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SUBMISSION ON THE PROPOSED NORTH KIMBERLEY MARINE PARK DRAFT JOINT MANAGEMENT PLAN BY AMSA WA

The WA Branch of the Australian Marine Sciences Association (AMSA) is pleased to submit its comments on the Draft Joint Management Plan for the proposed North Kimberley Marine Park. AMSA is the peak representative body for marine scientists in Australia with about 1,000 members representing all disciplines and associated primarily with universities, museums and marine consultancy companies in addition to State and Commonwealth Government agencies. AMSA provides independent scientific comment on matters of relevance to marine science; the opportunity to provide comment on the joint management plan for the proposed marine park is therefore welcome.

AMSA WA would like to preface its comments by noting its alignment with AMSA National in strongly supporting policies by both Commonwealth and State governments aimed at spatial management of the marine environment, including bioregional planning. We support the scientific foundations of the marine bioregional planning process, and within it, the National Representative System for Marine Protected Areas. In particular, we would like to refer you to AMSA's detailed position statement on MPAs (https://www.amsa.asn.au/amsa-position-statements) which is based on the extensive marine science supporting MPAs use as a conservation and management tool.

AMSA WA welcomes the proposed establishment of marine parks in the Kimberley region, an area of high biodiversity value. AMSA WA agrees with the proposal to classify the proposed North Kimberley Marine Park as Class "A" marine parks in order to provide the parks with the greatest security of tenure.

AMSA WA congratulates the Government and Wunambal, Gaambera, Balanggarra, Ngarinyin, and Miriuwung Gajerrong people on the successful negotiations for joint management of the proposed park. This represents another important step towards the vision of protecting the Kimberley Coast through the Kimberley Science and Conservation Strategy.

The Kimberley coastal waters are one of the least impacted ocean regions in the world (Halpern et al. 2008). The proposed Marine Park includes diverse ecosystems including mudflats, coral reefs and mangroves and experiences some of the largest tidal ranges in the world. These ecosystems include habitats which are home to animals of national and local conservation significance such as dugong, green turtles, estuarine crocodiles, whales, dolphins and migratory seabirds (Mustoe and Edmunds 2008). The areas covered by the proposed parks are also of high cultural significance and have important recreational and tourist areas for visitors.

Comments by AMSA WA on the draft management plan are summarized below. The comments of AMSA WA focus upon the management objectives and zonation strategies of the proposed park.

Management Objectives

AMSA WA supports the management objectives and strategies for cultural values (p.24). However there is a concern that the proposed permitted activities within the special purpose (cultural heritage) zones include all commercial fishing activities which is likely to prevent these zones from meeting their objectives (p.32).

AMSA WA supports the management strategies for natural values and the commitment that "Research will be a strong focus for the implementation and will be designed to fill key knowledge gaps" (p.25).

AMSA WA congratulates the plan for recognising the major pressure caused by climate change (p. 25) and that "The management response will focus on zoning as a tool to maintain or improve the resilience of ecosystems susceptible to climate change, and will include a network of sanctuary and special purpose zones to protect vulnerable habitats from multiple pressures".

There is a growing suite of literature addressing the design of marine parks in the face of climate change (Maynard et al. 2010; Mumby, Elliott, and Eakin 2011; Magris et al. 2014; Maina et al. 2015; Magris, Heron, and Pressey 2015; Jones et al. 2016). AMSA WA would like to draw your attention to the work of Fernandes, Green, & Tanzer (2012) who have created comprehensive guidelines for the design of resilient MPA's under future climate change. They recommend some critical principles for the design of MPAs to build resilience to climate change. The current plan does not adhere to the latest science regarding the design of resilient marine parks despite acknowledging its importance. Table 1 outlines these principles, indicates whether the proposed plan has sufficiently addressed the principle and provides recommendations.

Table 1. Principles for designing a MPA resilient to climate change with respect to the proposed North Kimberley Marine Park.

