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AMSA submission on the NSW Marine Parks Draft Plan, Stage 1

January 2022

To the Proposal Coordinator,

The Australian Marine Sciences Association (AMSA) is pleased for the opportunity to provide comment on the NSW Marine Parks Draft Plan, Stage 1 (Objectives and Actions). AMSA is Australia's largest professional association of marine scientists with more than 700 members, with the mission to advance marine science in Australia.

Executive Summary

AMSA endorses Marine Protected Areas (MPAs) as vital to the conservation of Australia's marine biodiversity and biomass and also to meet the nation's international obligations. AMSA supports a transparent approach to managing multiple uses of the marine social-ecological system which engages all stakeholders including scientists and partnerships with customary users and rights-holders.

AMSA has developed a Position Statement on MPAs, based on years of consultation with expert members in the fields of protected areas, fisheries and marine conservation, and the comments on the proposal are in accord with it. The Position Statement is included at the end of this submission, and accessible at

[https://www.amsa.asn.au/sites/default/files/AMSA%20MPA%20Position%20Statement%20October 2019.pdf](https://www.amsa.asn.au/sites/default/files/AMSA%20MPA%20Position%20Statement%20October%202019.pdf)

AMSA supports the design and implementation of an effective network of MPAs in NSW, however the current NSW Marine Parks Draft Plan is not adequate to ensure this is achieved.

MPAs should be designed based on sound scientific principles, to achieve a Comprehensive, Adequate and Representative (CAR) network of marine protection, as outlined in the Marine Parks Act 1997. MPAs with at least 30% sanctuary (no-take, IUCN I or II) zone are the most effective and therefore the preferred design option.

The NSW Marine Parks Draft Plan should provide a clear goal and a mechanism to increase the current 17.5% to at least 30% sanctuary (no-take, IUCN I or II) zone. In addition, MPAs should be effectively enforced, monitored and adaptively managed, left in place for the long term, large in size and located to maximise their ecological benefits.

MPAs can be an integral part of ecosystem-based fisheries management. MPA management should include a published adaptive management plan with measurable and quantifiable goals, performance measures, monitoring programs and adequate resourcing.

The implementation of effective policies and actions associated with NSW Marine Parks provides an opportunity for a systematic approach to providing information for State of The Environment reporting, the progress for Australia and NSW towards meeting the relevant UN Sustainable Development Goals (SDGs) and implementing the System for Economic Environmental Accounting (SEEA).

AMSA is encouraged by the invitation to contribute to the management of NSW MPAs through this submission process, and we make a number of specific recommendations and supporting comments throughout the remainder of our submission. We expect that a summary of all submissions will be made public and will indicate how views were considered and addressed in the Marine Park Network Plans. We are concerned to ensure that this takes place after poor due process and transparency in the Hawkesbury Shelf Marine Park submission process.

We welcome the opportunity to discuss our recommendations, and the broader design and implementation of MPAs, based the scientific evidence.

Yours Sincerely

A handwritten signature in black ink, appearing to read 'John Turnbull', written in a cursive style.

Dr John Turnbull

AMSA NSW Branch President

Introduction

Our detailed response is presented in line with the sections of the Draft NSW Mainland Marine Park Network Management Plan 2021-2031, Stage 1.

- Overall Comments (Plan pages 1-47)
- Objective 1 Comments (To protect and enhance species, habitats and ecosystems within marine parks)
- Objective 2 Comments (To improve water quality and reduce marine litter for the environment and community)
- Objective 3 Comments (To help understand, mitigate and adapt to the impacts of climate change on the NSW marine estate)
- Objective 4 Comments (To partner with Aboriginal people for protection of Aboriginal cultural values and improved marine park management)
- Objective 5 Comments (To improve access and opportunity for enhanced social, cultural and economic values from marine parks)
- Objective 6 Comments (To support evidence-based, inclusive and effective decision-making and marine park management)
- Attachment – AMSA Position Statement on MPAs
- *Addendum (added 7th February 2022): Thematic analysis of mentions in the Draft Plan of various stakeholder groups, pressures, values and valence (supportive vs threat-based mentions) of commercial fishing mentions*
- References

Recommendations (Plan pages 1-47)

In order to be effective, the NSW Marine Parks Plan and processes should:

