



14 March 2018
NT Coastal and Marine Management Strategy
PO Box 496
Palmerston NT 0832
marinecoastal.strategy@nt.gov.au

Dear Sir/Madam

As members of the Ocean Science Council of Australia (OSCA), we thank you for the opportunity to comment on the Northern Territory Coastal and Marine Management Discussion Paper released in February 2018. OSCA is an internationally recognised group of university-based and independent marine researchers with direct expertise in relation to the development of marine policy and its implementation, such that it is based on sound science, and is precautionary. We also have significant expertise in marine protected areas. We note that this Discussion Paper frames an approach to coastal and marine management and will be followed by a more specific Implementation Plan. We look forward to providing comment on the specific proposals and in this submission, we thus provide some general recommendations.

The NT Coastal and Marine Management Discussion Paper is an important step forward for the Northern Territory, Australia and indeed internationally. The NT's coastal waters are near-pristine and are some of the least impacted in the world. As such, the rich mix of habitats in the Top End are important refuges for many threatened coastal and marine species impacted by habitat losses elsewhere. This status is largely due to low population numbers and limited economic development, but this is rapidly changing with the expanding industrialisation of the region.

Some examples of the Top End's key coastal and marine values include:

- the more than 50 mangrove species that make the Top End's mangrove forests more diverse than those in any other part of Australia and provide 40% of the nation's mangrove cover;
- critical migratory shorebird and seabird habitat including extensive tidal mudflats and long-isolated offshore islands that provide sites for rookeries of threatened seabirds;
- seagrass meadows hosting dugongs and storing blue carbon;

- extensive mudflats and rivers that are habitat for speartooth and northern river sharks, two of the rarest shark species in the world, and the green, narrow, largetooth and dwarf sawfishes;
- sponge gardens in Darwin Harbour including more than 800 species and a home for four of the world's 11 giant clam species;
- 27 sites of international conservation significance along the Top End's 11,000-kilometres coastline including the Kakadu coast and Cobourg Peninsula, Anson, Fog and Shoal bays, Howard sand plains, Darwin Harbour, the Wessel Islands, Arafura Swamp and Limmen Bight. Recorded across these sites are:
 - at least 45 threatened animal species and 33 threatened plant species.
 - six of the world's seven marine turtle species, feeding and breeding in the region;
 - orcas, humpback whales and dolphin species including Australia's only endemic dolphin, the Australian snubfin dolphin
 - the saltwater crocodile, which in the 1970s was almost hunted to extinction and is now recovering.

Guiding Principles

When announcing its election commitment to a Coastal and Marine Management Strategy, NT Labor emphasised that it would be:

...a science based and consultative approach to management and conservation, involving all stakeholders. Commencing in 2018, the plan will safeguard our coasts—boosting recreational fishing opportunities, preventing damaging pollution, fostering sustainable industries and safeguarding the Territory's lifestyle¹.

As researchers, we recognise the fundamental importance of traditional ecological knowledge and effective stakeholder engagement. Our recommendations here are however restricted to our collective areas of expertise with respect to the ecological and economic evidence, is essential to ensure effective and appropriate decision making, especially in the planning and management of coasts and seas. The Coastal and Marine Management Strategy and its Implementation Plan should be underpinned by key scientific principles of the precautionary principle, ecological sustainable development, ecosystem-based management and marine spatial planning, and also quantify cumulative impacts.

Precautionary Principle

When human activities may lead to unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm. Examples of unacceptable harm with respect to the environment refers to harm that is:

- threatening to human life or health, or
- serious and effectively irreversible, or
- inequitable to present or future generations, or
- imposed without adequate consideration of the human rights of those affected.

¹ Territory Labor (2016) loc. cit.

Ecologically Sustainable Development

- ensure effective integration of both long-term and short-term economic, environmental, social and equitable considerations in decision-making processes;
- ensure that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- uphold the principle of intergenerational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
- ensure that the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making;
- promote improved valuation, pricing and incentive mechanisms.