Principle	Detail	Achieved?	Recommendation
1. Create as large a multiple use marine protected area as possible	Should include an entire coastal ecosystem within a marine park boundary	No	Extend marine park boundary
2. Prohibit destructive activities	Destructive activities decrease resilience	No	Prohibit all destructive activities
3. Represent at least 30% of each habitat within no-take areas	Global scientific recommendations of at least 30% no-take	No	Increase sanctuary zones
4. Ensure that no-take areas include critical sites (aggregation sites, turtle nesting areas, juvenile fish habitats)	When animals aggregate they are particularly vulnerable	No	Place sanctuary zone at Cape Dommett
5. Apply minimum and a variety of sizes to no-take areas within the network	For resilience, the larger the no-take zone the better	Uncertain	Sizes of zones are not stated in plan
6. Separate no-take areas by no more than 1-20 km to facilitate connectivity between no-take areas	Larval connectivity is critical for recovery of ecosystems	No	Sanctuaries are too far apart
7. Have no-take areas in square or circle shapes	Minimise adult spill-over and increase compliance	No	Simplify sanctuary boundaries
8. Place no-take area boundaries at habitat edges	Increases resilience to external impacts	Partly	Some sanctuaries need to be extended to encompass entire biophysical features such as Bigge Island
9. Minimise external threats	Reducing other stressors increases	No	Prohibit all destructive activities

	resilience		
10. Replicate protection of habitats	Include at least 3 replicates within no-take areas	No	Increase frequency of sanctuary zones
11. Long term protection	Allows full system recovery	Yes	N/A
12. Include special or unique sites in no-take areas	Should include highly biodiverse and critical areas for threatened species	Partly	Increase protection at Maret Islands and Cape Dommett
13. Include resilient sites in no-take areas	Include areas that have survived previous warming events	Unknown/No	Include Islands within Bonaparte Archipelago within sanctuaries

AMSA WA is concerned by the targets for key performance indicators for a number of reasons. The proposed plan does not set any measurable, outcomes based or quantitative targets. The setting of conservation targets is an essential component of systematic conservation planning (SCP) (Lieberknecht et al. 2010). The SCP process is dependent upon clearly defined targets, accountability and defensibility (Margules and Pressey 2000). Targets underpin the SCP process by providing a clear purpose for conservation decisions (Wood 2011). Targets may be related to biodiversity protection or socio-economic goals and aims, but to be properly implemented and achieved must be quantitative and easily defined (Lieberknecht et al. 2010, Wood 2011). Further, quantitative targets provide a benchmark against which to measure the success of a conservation area (Desmet and Cowling 2004).

The targets for key performance indicators: coral reef communities, mangrove and salt marsh communities, seagrass and macro-algae communities, turtles and dugongs with regards to general use zones where "No change in community composition or loss of extent and density relative to baseline levels due to human activities in the proposed marine park, **except in areas approved by the appropriate government regulatory authority**" (p. 27). With 65% of the proposed marine park currently designated as general use, this essentially leaves the majority of the proposed marine park open to a loss of key natural values. The footnote states "acceptable levels of change to be determined following the development of baselines". As the baselines have not yet been determined, AMSA WA finds that this is a critical flaw in the plan leaving a very vague target that will result in the potential destruction of critical values such as seagrass and macro-algal habitats which will then likely inhibit the ability for the park to meet the targets for turtles and dugongs with "No net loss or change in distribution relative to baseline levels due to human activities" (p.27).

A number of WAMSI projects have been collecting baseline data, however, the draft plan does not appear to utilize the information from this research.

AMSA WA supports the targets for Finfish within sanctuary zones (p.28) However, the targets for special purpose zones and general use zones are very weak for a proposed marine park with a strategic objective "To protect and conserve biodiversity and ecological integrity". The target within these zones leaves the majority of the proposed park exposed to potential over exploitation of target species, particularly given that "visitation is expected to increase overtime" (p.28 section 6.3).

