Australian Marine Science Association

Submission to:

Commonwealth Marine Reserves Review Committee

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Commonwealth Marine Reserves Review

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Introduction

This submission, to the Australian Government's review of Australia's national system of marine protected areas (MPAs), is presented by the Australian Marine Science Association (AMSA). It will be based on marine science and does not review socioeconomic issues in MPAs planning. The MPAs proposed by the Commonwealth are for conserving marine biological diversity and AMSA does not include comments on the use of these MPAs for managing fisheries. Our submission is limited to the current marine reserve proposal, so excludes other processes such as the previous rezoning of the Great Barrier Reef Marine Park.

AMSA maintains a position statement on MPAs, which synthesis our general view and this can be found at:
https://www.amsa.asn.au/sites/default/files/AMSA_MPA_PositionStatement_June2012_final.pdf

AMSA supports the policy, as has the Commonwealth, that MPAs should be designed along the International Union for Conservation of Nature (IUCN) principles of comprehensiveness, adequacy and representativeness (CAR). These principles are found in: http://www.iucn.org/about/work/programmes/global_policy/gpu_our_work/sustainable_development_goals/.

Planning goals and principles for Commonwealth Marine Protected Areas

The EPBC Act (1999) fulfils Australia's obligations as a signatory to the Convention on Biological Diversity (CBD) (United Nations Environment Programme, 1994) and the major

components of the Q2 Jakarta Mandate developed under that Convention. Australia committed to the target in the World Summit on Sustainable Development Plan of Implementation laid out in the CBD's Programme of Work on protected areas as follows: *The establishment and maintenance .....by 2012 for marine areas of comprehensive effectively managed and ecologically representative national and regional systems of protected areas that collectively,* inter alia *through a global network, contribute to achieving the three objectives of the Convention and the 2012 target to significantly reduce the current rate of biodiversity loss at the global, regional, national and sub-national levels and contribute to poverty reduction and the pursuit of sustainable development* (Wells et al., 2008).

The goals

Four goals to maximise conservation outcomes guided the identification of areas suitable for inclusion in the NRMSPA see: http://www.iucn.org/about/work/programmes/global_policy/gpu_our_work/sustainable_development_goals/. These goals apply nationally, and they guide identification of representative marine reserves in all the marine regions. Additionally, a number of supporting principles should assist in determining the location, selection (when more than one option to meet the goals is available), design and zoning of suitable areas.

Provincial bioregions were chosen by the Integrated Marine and Coastal Regionalisation of Australia (IMCRA) in a spatial framework for classifying Australia's marine environment. These bioregions are the result of scientific analysis that has classified Australia's marine environment into 41 broadly similar ecological regions.

Goal 1 - Each provincial bioregion occurring in the marine region should be represented at least once in the marine reserve network. Priority will be given to provincial bioregions not already represented in the National Representative System.

Goal 2 - The marine reserve network should cover all depth ranges occurring in the region or other gradients in light penetration in waters over the continental shelf.

Goal 3 - The marine reserve network should seek to include examples of benthic/demersal **biological** features (for example, habitats, communities, sub-regional ecosystems, particularly those with high biodiversity value, species richness and endemism) known to occur in the marine region at a broad sub provincial (greater than hundreds of kilometres) scale.

Goal 4 - The marine reserve network should include all types of seafloor features. There are 21 seafloor types across the entire EEZ. Some provincial bioregions will be characterised by the presence of a certain subset of features, such as continental slope or seamounts. The outstanding case of submarine canyons, which have some remarkable features (e.g. Bremer Canyon in SW WA where whales aggregate) should also be covered.

The Principles

Using the four goals, the following location principles were applied:

Principal 1. Marine reserves will be located taking into account the occurrence and location of existing spatial management arrangements (for example, existing protected areas and sectoral measures) that contribute to the goals.

Principal 2. The goals should be met with the least number of separate marine reserves (that is, a smaller number of larger marine reserves rather than many small marine reserves) to maximise conservation outcomes.

Where different options that meet the goals exist, the following selection principles should be considered in selecting areas suitable for inclusion in the NRSMPAs.

Principal 3. The capacity of a marine reserve to mitigate identified threats to conservation values.

Principal 4. The occurrence of spatially defined habitats for and/or aggregations of threatened and/or migratory species.

Principal 5. The occurrence of ecologically important pelagic features which have a consistent and definable spatial distribution.

Principal 6. The occurrence of known small-scale (tens of kilometres) ecosystems associated with the benthic/demersal environment.

Principal 7. Relevant available information about small-scale distribution of sediment types and sizes and other geo-oceanographic variables.

