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## Limmen Bight Marine Park Draft Plan of Management

### Comments from the Australian Marine Sciences Association Inc.

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## **1. Introduction**

The Australian Marine Sciences Association (AMSA) welcomes the opportunity to provide comments on the Limmen Bight Marine Park Draft Plan of Management.

AMSA is a professional society of more than 700 members nationwide, committed to promoting marine sciences. Our members are from universities, museums, private sector and government agencies and have expertise spanning all disciplines related to marine science. AMSA actively promotes the advancement of marine sciences in Australia and provides evidence-based scientific advice and support on matters of national and global interest.

We recognise the importance of traditional ecological knowledge in informing marine park management and of meaningful collaborations between marine scientists and Indigenous groups in conducting research on sea country. Many of our members are engaged in collaborative research projects with Traditional Owners, and at each of the past three AMSA annual conferences, we have held workshops on fostering such research collaborations (see <https://www.amsa.asn.au/indigenous-engagement-workshops>). However, our focus in this submission is the protection of natural values based on scientific evidence, because this is our area of expertise.

## **2. Protecting the natural values of Limmen Bight Marine Park**

Limmen Bight Marine Park has outstanding natural values that are of national and global significance. We commend the Northern Territory Government for releasing a report on the biodiversity values of the marine park to accompany the draft plan of management (Palmer & Smit, 2019). Of great value also is the accompanying report on the cultural values of the marine park (Bradley, 2018).

As the biodiversity report documents, important habitats of the marine park include:

- extensive seagrass meadows, which are vital habitats for dugongs, green turtles, prawns and other species
- fringing coral reefs, which are habitats for demersal and pelagic fishes, including top predators, and sea turtles
- extensive intertidal mud or sand flats, often with mangroves, which function as nursery grounds for many marine species as well as nesting sites for seabirds
- beaches and sand dunes, which are important habitats for shorebirds and nesting sites for sea turtles.

Species of high conservation value in the park include the Australian snubfin dolphin, Australian humpback dolphin, dugong, flatback turtle, green turtle, red knot, curlew sandpiper, all of which are listed as nationally and/or globally threatened.

One key criterion for assessing the draft plan of management is how effective it will be in driving the management actions necessary to protect habitats and species in the marine park and mitigate threats. The main existing and potential threats that

can be mitigated through park management are various forms of commercial fishing such as gillnetting and bottom trawling, seabed mining, marine debris and boat strike. For other threats that originate or operate beyond the marine park boundaries, such as climate change, terrestrial mining and changes to the hydrological regimes of rivers, the main focus of marine park management should be to optimise the resilience of species, habitats and ecosystems to disturbance.

Surprisingly, although the plan of management mentions several threats under the objective to 'conserve and protect biodiversity and ecological values for future generations', it does not specify any management actions to address these threats. The only commitment, included under an economics objective, is to 'ensure there will be no seabed mining'. We welcome this commitment. However, management commitments are also needed to address the other threats to the marine park.

It has already been seven years since Limmen Bight Marine Park was declared. But it appears that the NT Government intends to delay any management commitments for at least another two years, possibly more. This is unacceptably slow given the high values at stake and the growing threats, exemplified by the recent large-scale dieback of mangroves along the Gulf of Carpentaria coast, including at Limmen Bight (Duke et al., 2017). There should be no more delay in designing and implementing a management regime to maximise the resilience of species, habitats and ecosystems to events like this.

Although many aspects of the proposed Integrated Management Strategy will be valuable for shaping future management, there is sufficient understanding of most threats to proceed now to mitigation. To delay any longer is in breach of the precautionary principle (an essential element of ecologically sustainable development), which requires actions to avoid or diminish harm that is scientifically plausible although uncertain. In particular, as discussed below, a zoning plan is needed to regulate human activities in various parts of the park to ensure they are compatible with protecting natural, cultural and other values and fostering ecosystem resilience.

