 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.

³¹ 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.

³² 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.

³³ 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.³⁴

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,^{35,36,37,38,39} and the maintenance of high usage, and in some cases increases in visitation,^{37,40,41,42,43} 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 then are already 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.

³⁴ See eg Dhimurru (2006) Dhimurru Yolnguwu Monuk Gapu Wänga Sea Country Plan: A Yolngu Vision and Plan for Sea Country Management in North-East Arnhem Land, Northern Territory Dhimurru Land Management Aboriginal Corporation;

³⁵McGregor Tan research (2008), Solitary Islands Marine Park Community Survey Final Report, Prepared for: NSW Marine Parks Authority Project No: 8353

³⁶ McGregor Tan research (2008), Jervis Bay Marine Park Community Survey Final Report, Prepared for: NSW Marine Parks Authority Project No: 8353

³⁷ NSW Marine Parks Authority, 2010, Lord Howe Island Marine Park Summary of Research and Monitoring. NSW Government, Sydney.

³⁸ 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.

³⁹ Sparks, M and Munro M. 2011. Fisheries Research and Development Corporation Recreational Fishing Survey. Intuitive Solutions, Docklands, Victoria.

⁴⁰ 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.

⁴¹ 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.

⁴² 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.

⁴³ 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

1. AREAS OF CONTENTION IN THE TEMPERATE EAST RESERVE NETWORK

1A. MARINE NATIONAL PARK ZONES

Marine National Park Zones are critical to the protection of marine life.^{44,45,9,55,46} All other zones, including recreational fishing zones, or those that include vertical zoning⁴⁷ like benthic protection zones only offer partial protection⁴⁸ 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.

The majority of recreational fishers are supportive of Marine National Park Zones to protect marine life.⁴⁹ 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

⁴⁴ Australian Marine Science Association, 2012. Submission to the Draft Commonwealth Marine Reserve Network Proposal for the Temperate East Marine Region.

⁴⁵ 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.

⁴⁶ 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.

⁴⁷ Under current IUCN guidelines any zone containing vertical zoning is considered to have the level of protection of the least protected zone.⁴⁸

⁴⁸ Dudley, N., 2008. *Guidelines for Applying Protected Area Management Categories*, International Union for the Conservation of Nature (IUCN), Gland, Switzerland.

⁴⁹ Galaxy Research, 2014. *Community Attitude Survey*. Prepared for Dive Industry Association of Australia.

marine life as effectively Marine National Park Zones do.^{50,51,52,53,54,55,56} This is because it is not unusual for recreational fishing catch to exceed commercial fishing catch.⁵⁷ Recreational fishing also has the capacity to cause trophic cascades through the removal of older individuals in a population, or through the removal of top order predators.⁵⁷

Equally, commercial fishers often argue against Marine National Park Zones to avoid changes in where they are and aren't allowed to fish. There is a belief amongst some commercial fishers that when fisheries management is good enough, Marine National Park Zones won't be required.⁵⁸ 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 communities desire for some forests to be in National Parks, the Australian communities desire for⁵⁹ and the long standing community consensus⁶⁰ that some

⁵⁰ 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 Rottnest Island, Western Australia, *Marine and Freshwater Research*, Vol: 58, p. 286-292.

⁵¹ 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.

⁵² 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

⁵³ 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.

⁵⁴ Lester SE, Halpern BS (2008) Biological responses in marine no-take reserves versus partially protected areas. *Mar Ecol Prog Ser* 367: 49–56.

⁵⁵ 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.

⁵⁶ 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

⁵⁷ 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.

⁵⁸ 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>>

⁵⁹ 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.

⁶⁰ In 1998 all Australian Government's 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 Marine Protected Areas*. Australian and New Zealand Environment and Conservation Council, Task Force on Marine Protected Areas. Environment Australia, Canberra.

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.²⁴ This position is hard to support in the Temperate East Marine Region where total displacement is 0.3% of commercial fisheries active in the region and where there is almost no significant displacement of any commercial fishery even those which have been assessed by the Government as providing the greatest risks to the marine life of the Temperate East.^{23,10}

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, to maintain ecosystem services and to realise the economic value of community aspirations for healthy oceans.¹⁴ 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.⁶¹

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 2009.⁹ Science community submissions to the public consultation process for the Temperate East Marine Reserves from the CSIRO and the Australian Marine Science Association (AMSA) each focussed on the need for the Temperate East Marine Reserves to contain more Marine National Park Zones particularly on the shelf and continental slope. One of the foci of the CSIRO submission was for new Marine National Park Zones to cover the 91 Temperate East Marine Region depth habitats which currently have no Marine National Park Zones (Table 2) and for new Marine National Park Zones within the four marine reserves in the Temperate East Marine Region that currently have no Marine National Park Zones (Table 1).