AMSA WA supports the proposed management objectives for recreation, tourism and community values (p.29). However, the proposed special purpose (recreation and conservation) zones still allow commercial fishing (p. 38), this is atypical for other recreation zones in the state (ie. Ningaloo), and directly contradicts the objective for the zone to recognise the "high recreational and cultural value" of an area. AMSA WA recommends altering the permitted activities within this zone to include only recreational activities in order to align the marine park with other marine parks in the state.

AMSA WA supports the management objectives and strategies for commercial fishing and pearling (p. 30), however there appears to be a critical imbalance in the prioritisation of area available to commercial fishing activity (79% of the proposed park), given that commercial fishing activity is currently minimal (p.19).

The high levels of destruction to benthic habitats by trawling activities is well known (Thrush and Dayton, 2002) which makes it an incompatible activity within the proposed marine park. Further, gillnets represent a major threat to many species as by-catch, notably turtles, dugong and dolphins AMSA WA recommends an increase in the special purpose (recreation) zones and a change to the permitted activities within the special purpose (cultural heritage) zones to remove trawling and gillnetting activities from a larger proportion of the proposed park. This will reduce the impact of these damaging activities whilst still allowing less destructive fishing methods to continue.

Allowing mineral exploration and development within the proposed park (p. 30) will inhibit the ability for the park to meet 75% of the strategic objectives: 1. To protect and conserve the value of the land and sea to the culture and heritage of Aboriginal people; 2.To protect and conserve biodiversity and ecological integrity; 3. To allow recreation, tourism and community use for the appreciation of the park's landscape, natural and cultural heritage values.

Mineral exploration, development and infrastructure, and geophysical surveys in the marine environment are not compatible with the values of the proposed marine park yet the draft plan currently leaves the majority of the marine park open for mining activities and ground-disturbing mineral and petroleum exploration and development. These activities could adversely affect marine mammals. In addition, air and ship borne geophysical surveys, ship-loading and other mining related infrastructure may be allowed to occur within sanctuary zones.

Because organisms have evolved to sense sound and vibration as an adaptation for survival and reproduction in the marine environment, they are also susceptible to impacts from sound and vibration produced during human activities. Prolonged exposure to noise

approaching and crossing the pain threshold can cause physical damage to the sensory organ and cause 'noise-induced hearing loss' (Southall et al. 2007). Noise-induced hearing loss can occur from intense sound exposure over a brief period, or from continuous exposure at high levels over an extended period. In addition other effects may be experienced, such as changes in physiology associated with stress. If the exposure is intense enough, it is thought that resonance of air spaces in organs or dissolved nitrogen gas bubble growth within tissues can result in ruptured tissues or organs. The potential effects resulting from exposure to sound and vibration depend directly on the characteristics (intensity, level, duration, frequency, etc.) of the sound as well as the animal's physiology and morphology. Based on research on impacts of sound on animals, the range of effects have been grouped according to the type and severity of impact. These include: masking of sounds animals produce for communication and navigation, or which are important cues for their survival; changes in behaviour which can affect energetics, such as displacement, attraction or avoidance; physiological stress-related responses; and in more extreme situations, hearing impairment or non-hearing related physiological injury (Richardson et al. 2007; Southall et al. 2007). Noise sources with all of these potential impacts include seismic surveys, some other geophysical surveys and pile driving. Noise sources that generally have a lower source intensity but can have deleterious effects over long exposures include increased vessel traffic, dredging, drilling, and other noise sources related to development. The areas covered by the proposed national parks have many species of marine mammal. These include snubfin and humpback dolphins (p.14). These animals are thought to be endemic to the northern regions of Australia, and being coastal (and resident), are particularly susceptible to near-shore impacts of pollution, including underwater noise emissions (Thiele, D. pers. com. to Salgado Kent, C.P). Dugong also occur in the area (p. 14). AMSA WA recommends that activities known to have a high level of potential impacts from underwater noise, such as geophysical surveys, and mining activities are not allowed within the proposed North Kimberley Marine Park especially within Sanctuary zones

Zoning Design

AMSA WA supports the implementation of multiple management zones to achieve a balance between "protecting the health and resilience of the area, while supporting ongoing tourism and recreation, commercial activities and fishing" (p.31).