One example of management actions that should be implemented as soon as possible is restrictions on fishing to protect threatened sawfishes, coastal dolphins, turtles and dugongs. All sawfishes 'face a very high risk of global extinction' due largely to entanglement in fishing nets (SEWPAC, 2012). Capture as bycatch is also a major threat for the Australian snubfin and Australian humpback dolphins (Parra, Cagnazzi, Perrin, & Braulik, 2017) and the dugong (Marsh & Sobotzick, 2015). Populations of all these species are highly vulnerable to decline from very low rates of human-caused mortality and have limited capacity to recover from declines. Northern Australia is considered a 'lifeboat area' for sawfishes (Dulvy et al., 2016) and a global stronghold for dugongs, and the two dolphin species are found only in shallow coastal waters in northern Australia and southern New Guinea (Brown, Bejder, Pollock, & Allen, 2016). Therefore, preventing all mortality of these species by gillnetting and bottom trawling should be a high management priority.

### **3. The importance of a zoning plan**

We are surprised and concerned that the draft plan of management does not include a zoning plan. Zoning is widely accepted as essential for effective marine park management. Yet the draft management plan says a 'zoning plan approach' may not eventuate for another two years. There is no other information provided about this intended 'approach', so it is not clear that the zoning plan itself will be finalised within two years.

We strongly recommend that a zoning plan is expeditiously developed and that a revised management plan with this plan is released for public comment before being finalised.

Because of the lack of a zoning plan and the uncertainty about what management regime is intended, we focus below on recommending sources of guidance for marine planning and outlining the many benefits of effective zoning.

#### **3.1 Principles for zoning**

Marine zoning plans should be based on the principles of comprehensiveness, representativeness and adequacy, as outlined in the Guidelines for Establishing the National Representative System of Marine Protected Areas for Australia (ANZECC–FMPA, 1998).

In 2009, more than 40 Australian experts in marine conservation science developed a set of operational principles to guide the design of marine protected areas in Australia (The Ecology Centre, 2009). We strongly recommend that the Northern Territory Government base the zoning plan for the Limmen Bight Marine Park on these principles. We endorse the advice in this document that all biologically important areas should have at least 30% of their extent protected within marine sanctuaries, with the proviso that 'threatened and highly range-restricted species and habitats should be targeted for full reservation' (The Ecology Centre, 2009).

One unavoidable context for marine planning is a rapidly changing environment, particularly changes being driven by global warming. The recent large-scale death of mangroves in the Gulf of Carpentaria, including in the Limmen Bight Marine Park (Duke et al., 2017; Harris et al., 2017), is a stark example of the great challenges facing marine park managers and the critical importance of fostering climate change resilience in marine parks.

There is growing scientific evidence that marine habitats in sanctuary zones (where extractive activities are not permitted) are more robust to disturbances caused by climate change. For example, international evidence shows that no-take zones can promote ecological resilience by supporting complete trophic webs and larger-bodied individuals (Bates et al., 2019; Behrens & Lafferty, 2004; Micheli et al., 2012; Mumby, Wolff, Bozec, Chollett, & Halloran, 2014). In the rapidly warming waters offshore from Tasmania, fish communities in no-take zones are more stable than those in fished zones and better able to resist invasions from warmer-affinity species (Bates et al., 2014). In eastern Australia, marine reserves greatly enhanced the capacity of coral reefs to withstand the impacts of catastrophic flooding in 2011 (Olds et al., 2014).

As a result, there is a growing suite of advice about how to design resilient marine protected areas (Jones, Watson, Possingham, & Klein, 2016; Magris, Heron, & Pressey, 2015; Magris, Pressey, Weeks, & Ban, 2014; Maina et al., 2015; Maynard, Marshall, Johnson, & Harman, 2010; Mumby et al., 2011). In particular, AMSA would like to draw your attention to the comprehensive guidelines developed by Fernandes et al. (2012) for the design of resilient marine parks.