TABLE 1: MARINE RESERVES WITHIN THE NORTH-WEST MARINE RESERVE NETWORK THAT CURRENTLY HAVE NO MARINE NATIONAL PARK ZONES.

Marine reserves with no Marine National Park Zones:
1. Gifford Marine Reserve
2. Hunter Marine Reserve
3. Jervis Marine Reserve
4. East Gippsland Marine Reserve

⁶¹ CSIRO, 2012. Submission to the Draft Commonwealth Marine Reserve Network Proposal for the Temperate East Marine Region.

TABLE 2: REPRESENTATION OF AUSTRALIAN DEPTH HABITATS⁶² WITHIN MARINE NATIONAL PARK ZONES IN THE TEMPERATE EAST MARINE REGION.

Bioregion	% Marine National Park Zones	Number of depth habitats	Number of depth habitats with adequate representation within Marine National Park Zones ^{9,63}	Number of depth habitats with no Marine National Park Zones
Batemans Shelf	0%	8	0	8
Central Eastern Province	0%	12	0	12
Central Eastern Transition	0%	15	0	15
Hawkesbury Shelf	0%	8	0	8
Kenn Transition	0%	9	0	9
Lord Howe Province	2%	18	7	2
Manning Shelf	0.1%	7	0	6
Norfolk Island Province	10%	17	1	7
Southeast Transition	0%	12	0	12
Tasman Basin Province	5%	14	2	4
Tweed-Moreton	0.004%	9	0	8
Total	4%	129	10	91

Equally a major focus of the AMSA submission was the poor protection within Marine National Park Zones of the biodiverse shelf and continental slope habitats. The current zoning of the Temperate East Reserve Network leaves six of the eleven bioregions of the Temperate East Marine Region with no Marine National Park Zones (Table 2). This is in contravention of the national policy established by the Howard Government in 1998 to guide the development of Australia's National Representative System of Marine Protected Areas and agreed to by all Australian Governments.⁶⁴ This is a major flaw in the Temperate East Reserve Network that urgently needs to be addressed. It is these examples of total failure to implement long standing

⁶² Commonwealth of Australia, 2011. *Bathomes within Australian waters*.

<http://www.environment.gov.au/metadataexplorer/full_metadata.jsp?docId={1C0DC470-61A9-446C-83E2-48CC9F8356CF}&loggedIn=false>

⁶³ IUCN World Parks Congress, 2014. *A strategy of innovative approaches and recommendations to enhance implementation of marine conservation in the next decade*. International Union for the Conservation of Nature, Gland, Switzerland.

⁶⁴ 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.

national policy commitments that makes the Commonwealth Marine Reserve Network vulnerable to serious criticism from Australian scientists.^{65, 66, 67, 68}

The Temperate East Marine Region includes globally, nationally and regionally significant locations for marine life. These are some of Australia's most important marine ecosystems and they are deserving of world class protection within Marine National Park Zones. For example, of the eight key ecological features identified for Australian marine life in the Temperate East three have no representation within Marine National Park Zones and only one meets the minimum Australian science community⁹ and World Parks Congress⁶³ standards for adequate protection within Marine National Park Zones. Equally of the 211 biologically important areas for turtles, sharks, seabirds and cetaceans that extend into the Temperate East Marine Region, just 1 meets the minimum Australian science community⁹ and World Parks Congress⁶³ standards for adequate protection within Marine National Park Zones and 50 currently have no representation within Marine National Park Zones.

A scientific study of marine reserves across the world, released in 2014 now shows that to be effective new Marine National Park Zones need to be greater than 100km² in size and include reef systems within their boundaries in addition to a buffer zone of deep water or sand.⁶⁹ **In light of this new information the Marine National Park Zones for the Cod Grounds and Pimpernel Rock in the Solitary Islands Marine Park should be updated or the protection provided to these high conservation value areas may not be effective.**

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

Centre for Conservation Geography advice: The Temperate East Reserve Network could be substantially improved by expanding the number of Marine National Park Zones, particularly on the shelf and continental slope. The Centre for Conservation Geography's top five locations for new Marine National Park Zones are:

1. CONTINENTAL SHELF

The Temperate East Marine Reserve Network contains four marine reserves, Solitary Islands, Cod Grounds, Hunter, and Jervis over the continental shelf. These Marine Reserves currently contain no new Marine National Park Zones leaving the protection of the Temperate East shelf ecosystems at 0.01%. This lack of protection for high conservation value shelf ecosystems urgently needs to be addressed. The two Marine National Park Zones that do exist at the Cod

⁶⁵ Edgar, G. 2006. *Proposed Commonwealth Reserves South East Marine Region*. Australian Marine Sciences Association <http://www.amsa.asn.au/>

⁶⁶ SPRP 2006, Guidance on Achieving Comprehensiveness, Adequacy, and Representativeness in the Commonwealth waters component of the National Representative System of Marine Protected Areas, Scientific Peer Review Panel for the National Representative System of Marine Protected Areas.