Principal 8. Occurrence of listed heritage sites (where inclusion in the marine reserve network would improve administration of protection regimes).

Principal 9. Socio-economic costs should be minimised.

Once the broad location of marine reserves has been determined, the following design principles should be applied to further refine the size and shape of individual marine reserves:

Principal 10. Individual areas should, as far as practicable, include continuous depth transects (for example, from the shelf to the abyss).

Principal 11. Whole sea floor features (such as geomorphic features) should be included.

Principal 12. Features should be replicated wherever possible within the system of marine reserves (i.e., included more than once).

Principal 13. Size and shape should be orientated to account for inclusion of connectivity corridors and biological dispersal patterns within and across marine reserves.

Principal 14. Boundary lines should be simple, as much as possible following straight latitudinal/longitudinal lines.

Principal 15. Boundary lines should be easily identifiable, where possible coinciding with existing regulatory boundaries.

Principal 16. The size and shape of each area should be set to minimise socio-economic costs.

For each area identified as a candidate marine reserve, specific conservation objectives should be set. Area-specific conservation objectives reflect the four goals. For example, they may relate to the integrity of bioregional characteristics (Goal 1) or of specific large-scale biological features (Goal 3) that the area aims to represent. They may also relate to other relevant principles, such as the integrity of habitat important for a threatened species (Principle 4).

To accommodate climate change as far as practicable, design principles and zoning that promote resilience and adaptation should be incorporated. In particular, accommodating latitudinal or longitudinal movement in ecosystem or species distributions and changes in oceanographic features and currents, should be anticipated in response to climate change.

Because zoning of marine reserves (that is, the allocation of appropriate management regimes to different areas) has the potential to affect the socio-economic costs associated with the establishment of any marine reserve, the Australian Government recognised the importance of addressing zoning considerations as early as possible in the process. The following zoning principles were applied in developing the regional systems of marine reserves:

1. Zoning was based on the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)/the World Conservation Union (IUCN) categories of protection.

2. The regional marine reserve network aimed to include some highly protected areas (IUCN Categories I and II) in each provincial bioregion.

3. Zoning was based on the consideration of the threat that specific activities pose to the conservation objectives of each marine reserve.

4. Zoning of marine reserves sought to ensure that the conservation objectives of the area were protected, taking into account a precautionary approach to threats and the relative costs and benefits (economic, social and environmental) of different zoning arrangements.

Under the EPBC Act marine reserves must be assigned to an IUCN category. The IUCN categories relevant to Commonwealth marine reserves are:

- National Park (IUCN II): protected and managed to preserve its natural condition. Sometimes known as a marine sanctuary zone or no-take area.
- Habitat/species management area (IUCN IV): managed primarily, including (if necessary) through active intervention, to ensure the maintenance of habitats or to meet the requirements of specific species
- Managed resource protected area (IUCN VI): managed to ensure long-term protection and maintenance of biological diversity with a sustainable flow of natural products and services to meet community needs.

Options for zoning, and zoning boundaries, and allowed uses should be made. These options should have been consistent with the Goals and Principles for the Establishment of the National Representative System of Marine Protected Areas (NRSMPA) in Commonwealth Waters.

In particular AMSA strongly supports the use of IUCN II or No-take, national park or sanctuary zones for the conservation of biodiversity conservation and scientific reference. There is overwhelming scientific evidence to support IUCN II zones as successful management tools for marine conservation and this type of zoning should be considered as best practise. (Edgar, 2014; Guarderas et al., 2008). 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.

Scientific Assessment

The Bioregional Advisory Panel (BAP) and the Expert Scientific Panel (ESP) are considering 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. The panels are also considering options for addressing the most significant information gaps hindering robust, evidence-based decision-making for the management of the marine reserves.

However, monitoring, evaluation and reporting are not well described in the background to Commonwealth MPAs. It is also unclear how monitoring to determine the effectiveness of reserves and to report on the effectiveness of them to attain their objectives will occur with the current zoning scheme.

The complexity and relative poorly understood spatial and temporal variability of the Australian marine estate means there are extensive knowledge gaps. To assist in the development of robust sampling and monitoring schemes, e.g. replication, adequate power, independence, to determine the success of the marine reserve system the following additional planning principles are supported:

1. Each provincial bioregion occurring in the marine region should be represented at least once in the marine reserve network. Priority should have been given to provincial bioregions not already represented in the National Representative System.

2. The marine reserve network should cover all depth ranges occurring in the region or other gradients in light penetration in waters over the continental shelf.