In order for a marine park to effectively meet biodiversity conservation objectives the basic scientific recommendation is to ensure a system of no-take sanctuary zones are Comprehensive, Adequate and Representative. However, the while the proposed plan has been designed to be "comprehensive and representative" it has not been designed to be adequate, as demonstrated by only 21% of the proposed marine park being designated as no-take sanctuary zones.

In order for a marine park to achieve the best biodiversity conservation outcomes and meet the minimum scientific guidelines, the marine park needs to extend over the entire ecological system and at least 30% of the marine park needs to be designated as a highly protected no-take sanctuary zone (Goodyear 1993, Roberts and Hawkins 2000).

The draft management plan requests that the proposed zoning for this park should be considered in the context of the other marine parks within the region (p.31). In combination with the existing and proposed marine parks in the Kimberley region, 64% of the coastal marine ecosystem is within a marine park boundary, but less than 20% of this area within the marine parks is designated as a no-take sanctuary zone. This equates to approximately 13% of the Kimberley marine coastal ecosystem demarcated as no-take sanctuary zones which falls far below the scientific guidelines and the best practice management plans at the Great Barrier Reef Marine Park and Ningaloo Marine Park which both incorporate the entire system and have 33% and 34% no-take respectively.

Permitted activities within Zones

AMSA WA is concerned with the proposed permitted activities within Zones. Particularly given the permitted activities within the proposed zones significantly differ from zones with the same names in other marine parks within the state which is likely to confuse marine park users and reduce the level of compliance within the park.

General Use zones- The draft plan leaves the general use zones open to assessment of damaging mineral and petroleum activities which will prevent the proposed park from meeting strategic objectives 1-3. AMSA WA recommends restricting all mineral and petroleum activities from within the boundaries of the marine park.

Special Purpose (Recreation and conservation) zones- The draft plan permits some commercial fishing activity within these zones. This is unusual and atypical for recreation zones in other marine parks such as Ningaloo and Commonwealth MPAs. It also reduces the intrinsic value of these zones for recreational users.

Special Purpose (cultural heritage) zones- The draft plan permits all commercial fishing activities within these zones. This is likely to prevent the zones from meeting their objectives and will reduce the intrinsic value of these zones for indigenous communities.

Sanctuary zones- the proposed plan permits customary fishing and hunting within Sanctuary zones. There is a need to actively engage with Traditional Owners to develop effective and supportive management arrangements for sanctuary zones by plans being developed cooperatively with and supported by Traditional Owner Groups. During this process of consultation and building relationships with Traditional Owner Groups, options for agreements and permits can be discussed, along with other options that communities put forward.

Particular areas with suggested changes to proposed zoning

The Maret Islands are highlighted in the plan as an area with exceptional diversity of hard coral (p.14) yet the proposed plan has given this area the lowest level of protection within a general use zone. AMSA WA recommends extending the boundary of the marine park to incorporate the Maret Islands and to recognise their conservation significance by extending the Bigge Island sanctuary zone to include the Maret Islands. Replication could be achieved by also creating sanctuary zones surrounding West Montalivet, Patricia and Walker Islands.

Cape Dommet is recognised as a critical flatback turtle nesting area (p.14) and an important area for the vulnerable Snubfin dolphin and Sawfish yet the proposed plan has demarcated this area as a special purpose (recreation and conservation) zone which currently still permits commercial fishing activity. AMSA WA recommends increasing the level of protection for this critical area for threatened species to a sanctuary zone.

The small general use zone surrounding Troughton Island, nested within the large sanctuary zone is likely to have negative effects beyond the boundaries of the zone through the edge effect (Fernandes, Green, and Tanzer 2012). It also increases the complexity of boundaries for users which is likely to impact negatively on compliance. AMSA WA therefore suggests changing this general use zone to sanctuary zone for continuity.

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