
THE NORTH-WEST MARINE RESERVE
NETWORK:

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

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

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**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 North-west Marine Reserve Network the Centre for Conservation Geography makes five key findings relating to a review of the zoning plans for the North-west Marine Reserves (the North-west Marine Reserve Network 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 North-west 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 North-west Marine Reserve Network particularly within poorly protected shelf and upper slope environments.
2. **Social and economic impacts:** The information compiled by the Centre for Conservation Geography shows that the net social and economic value of the North-west Marine Reserve Network to the Australian community is upwards of \$250 million. 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 99% of the nearly 20,000 submissions to the public consultation process supportive of increased protection for the North-west Marine Region. The zoning plan could be improved so as to enhance the positive social and economic impacts by providing increased protection to key tourism assets like the Kimberley, Rowley Shoals and Ningaloo and by extending the area protected from destructive fishing practices like pelagic gillnetting and longlining.
3. **Destructive fishing practices:** The Government's risk assessment process found six commercial fishing practices to be incompatible with the conservation values of the North-west Marine Reserve Network. The zoning plan should be adjusted to ensure that these six fishing practices are fully removed from the North-west Marine Reserve Network.
4. **Seabed mining:** The North-west Marine Reserve Network leaves 88% of the North-west Marine Region open to seabed mining. Australian's don't want to see mining across such large swathes of our oceans. The zoning plan for the North-west Marine 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 North-west Marine Region. Habitats with low, or no protection within Marine National Park Zones include key ecological features and biologically important areas for iconic species like Sea Turtles, Sawfish and Humpback Whales. The review should consider increasing the protection for these features.

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 North-west Marine 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 North-west Marine 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 North-west Marine 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 North-west proclaimed by the Coalition Government in December 2013 maximises the protection of marine life by:

1. **Establishing the first protection for the Dampier Archipelago:** The marine life of the Dampier Archipelago is extremely diverse, one of the most diverse in Australia⁵ and perhaps the most diverse in Western Australia.⁶ The North-west Marine Reserve Network establishes the first ever Marine National Park Zones for this biodiversity hotspot (Figure 1).
2. **Protection of the Kimberley:** The Kimberley is one of the few large intact tropical shelf environments left in the world.⁷ The Kimberley is globally significant for marine life.⁸ The Kimberley and Argo Rowley Terrace Marine Reserves increase the protection of the Commonwealth waters of the Kimberley within Marine National Park Zones from less than 1% to 9% (Figure 1).
3. **Protection of the Big Bank:** The Abrolhos Marine Reserve establishes the first ever Marine National Park Zone protection for the Zuytdorp bioregion in an area known locally as the Big Bank (Figure 1). The Big Bank is a key spawning ground for Western Rock Lobsters. Western Rock Lobsters are a key ecological feature of the Australia's south-west marine life and their harvest supports one of Australia's most valuable fisheries.⁹

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 WA Museum, 2006. *Marine Life of the Dampier Archipelago: About the project*. <<http://wamuseum.com.au/dampier/about.asp>>

⁶ Government of Western Australia, 2013. *Dampier Archipelago Island Reserves*, Department of Parks and Wildlife <<http://parks.dpaw.wa.gov.au/park/dampier-archipelago>>

⁷ 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.

⁸ Government of Western Australia, 2013. *Lalang-garram / Camden Sound Marine Park Management Plan 2013 – 2023*, Department of Parks and Wildlife, Perth, Western Australia.

⁹ Commonwealth of Australia, 2007. *The South-west Marine Bioregional Plan: Bioregional profile*, National Oceans Office Branch, Department of Environment and Water Resources, Kingston, Tasmania, Australia.

4. **Protection of humpback whale calving habitats:** The Kimberley contains the calving grounds for one of the world's largest populations of Humpback Whales. The Kimberley Marine Reserve increases the protection within Marine National Park Zones for calving and nursing Humpback Whales within the Commonwealth waters of the Kimberley from 0% to 30%.
5. **Protection of large relatively intact pelagic and deep water ecosystems:** The Argo-Rowley Terrace and Gascoyne Marine Reserves both contain large Marine National Park Zones that establish high levels of protection for relatively intact large pelagic and deep ocean ecosystems including the Australian spawning grounds for critically endangered southern Bluefin Tuna (IUCN Red List) (Figure 1).^{10,11}
6. **Protecting a diversity of marine habitats:** The North-west Marine Reserve Network increases the level of Marine National Park Zones within the Commonwealth waters of the North-west region from less than 1% up to 9%. These Marine National Park Zones include 114 of the 482 unique seafloor environments mapped by the Centre for Conservation Geography within the North-west region. For 52 of these unique seafloor environments the North-west Marine Reserve Network meets the minimum Australian science community benchmarks for protection.¹²
7. **Protection from destructive fishing practices:** The North-west Marine Reserve Network protects 35% of the North-west Marine Region from demersal trawling, demersal gillnetting and demersal longlining including world heritage areas like Shark Bay and Ningaloo. A smaller 9% of the North-west Marine Region is protected from the fishing practices determined to be incompatible with marine reserves by the Government's fishing gear risk assessment (Figure 8).¹³
8. **Protection from oil, gas and mining:** The North-west Marine Reserve network protects 12% of the North-west from oil, gas and other mining activities including the Wallaby Saddle and parts of the Dampier Archipelago and the Kimberley (Figure 7, Figure 9).

¹⁰ Australian Marine Sciences Association, 2011. Submission to the Draft Commonwealth Marine Reserve Network Proposal for the North-west Marine Region.

¹¹ Caton, A.E. (1991). Review of aspects of southern bluefin tuna biology, population and fisheries. **In:** Shomura, R.S., J. Majkowski & S. Langi, eds. *Proceedings of the First FAO Organization Expert Consultation on interactions of Pacific Tuna Fisheries*. [Online]. Food and Agriculture Organization, United Nations. Available from: <<http://www.fao.org/docrep/005/t1817e/t1817e15.htm>>

¹² 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>

¹³ Mary Lack Shellack Pty Ltd, 2010. *Assessment of risks that commercial fishing methods may pose to conservation values identified in the Areas for Further Assessment of the North and North-west Marine Regions*, Prepared for the Department of the Environment, Water, Heritage and the Arts, Canberra, ACT, Australia.

North-west Marine Reserve Network

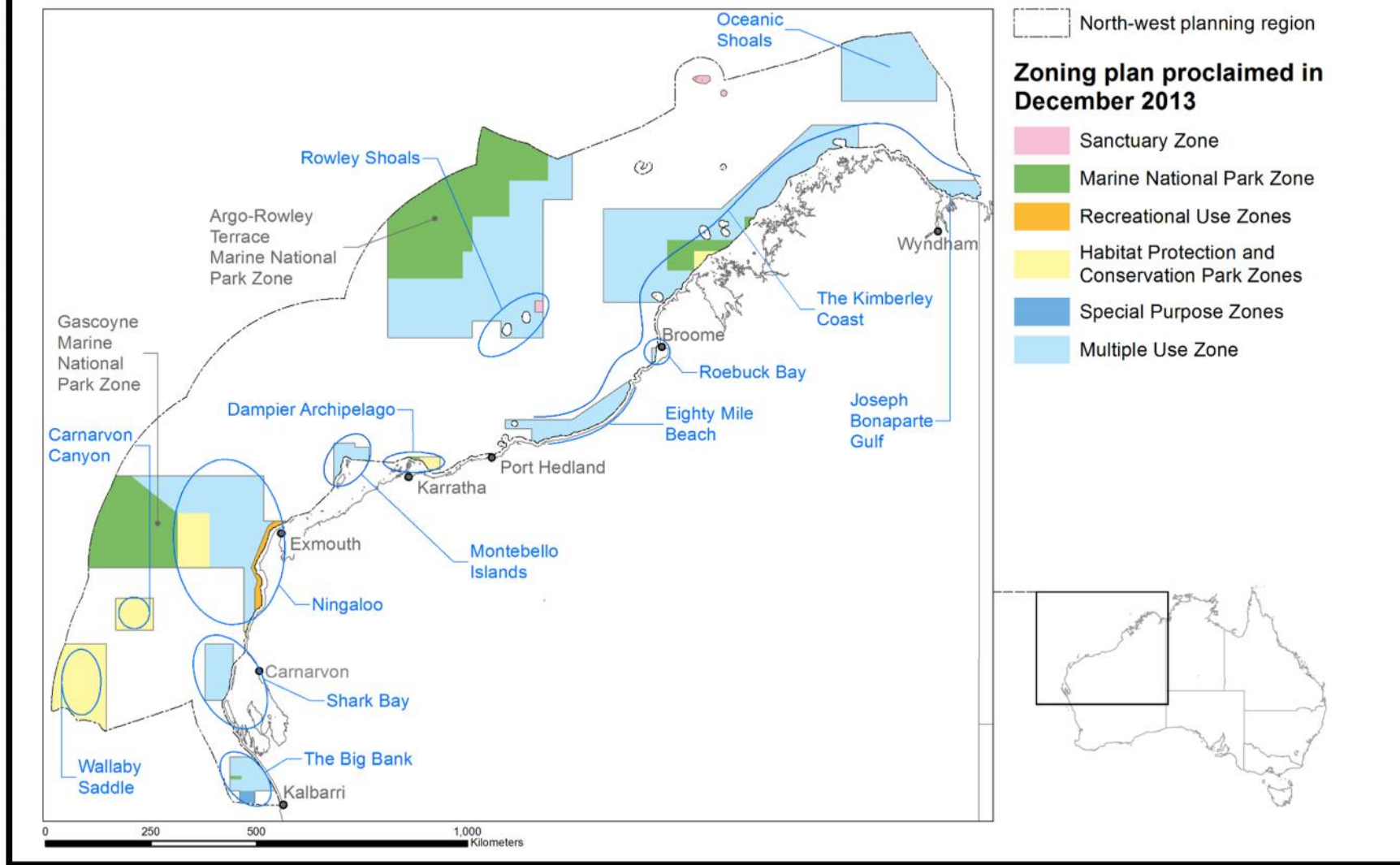


FIGURE 1: THE NORTH-WEST MARINE RESERVE NETWORK PROCLAIMED BY THE FEDERAL LABOR GOVERNMENT IN 2012 AND BY THE FEDERAL COALITION GOVERNMENT IN 2013.