3. The marine reserve network should seek to include examples of benthic/demersal biological features (for example, habitats, communities, sub-regional ecosystems, particularly those with high biodiversity value, species richness and endemism) known to occur in the marine region at a broad sub provincial (greater than hundreds of kilometres) scale.

4. The marine reserve network should include all types of seafloor features. There are 21 seafloor types across the entire Exclusive Economic Zone. Some provincial bioregions will be characterised by the presence of a certain subset of features, such as continental slope or seamounts.

5. The capacity of a marine reserve to mitigate identified threats to conservation values.

6. The occurrence of spatially defined habitats for and/or aggregations of threatened and/or migratory species.

7. The occurrence of ecologically important pelagic features which have a consistent and definable spatial distribution.

8. The occurrence of known small-scale (tens of kilometres) ecosystems associated with the benthic/demersal environment.

9. Relevant available information about small-scale distribution of sediment types and sizes and other geo-oceanographic variables.

10. Individual areas should, as far as practicable, include continuous depth transects (for example, from the shelf to the abyss).

11. Whole sea floor features (such as geomorphic features) should be included.

12. Features should be replicated wherever possible within the system of marine reserves (that is, included more than once).

13. Size and shape should be orientated to account for inclusion of connectivity corridors and biological dispersal patterns within and across marine reserves.

Review

In a recent book Grech et al. (2014) presented a very detailed critique of Commonwealth MPAs. Some of this chapter is reproduced here to offer to the Commonwealth Marine Reserves Review.

Table 1. Percentage of Commonwealth waters in each of six marine bioregional planning regions within IUCN categories I and II ('no-take' marine reserves), IV and VI. The Heard Island and McDonald Islands (HIMI) Marine Reserve and the Great Barrier Reef Marine Park are not included in this table because they were not part of the Commonwealth's recent bioregional planning exercise to establish new MPAs (Grech et al. 2014).

	North	*North-west*	*[a] South-west*	*South-east[a]*	*East*	*Coral Sea*	*All regions*
IUCN I	*-*	*0.12*	*-*	*9.38*	*-*	*-*	*2.18*
IUCN II	*2.71*	*9.65*	*13.9*	*-*	*4.11*	*50.78*	*12.19*
IUCN IV	*-*	*1.89*	*9.11*	*6.46*	*9.55*	*29.16*	*9.50*
IUCN VI	*22.46*	*19.76*	*16.35*	*7.95*	*12.48*	*20.06*	*15.18*
Total Waters (km^2)	*625 690*	*1 067 731*	*1 292 014*	*1 632 402*	*1 466 831*	*989 842*	*7 074 510*

[a] Recreational Use Zones are categorised as IUCN IV in this table.

The Commonwealth MPAs (not including the Great Barrier Reef Marine Park) include five types of zones that fall into the IUCN categories of I, II, IV and VI (Plate 11; and 27.3). Zones classified as IUCN categories I and II are 'notake' marine reserves (i.e. Sanctuary and Marine National Park Zones). However, three sites identified by the Commonwealth as category II 'Recreational Use Zones 'located at Ashmore Reef and Ningaloo (North-west region) and Freycinet (South-east region), misapply the IUCN categories by allowing recreational fishing

activities (Fitzsimons, 2011). Category IV 'Habitat Protection Zones' allow extractive uses, including some types of commercial fishing (e.g. trolling, purse-seining, pelagic gillnetting and long-lining), pearling, aquaculture and recreational fishing. Category VI 'Multiple Use Zones' allow a much broader range of commercial fishing and other activities, including oil and gas extraction and exploration (mining). The percentage of each bioregional planning region within each IUCN category is shown in Table 1.

The Australian Government fulfilled its goal to represent each of the provincial bioregions in its 2007 and 2012 declarations of Commonwealth MPAs, except the Cocos and Christmas Islands provinces (outside of the scope of the NRSMPA planning process) and the Northeast Shelf Province (already protected in the Great Barrier Reef Marine Park). However, the extent of protection differs widely between provincial bioregions. For example, seven of the 38 provincial bioregions have less than 10% of their total areas within MPAs, while bioregions within the Coral Sea are almost fully protected (Devillers et al., 2014). The percentages of provincial bioregions within highly protected marine reserves (IUCN categories I and II) are much smaller. Six provincial bioregions have no marine reserves and only seven have more than 20% coverage (Devillerset al., 2014). Coastal areas that are exposed to greater intensities of human use are not well represented in the Commonwealth MPAs. Twenty-eight of the 49 meso-scale bioregions in Commonwealth waters (not including the Great Barrier Reef Marine Park) have no marine reserves, five have less than 1% coverage, and the remaining 16 have between 1% and 19% coverage. Overall, only 2.88% of the area of coastal meso-scale bioregions is protected by marine reserves compared to 17.23% of the area of offshore provincial bioregions (see Barr & Possingham, 2013). The bias of marine reserves away from coastal areas is also demonstrated by the coverage of marine reserves within the four geomorphic provinces of Heap & Harris (2008). Less than 3% of the area of Commonwealth waters on the continental shelf are within marine reserves compared to over 20% of the abyssal plain (>4000 m depth; Devillerset al., 2014).