### **3.2 The many benefits of sanctuary zones**

Since the first scientific studies on marine protected areas in the early 1970s, a clear global scientific consensus has developed on the benefits of highly protected marine parks, as outlined in numerous peer-reviewed scientific papers and consensus and position statements by leading marine science experts and organisations. This includes a recent scientific statement by the Ocean Science Council of Australia addressed to the Australian Government and signed by close to 1500 marine scientists, which says in part (Ocean Science Council of Australia, 2017):

At a time when oceans are under increasing pressure from overexploitation, climate change, industrialisation, and plastics and other forms of pollution, building resilience through highly protected Marine National Park IUCN II Zones is well supported by decades of science. This research documents how high-level protection conserves biodiversity, enhances fisheries and assists ecosystem recovery, serving as essential reference areas against which areas that are subject to human activity can be compared to assess impact.

The statement affirmed the importance of achieving a target of at least 30% of each marine habitat in IUCN II zones, which is 'supported by Australian and international marine scientists and affirmed by the 2014 World Parks Congress in Sydney and the IUCN Members Assembly at the 2016 World Conservation Congress in Hawaii'.

There is overwhelming scientific evidence across diverse marine habitats and numerous locations around the world of strong biodiversity conservation benefits from no-take marine sanctuaries compared to all other types of marine management (Green et al., 2014). As discussed above, one of their benefits is increasing the resilience of marine ecosystems to climate change.

One of the most consistent effects of sanctuary zones is an increase in the abundance of large individual fish. Globally, sanctuary zones on average increase the size of fish by 28% (Lester et al., 2009). The reproductive output of larger fish is disproportionately greater than that of smaller fish (i.e. one 2-kilogram fish produces more eggs than two 1-kilogram fish) (Barneche, Robertson, White, & Marshall, 2018). This means that sanctuary zones can provide great benefits to fish populations by providing a refuge for bigger mothers that reproduce more, benefiting not only the sanctuary, but also the surrounding areas. In terms of fish egg production, a single highly protected hectare is, on average, equivalent to 3–225 unprotected hectares (Marshall, Gaines, Warner, Barneche, & Bode, 2019). These studies are consistent with other studies that have demonstrated strong

spillover benefits of sanctuary zones for fisheries in both temperate and tropical reserves (Harrison et al., 2012; Le Port et al., 2017)

Partial protection is widely acknowledged in the scientific literature as an inadequate alternative to no-take protection. The abundance, biomass and body size of fish in partially protected areas are often similar to that in completely unprotected areas (Costello & Ballantine, 2015; Edgar et al., 2014; Giakoumi et al., 2017).

There is also wide support in the community for marine parks with sanctuary zones. Navarro, Kragt, Hailu, and Langlois (2018) quantified social support from recreational fishers for marine sanctuaries by surveying fishers from 10 Australian marine parks. The level of support for sanctuaries among recreational fishers was more than three times greater than the opposition in all marine park regions except Sydney. Australia-wide, most (63%) recreational fishers who fished in established marine parks said they supported sanctuary zones, and only 18% opposed them. The pattern of support depended on the age of the marine parks: the level of support was greater in the longer-established parks. On average, support for no-take zones increased from 42% to 71% over 15 years, with the most rapid change occurring in the first five years after establishment.

#### **4. The importance of a MERI program**

AMSA strongly endorses the proposed strategy in the draft management plan for a systematic monitoring, evaluation, reporting and improvement (MERI) program 'to assess the effectiveness of management of key values, with a focus on condition, pressure and response indicators and measures'.

Appropriate biological and environmental indicators and ecologically appropriate trigger values will need to be determined, which should be subject to review as part of the adaptive management cycle. Clear management responses to trigger values will need to be developed to allow rapid responses to identified biological and environmental changes. Climate change should be considered in all management plans as part of performance assessment monitoring and evaluation (Davies et al., 2016).

However, the current lack of a MERI program should not be used as a reason for delaying the development of a zoning plan and implementing precautionary management. The evident environmental changes already underway are a strong reason to proceed.

#### **5. Conclusion**

AMSA urges the Northern Territory Government to delay no longer in developing and implementing management of the Limmen Bight Marine Park to protect its outstanding natural and cultural values and foster resilience to disturbances such as those engendered by climate change. We recommend that best practice design principles are applied, including those recommended here by The Ecology Centre (2009) and Fernandes, Green et al. (2012). In particular, we recommend that the NT Government expeditiously develop a zoning plan as a foundational element of management.

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