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 North-west Marine Reserve Network to the Australian community is \$250 million. 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 North-west Marine 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-west stand to reap substantial benefits from the North-west Marine Reserve Network. This is why the business community of Western Australia has been so proactive in its support of Marine National Park Zones.¹⁴
 - a. **Healthy marine life:** The West Australian community is predominantly a coastal community that has a deep love of its marine environment. This can be seen in the popularity of the establishment of new marine parks by the Barnett Coalition Government in the Kimberley each with much higher levels of Marine National Park Zones than in the adjacent Commonwealth Marine Reserves. Of the almost 20,000 submissions to the public consultation process for the North-west Marine Reserve Network over 99% of submissions called for more, not less, Marine National Park Zones.¹⁵ This accords with the 92% of West Australian's who support the Government taking actions to protect WA's marine life¹⁶ Improving the health of the marine environment is estimated to be worth between \$100 and \$220 million per annum to West Australians.¹⁷
 - b. **Tourism:** The tourism industry of the North-west is worth upwards of \$1.0 billion per annum.¹⁸ With World Heritage sites like Shark Bay and Ningaloo and globally unique environments like the Kimberley, the North-west Marine Region is a hotspot for nature-based tourism. Nature-based marine tourism in these locations is totally dependent on a healthy and abundant marine life. The North-

¹⁴ For example see <<https://au.news.yahoo.com/thewest/regional/south-west/a/13721993/businesses-join-voices-in-protest/>> and <<http://www.businessnews.com.au/article/Cullen-leads-local-push-to-stop-offshore-drilling>>

¹⁵ 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.

¹⁶ Patterson Market Research, 2011. *Western Australian community attitudes towards marine sanctuaries*, Patterson Market Research, Applecross, Western Australia.

¹⁷ The Allen Consulting Group, 2009. *The economics of marine protected areas*, The Allen Consulting Group, Melbourne, Victoria.

¹⁸ Sources: Gascoyne Development Commission <<http://www.gdc.wa.gov.au/contents/investing/tourism.htm?id=125>> , Kimberley Development Commission: <<http://kdc.wa.gov.au/economic-activity/>> and the Pilbara Development Commission <<http://www.economicprofile.com.au/pilbara/tourism/output>>

west Marine Reserves are critical regional economic infrastructure for maintaining and growing this billion dollar a year industry. For example, the Marine National Park Zones in the Dampier Archipelago provide Karratha with its first secure dive tourism infrastructure, while the protection provided for calving and nursing humpback whales by the Marine National Park Zones in the Kimberley Marine Reserve will enhance the capacity of Western Australia's \$45 million per annum whale watching industry to continue to grow. Marine National Park Zones in depths of 40m or less are critical pieces of regional economic infrastructure for the North-west dive tourism Industry.¹⁹ Increasing the diversity and range of high quality dive sites is important for increasing the capacity of the North-west dive tourism Industry to compete with interstate and international competitors. Given the choice, divers will almost always choose to dive in Marine National Park Zones over other areas making the establishment of these areas critical to the future of the industry. The North-west contains at least two current world-class diving attractions for dive tourism at Ningaloo Reef and Rowley Shoals. Both the Kimberley and Dampier Marine Reserves contain Marine National Park Zones in these critical shallower depths and have the potential to add to the regional infrastructure for dive tourism.

- 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 from our oceans exceeded \$25 billion per annum.²⁰ The Marine National Park Zones of the North-west Marine Reserve Network are estimated to provide environmental services of greater than \$150 million per annum.
 - d. **Fishery benefits:** Marine reserves have both potentially positive and negative impacts on recreational and commercial fisheries. Unfortunately, the Government's impact assessment process has been solely focussed on the potential negative impacts. The potential positive benefits such as more stable catches, or increased insurance against stock depletion have not been estimated for the North-west Marine Reserve Network. The positive benefits to fishing can be evidenced in the existing marine reserves in the North-west and in other areas closed to fishing, for example at Shark Bay, Ningaloo and within the Pilbara Trawl Fishery.
2. **Oil, Gas and Mining:** The North-west Marine 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 North-west Marine Reserve Network not only minimises negative impacts for recreational fishers, but it also provides significant recreational fishing benefits. Overall, while 9% of the North-west region is within Marine National Park Zones, access has been maintained to more than 99% of the areas of importance to

¹⁹ Western Australian SCUBA Diving Industry, 2011. Submission to the Draft Commonwealth Marine Reserve Network Proposal for the North-west Marine Region.

²⁰ Eadie, L., and Hoisington, C., 2011. *Stocking Up: Securing our marine economy*, Centre for Policy Development, Sydney, New South Wales, Australia.

recreational fishers. This fact is openly acknowledged by the WA peak body for recreational fishing (Recfishwest), who have noted with concern that claims of "talking of vast areas locked away from recreational fishermen is simply wrong and alarmist."²¹ The areas of greatest interest to recreational fishers in the North-west Marine Reserve Network have been game fishing locations at Ningaloo and Broome.²²

- a. **Broome:** Annual aggregations of baitfish develop in Roebuck Bay during the wet season and move northwards to locations west of Quondong Point. These aggregations of baitfish attract aggregations of other species targeted by fishers. This area also attracts annual aggregations of Sailfish and Black Marlin. 100% of this area remains open to recreational fishers.
 - b. **Ningaloo:** Ningaloo is one of Western Australia's most prestigious game fishing locations.²³ 100% of the Commonwealth waters in this area remain open to recreational fishers.
 - c. **Dampier Archipelago:** In an Australian Recreational Fishing Foundation media release on 14th of June, 2012 the Dampier Archipelago was mentioned as one of the locations where "recreational anglers face being locked out of vast tracts of Australia's oceans".²⁴ However, this does not appear to be correct. Recreational fishers access the Dampier Archipelago from Karratha. Currently 100% of the areas within 20 nautical miles from Karratha are open to recreational fishing and 86% of the areas within 30 nautical miles are open to recreational fishers. Empirical evidence from groups such as the Australian Recreational Fishing Foundation are currently insufficient. In order to assert that the new Marine National Park Zones in the Dampier Archipelago will be incompatible with internationally renowned, high-quality, economically beneficial recreational fishing experiences, empirical evidence of such impacts in the North-west's existing marine reserves needs to be provided. The Ningaloo Marine Park -in State waters - has, for example, a much higher level of Marine National Park Zone protection - with no evidence of negative impacts on recreational fishing experiences.⁴⁶
4. **Commercial fishing:** The North-west Marine Reserve Network is very effective at minimising the displacement of commercial fishing activities. The North-west Marine Reserve Network extends over 35% of the North-west Marine Region and includes 9% of the North-west Marine Region in Marine National Park Zones but displaces only 0.1%

²¹ Australian Anglers Association, 2012. *Minutes of delegates meeting 19th of June, 2012*, Australian Anglers Association (WA Division) Inc. <<http://www.aaawa.iinet.net.au/MinutesJune2012.pdf>>

²² Recfishwest, 2011. *Recfishwest submission to the north-west Commonwealth marine reserve network proposal*, Submission to the Draft Commonwealth Marine Reserve Network Proposal for the North-west Marine Region.

²³ Exmouth Game Fishing Club, 2009. *About EGFC* <<http://www.egfc.com.au/about/>>

²⁴ Australian Recreational Fishing Foundation, 2012. *Marine parks Aussie recreational fishing families 'locked out forever!'* <<http://www.recreationalfishing.com.au/index.php/component/k2/item/27-marine-parks-aussie-recreational-fishing-families-locked-out-forever>>

of the commercial fisheries active in the region.²⁵ The impact on commercial fisheries in the North-west Marine Region is so minimal that after two years the National Seafood Industry Alliance website is yet to find one commercial fisherman who is willing to publicly claim a significant impact.²⁶ The Government has been able to achieve this by adopting many of the changes to the North-west Marine Reserve Network proposed by the fishing industry.²⁷ For example, the Commonwealth Government reduced the size of the proposed Shark Bay, Eighty Mile Beach and Kalbarri Marine Reserves in order to reduce the impact on trawl and gillnet fisheries. Only two fisheries active in the North-west - the North-west Slope Trawl and Kimberley Prawn Trawl - have a displacement of greater than 3% of the annual value of their catch.²⁵

- a) **North-west Slope Trawl:** Over the past five years only two of the seven licenced vessels in the fishery have operated. This represents a latency level of greater than 70% suggesting that economic factors are having an order of magnitude greater impact on the fishery than marine reserves. The overall level of displaced effort at less than \$100,000 is low. This has been achieved by allowing the fishery to continue to trawl globally significant areas for marine life within the Kimberley and around the Rowley Shoals. This was controversial with other commercial fishers who see the North-west Slope Trawl as damaging key habitats for other demersal fisheries.²⁸
- b) **Kimberley Prawn Trawl:** Over the last five years effort in the Kimberley Prawn Trawl is the lowest it has been since effort was first estimated in 1990. Over this period 89% of the licences have been latent and 75% of fishing days have been unfished. This suggests that economic factors are having an order of magnitude greater impact on the fishery than marine reserves. The high level of latency in the fishery suggests that the marine reserves will have little or no actual impact despite the 7.5% nominal displacement on catch in the fishery as those boats still active in the fishery will have the opportunity to fish in the areas vacated by the boats that are ceasing to operate.
- c) **Destructive Fishing Practices: The Government,** against the advice of its risk assessment, has continued to allow the Western Tuna and Billfish Fishery to continue longlining in 91% of the North-west Marine Region. There are also unaddressed concerns in response to the Government's risk assessment concerning the impact of fish traps on endemic demersal fish species and of gillnetting on dolphins and bank/shoal communities in the Big Bank north of Kalbarri. Allowing these fisheries to continue operating within marine reserves

²⁵ Commonwealth of Australia, 2012. *Completing the Commonwealth marine reserves network: Regulatory impact statement*, Department of Sustainability, Environment, Water, Population and Communities, Canberra, ACT, Australia.

²⁶ National Seafood Industry Alliance, 2014. *North-west: meet the fishers*, <http://www.seafoodforaustralia.com.au/meet_the_fishers/north_west_fishers.phtml> viewed 25/03/2015.

²⁷ Commonwealth Fisheries Association, and Western Australian Fishing Industry Council, 2011. Submission to the Draft Commonwealth Marine Reserve Network Proposal for the North-west Marine Region.

²⁸ Kimberley Professional Fisherman's Association and Northern Demersal Scalefish Fishery Licence Holders, 2011. Submission to the Draft Commonwealth Marine Reserve Network Proposal for the North-west Marine Region.

has been one of the ways in which the Government chose to minimise the impact on these fisheries.¹³

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 is broadly 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 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'.²⁹

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.^{30, 31, 32, 33} Observation of the effects of environmental degradation on communities also reveals the sense of security derived from adequate protection of natural environments, with

²⁹ Olival et al. (2013) 'Linking the Historical Roots of Environmental Conservation with Human and Wildlife Health' *Ecohealth* 10: 224-227

³⁰ 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."

³¹ 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.

³² 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*.

³³ 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.

higher levels of stress, anxiety, depression and social conflict occurring in communities experiencing high levels of environmental change and degradation.^{34, 35, 36, 37}

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 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.³⁸

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,^{39, 40, 41, 42, 43} and the

³⁴ 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.

³⁵ 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.

³⁶ 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.

³⁷ McNamara and Westoby (2011) 'Solastalgia and the Gendered Nature of Climate Change' *Ecohealth* **8**: 233-236

³⁸ See for example: Dhimurru (2006) Dhimurru Yolngu 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;

³⁹ McGregor Tan research (2008), Solitary Islands Marine Park Community Survey Final Report, Prepared for: NSW Marine Parks Authority Project No: 8353

⁴⁰ McGregor Tan research (2008), Jervis Bay Marine Park Community Survey Final Report, Prepared for: NSW Marine Parks Authority Project No: 8353

⁴¹ NSW Marine Parks Authority, 2010, Lord Howe Island Marine Park Summary of Research and Monitoring. NSW Government, Sydney.