⁶⁷ Pressey, B., 2013. *Australia's new marine protected areas: why they won't work*, The Conversation, <<http://theconversation.com/australias-new-marine-protected-areas-why-they-wont-work-11469>>

⁶⁸ Barr, L.M., and Possingham, H.P., 2013. Are outcomes matching policy commitments in Australian marine conservation planning? *Marine Policy*, Vol. 42: 39-48.

⁶⁹ 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.

Grounds and Pimpnel Rock in the Solitary Islands Marine Reserve urgently need to be increased in size to at least 100km² and to be extended over whole reef systems, including a buffer zone of deep water, or sand to be consistent with the findings of recently published scientific research on how to establish effective marine protected areas.^{55, 44} Marine National Park Zones should also be established within the Jervis and Hunter Marine Reserves as recommended by the CSIRO and AMSA.^{44, 61}

2. CONTINENTAL SLOPE

The Temperate East Marine Reserve Network contains four marine reserves, East Gippsland, Jervis, Hunter and Central Eastern, which extend over parts of the Australian continental shelf. Currently the Temperate East Marine Reserve protects 0% of the Australian continental shelf within Marine National Park Zones. This lack of protection can be addressed by establishing new Marine National Park Zones in each of these four marine reserves as recommended by the CSIRO and AMSA.^{44, 61}

3. TASMANTID SEAMOUNT CHAIN

Marine National Park Zones currently extend over three of the fifteen Tasmantid seamounts in the Temperate East Marine Region.^{14, 31} This is well below the minimum level of protection recommended by the Australian scientific community and committed to by the Australian Government at the World Parks Congress.^{9, 63} Additional Marine National Park Zones should focus on the Britannia, Queensland, Barcoo and Taupo Seamounts all of which are already closed to commercial fishing under fisheries legislation to protect Harrison's Dogfish which has almost been extirpated from much of range.^{61, 70}

4. NORFOLK SEAMOUNT CHAIN

Marine National Park Zones currently extend over none of the Norfolk Island Seamounts. The Norfolk Island Seamounts were identified by the Howard Government as one of Australia's eleven most unique habitats for marine life.⁷¹ The seamounts have also been identified as part of one of the ecologically and biologically significant marine areas of the western South Pacific.⁶¹ These seamounts are unique habitats of global ecological significance and deserve world class protection within Marine National Park Zones.

5. LORD HOWE SEAMOUNT CHAIN

Within the Lord Howe Seamount Chain, Marine National Park Zones currently extend over Middleton Reef and parts of Elizabeth Reef, Lord Howe Island and Balls Pyramid. Protection of the Lord Howe Seamount Chain could be increased to world class levels of protection by establishing Marine National Park Zones over Gifford Guyot and the seamounts to the east of Lord Howe Island.

6. OTHER TOP PRIORITY LOCATIONS

Any prioritisation into a 'top five' will miss numerous locations with very high conservation values deserving of Marine National Park Zone protection. For example other high conservation value features that currently have 0% protection within Marine National Park Zones include the Wanganella Banks and the Tasman Front.

⁷⁰ Commonwealth of Australia, 2013. *Southern and Eastern Scalefish and Shark Fishery (Closures) Direction No. 1 2013*, <<http://www.comlaw.gov.au/Details/F2013L00168>>

⁷¹ Williams, A., Althaus, F., and Furlani, D., 2006. *Assessment of the conservation values of the Norfolk Seamounts area*, CSIRO Marine and Atmospheric Research.

1B. OIL, GAS AND SEABED MINING

The zoning plan for the Temperate East Reserve Network currently allows mining for oil, gas and minerals over 86% of the Temperate East Marine Region (Figure 2). Australians do not want mining across such large swathes of our oceans. The Temperate East Reserve Network needs to find a better balance between protecting marine life and facilitating the development of potential new uses of the ocean. The Temperate East Marine Region contains areas of global, national and regional significance for marine life that need to be set aside as 'no go' areas seabed mining. For example Jervis Bay, Port Stephens and Solitary Islands have all been identified by the both the NSW and Commonwealth Government's as exception locations for marine life but the Temperate East Marine Reserve Network leaves these areas open for future mining operations. These are key locations for nature-based tourism, where the economic consequences for local and regional economies in the event of an oil spill like that in the Kimberley in 2009, or from pollution from the mining of minerals would be drastic. The International Council on Mining Metals recognised over a decade ago that establishing such 'no go' zones are an important aspect of the regulatory framework for mining globally.⁷²

The zoning plan for the Temperate East Reserve Network would be substantially improved by prohibiting mining from operating in those parts of the Marine Reserves that are currently outside exploration leases. This would increase the area protected from mining and exploration from 14% to 26% of the Temperate East Marine Region.