There are many examples of human activities, such as fishing and oil and gas development, being prioritised over marine reserves in Commonwealth waters. In the Coral Sea, marine reserves and category IV zones that precluded pelagic long-lining were configured around areas with high intensities of pelagic long-lining (Hunt, 2013). Devillers et al. (2014) found that average fish catches were lower by factors of 5.6–13.9 within Commonwealth MPAs than outside, and that marine reserves avoided oil and gas titles, release areas and wells. Williams et al. (2009) found that the 'zone of importance' (Australian waters <1500 m where human uses coincide with the greatest mega-faunal biodiversity) received the least amount of protection by marine reserves in the South east planning process in 2007. The systematic designation of protected areas at sites of least value for extractive uses is known as 'residual protection' (Margules & Pressey, 2000). There are two key reasons the residual protection of Australia's marine environment is detrimental to biodiversity conservation. First, species and ecosystems exposed to high levels of human use are also those most vulnerable to negative effects and therefore most in need of protection; but residual reservation affords these features least protection. Second, selecting areas for protection that have low levels of human use cannot improve the condition of those areas and creates a false sense of security. A false sense of security can lead to reserve fatigue, where Government, stakeholders and communities use up the limited supply of 'conservation

capital', reducing the willingness to extend MPAs in the future, even into areas that most need protection. The primary objective of the Australian Government to minimise the socio-economic impacts or 'opportunity costs' of new MPAs has overridden concerns for biodiversity and therefore jeopardised the effective protection of Australia's marine biodiversity now and into the future (Devillers et al., 2014).

An important, unresolved question about MPAs is whether the many gaps in representation of species and ecosystems are random or systematic. Systematic gaps could, for example, be related to the ease with which MPAs can be established and be inversely related to the level of extractive uses of the ocean. This kind of systematic bias, if present, would mirror the widely observed bias in marine reservation towards over-representation of ecosystems with the least value for extractive uses (Joppa and Pfaff, 2009). One of the major disadvantages of this bias is that the species and ecosystems most associated with extractive uses and most in need of protection continue to decline without effective intervention (Pressey et al., 2000). The phenomenon of protected areas being "residual" to extractive uses (Margules and Pressey, 2000), although long established for terrestrial regions, has been a more recent area of research in the marine environment (Lynch 2006; Edgar et al. 2008; Guarderas et al., 2008; Edgar, 2011Devillers et al., 2014).

Conclusions

The size and placement of strict nature reserve (IUCN II) did not appear to be informed by CAR principles or fishing gear risk assessments (FGRAs). There seems to be a general lack of scientific explanation on decisions. Zoning decisions, size of marine parks and representativeness do not have transparent available science. This lack of transparency may be addressed by the ESP. In particular there is major under representation of habitat types such as the continental shelf and continental slope.

There appears to be limited contribution from the extensive scientific literature on MPA design and performance by the Commonwealth MPA zoning. Even the simple rule to maximize area protection in a way that does not affect any user, and with a fairly even spread around the continent is not followed. For example nearly all no-take zones are over abyssal plains in 4000 m depth, and near shore habitat protection zones exclude trawling only in areas where trawling is uneconomic.

A specific, though in no way isolated example, is the poor representation of near shore exploited habitat types in the Temperate East, where the only no-take zones in the region with significant human activity (the continental shelf and upper slope) are a 1 km x 1 km in area and a 2 km x 2 km area both of which were pre-existing. For conservation of bio-diversity the places where no-take zones are most probably required are those with highest human activity, hence the highest cumulative threats to the highest number of threatened species.

It is also clear that Commonwealth Marine Reserves have been poorly integrated with MPAs in state waters. The best examples of integration are the Head of the Bight Marine Park that protects the southern right whale, and the existing reserves network for the east coast population of grey nurse sharks (Lynch et al., 2013) but these coordinations are rare and should be further explored.

AMSA supports the view that the current review of commonwealth marine reserves represents an excellent opportunity to address weaknesses in the previous plan. A design that follows CAR principles to make replicated IUCN II no-take zones the key outcome of the plan will be best both for the conservation of biological diversity and robust scientific assessment of reserve performance.

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