⁴² 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.

⁴³ Sparks, M and Munro M. 2011. Fisheries Research and Development Corporation Recreational Fishing Survey. Intuitive Solutions, Docklands, Victoria.

maintenance of high usage, and in some cases increases in visitation,^{41, 44, 45, 46, 47} 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 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.

⁴⁴ 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.

⁴⁵ 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.

⁴⁶ 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.

⁴⁷ 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 NORTH-WEST MARINE RESERVE NETWORK

1A. MARINE NATIONAL PARK ZONES

Marine National Park Zones are critical to the protection of marine life.^{48,49,12,59,50} All other zones, including recreational fishing zones, or those that include vertical zoning⁵¹ like benthic protection zones only offer partial protection⁵² 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.^{16, 53} 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

⁴⁸ Australian Marine Science Association, 2011. Submission to the Draft Commonwealth Marine Reserve Network Proposal for the North-west Marine Region.

⁴⁹ 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.

⁵⁰ 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.

⁵¹ Under current IUCN guidelines any zone containing vertical zoning is considered to have the level of protection of the least protected zone.⁵²

⁵² Dudley, N., 2008. *Guidelines for Applying Protected Area Management Categories*, International Union for the Conservation of Nature (IUCN), Gland, Switzerland.

⁵³ Galaxy Research, 2014. *Community Attitude Survey*. Prepared for Dive Industry Association of Australia.

marine life as effectively Marine National Park Zones do.^{54,55,56,57,58,59,60} This is because it is not unusual for recreational fishing catch to exceed commercial fishing catch.⁶¹ 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.⁶¹

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.⁶² 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 for⁶³ and the long standing community consensus⁶⁴ that some

⁵⁴ 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.

⁵⁵ 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.

⁵⁶ 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

⁵⁷ 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.

⁵⁸ Lester SE, Halpern BS (2008) Biological responses in marine no-take reserves versus partially protected areas. *Mar Ecol Prog Ser* 367: 49-56.

⁵⁹ 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.

⁶⁰ 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

⁶¹ 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.

⁶² 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>>

⁶³ 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.

⁶⁴ 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.²⁷ This position is hard to support in the North-west Marine Region where total displacement is 0.1% 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 North-west.^{25, 13}

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.¹⁷ 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.⁶⁵

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 2009.¹² Science community submissions to the public consultation process for the North-west Marine Reserves from the CSIRO and the Australian Marine Science Association (AMSA) each focussed on the need for the North-west Marine Reserves to contain more Marine National Park Zones. The CSIRO submission focus was for new Marine National Park Zones to cover the 95 North-west depth habitats which currently have no Marine National Park Zones (Table 2) and for new Marine National Park Zones within the eight marine reserves in the North-west 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. Shark Bay Marine Reserve
2. Carnarvon Canyon Marine Reserve
3. Montebello Marine Reserve
4. Eighty Mile Beach Marine Reserve
5. Roebuck Marine Reserve
6. Oceanic Shoals Marine Reserve
7. Joseph Bonaparte Gulf Marine Reserve

⁶⁵ CSIRO, 2011. Submission to the Draft Commonwealth Marine Reserve Network Proposal for the North-west Marine Region.

TABLE 2: REPRESENTATION OF AUSTRALIAN DEPTH HABITATS⁶⁶ WITHIN MARINE NATIONAL PARK ZONES IN THE NORTH-WEST MARINE REGION.

Bioregion	Number of depth habitats	Number of depth habitats with adequate representation within Marine National Park Zones ^{12,67}	Number of depth habitats with no Marine National Park Zones
Bonaparte Gulf	4	0	4
Cambridge-Bonaparte	2	0	2
Canning	3	0	2
Central Western Transition	12	1	9
Eighty Mile Beach	2	0	2
Kimberley	6	0	2
Ningaloo	7	0	7
Northwest Province	15	1	13
Northwest Shelf	7	0	5
Northwest Transition	18	8	6
Oceanic Shoals	9	0	9
Pilbarra (nearshore)	2	1	1
Pilbarra (offshore)	7	0	6
Timor Province	19	2	16
Zuytdorp	6	0	2
Total	119	6	95

Equally a major focus of the AMSA submission was the poor protection within Marine National Park Zones for the shallower habitats on the shelf and upper slope.¹⁰ Marine National Park Zones currently extend over 80% of the North-west Marine Region's abyssal plains but over just 2.2% of the continental shelf and 0.4% of the upper slope. It is this totally disproportionate level of protection between the deep ocean and shelf and upper slope habitats that causes the Commonwealth Marine Reserve Network to be vulnerable to serious criticism from Australian

⁶⁶ Commonwealth of Australia, 2011. *Bathomes within Australian waters*. <http://www.environment.gov.au/metadateexplorer/full_metadata.jsp?docId={1C0DC470-61A9-446C-83E2-48CC9F8356CF}&loggedIn=false>

⁶⁷ 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.

scientists.^{68, 69, 70, 71} The highly protected deep sea habitats include 16% of the Australian spawning grounds for critically endangered southern bluefin tuna (IUCN Red List), however the lack of similar protection for high conservation value shallower habitats where extractive use and threats are higher is a major flaw in the current marine reserve network.

The upper slope habitats of the North-west are characterised by high numbers of endemic species, marine life that occurs nowhere else,⁷² while the shelf habitats are some of the world's most intact shallow water habitats⁷ including globally significant locations like the Kimberley, Rowley Shoals and the Dampier Archipelago and Ningaloo and Shark Bay World Heritage Sites. These are some of Australia's most important places for marine life and they are deserving of world class protection within Marine National Park Zones. For example of the 14 key ecological features⁷³ identified for Australian marine life in the North-west only four have any representation within Marine National Park Zones and only two meet the minimum Australian science community¹² and World Parks Congress⁶⁷ standards for adequate protection within Marine National Park Zones. Equally of the 273 biologically important areas for whales, dolphins, sharks, seabirds, dugongs and turtles that extend into the North-west Marine Region, 220 currently have no representation within Marine National Park Zones.

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

Centre for Conservation Geography advice: The North-west Marine Reserve Network could be substantially improved by expanding the number of Marine National Park Zones on the shelf and upper slope. The Centre for Conservation Geography's top five locations for new Marine National Park Zones to address the poor protection of the shelf and upper slope are:

1. NORTH KIMBERLEY

The two depth habitats in the Kimberley Bioregion currently not represented in Marine National Park Zones (Table 2) have a restricted distribution in the deep channel to the north of the Holothuria Reefs. The Western Australian Premier, the West Australian Marine Parks and Reserves Authority and the CSIRO have all urged that a new Marine National Park Zone be

⁶⁸ Edgar, G. 2006. *Proposed Commonwealth Reserves South East Marine Region*. Australian Marine Sciences Association <http://www.amsa.asn.au/>

⁶⁹ 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.

⁷⁰ 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>>

⁷¹ Barr, L.M., and Possingham, H.P., 2013. Are outcomes matching policy commitments in Australian marine conservation planning? *Marine Policy*, Vol. 42: 39-48.

⁷² Commonwealth of Australia, 2008. *The North-west Marine Bioregional Plan: Bioregional Profile*, Department of the Environment, Water, Heritage and the Arts, Kingston, Tasmania, Australia.

⁷³ Commonwealth of Australia, 2012. *Key Ecological Features*. <<http://www.environment.gov.au/webgis-framework/apps/ncva/ncva.jsf>>

established in the North Kimberley (Figure 2).^{74,75,65} The West Australian Government is in the process of establishing a marine park over this area that will extend from the Camden Sound to Northern Territory border. The West Australian Marine Parks and Reserves Working Group has recommended that to complement management in state waters a Marine National Park Zone that includes the Commonwealth waters adjacent to the Maret Islands, Long Reef, Cassini Island and Holothuria Reefs. Holothuria Reefs and Long Reef are the two of the largest coral reef / bank and shoal systems in the Kimberley⁷⁶ that extend from the proposed North Kimberley Marine Park in WA waters into the Kimberley Marine Reserve in Commonwealth waters. Long Reef contains globally unique reef habitat of high density organ pipe corals⁷⁷ and has been identified as an area of particular interest for conservation since at least 1994.⁷⁸ Cassini Island is "one of the most diverse places in the Kimberley"⁷⁹ and has been identified as an important location for protection since at least 1991.⁸⁰ Surrounded by coral reefs Cassini Island is the most important Green Turtle nesting site in the proposed North Kimberley Marine Park.⁸¹ The area to the west of the Maret Islands contains the Rob Roy coral reefs, a good example of Kimberley inshore platform reefs.⁸² The Rob Roy Reefs contain unusual coral community structures at the edge of the turbidity zone and is a high priority for protection.⁸³ In addition to these areas a 2014 report by the Centre for Conservation Geography also identified Booby Island and the Montalivet Islands in the Bonaparte Archipelago as high conservation value areas adjacent to Commonwealth waters in the proposed North Kimberley Marine Park.⁸⁴ A new Marine National Park Zone in the North Kimberley could increase protection for 12 biologically important areas that currently have zero, or inadequate representation within Marine National Park Zones.⁸¹

This globally significant part of the North Kimberley is outside of the high prospectivity areas of the Browse and Bonaparte basins and has no existing or proposed oil and gas leases. This combined with the fact that the area contains some of the lowest levels of recreational and commercial fishing in Australia^{98,99} makes this an idea location for the establishment of a large marine national park zone.

⁷⁴ Barnett, C., 2011. Submission to the Draft Commonwealth Marine Reserve Network Proposal for the North-west Marine Region.

⁷⁵ West Australian Marine Parks and Reserves Authority, 2011. Submission to the Draft Commonwealth Marine Reserve Network Proposal for the North-west Marine Region.

⁷⁶ Harris, P, Heap, A, Passlow, V, Saffi, L, Fellows, M, Porter-Smith, R, Buchanan, C, & J Daniell. 2005. *Geomorphic Features of the Continental Margin of Australia*. Geoscience Australia, Record 2003/30, 142pp.

⁷⁷ Richards, Z.T., Bryce, M., and Bryce, C., 2013. New records of atypical coral reef habitat in the Kimberley, Australia, *Journal of Marine Biology*, Volume 2013, Article ID 363894, 8 pages, <http://dx.doi.org/10.1155/2013/363894>

⁷⁸ Department of Conservation and Land Management (CALM). 1994. *A representative marine reserve system for Western Australia*. Report of the Marine Parks and Reserves Selection Working Group. Department of Conservation and Land Management, Perth Western Australia.

⁷⁹ Pers. comm. Clay Bryce, Western Australian Museum

⁸⁰ Burbidge, A.A., McKenzie, N.L. and Kenneally, K.F. (1991). *Nature Conservation Reserves in the Kimberley Western Australia*. Department of Conservation and Land Management, Como.