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

Centre for Conservation Geography advice: As for the Coral Sea Marine Reserve, the zoning scheme for the Temperate East Reserve Network needs to reflect the fact that each of the marine reserves represents a location identified by the Australian Government as having particularly high conservation values for marine life. The zoning plan should excluded mining and exploration for mining from any locations where mining leases do not already exist.

⁷² International Council on Mining and Metals, 2003. *ICMM newsletter: "No-Go" pledge signals a new era of collaboration with the conservation movement. Vol 2. Issue 4*, International Council on Mining and Metals.

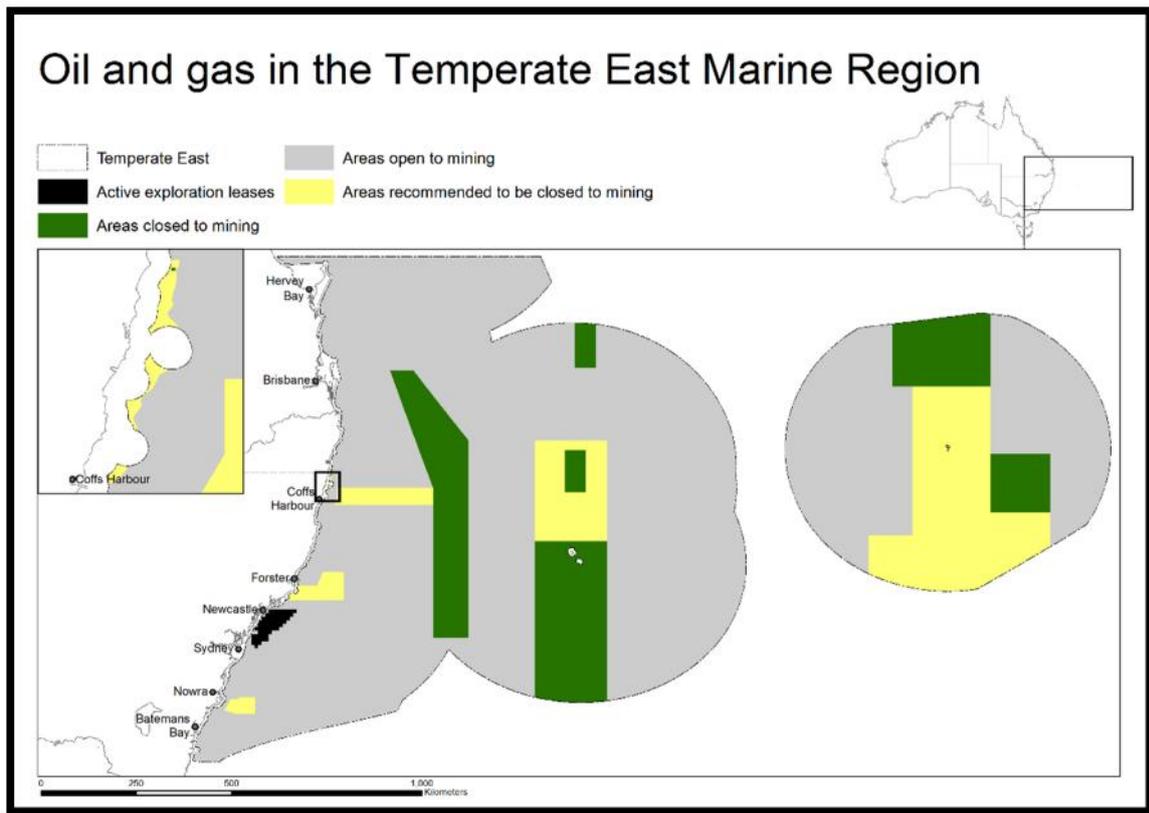


FIGURE 2: OIL AND GAS EXPLORATION AND PRODUCTION IN THE TEMPERATE EAST MARINE REGION.