- Design MPAs based on sound scientific principles, to achieve a Comprehensive, Adequate and Representative (CAR) network of marine protection.
- Ensure MPAs have at least 30% sanctuary (no-take, IUCN I or II) zone, as these are the most effective and therefore the preferred design option.
- Manage and enforce MPAs effectively, fund them adequately, leave them in place in the long term, and ensure they are large in size (particularly sanctuary zones) and located to maximise their ecological benefits.
- Implement a transparent approach to managing multiple uses of the resources of marine social-ecological systems which engages all stakeholders, including scientists, and partners with traditional owners.
- Integrate MPAs with ecosystem-based fisheries management.
- Manage MPAs via a published management plan with goals, performance measures, monitoring programs and adequate resourcing.
- Continue ensuring Traditional Owners have a prominent role in the plan and its implementation
- Recognise marine researchers as key stakeholders, not only as participants on the advisory committees.
- Acknowledge the necessity of creating a seventh NSW marine park, in the Hawkesbury Shelf bioregion
- Recognise that recreational fishing is one of many important social activities conducted in MPAs and ensure research, funding and management actions are fairly distributed and inclusive of all user categories; for example snorkelers, swimmers, divers, boarders, etc.
- Recognise that industrial-scale activities, such as large scale commercial fishing and aquaculture, are incompatible with all levels of protection in MPAs, in accordance with IUCN guidelines.

Overall points by page#

P 3: Whilst a “win-win” strategy is admirable, some management measures are necessary that will impact on stakeholders in a way that will be perceived as negative, in order to achieve higher level outcomes (acknowledged on P 16). For example, whilst the majority of fishers support marine reserves (including sanctuary zones) there is a minority for which no level of sanctuary protection is acceptable. The plan should give a clear indication of how the government will handle these perceived trade-offs. For example, the primary purpose of MPAs (conservation of biodiversity) should be given priority.

P 5: How will “healthy coast and sea” be defined and measured? A key element is conservation or restoration of biodiversity, and maintenance of ecological function (such as adequate predation). These are the stated primary purpose of marine parks in legislation.

P 5: There is no mention of the seventh marine park, acknowledged as necessary by the scientific audit in 2012 – the Hawkesbury bioregion marine park. The gap in terms of comprehensiveness (part of the stated CAR principles) is obvious in the map on P 6.

P 7: Whilst 17.5% of the total area of mainland marine parks is sanctuary zone, only 7.5% of NSW waters are sanctuary zone. Lower levels of protection are of uncertain (and in some studies, no

significant) ecological value (Turnbull et al, 2021), and so should not be counted towards overall biodiversity protection objectives.

P 12: Sustainable development – AMSA recommends SDG (14) targets and indicators be referenced and reported against. For example:

- 14.2.1 Use of ecosystem-based approaches to managing marine areas
- 14.4.1 Proportion of fish stocks within biologically sustainable levels
- 14.5.1 Coverage of protected areas in relation to marine areas
- 14.6.1 Instruments to combat illegal, unreported and unregulated fishing
- 14.a.1 Proportion of research budget allocated to marine research?

P 12: Under the Ecologically Sustainable Development (ESD) principle of intergenerational equity, future generations should inherit ecosystems of equal or better condition. The plan should indicate how this will be measured and managed towards. The plan should acknowledge ongoing loss of biodiversity, and declines in biomass, which must be reversed in order to achieve these ESD principles.

P 15: Management is not only about addressing threats; it is also about achieving longer term goals and outcomes. These are implied for example in the ESD principles of intergenerational equity, and other global frameworks such as the 30 x 30 High Ambition Coalition which Australia committed to in June 2021. Longer term goals should be integrated in the 5 step process.

P 9-17: The implementation of the policy and actions associated with this NSW Marine Parks Draft Plan (Stage 1) provides a unique opportunity for a systematic approach to providing coherent integrated information regarding NSW MPAs for the Commonwealth State of The Environments Reports, The NSW State of the Environment Reports and the progress for Australia and NSW towards meeting the relevant UN-SDGs as well as implementing the System for Economic Environmental accounting.

P 17: Peer reviewed literature is published to the highest standard and therefore should be given priority over, for example, non-peer-reviewed reports and public opinion in the list of suitable evidence.

P 18: AMSA is pleased to see the prominent role of Traditional Owners in the plan.

P 20: The advice of advisory committees must be formally documented, and include responses to such advice (including giving evidence-based rationale for any decisions that go against such advice).

P 20: Marine scientists and researchers, and their institutions (eg Universities) should be recognised as key stakeholders, not only as participants on the advisory committees.