⁸¹ Commonwealth of Australia, 2011. *Biologically important areas in the North-west marine region*. <<http://www.environment.gov.au/webgis-framework/apps/ncva/ncva.jsf>>

⁸² Wilson, B., 2013. *The biogeography of the Australian North-west Shelf*, Elsevier, San Diego, CA, USA.

⁸³ Richards, Z., 2013. *Marine life of the Kimberley Region: Researchers Diaries*, Western Australian Museum, <<http://museum.wa.gov.au/kimberley/diaries/dr-zoe-richards-1>>

⁸⁴ Beaver, D., 2014. *Proposed North Kimberley Marine Park: Interim advice on potential locations for marine sanctuaries*, Centre for Conservation Geography, Sydney, NSW, Australia.

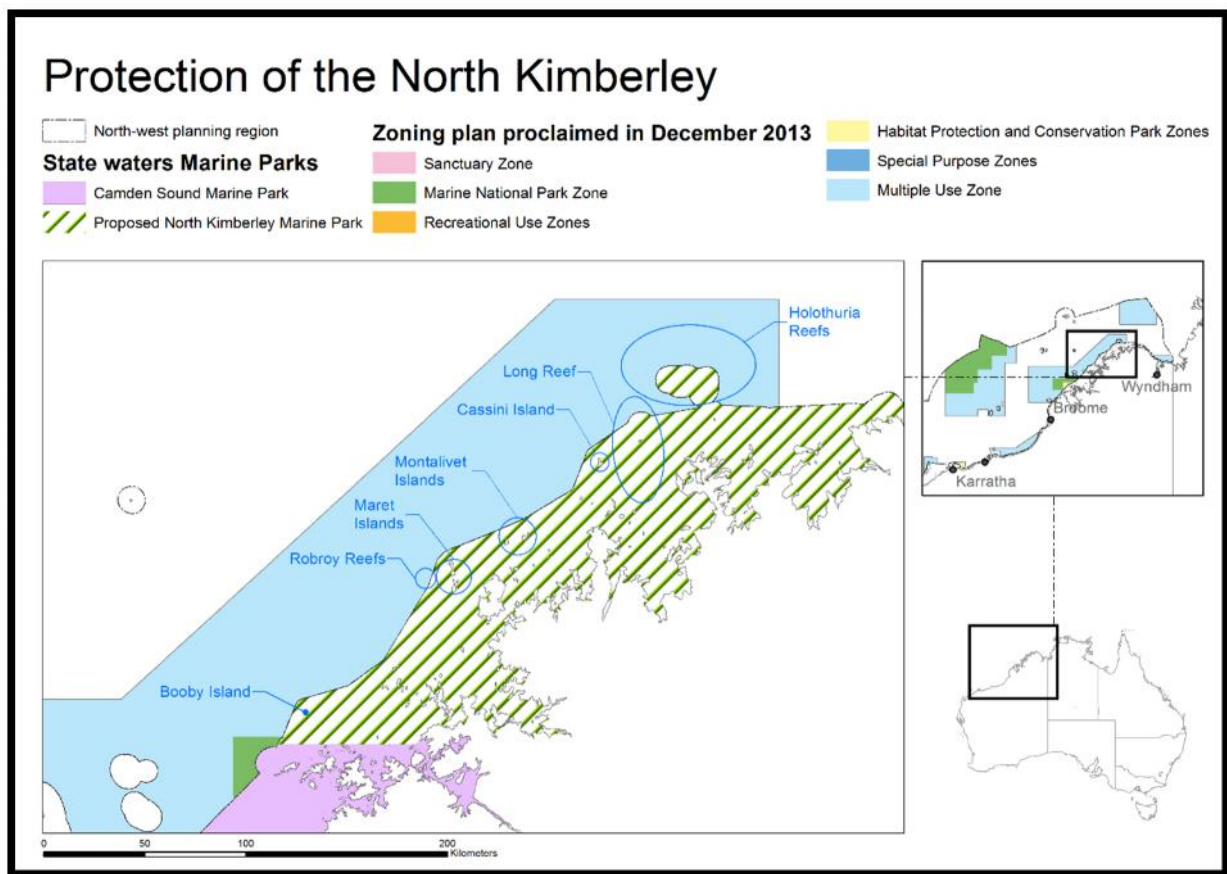


FIGURE 2: THE NORTH KIMBERLEY IS ONE OF THE TOP PRIORITY LOCATIONS IN THE NORTH-WEST MARINE REGION FOR A NEW MARINE NATIONAL PARK ZONE.

2. ROWLEY SHOALS

The Rowley Shoals are a globally unique set of shelf edge atolls to the south-west of Broome. Described as the most perfect example of shelf atolls in Australian waters Rowley Shoals⁸⁵ hosts some of the world's healthiest coral reefs, with a diverse and intact shark fauna the reefs are intended to be managed as a scientific reference site to provide a baseline against which to measure the health of coral reefs elsewhere.^{72,86} Offering some of the world's best diving the Rowley Shoals are also a key piece of regional economic infrastructure for tourism. The North-west Marine Reserve Network currently includes no new Marine National Park Zones for Rowley Shoals due to a veto from the Commonwealth Government Department of Resources, Energy and Tourism (DRET) which has a desire to see the shoals mined for oil and gas. However oil and gas companies currently see the area as being a "no go" zone for mining due to its global significance for marine life and did not bid on the exploration lease being offered by the DRET. This has cleared the way for the review to give Rowley Shoals the protection it deserves by

⁸⁵ Fairbridge, R.W., 1950. Recent and Pleistocene coral reefs of Australia, *Journal of Geology* 58: 330–401 in Collins, L., 2011. Geological setting, marine geomorphology, sediments and oceanic shoals growth history of the Kimberley Region, *Journal of the Royal Society of Western Australia*, 94: 89-105.

⁸⁶ Government of Western Australia, 2007. *Rowley Shoals Marine Park Management Plan 2007-2017*, Department of Environment and Conservation, Perth, Western Australia.

establishing a large Marine National Park Zone in the Commonwealth waters surrounding the reefs.

The Rowley Shoals are the only location where it is possible to represent the Shallow Upper Slope habitats of the North-west Transition bioregion with all other possible locations already covered by mining leases. The Marine Reserves Review should also consider recommending the expansion of the Argo-Rowley Terrace Marine Reserve to include all of the Rowley Shoals, including the submerged fourth shoal⁸⁷. Leaving the fourth shoal open for trawling by the North-west Slope Trawl is totally inconsistent with the protection of the marine life of the Rowley Shoals ecological system.

Expanding the Marine Reserve boundaries and establishing a Marine National Park Zone would have minimal impact on commercial fishing and the oil and gas industry has already clearly indicated that they consider the area to be a "no go" zone. Recreational fishing in the Rowley Shoals occurs around Clerke Reef and the area to the west Clerke Reef (Figure 3).⁸⁶ Establishing this area as a Recreational Zone would ensure that the impact on recreational fishers is minimised.

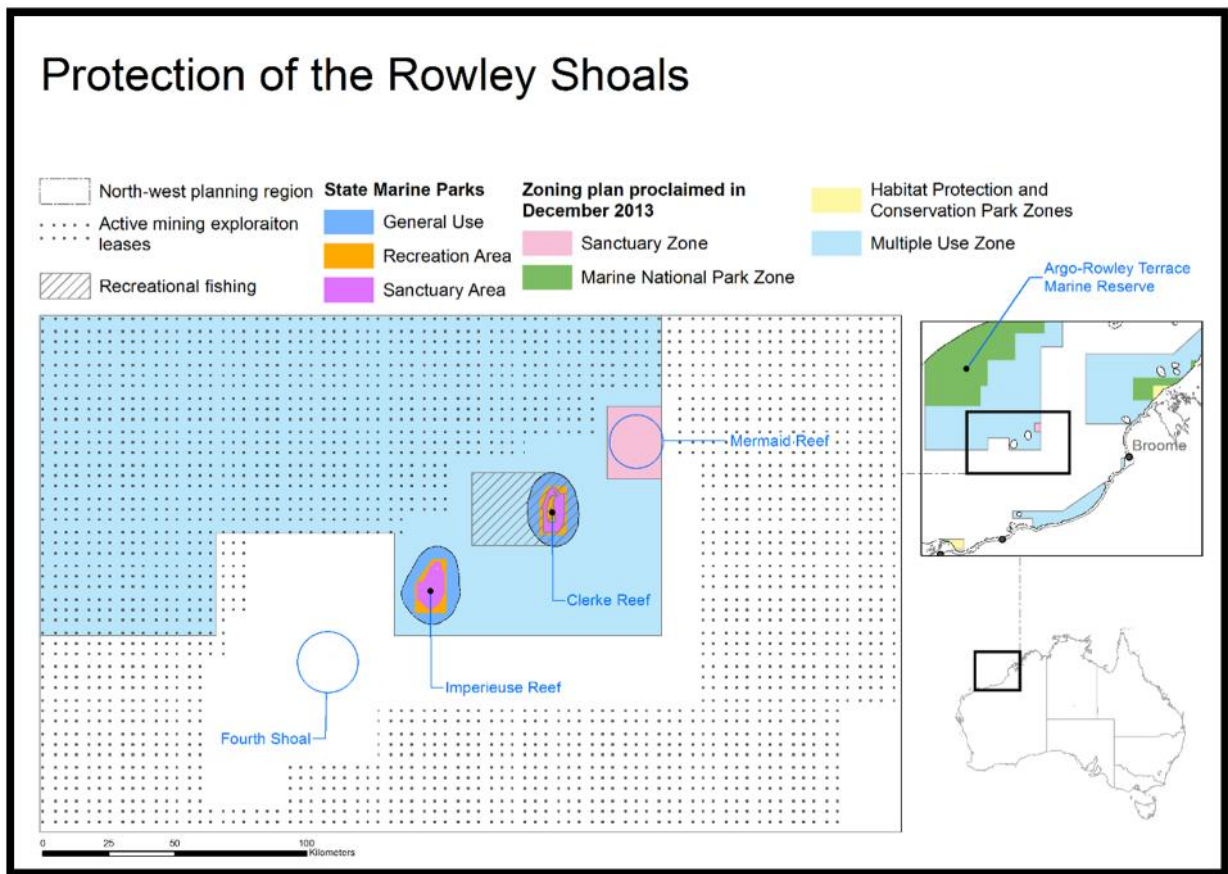


FIGURE 3: THE ROWLEY SHOALS IS ONE OF THE TOP PRIORITIES IN THE NORTH-WEST MARINE REGION FOR A NEW MARINE NATIONAL PARK ZONE.

⁸⁷ Mustoe, S., 2008. *Kimberley Coast Natural Values Workshop, 5-7 February 2008*, Transcript of Results. WWF-Australia, Sydney, New South Wales, Australia.