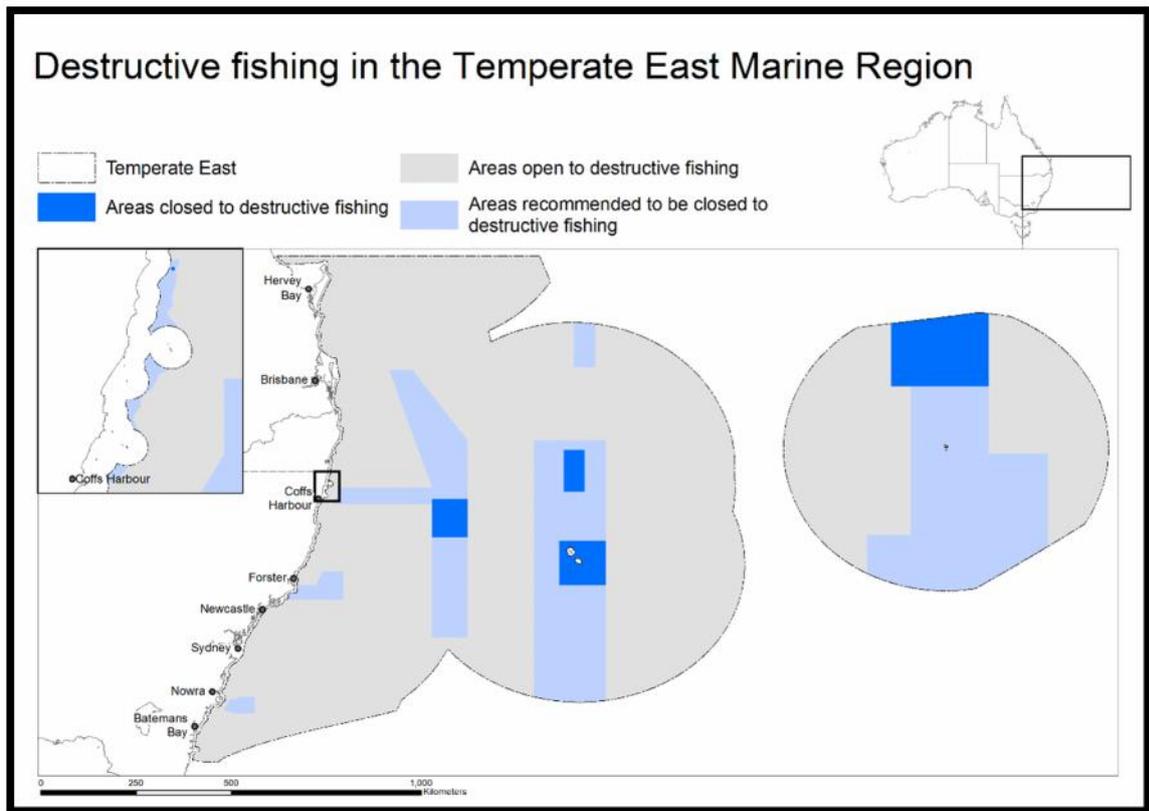


FIGURE 3: AREAS CURRENTLY CLOSED AND RECOMMENDED TO BE CLOSED TO DESTRUCTIVE FISHING PRACTICES IN THE TEMPERATE EAST MARINE REGION.

1C. DESTRUCTIVE FISHING PRACTICES

The Government's risk assessment report categorizes nine fishing practices, demersal trawling, Danish seining, mid-water trawling, beam trawling, pelagic longlining, demersal longlining, mesh nets (gillnets), purse seining, and fish trapping as being incompatible with the Temperate East Reserve Network.¹⁰ The Temperate East Reserve Network successfully protects 4% of the Temperate East from these fishing practices. A political decision to only consistently exclude one of these nine destructive fishing practices from the rest of the Temperate East Marine Reserve Network means that most of the high conservation value areas for marine life in the Temperate East remain at risk from destructive fishing practices. The Temperate East Reserve Network could be substantially improved by the total removal of destructive fishing practices from the marine reserves as has been achieved with mesh nets (gillnets) and was recommended by the Government's risk assessment process.¹⁰

This would significantly improve the protection of marine life and the social and recreational fishing outcomes of the Temperate East Reserve Network but have minimal impact on the commercial that use these gear types. The fisheries proposing to use these techniques within the Temperate East Marine Reserves are the East Coast Tuna and Billfish Fishery, SESSF Commonwealth Trawl, and the NSW Ocean Trawl.

Allowing the SESSF Commonwealth Trawl and NSW Ocean Trawl to operate within the Solitary Islands, Jervis and Hunter Special Purpose Zones reduces the potential negative impact on these fisheries to zero and 0.5% respectively.²³ This contravenes the Government's policy which is to protect marine life in a way that minimises impact on commercial fishers, not to compromise the protection of marine life by reducing the impact on commercial fisheries to virtually nothing.⁴ Removing trawling from these Special Purpose Zones would increase the potential negative impact on these fisheries to 0.7% and 1% respectively.²³ This is a minimal impact to which license holders should be able to adjust easily.

Allowing the East Coast Tuna and Billfish Fishery to operate within the Special Purpose, Multiple Use and Habitat Protection Zones of the Temperate East Marine Reserve Network reduces the impact on this fishery down to 0.6%.²³ 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 2013.⁷³ This is an average annual rate of decline of around 9 vessels per year due to the frequently negative economic returns of the fishery.⁷³ An economically sustainable fishery in the future is reliant on fewer operators catching high value species closer to port.⁷³ In this context closing the Temperate East Marine Reserve Network to pelagic longlining and providing structural adjustment funding to affected commercial fishers is more likely to have a positive, than a negative economic impact on the fishery.