Ecosystem-based management

- maintain ecological processes e.g. water and nutrient flows, community structures and ecosystem links;
- maintain biological diversity, including the capacity for evolutionary change;
- maintain viable populations of all native species in functioning biological communities;
- manage the human resource use and minimise its impacts so as not degrade ecosystem function; and
- assess direct, indirect and cumulative impacts of human actions on ecosystems.

Marine spatial planning

- maintain or restore species diversity, habitat diversity and heterogeneity, populations of key species and connectivity;
- account for context and uncertainty;
- enhance ecological sustainability while seeking to balance ecological, social, economic, and governance objectives;
- ensure management areas are large enough to incorporate relevant ecosystem processes;
- address interrelationships and interdependence within the management area, including natural processes, activities and authorities; and
- integrate with statutory planning schemes of coastal municipalities.

Cumulative impacts

- The total impact arising from the project (under the control of the developer), other activities (that may be under the control of others, including other developers, local communities, government) and other background pressures and trends which may be unregulated. The project's impact is therefore one part of the total cumulative impact on the environment. The analysis of a project's incremental impacts combined with the effects of other projects can often give a more accurate understanding of the likely results of the project's presence than just considering its impacts in isolation. It should also set in train a process for establishing a network of marine national parks,

the primary role of which is biodiversity conservation and all this entails in terms of resilience and knowledge building².

Implementing Effective Spatial Management and the NRSMPA

A key component of spatial planning is the establishment of marine parks. There is broad consensus across the international marine research community on the importance of fully protected marine parks in delivering conservation and economic outcomes. Establishing fully protected marine parks would be positive for Indigenous communities in terms of environmental, cultural and social outcomes, attract tourism to regional areas of the NT, bringing much needed economic activity and jobs. Unspoilt natural landscapes and wildlife interactions are a key drawcard for the growing high-end tourism market.

Research shows that the number of fish species and the size of fish increase inside fully protected marine parks, and larvae and adult spill across their boundaries. Fully protected marine parks also increase the resilience of marine life to climate change, and their protected marine life recovers more quickly than that in partially and unprotected areas following damage from floods and coral bleaching and resist climate “invaders”. Resilience to climate change is particularly critical for the NT as its fish assemblages are expected to be particularly hard hit with warming oceans. Fully protected marine parks also accelerate the recovery of fisheries after natural or human-induced declines in fish populations, an important economic benefit. Of note are the clear benefits generated for the Great Barrier Reef Marine Park following the expansion of its fully protected marine park areas (green zones) to 33% under the 2004 Representative Areas Program as documented in McCook et al. (2010). Fully protected marine parks, acting as reference areas, also allow the science community to provide advice to government on the status of the marine environment and the effectiveness of management.

This year marks the 20th anniversary of the Australian, state and Northern Territory governments agreeing to establish the National Representative System of Marine Protected Areas (NRSMPA). Since that time, each jurisdiction has made varying degrees of progress towards it, but the number, size and protection levels of the marine protected areas vary considerably and their networks incomplete.

Australia’s Commonwealth waters now have 60 marine parks, South Australian waters 19, Western Australia 18, Victoria 30, Tasmania seven, NSW six and Queensland three (although the three together cover more than 70,000 square kilometres). The Northern Territory has declared only one new park, Limmen Bight Marine Park, since 1998 (its only other, Cobourg Marine Park, dates back to 1983). The Territory thus has a tremendous opportunity to ensure that its network of marine parks reflects the wealth of evidence and knowledge that has accrued as its network is implemented.

² United Nations 2018 ‘Biodiversity terms’, <<http://www.biodiversitya-z.org/content/cumulative-impacts>>.