3. NINGALOO

Ningaloo, one of the world's longest fringing coral reef and one of the healthiest coral reefs systems in the world is a world heritage area. The West Australian Ningaloo Marine Park contains a world class Marine National Park Zone network, however the Commonwealth Marine Reserve contains no Marine National Park Zones within 150km of the reef. The West Australian Marine Parks and Reserves Authority has requested that the Commonwealth Government consider establishing Marine National Park Zones in areas adjacent to important locations for marine life in West Australian waters.⁷⁵ For Ningaloo these are adjacent to the Osprey, Cloates, Pelican, Cape Farquhar and Turtles Marine Sanctuary Zones. Establishing Marine National Park Zones in this area would improve the protection of three key ecological features for Australian marine life that currently have zero, or inadequate representation within Marine National Park Zones in the North-west Marine Region [Ningaloo Canyons (0%), Ningaloo (0%), North-west continental slope demersal fish communities (0.3%)]. There is also the opportunity to protect the biologically important inter-nesting habitats of endangered (IUCN Red List) loggerhead turtles and critically endangered (IUCN red list) hawksbill turtles at Ningaloo and Gnarloo Bay which currently have 0% protection within Marine National Park Zones within Commonwealth waters. Vulnerable whale sharks also currently have 0% of their biologically important Commonwealth waters Ningaloo feeding grounds protected in Marine National Park Zones. Establishing new Marine National Park Zones at Ningaloo also provides an opportunity to represent the 29 depth habitats in the Ningaloo, Northwest Province and Central West Transition bioregions that the CSIRO submission highlighted as currently have no representation in Marine National Park Zones in the North-west Marine Region.

Now that Shell has determined that the area to the west of Ningaloo is not prospective and has relinquished their petroleum exploration leases it is possible to create the Marine National Park Zones recommended by CSIRO, the Australian Marine Sciences Association and the West Australian Marine Parks and Reserves Working Group. The adjacent Ningaloo Marine Park in state waters provides a template for how world class Marine National Park Zones can be established while minimising any potential negative impacts on commercial and recreational fishers.

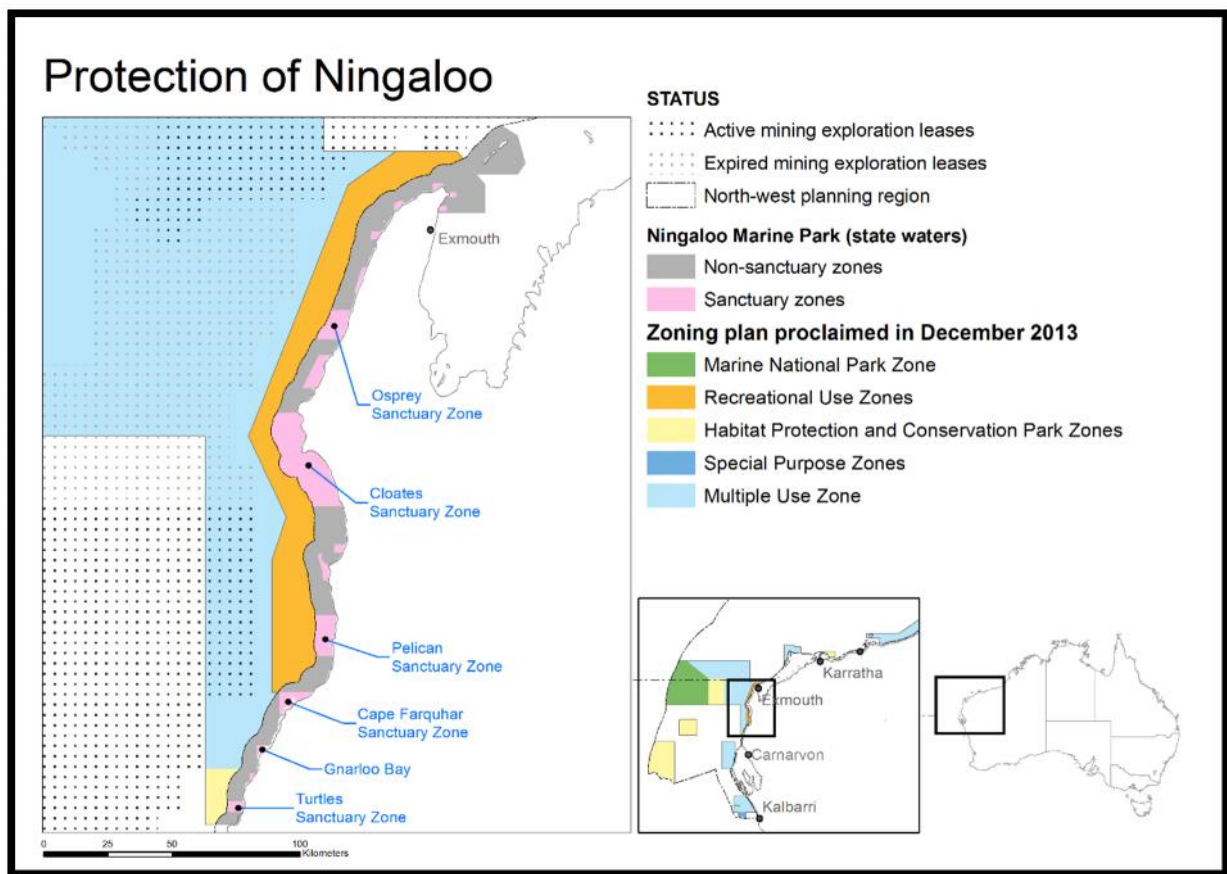


FIGURE 4: NINGALOO IS ONE OF THE TOP PRIORITIES IN THE NORTH-WEST MARINE REGION FOR A NEW MARINE NATIONAL PARK ZONE.

4. LACEPEDE AND ADELE ISLANDS

The Lacepede Islands are the largest nesting site in Western Australia for endangered (IUCN red list) green turtles⁷² and are one of the most important seabird nesting sites in the Kimberley.⁸⁷ The Lacepede Islands currently lack a Marine National Park Zone due to the previous presence of an oil and gas exploration lease. This lease was cancelled on the 01/11/2012 following Emerald Gas Pty Ltd.'s decision to abandon exploration of the area.⁸⁸ The establishment of a Marine National Park Zone to protect the marine life of the Lacepede Islands would be a major improvement to the North-west Marine Reserve Network. A Marine National Park Zone for the Lacepede Islands has the potential to increase protection for 43 biologically important areas including dugong and coastal dolphin feeding grounds, flatback and green turtle inter-nesting habitats and calving, nursing and resting habitats for humpback whales including the humpback high density area at Pender Bay.⁹⁵ This area also contains depth habitats in the Canning and Northwest Shelf bioregions that the CSRIO submission recommended for inclusion within new Marine National Park Zones. Additionally the establishment of a Marine National Park Zone in an area of such abundant marine life in shallow waters relatively accessible from Broome would be a major piece of new regional economic infrastructure for nature based tourism in the Kimberley, including dive tourism. While the Lacepede Islands are relatively remote from existing boat launching sites at Broome and One Arm Point there is some recreational fishing in this area as well as some activity in the West Australian Mackerel Fishery. Depending on the boundaries chosen both of these activities have the capacity to be advantaged rather than

⁸⁸ Commonwealth of Australia, 2012. *Cancellation of petroleum exploration permit WA-419-P*, Gazette – C2012G00192 <<http://www.comlaw.gov.au/Details/C2012G00192>>

disadvantaged by the establishment of a new Marine National Park Zone for the Lacepede Islands.

Adele Island is also one of the most important seabird nesting sites in the Kimberley.⁸⁷ Adele Island supports a unique coral reef ecology and is the only coral reef system in Australia where mixed assemblages of rhodoliths and coralliths are known to occur.⁷⁷ Adele Island currently lacks a Marine National Park Zone due to the previous presence of an oil and gas exploration lease. This lease was surrendered on the 08/05/2013 following Hunt Oil Australia's decision not to go ahead with drilling following the acquisition and analysis of 3D seismic imagery.⁸⁹ The establishment of a Marine National Park Zone to protect the marine life of the Lacepede Islands would be a major improvement to the North-west Marine Reserve Network. The around Adele Island has almost no commercial fishing activity²⁵, no recreational fishing activity²² and now no oil and gas leases and is an ideal location for increasing protection for the globally significant conservation values of the Kimberley.

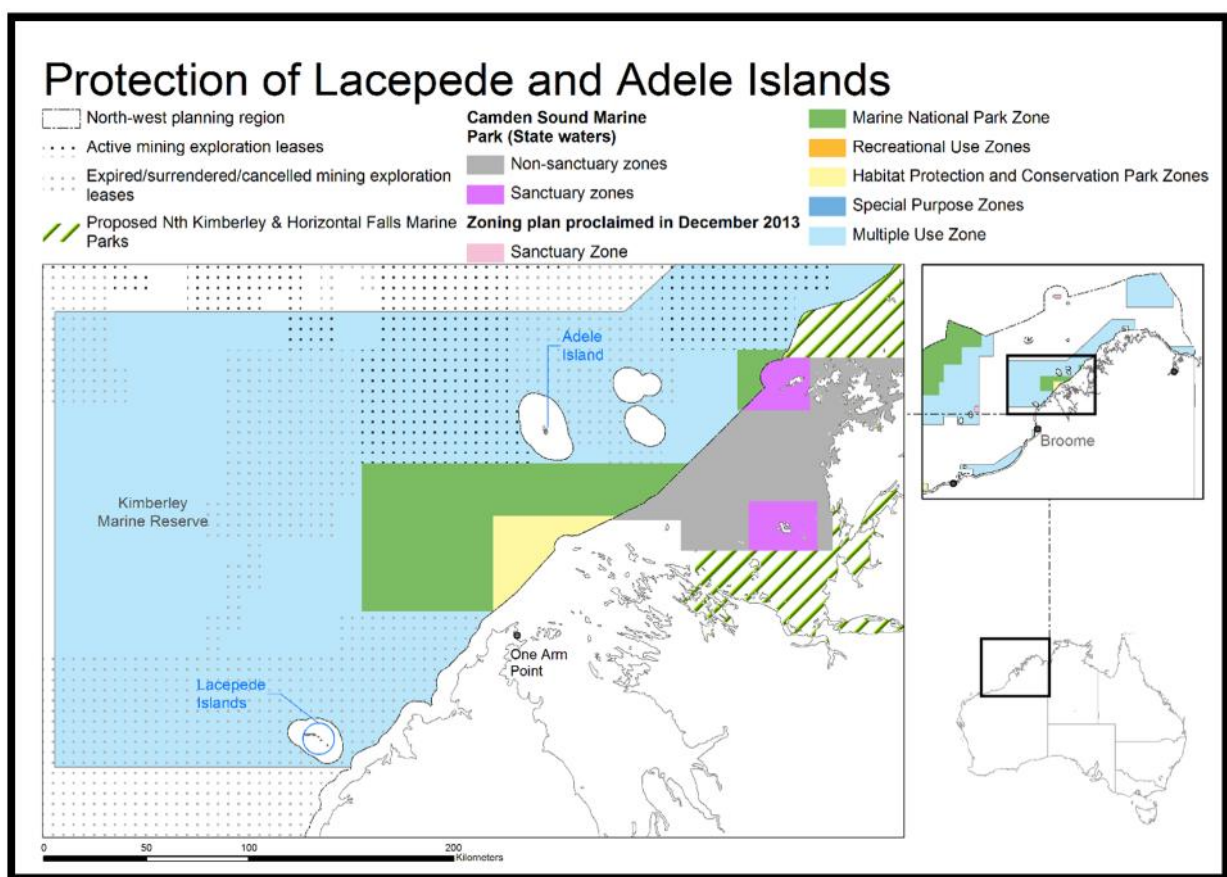


FIGURE 5: THE LACEPEDE ISLANDS AND ADELE ISLAND ARE TWO OF THE TOP PRIORITIES IN THE NORTH-WEST MARINE REGION FOR NEW MARINE NATIONAL PARK ZONES.