Allowing these fisheries to continue to operate within the marine reserves against the advice of the Government's risk assessment process undermines the integrity and conservation, social and economic benefits of the Temperate East Reserve Network for no obvious commercial benefit.

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

⁷³ Georgeson, L, Stobutzki, I & Curtotti, R (eds) 2014, *Fishery status reports 2013–14*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra.

Centre for Conservation Geography advice: The zoning plan for the Temperate East Reserve Network could be substantially improved by removing destructive fishing practices from all marine reserves as recommended by the Government's fishing gear risk assessment.¹⁰

3. IMPROVING SOCIAL AND ECONOMIC CONSIDERATIONS.

Where Government planning processes overlap with Indigenous people's sea country this needs to be recognised by incorporating traditional owners and other relevant Indigenous bodies in the Temperate East as a decision maker rather than a stakeholder within the process.⁷⁴ Even if native title, co-management or land council ownership doesn't extend into Commonwealth waters Indigenous owners and rangers have important cultural, social, environmental and economic perspectives, knowledge and aspirations that need to be better incorporated into the planning process. In New South Wales existing ranger groups already involved in managing their sea country are likely to have key skills, knowledge and capacity to assist with the management of the new Commonwealth Marine Reserves, and more informal land management programmes operating out of a number of land councils have great potential to extend their activities into marine environments with adequate support. Much greater consideration needs to be given to how recognised native title holders and other Indigenous land-owner groups could be involved in Commonwealth Marine Reserve decision making and management in the Temperate East. Providing support to the establishment of wide networks of Indigenous ranger groups similar to those currently operating in Northern Australia represents a clear direction forward in this regard.

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 Database⁷⁵, or The National Recreational and Indigenous Fishing Survey⁷⁶ for recreational fishing activities, or the Atlas of Australian Marine Fishing and Coastal Communities⁷⁷ for commercial fishing or The Economics of Marine Protected Areas by the Allen Consulting Group¹⁴ for overall economic analysis of the potential positive and negative impacts of the marine reserves. 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

⁷⁴ For example see North Kimberley Saltwater Country Steering Committee, 2010. *North Kimberley Saltwater Country Plan*, Mayala Native Title Claim Group, Dambimangari Corporation, Wunambul-Gaambera Aboriginal Corporation, Balanggarra Native Title Claim Group and Kimberley Land Council, Kimberley, Western Australia.

⁷⁵ See <http://www.dpi.nsw.gov.au/fisheries/recreational/saltwater/gamefish-tagging> for more information.

⁷⁶ 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.

⁷⁷ 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.

vested interests and individuals to destabilise the decision making process with baseless assertions.

TABLE 3: INDIGENOUS GROUPS WITH OVERLAPPING, ADJACENT, OR CLOSEST SEA COUNTRY OR COASTAL LANDS SUBJECT TO NATIVE TITLE DETERMINATIONS OR REGISTERED NATIVE TITLE APPLICATIONS, CO-MANAGEMENT ARRANGEMENTS OR LOCAL LAND COUNCIL OWNERSHIP.⁷⁸

Commonwealth Marine Reserves in the Temperate East marine planning region	Indigenous groups and local land councils with overlapping, adjacent, or closest sea or coastal country
Central Eastern	Byron Bay Bundjalung, Bundjalung, Yaegl, Tweed Byron LALC, Jali LALC, Birrin Gargle LALC, Grafton Ngerrie LALC, Coffs Harbour LALC, Nambucca LALC, Stuart Islands Tribal Elders Descendants, Gumbainnirr People, Unkya LALC, Kempsey LALC, Birpai LALC, Bunyah LALC, Purfleet-Taree LALC, Forster LALC, Karuah LALC, Worimi LALC, Awabakal LALC, Bahtabah LALC, Darkinjung LALC, Awabakal and Guringai People.
Solitary Islands	Yaegl People, Birrin Gargle LALC, Grafton Ngerrie LALC, Coffs Harbour LALC.
Cod Grounds	Bunyah LALC, Purfleet-Taree LALC
Hunter	Forster LALC, Karuah LALC, Worimi LALC.
Jervis	Jerrinja LALC, Wreck Bay Community Council ⁷⁹
East Gippsland	Eden LALC ⁸⁰

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

⁷⁸ Unless otherwise stated information has been sourced from: National Native Title Tribunal, 2014. *National Native Title Register (Determinations) - boundaries and core attributes*. Nov 2014 ed. National Native Title Tribunal, Perth, and National Native Title Tribunal, 2014. *Register of Native Title Claims - boundaries and core attributes about application*. Nov 2014 ed. National Native Title Tribunal, Perth, NSW Aboriginal Land Council 2009 *Map of Local Aboriginal Land Council Boundaries*

⁷⁹ Wreck Bay Community Council is the body responsible for representing Indigenous groups within the co-management arrangement currently in place for Booderee National Park. See Farrier, D. and M. Adams (2011). "Indigenous-Government Co-Management of Protected Areas: Booderee National Park and the National Framework in Australia."