Table 1 Implementation of the NRSMPA in each Australian state and the Northern Territory

Jurisdiction	Coastal waters	No. of MPAs	Area of MPAs (ha)	% of coastal waters in MPAs	% of coastal waters in no-take
Queensland	12,199,400	3	7,218,680	59.2	14.0
NSW	880,200	6	346,820	39.4	7.5
Victoria	1,021,300	30	121,137	11.9	5.2
Tasmania	2,235,700	7	135,133	6.0	4.9
South Australia	6,003,200	19	2,920,360	45.8	6.0
Western Australia	11,574,000	18	4,703,479	40.6	8.1
Northern Territory	7,183,900	2	317,400	4.4	0.97

Decades of research have shown that marine parks that deliver conservation and economic benefits share specific characteristics:

(1) *They offer full rather than partial protection to extractive activities.*

Areas of marine parks that allow some form of fishing do not afford the same level of protection as marine national parks. The reduced levels of protection result in reduced conservation outcomes (Denny and Babcock 2004; Shears et al. 2006; Lester and Halpern 2008; Di Franco et al. 2009; Sciberras et al. 2015). In particular, Sciberras et al. (2015) concluded that “while [partially protected areas] PPAs significantly enhance density and biomass of fish relative to open areas, NTRs [no-take reserves] yielded significantly higher biomass of fish within their boundaries relative to PPAs.” Edgar et al. (2014), in their seminal paper in *Nature*, concluded that “no-take” is a critical feature of successful marine reserve in generating biodiversity outcomes and Australia’s peak marine science body, the Australian Marine Sciences Association (AMSA), made clear in its submission to the review of Commonwealth Marine Reserves that “Any rezoning to include more habitat protection, even if ‘better’ than general use, is still not no-take and therefore cannot be considered to satisfy CAR principles”⁴. It should be emphasised that management zones open to fishing within marine reserves are of little use to assess the effects of fishing and efficacy of fishery management outside of reserves. Finally, there is a considerable and growing body of scientific evidence that suggests that partial protection has greater management costs than full protection, while generating much less in the way of meaningful, measurable conservation outcomes than MNPZ (Ban et al. 2011, Sciberras et al. 2015).

(2) *Big, remote and continuous.*

In addition to finding that effective marine parks were fully protected, Edgar et al. (2014) found that meaningful conservation outcomes required that marine parks should be continuous, isolated and large. Large and intact marine national parks are also necessary to protect relatively mobile species such as tuna and oceanic sharks (Koldewey et al. 2010; Wilhelm et al. 2014) and turtles (Scott et al. 2012).

(3) ***Networks of marine parks are Comprehensive, Adequate and Representative***

Well-designed networks of marine parks satisfy three key principles. They are:

- i. *Comprehensive* such that the network includes a full range of ecosystems at an appropriate scale within and across each marine bioregion. As a minimum, each ecosystem within each of the Top End's 13 marine bioregions would be inside at least one fully protected marine national park zone.
- ii. *Adequate* such that the required level of reservation to ensure the ecological viability and integrity of populations, species and communities. A Top End marine national park zone should be as large as possible and include the whole of the feature it aims to protect i.e. reef, threatened species aggregation site, spawning site, critical habitat, upwelling zone, canyon. More than one example of each should be protected.
- iii. *Representative* such that areas selected reflect the biotic diversity of their marine ecosystems. The range of different habitats within Top End marine ecosystems should be included in marine national park zones. This should include rare, endangered or unique communities and species.

The size, number, spacing and shape of conservation zones, their protection of critical habitats and the maintenance of connectivity and ecosystem function are also important considerations in network design. In 2009, the University of Queensland's Ecology Centre (The Ecology Centre, 2009) worked with more than 40 marine scientists to develop a comprehensive set of MPA design principles³ for Australia:

- i. Biodiversity primacy: Nature conservation and maintenance of ecological integrity are the primary outcomes for the MPA network;
- ii. Management constraints: Recognition of the constraints in the likely management arrangements, and the need to minimise management costs consistent with achieving effective biodiversity conservation;
- iii. Multiple objectives: Low-impact uses may be permitted in an MPA system within appropriate management zones, providing that biodiversity conservation outcomes and protection of ecological integrity can be demonstrated;
- iv. Managing the threats: The location of MPAs should avoid or minimise exposure to any known and potential threats to the biodiversity;
- v. Monitoring, assessment and reporting: to confirm the effectiveness of the MPA design, and provide reference areas for assessing impacts; and
- vi. Stakeholder engagement: Wide engagement with stakeholders is required in selection, declaration, zoning and management to ensure that robust local and traditional knowledge is used in the design/planning, and that existing use rights and potential threats are considered in the planning process.

Conclusion

At a time when oceans are under increasing pressure from overexploitation, climate change, industrialisation, and plastics and other forms of pollution, building resilience through a strong backbone of fully protected

³ The Ecology Centre 2009 *Scientific principles for design of marine protected areas in Australia*, The Ecology Centre, University of Queensland, St Lucia.

marine parks is well supported by decades of science. Experience also shows that stakeholders support marine national parks as they observe their benefits, both in terms of commercial fisheries (Goñi et al. 2010), recreational fisheries (Pascoe et al. 2014, Arias and Sutton 2013), tourism (Vianna et al. 2012) and education (Angulo- Valdes et al. 2010).

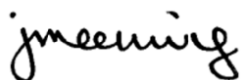
Decision-makers and the community value evidence-based policy. At a time of rapid environmental change, there is a great need for responsive management underpinned by strong science. This should embrace the need for representative and replicated marine national parks of adequate size, provide clear direction recommending scientific monitoring of zoning effectiveness, and allocate essential resources for science and enforcement. An appropriately designed and scientifically based network can co-exist alongside important marine industries and other human activity for mutual benefit and in support of our blue economy.

The finalisation of the strategy remains a remarkable opportunity for the Territory Government to strengthen the levels of marine protection and to do so on the back of strong evidence. OSCA recommends that the Coastal and Marine Management Strategy and Implementation Plan should, if they are to be science based, support:

- a comprehensive, adequate and representative network of jointly managed marine national parks for the Territory's coastal waters designed to maximise biodiversity conservation while minimising any social and economic effects;
- scientific monitoring of the effectiveness of marine national parks;
- a central role for Traditional Owners in the management of marine national parks; and
- adequate resources for scientific research, evaluation, enforcement and compliance
- capacity building for Indigenous ranger groups, who provide the most cost-effective marine management in the Top End.

Yours sincerely

For the Ocean Science Council of Australia, with additional Australian and international signatures to follow:



Jessica Meeuwig Professor of Marine Science and Director, Centre for Marine Futures, Oceans Institute, University of Western Australia.



Chris Daniels Professor of Biology, Division of Health Sciences, University of South Australia

David Booth Professor of Marine Ecology and Director of Centre for Environmental Sustainability, University of Technology Sydney.

Ove Hoegh-Guldberg FAA Director of the Global Change Institute and Professor of Marine Science at the University of Queensland.

Craig Johnson Head of Ecology and Biodiversity Centre, and Associate Director, Institute of Marine and Antarctic Studies, University of Tasmania

The Ocean Science Council of Australia (OSCA): *OSCA is an independent group of highly-recognised researchers with specialist knowledge about the oceans. We are based around Australia with expertise in a variety of disciplines - marine ecology, environmental law, economics, and sociology. Our mission is to ensure that policy is knowledge based – informed by the latest science – and to provide independent advice on the major opportunities and challenges for Australia’s oceans.*