5. EIGHTY MILE BEACH

Eighty Mile Beach is one of Australia's most important habitats for migratory shorebirds and contains biologically important areas for critically endangered (IUCN Red List) Green Sawfish

⁸⁹ Commonwealth of Australia, 2013. *Surrender of Petroleum Exploration Permit WA-413-P*, Gazette – C2013G00701, < <http://www.comlaw.gov.au/Details/C2013G00701> >

and Freshwater Sawfish, and endangered (IUCN Red List) Dwarf Sawfish as well as important nesting and internesting habitats for endemic Flatback Turtles. The Eighty Mile Beach Marine Reserve also the biologically important seabird feeding and breeding habitats around Bedout Island, one of the most important seabird nesting sites in the Kimberley.⁸⁷ All of these biologically important areas currently have no representation within Marine National Park Zones within the North-west Marine Region. The Eighty Mile Beach is the one of the marine reserves that currently contains no Marine National Park Zones and is a priority for the establishment of Marine National Park Zones to represent the depth habitats of the Eighty Mile Beach, Pilbarra bioregions based on submissions from the CSIRO, Australian Marine Sciences Association and the West Australian Marine Parks and Reserves Authority.^{65, 48, 75} The West Australian Government has established a zoning plan for the marine park at Eighty Mile Beach that includes Marine National Park Zones over more than 20% of the marine park. Marine National Park Zones are at Anna Plains, Pardoo and Cape Keraudren. These high conservation locations along with the Commonwealth waters around Bedout Island should be the priority for the establishment of Marine National Park Zones within the Eighty Mile Beach Marine Reserve as recommended by the CSIRO and the West Australian Marine Parks and Reserves Authority.

This area has minimal recreational fishing from access points at the Eighty Mile Beach Caravan Park and Cape Keraudren and no oil and gas leases. Marine National Park Zones established in the Eighty Mile Beach Marine Reserve should meet conservation objectives while minimizing impact on the pearl dive fishery operating off Eighty Mile Beach.

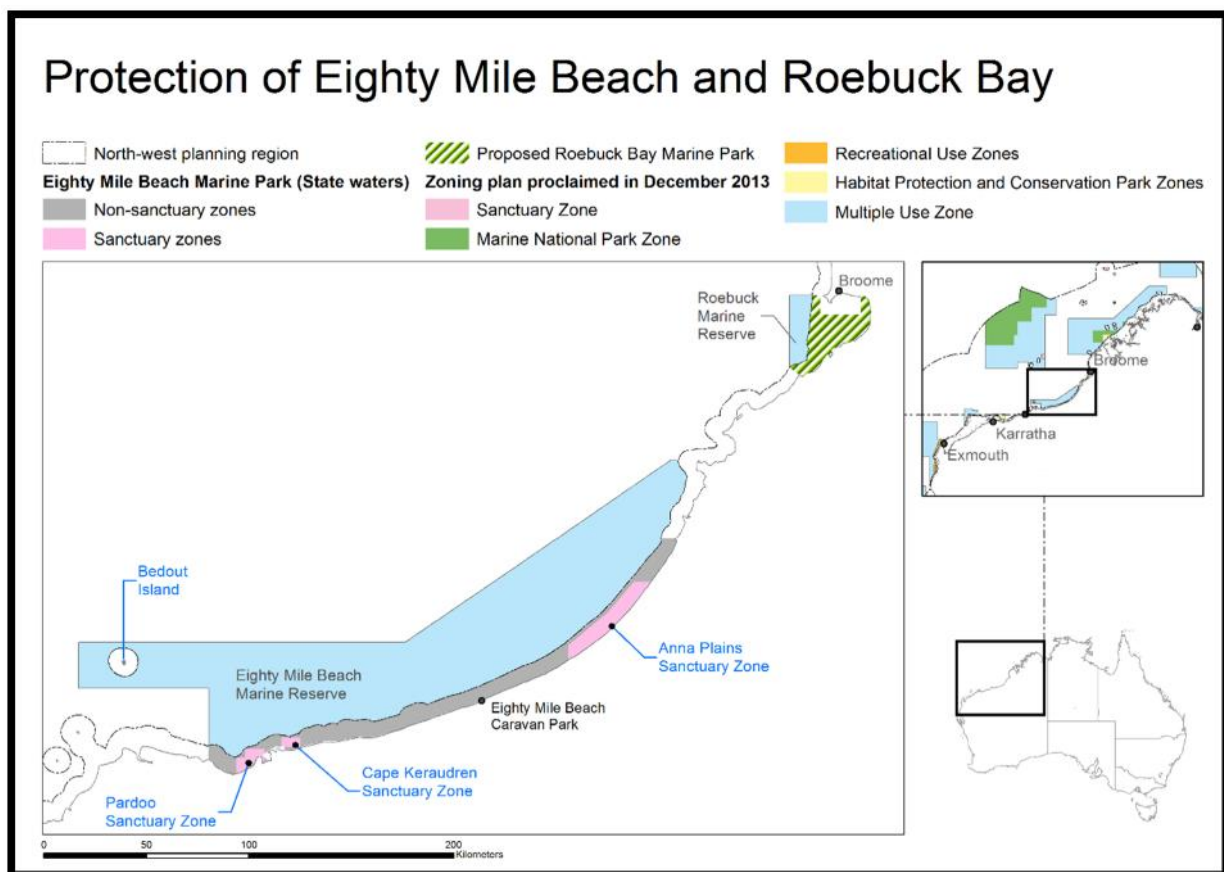


FIGURE 6: EIGHTY MILE BEACH AND ROEBUCK ARE TWO OF THE TOP PRIORITIES IN THE NORTH-WEST MARINE REGION FOR NEW MARINE NATIONAL PARK ZONES.

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 Shark Bay is a world heritage area and one of the world's most important habitats for vulnerable (IUCN Red List) dugongs and endangered (IUCN Red List) Loggerhead Turtles. The Shark Bay Marine Reserve currently contains no Marine National Park Zones (Figure 1) and is a priority for the establishment of Marine National Park Zones in the Zuytdorp bioregion based on submissions from the CSIRO, Australian Marine Sciences Association and the West Australian Marine Parks and Reserves Authority.^{65, 48, 75}

Equally the Oceanic Shoals, Joseph Bonaparte Gulf, Roebuck Bay, Wallaby Saddle, Carnarvon Canyon and Montebello Islands are marine reserves that the Federal Government has identified as having high conservation values that are yet to include a Marine National Park Zone as recommended by the CSIRO (Figure 1). Or for example the expansion of the Big Bank Marine National Park Zone would provide the opportunity to include additional depth habitats of the Zuytdorp bioregion as recommended by the CSIRO (Table 2).

1B. OIL AND GAS MINING

The zoning plan for the North-west Marine Reserve Network currently allows mining for oil and gas over 88% of the North-west Marine Region (Figure 7). Australians don't want mining across such large swathes of our oceans. The North-west Marine Reserve Network needs to find a better balance between protecting marine life and facilitating the development of the North-west oil and gas industry. There are number of locations in the North-west Marine Region that need to be set aside as 'no go' areas for oil and gas. These are locations where consequences for marine life in the event of an oil spill like that in the Kimberley in 2009 would be particularly 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.⁹⁰

The locations within the North-west that obviously meet the criteria of being globally important for species that would be particularly impacted by an oil spill are:

1. **Ningaloo:** World Heritage Area.
2. **Shark Bay:** World Heritage Area
3. **Roebuck Bay:** Globally significant location for shorebirds.
4. **Eighty Mile Beach:** Globally significant location for shorebirds.
5. **Rowley Shoals:** Coral reef ecosystem that is a hotspot for endemic species. This area is already informally a no go zone with oil and gas companies not bidding on the oil and gas exploration lease released over the Rowley Shoals.
6. **Inshore Kimberley:** Globally significant location for Humpback Whales, coastal Dolphins and endangered Sawfish (IUCN Red List).
7. **Big Bank:** Critical spawning ground for endemic Western Rock Lobsters, one of Australia's most valuable fisheries and key ecological feature of Australia's south-west marine life.⁹

The zoning plan for the North-west Marine Reserve Network would be substantial improved by prohibiting oil and gas from operating in those parts of these locations that are currently outside oil and gas leases. This would increase the area protected from mining and exploration for oil and gas from 12% to 22% of the North-west Marine Region.

While it may be too late to change the zoning in the parts of these locations where mining leases have already been granted the zoning scheme for the North-west Marine Reserve Network could be considerably improved by changing the zoning to permanently protect these globally important locations from the threat of oil spills.

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

Centre for Conservation Geography advice: The zoning plan for the North-west Marine Reserve Network should be amended to remove the threat of oil spills from specific globally significant marine habitats within the North-west that are particularly vulnerable to oil spills.

⁹⁰ 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.