⁸⁰ Please note this table only refers to Indigenous groups associated with those parts of the East Gippsland Commonwealth Marine Reserve that overlap with the Temperate East marine planning region.

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.

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.⁴² Researchers in fact found considerable evidence of both return and new visitors engaging in recreational fishing within the marine park.⁴⁰ 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.^{81, 82, 83}

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.^{41, 42, 83, 35, 40, 36, 84, 37,}

⁸¹ 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

⁸² 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>

⁸³ DERM (2012) *Moreton Bay Marine Park monitoring program February 2012*, DERM, State of Queensland

⁸⁴ 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

⁸⁵ Of particular interest is recent research documenting at length the concerns of a focussed 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.⁸⁵ 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.⁸⁵ 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.⁴¹ Rather than being dissuaded from fishing, recreational fishers were able to creatively 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.⁸⁶

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.³⁹

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 as 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

⁸⁵ 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

⁸⁶ 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.

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.

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: (1) That the government give greater consideration to how and when traditional owners are involved in decision making and management around marine reserves. (2) That the Government increase its investment in the publishing and periodically 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. (3) That the Government establish a research program that monitors and assesses the social and economic impacts of the Commonwealth Marine Reserves.

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. Indigenous communities through their ranger programs, recreational fishers through programs like the NSW Game Fishing Tagging Database⁷⁵ and Redmap⁸⁷ and divers via surveys for Reef Life Survey⁸⁸ are already engaged in research activities in the Temperate East Marine Region. These opportunities for involvement should be expanded as part of the ongoing engagement with regional stakeholders in the management of the Temperate East Reserve Network.

⁸⁷ See <http://www.redmap.org.au/> for more information.

⁸⁸ See <http://reeflifesurvey.com/> for more information.

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. 2014⁵⁵; Lubchenco et al. 2003⁸⁹; Ballantine 1991⁹⁰). Currently Marine National Park Zones are the only zones within the Temperate East Reserve Network 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^{50, 51, 52, 53, 54, 55, 56} but can be useful for preventing habitat damage, or 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.⁹ These guidelines establish the Australian scientific benchmarks for the protection of conservation features within Marine National Park Zones at between 30% and 100%. These guidelines are the same as those set by the 2014 World Parks Congress where the nations of the world, including Australia, committed to protecting at least 30% of all marine habitats within Marine National Park Zones across the world's marine bioregions by 2030.⁹¹

In general the zoning plan for the Temperate East Reserve Network contains too many different types of zones, unnecessarily increasing management and enforcement costs⁹² and not enough Marine National Park Zones.^{44,61} It is particularly problematic that three of the five types of partially protected zones fail to exclude three or more fishing practices classed as incompatible with the Temperate East marine reserves by the Government's risk assessment process.¹⁰ The Centre for Conservation Geography considers that almost all areas within the existing Multiple Use, Special Purpose and Habitat Protection Zones could be reallocated to a Conservation Park Zone that excluded mining and fishing practices classed as incompatible with the marine reserves by the Government's risk assessment process.¹⁰ This would significantly simplify the management arrangements reducing the costs associated with effectively managing the reserves and improve the integrity and environmental, social and economic outcomes of the network.

MARINE NATIONAL PARK ZONES

The boundaries of the Marine National Park Zones of the Temperate East Reserve Network are designed primarily to fulfil the following policy objectives:

⁸⁹ 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

⁹⁰ Ballantine WJ (1991) *Marine Reserves for New Zealand*, University of Auckland, Auckland, New Zealand.

⁹¹ IUCN World Parks Congress, 2014. *A strategy of innovative approaches and recommendations to enhance implementation of marine conservation in the next decade*. International Union for the Conservation of Nature, Gland, Switzerland.

⁹² 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.

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1. Maximise the protection of biodiversity (see section Maximising marine biodiversity protection).
 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 Temperate East Marine Region (Nature Based Tourism) (see section Social and Economic Impacts).
 3. Minimise potential negative social and economic impacts particularly on recreational and commercial fishers (see section Social and Economic Impacts).

Some changes are needed to the Temperate East Reserve Network to bring the number and size of Marine National Park Zones into line with the recommendations of Australia's science community (see section 1A. Marine National Park Zones).

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.⁴
2. Create additional Marine National Park Zones to address the concerns of the Australian scientific community as outlined in section 1A. Marine National Park Zones.

MULTIPLE USE ZONES

The Temperate East Reserve Network contains six Multiple Use Zones stretching right across the network. The Multiple Use Zones allow seabed mining and oil and gas mining. The marine reserves constitute areas identified by the Australian Government as of particularly high conservation value for marine life. Continuing to allow destructive activities like mining undermines the integrity of the zoning system. Additionally it potentially causes scarce tax payers resources to be wasted by investing money in conservation in locations where destructive activities are being allowed to continue. Mining and mining exploration should not be allowed within marine reserves outside these existing exploration leases.