References cited

- Angulo-Valdes JA, Hatcher BG 2010 A new typology of benefits derived from marine protected areas, *Mar. Policy* **34 (3)**:635–644.
- Arias A, Sutton SG 2013 Understanding recreational fishers' compliance with no-take zones in the Great Barrier Reef Marine Park, *Ecology and Society* **18**:1–9.
- Ban NC, Adams V, Pressey RL, Hicks J, 2011. Promise and problems for estimating management costs of marine protected areas. *Conservation Letters*, **4**: 241–252.
- Denny CM, Babcock RC, 2004. Do partial marine reserves protect reef fish assemblages? *Biological Conservation* **116**: 119–129.
- Di Franco A, Bussotti S, Navone A, 2009. Evaluating effects of total and partial restrictions to fishing on Mediterranean rocky-reef fish assemblages. *Marine Ecology Progress Series* **387**: 275–85.
- Edgar GJ, Stuart-Smith R, Willis TJ, Kininmonth S, Baker SC, Banks S, Barrett NS, Becerro MA, Bernard ATF, Berkhout J, Buxton C, Campbell SJ, Cooper AT, Davey M, Edgar SC, Forsterra G, Galvan D, Irigoyan AJ, Kushner DJ, Moura R, Parnell P, Shears NT, Soler G, Strain EMA, Thomson RJ, 2014

- Global conservation outcomes depend on marine protected areas with five key features, *Nature*, **506**:216–223.
- Goñi R, Hilborn R, Diaz D 2010 Net contribution of spillover from a marine reserve to fishery catches, *Marine Ecology Progress Series*, **400**:233–243.
- Koldewey HJ, Curnick D, Harding S, Harrison LR, Gollock M 2010 Potential benefits to fisheries and biodiversity of the Chagos Archipelago/British Indian Ocean Territory as a no-take marine reserve, *Mar. Poll. Bull.*, **60**:1906–1915.
- Lester S, Halpern B, 2008. Biological responses in marine no-take reserves versus partially protected areas. *Marine Ecology Progress Series* **367**: 49–56.
- McCook LJ, Ayling T, Cappo M, Choat JH, Evans RD, De Freitas DM, Heupel M, Hughes TP, Jones GP, Mapstone B, 2010. Adaptive management of the Great Barrier Reef: A globally significant demonstration of the benefits of networks of marine reserves. *Proceedings of the National Academy of Sciences* 107:18278-18285.
- O'Leary BC, Winther-Janson M, Bainbridge JM, Aitken J, Hawkins JP, Roberts CM 2016 Effective coverage targets for ocean protection, *Conservation Letters*, DOI: 10.1111/conl.12247
- Pascoe S, Doshi A, Dell Q, Tonks M, Kenyon R 2014 Economic value of recreational fishing in Moreton Bay and the potential impact of the marine park rezoning, *Tourism Management*, **41**:53–63.
- Scott R, Hodgson DJ, Witt MJ, Coyne MS, Adnyana W, Blumenthal JM, Broderick AC, Canbolat AF, Catry P, Ciccione S, Delcroix E, Hitipeuw C, Luschi P, Pet-Soede L, Pendoley K, Richardson PB, Rees AF, Godley, BJ 2012 Global analysis of satellite tracking data shows that adult green turtles are significantly aggregated in Marine Protected Areas, *Global Ecology and Biogeography*, **21**:1053–1061.
- Shears N, Grace R, Usmar M, Kerr V, Babcock R, 2006. Long-term trends in lobster populations in a partially protected vs. no-take marine park. *Biological Conservation* **132**: 222–231.
- Sciberras M, Jenkins SR, Mant R, Kaiser MJ, Hawkins SJ, Pullin AS, 2015. Evaluating the relative conservation value of fully and partially protected marine areas. *Fish and Fisheries* **16(1)**: 58–77.
- The Ecology Centre, The University of Queensland 2009 Scientific Principles for Design of Marine Protected Areas in Australia: A Guidance Statement.
- Wilhelm TA, Sheppard CRC, Sheppard ALS, Gaymer CF, Parks J, Wagner D, Lewis Na, 2014. Large marine protected areas – advantages and challenges of going big. *Aquatic Conservation: Marine and Freshwater Ecosystems* **24**:24-30.