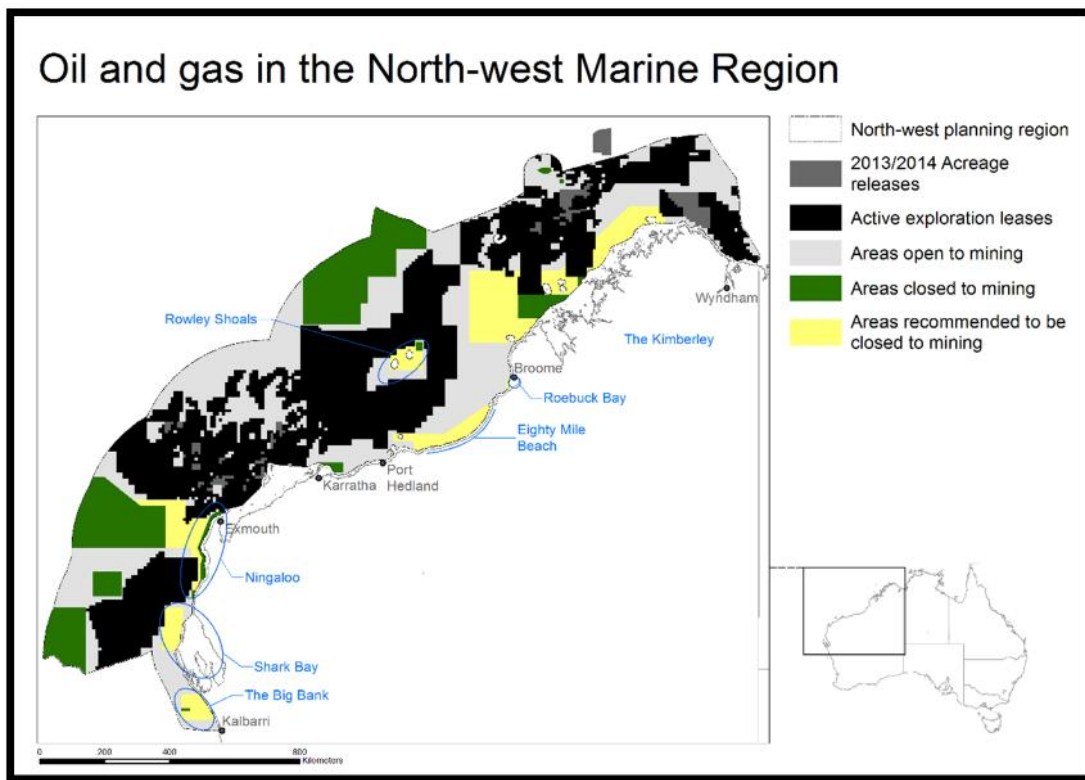


FIGURE 7: OIL AND GAS EXPLORATION AND PRODUCTION IN THE NORTH-WEST MARINE REGION⁹⁴.

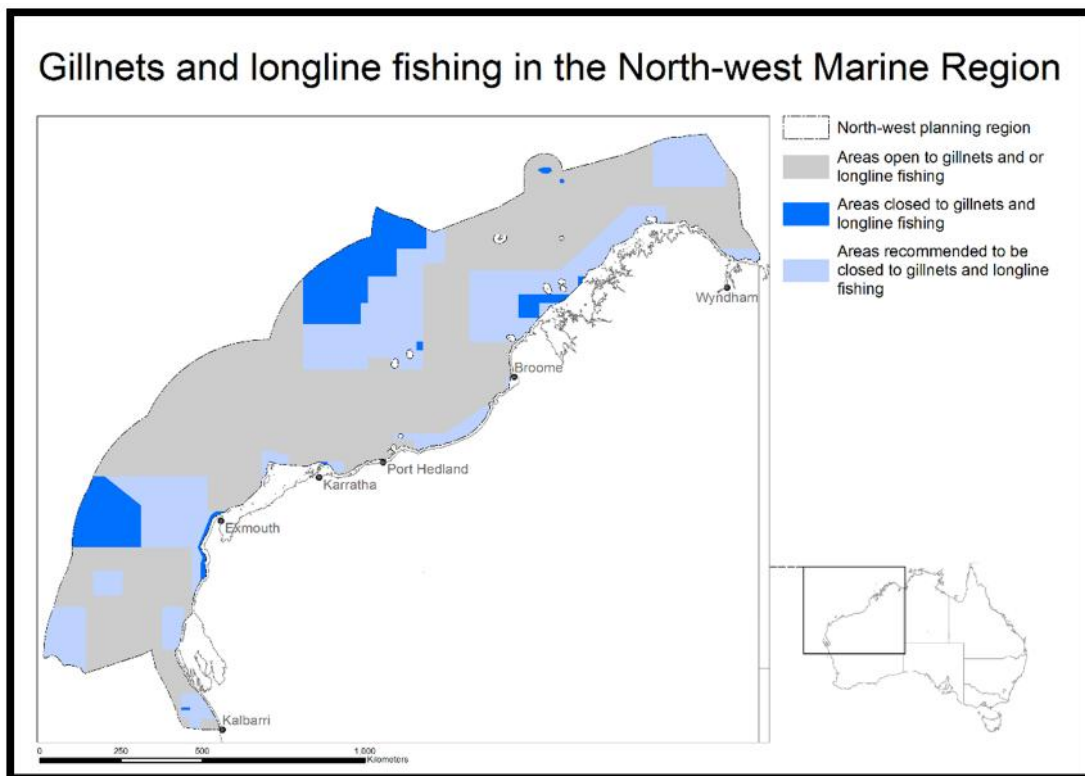


FIGURE 8: AREAS CURRENTLY CLOSED AND RECOMMENDED TO BE CLOSED TO DESTRUCTIVE FISHING PRACTICES IN THE NORTH-WEST MARINE REGION.

1C. DESTRUCTIVE FISHING PRACTICES

The Government's risk assessment report categorizes six fishing practices, demersal trawling, pelagic and demersal longlining and gillnetting, and fish traps as being incompatible with the North-west Marine Reserve Network.¹³ The North-west Marine Reserve Network successfully protects 35% of the North-west from trawling and demersal longlining and gillnetting but a political decision to allow the three other fishing gear types into extensive areas of the marine reserves means that many areas remain at risk from destructive fishing practices. The North-west Marine Reserve Network could be substantially improved by the total removal of pelagic longlining and gillnetting from the marine reserves as has been achieved with trawling and demersal longlining and gillnetting and was recommended by the Government's risk assessment process.

This would significantly improve the protection of marine life and the social and recreational fishing outcomes of the North-west Marine Reserve Network but have minimal impact on the two commercial fisheries that use these gear types. For example the only fishery in the North-west Marine Region to use pelagic gillnetting are the Northern Shark Fisheries^{13,91} These fisheries have been closed for the past five years following the loss of their export licences due to concerns over the ecological damage being caused by the fisheries.⁹¹ As such adjusting the zoning scheme would permanently protect marine life from this destructive fishing practice while having zero impact on the current fishing industry.

Equally the only fishery to use pelagic longlining in the North-west Marine Region is the Western Tuna and Billfish Fishery. This fishery has over 95% latency in both active vessels and proportion of its total allowable catch taken indicating that economic factors are having a much greater impact on the fishery than the existing marine reserves could have.⁹² There is no reason why the fishery would not be able to continue to operate at the residual level it has been operating at for the last ten years outside the marine reserves.

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

Centre for Conservation Geography advice: The zoning plan for the North-west Marine Reserve Network could be substantially improved by removing longlining and gillnetting from all marine reserves as recommended by the Government's fishing gear risk assessment.¹³

⁹¹ Fletcher, W.J. and Santoro, K. (eds). (2013). *Status Reports of the Fisheries and Aquatic Resources of Western Australia 2012/13: The State of the Fisheries*. Department of Fisheries, Western Australia.

⁹² Georgeson, L, Stobutzki, I & Curtotti, R (eds) 2014, *Fishery status reports 2013-14*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra.

1D. OTHER SEABED MINING

The zoning plan for the North-west Marine Reserve Network currently allows seabed mining in 88% of the North-west Marine Region (Figure 9). The seabed mining industry lacks a social licence to operate in Australian waters.⁹³ There are currently four seabed mining applications in the North-west in the Joseph Bonaparte Gulf.⁹⁴ The Joseph Bonaparte Gulf is one of the world's most intact tropical shelf ecosystems⁷ and these proposed mining leases overlap with one of the world's most biologically important intersting habitats for endemic Flatback Turtles and one of Australia's most biologically feeding grounds for endangered Loggerhead and Green Turtles (IUCN Red List) and vulnerable Olive Ridley Turtles.⁹⁵ Local communities do not want mining across such large swathes of our oceans (Figure 9). Unfortunately, the process for granting mining leases in Australia lacks any input from local communities and some of these areas are already suffering under the uncertainty created by companies seeking licences to conduct mining. The North-west Marine Reserve Network could be considerably improved by changing the zoning to protect 35% of the North-west Marine Region from seabed mining (Figure 9).

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

Centre for Conservation Geography advice: The Coral Sea Marine Reserve prohibits any seabed mining operations within the Marine Reserves. This prohibition should be extended to include all Commonwealth Marine Reserves including all the marine reserves in the North-west Marine Reserve Network.

⁹³ CSIRO, 2013. *Testing the waters for seabed mining*, <<http://www.csiro.au/Outcomes/Oceans/Marine-resources-and-development/Blue-resources/Seabed-mining.aspx>>

⁹⁴ Data on mining, petroleum and geothermal leases downloaded from <http://geodownloads.dmp.wa.gov.au/datacentre/datacentreDb.asp>

⁹⁵ Commonwealth of Australia, 2011. *Biologically important areas in the North-west marine region*. <http://www.environment.gov.au/metadateexplorer/full_metadata.jsp?docId={1BCBBFAC-67CF-4363-A690-A4628BB7455E}&loggedIn=false>

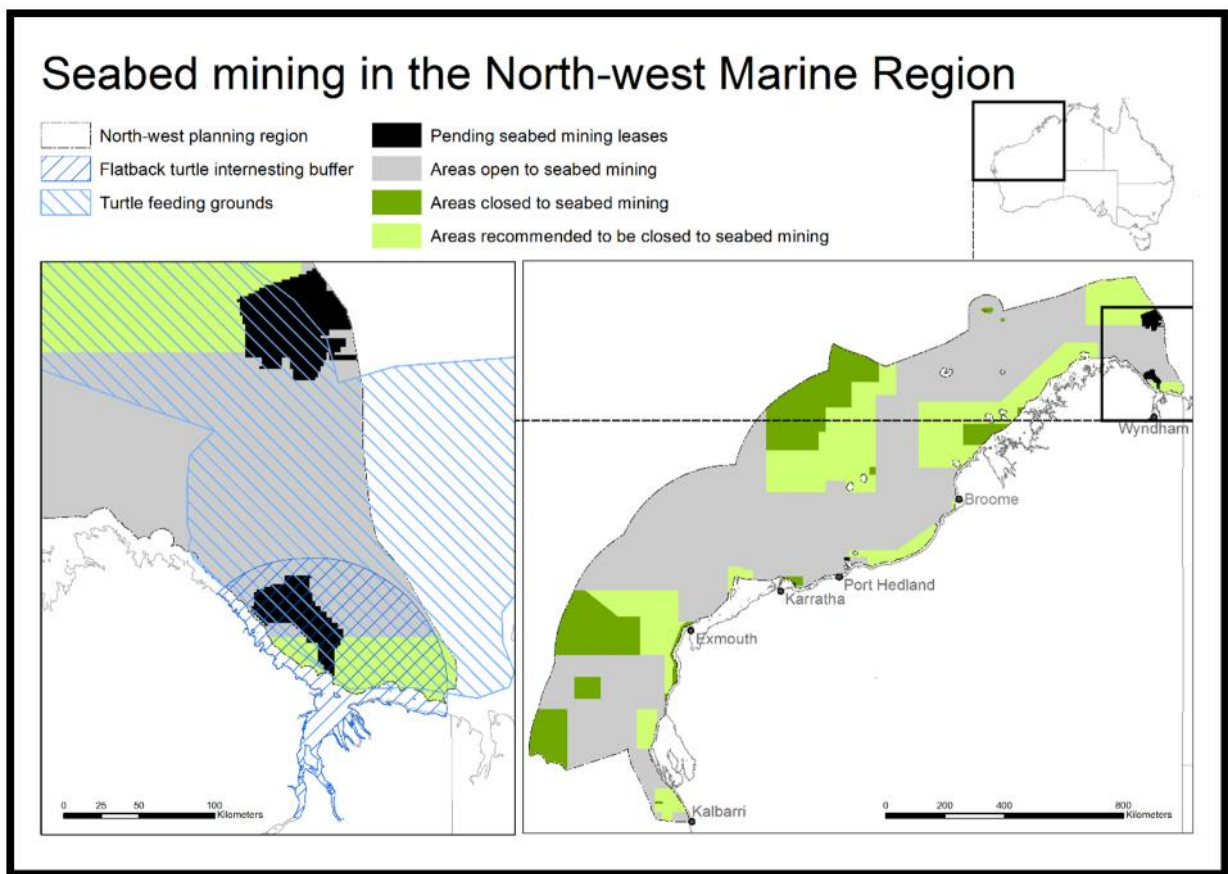


FIGURE 9: SEABED MINING IN THE NORTH-WEST MARINE REGION.