The Multiple Use Zones also allow pelagic longlining, fish traps, mid-water trawling, purse seining. Most of the fisheries using these techniques are not currently active within the Temperate East Marine Reserve Network. The exception is the Eastern Tuna and Billfish Fishery using pelagic longlining. However 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 2013.⁷³ This is an average annual rate of decline of around 9 vessels per year due to the frequently negative economic returns of the fishery.⁷³ An economically sustainable fishery in the future is reliant on fewer operators catching high value species closer to port.⁷³ In this context closing the Temperate East Marine Reserve Network to pelagic longlining and providing structural adjustment funding to affected commercial fishers is more likely to have a positive, than a negative economic impact on the fishery. Allowing these destructive fishing techniques to continue within Multiple Use Zones against the advice of the Government's risk assessment process undermines the integrity and conservation, social and economic benefits of the Temperate East Marine Reserve Network for no obvious commercial benefit.

Centre for Conservation Geography advice:

1. Change Multiple Use Zones to Conservation Park Zones.

SPECIAL PURPOSE ZONES

The Temperate East Reserve Network contains five Special Purpose Zones within the Jervis, Hunter and Solitary Islands Marine Reserves. This zone appears specially designed to allow trawling, Danish seining and demersal longlining with the Temperate East Reserve Network against the advice of the Government's fishing gear risk assessment.¹⁰ This is of benefit to two specific fisheries the SESSF Commonwealth Trawl Fishery and the NSW Ocean Trawl Fishery. Both of these fisheries would still experience minimal impact if they were excluded from the Temperate East Marine Reserve Network entirely.²³ Allowing them to continue within the Special Purpose Zones appears to be a political decision that has the effect of undermining the integrity of, and conservation, social and economic benefits of the Temperate East Marine Reserve Network for no obvious commercial benefit.

Centre for Conservation Geography advice:

1. Change Special Purpose Zones to Conservation Park Zones.

HABITAT PROTECTION ZONES

The Temperate East Reserve Network contains five Habitat Protection Zones over the Lord Howe Rise, Gifford Guyot, the Tasmantid Seamount Chain and the Norfolk Island Seamount Chain. This zone protects these high conservation value areas from the impacts of mining for oil, gas or mineral but continues to allow access pelagic longlining, mid-water trawling and purse seining against the advice of the Government's risk assessment process.¹⁰ Neither mid-water trawling or purse seining are currently active in these areas. While there is a small amount of pelagic longlining in these areas, the economics of the fishery would actually be improved by having a smaller number of operators focussed closer to shore (thus reducing fuel costs and increasing fishery profitability). Excluding these fishing practices from Habitat Protection Zones is more likely to have a positive than a negative impact on the economics of the fishery.

Centre for Conservation Geography advice:

1. Change Habitat Protection Zones to Conservation Park Zones.

HABITAT PROTECTION (LORD HOWE) ZONE

The Temperate East Reserve Network contains two Habitat Protection (Lord Howe) Zones around Lord Howe Island. This zone already has the same characteristics as a Conservation Park Zone (no mining, no destructive fishing practices). Have two different zone names for the same purpose is unnecessary.

Centre for Conservation Geography advice:

1. Change Habitat Protection (Lord Howe) Zones to Conservation Park Zones.

RECREATIONAL USE ZONE

The Temperate East Reserve Network contains three Recreational Use Zones around Elizabeth Reef. The Centre for Conservation Geography recommends that this zone be kept as is.

Centre for Conservation Geography advice:

1. No changes to the Recreational Use Zone at Elizabeth Reef.

6. RESEARCH PRIORITIES

Future priorities for scientific research and monitoring on marine biodiversity for the Temperate East Marine Reserve Network should focus on the status of those key conservation assets for which protection remains low. The top priorities being:

1. Upper slope ecosystems, particularly key ecological features like canyons and seamounts.
2. Shelf ecosystems, particularly considering the fact that no New Marine National Park Zones have been established and key ecological features like shelf edge rocky reefs currently have 0% protection within Marine National Park Zones.
3. Key ecological features and biologically important areas particularly for key species or locations like the Tasmantid, Lord Howe and Norfolk Seamount chains, or Grey Nurse and White Sharks.

Research priorities should be on documenting the diversity and abundance of marine life of each of these 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 Temperate East Marine Reserve Network as well as condition inside and outside the marine reserve network to allow for adaptive management if it becomes clear that either new marine reserves are required or that a zone is not effectively protecting the 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 existing NRSMPA and continuing to develop the ecological, social and economic data to support the future additions to the NRSMPA.

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