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 as a decision maker rather than a stakeholder within the process.⁹⁶ Even if native title doesn't extend into Commonwealth waters traditional owners and rangers have important cultural, social, environmental and economic perspectives, knowledge and aspirations that need to be better incorporated into the planning process. For example in the Kimberley existing Indigenous 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 (Table 3). Much greater consideration needs to be given to how Indigenous ranger groups could be involved in Commonwealth Marine Reserve decision making and management.

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 Database⁹⁷, or The National Recreational and Indigenous Fishing Survey⁹⁸ for recreational fishing activities, or the Atlas of Australian Marine Fishing and Coastal Communities⁹⁹ for commercial fishing or the economics of marine protected areas by the Allen Consulting Group¹⁷ 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 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.

⁹⁶ 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.

⁹⁷ See <http://www.dpi.nsw.gov.au/fisheries/recreational/saltwater/gamefish-tagging> for more information.

⁹⁸ 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.

⁹⁹ 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.

TABLE 3: COMMONWEALTH MARINE RESERVES AND INDIGENOUS GROUPS WITH OVERLAPPING, ADJACENT, OR CLOSEST SEA COUNTRY SUBJECT TO NATIVE TITLE DETERMINATIONS OR REGISTERED NATIVE TITLE APPLICATIONS.¹⁰⁰

Commonwealth Marine Reserves in the Kimberley	Indigenous groups with overlapping, adjacent, or closest sea country subject to Native Title determinations or registered Native Title applications.
Joseph Bonaparte Gulf	Miriuwung-Gajerrong, Balangarra.
Oceanic Shoals	Balangarra, Wanumbal-Gaambera.
Kimberley	Wanumbal-Gaambera, Dambimangari, Mayala, Bardi and Jawi, Nyul Nyul (Bundibur), Jabbir Jabbir, Djabera Djabera.
Ashmore Reef & Cartier Island	Wanumbal-Gaambera, Dambimangari, Mayala, Bardi and Jawi, Nyul Nyul, Jabbir Jabbir, Djabera Djabera.
Roebuck	Yawaru (Rubibi).
Eighty Mile Beach	Ngamuyumarta, Ngarla, Karajarri.
Argo-Rowley Terrace	Ngamuyumarta, Ngarla, Karajarri, Yawaru (Rubibi).
Dampier	Ngarluma/Yindjabarni, Yaburara and Madudhunera people.
Montebello	Ngarluma/Yindjabarni, Yaburara and Madudhunera people, Kurama Marthudunera.
Ningaloo and Gascoyne	Gnulli.
Canarvon Canyon	Gnulli, Malgana.
Shark Bay	Malgana.
Wallaby Saddle (Abrolhos Marine Reserve)	Malgana, Gnulli.
Big Bank (Abrolhos Marine Reserve) ¹⁰¹	Nanda people.

¹⁰⁰ 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.

¹⁰¹ Please note this table only refers to traditional owner groups potentially associated with those part of the Abrolhos marine protected area that fall within the North-West commonwealth marine planning region.

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.⁴⁶ Researchers in fact found considerable evidence of both return and new visitors engaging in recreational fishing within the marine park.⁴⁴ 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.^{102, 103, 104}

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.^{45, 46, 104, 39, 44, 40, 105,}

¹⁰² 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

¹⁰³ 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>

¹⁰⁴ DERM (2012) *Moreton Bay Marine Park monitoring program February 2012*, DERM, State of Queensland

¹⁰⁵ 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

^{41, 106} 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.¹⁰⁶ 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.¹⁰⁶ 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.⁴⁵ 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.¹⁰⁷

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.⁴³

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

¹⁰⁶ 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

¹⁰⁷ 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. Members of the recreational fishing and diving communities are already involved in data collection in the North-west for example in dive based surveys for Reef Life Survey¹⁰⁸ and for the NSW Game Fishing Tagging Database⁹⁷ and Redmap¹⁰⁹. These opportunities for involvement should be expanded as part of the ongoing engagement with regional stakeholders in the management of the North-west Marine Reserve Network.

¹⁰⁸ See <http://reeflifesurvey.com/> for more information.

¹⁰⁹ See <http://www.redmap.org.au/> 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. 2014⁵⁹; Lubchenco et al. 2003¹¹⁰; Ballantine 1991¹¹¹). Currently Marine National Park Zones are the only zones within the North-west Marine 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^{54, 55, 56, 57, 58, 59, 60} 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.¹² 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 2030.¹¹²

In general the zoning plan for the North-west Marine Reserve Network contains too many multiple use and habitat protection zones which fail to protect marine life from destructive fishing practices and/or seabed mining and too few Marine National Park Zones particularly on the shelf and upper slope. It is particularly problematic that all of the partially protected zones fail to exclude one or more fishing practices classed as incompatible with the North-west marine reserves by the Government's risk assessment process.¹³ The Centre for Conservation Geography considers that almost all areas within the existing Habitat Protection, Multiple Use and Special Purpose 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.¹³ 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 North-west Marine Reserve Network are designed primarily to fulfil the following policy objectives:

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

¹¹⁰ 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

¹¹¹ Ballantine WJ (1991) *Marine Reserves for New Zealand*, University of Auckland, Auckland, New Zealand.

¹¹² 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.

infrastructure for one of the major industries active in the North-west 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 North-west Marine Reserve Network to bring the number and size of Marine National Park Zones into line with the recommendations of Australia's science community and recent scientific research (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.

HABITAT PROTECTION ZONES

The North-west Marine Reserve Network contains six Habitat Protection Zones over the Wallaby Saddle, Carnarvon Canyon, the Dampier Archipelago, the entrance to King Sound in the Kimberley, at Gnarloo Bay in Ningaloo and in the deep ocean west of Ningaloo. The boundaries of the Habitat Protection Zones appear to be designed to recognise those locations where the Australian mining industry have signalled that they will have no future interests. These zones are an improvement over the other partially protected zones in the North-west in excluding mining and all but three of the fishing practices classed as incompatible with the North-west Marine Reserve Network by the Government's risk assessment process. These three fishing practices are pelagic longlining, pelagic gillnetting and fish trapping.

The only fishery to benefit from continuing to allow pelagic longlining is the Western Tuna and Billfish Fishery. This fishery has over 95% latency in both active vessels and the proportion of its total allowable catch taken indicating that economic factors are having a much greater impact on the fishery than the North-west Marine Reserve Network could have.¹¹³ There is no reason why the fishery would not be able to continue to operate at the residual level it has been operating at for the last ten years outside the Habitat Protection Zones. Allowing this fishery to continue to operate in the Habitat Protection Zones unnecessarily compromises the conservation values of the area for no economic benefit.

Equally the only fishery in the North-west Marine Region to use pelagic gillnetting are the Northern Shark Fisheries^{13,113} These fisheries have been closed for the past five years following the loss of their export licences due to concerns over the ecological damage being caused by the fisheries.⁹¹ As such adjusting the zoning scheme would permanently protect marine life from this destructive fishing practice while having zero impact on the current fishing industry.

There are two fisheries utilising fish traps within the North-west Marine Reserve Network in the Kimberley and Pilbara. However the areas of high fishing effort in these fisheries have almost no overlap with the North-west Marine Reserve Network.^{25, 91}

Centre for Conservation Geography advice:

1. Change the six Habitat Protection Zones to Conservation Park Zones.

¹¹³ Fletcher, W.J. and Santoro, K. (eds). (2013). *Status Reports of the Fisheries and Aquatic Resources of Western Australia 2012/13: The State of the Fisheries*. Department of Fisheries, Western Australia.

MULTIPLE USE ZONES

The North-west Marine Reserve Network contains ten Multiple Use Zones stretching right across the network. The Multiple Use Zones allow seabed mining, oil and gas mining, pelagic longlining, pelagic gillnetting and fish trapping. 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 and longlining 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. While it may be too late for those locations where oil and gas exploration leases have already been allocated (Figure 7) mining and mining exploration should not be allowed within marine reserves outside these existing exploration leases.

As outlined in the section on Habitat Protection Zones above there is no reason why the pelagic longlining, pelagic gillnet and fish trapping fisheries would not be able to continue to operate at the same as level as they currently do outside the Multiple Use Zones. Allowing these fisheries to continue to operate in the Multiple Use Zones unnecessarily compromises the conservation values of the area for no economic benefit.

Centre for Conservation Geography advice:

1. Remove approval for pelagic longlining, pelagic gillnetting and fish trapping to continue to operate within Multiple Use Zones within the North-west Marine Reserve Network.
2. Change Multiple Use Zones outside of existing oil and gas exploration leases to Conservation Park Zones.

SPECIAL PURPOSE ZONES

A single Special Purpose Zone within the Abrolhos Marine Reserve extends from the South-west Marine Region into the North-west Marine Region. See discussion of Special Purpose Zones in CCG Report on the South-west Marine Reserve Network for recommendations on this zone.¹¹⁴

¹¹⁴ Beaver, D., Turner, J., Keily, T., and Douglass, L., 2015. *The South-west Marine Reserve Network: Centre for Conservation Geography Report to the Australian Government's Marine Reserves Review.*

6. RESEARCH PRIORITIES

Future priorities for scientific research and monitoring on marine biodiversity for the North-west 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 the Ningaloo Canyons, the North-west Atolls and demersal slope fish communities and biologically important areas like feeding grounds for seabirds and inter-nesting habitats for Sea Turtles.
2. Shelf ecosystems, particularly biologically important areas like breeding and feeding grounds for Sawfish, Sea Turtles, Dugong, Dolphins and seabirds.
3. Key ecological features and biologically important areas particularly for key species or locations like Glomar Shoals, deep sea canyons, Wallaby Saddle and feeding and breeding areas for marine mammals, turtles, sharks and seabirds.

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 North-west 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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