P 21: Given the importance of threatened species, they should receive more prominence in the early explanatory sections of the plan.

P 22: AMSA recommends there be an explicit goal to align management zones when state and Commonwealth marine parks are adjacent to each other, for example for continuity of protection from shallow shelf to deep shelf zones.

P 25: By limiting the planning process to threats and values in existing marine parks, the plan does not support the creation of the urgently required seventh marine park in the Hawkesbury bioregion.

P 34: Fishing activities also threaten social values, for example user conflict, litter and loss of access to values by non-extractive users (such as viewing unimpacted marine life by snorkelers and SCUBA divers). Fishing also can represent loss of values between fishing categories, for example commercial fishers taking biomass that could have been accessed by recreational fishers and vice versa.

P 38: As ecological values underpin social values (acknowledged on page 28) the first three objectives – ecosystems, water quality and managing climate change – should be given priority over the second three – culture, community access and governance in the event that a trade-off is required.

P 41: Given the complexities of cumulative and multiple threats, the primary performance measures for success should be quantifiable ecological outcomes (eg maintained or increased biodiversity) rather than activity (eg implementation of actions).

P 44: Given the importance of sanctuary zones (and their acknowledged superiority in achieving primary purpose outcomes in the academic literature) there should be a stated objective regarding the extent of these zones and commitment to not destroy their effectiveness by opening them up to fishing. AMSA's position is that 30% sanctuary zone is required to conserve biodiversity.

P 44: It should be recognised that industrial-scale activities are incompatible with all levels of marine park zone, as stated in IUCN guidelines.

P 44: A comprehensive network of marine protection in NSW requires the designation of a marine park in the Hawkesbury bioregion, yet this receives no mention in this plan (despite being the subject of much effort by managers and scientists, and support from diverse stakeholders in recent years). A number of important species and ecological values occur in this bioregion, such as much of the range of the red-toed anglerfish, Sydney pygmy pipehorse and the threatened soft coral *Dendronephthya australis*, and the northern-most extent of the range of the weedy seadragon.

P 45: Monitoring must be adequately funded and well-backed by investment in technology. It must not rely too heavily on volunteer activities, which cannot be guaranteed nor directed. Where volunteer activities are assumed in the monitoring plan, they must be adequately supported (for example, covering volunteer training and expenses).

Objective 1) To protect and enhance species, habitats and ecosystems within marine parks

This objective is the key to protecting the biodiversity of our coastal waters. Overall the actions are sound but in many cases too vague, as noted in our table of comments below. We strongly feel that Sanctuary Zones are the key tools to realise this objective and would like to see more attention to these, and an undertaking to increase their areas.

Specific Recommendations

	Action	AMSA comments
1.1c	Strengthen approvals and consents for activities that may damage or interfere with estuarine or marine habitats, species or ecosystems.	<i>What implications does this have for marine research, processes and policy?</i>
1.1d	Ensure DPI Fisheries has concurrence for riparian and coastal foreshore development that is directly adjacent to a marine park.	<i>This is important, especially when coastal runoff is substantial or for species that are transiently/migratory. Will this require partnerships/joint authorities with local and state bodies?</i>
1.1e	Strengthen how marine park values are taken into account in the approval of marine development that is adjacent to a marine park (i.e. north or south of marine park boundaries).	<i>The term "strengthen" is ambiguous. What does this actual mean in practice and process? This should include eastern boundaries eg Commonwealth waters, where shipping, seismic development etc may be issues</i>
1.2a	Provide areas of protection for ecosystems, habitats and species that are under threat or that underpin important environmental, social, cultural or economic values.	<i>Yes, that is a central goal of marine parks, with primacy for environmental values. Sanctuary zones are the gold standard and must be maintained/expanded. Also, unambiguous zoning and rule enforcement eg for extraction, anchoring etc must be developed.</i>
1.2c	Undertake a threatened species assessment for each marine park to understand key habitats, local threats and opportunities for marine parks to support protection and recovery.	<i>Threatened species lists should not just be representative of localised area, but reflect the nature of a specie's abundance and distribution. Species that are vulnerable may thrive in MPAs (eg weedy seadragon, blue groper) but populations are threatened in wider distribution due to environmental impacts, resulting in a false sense of security. TARA has identified climate change to be the most significant stressor/threat over 50 years which will affect the distribution of vulnerable and threatened species due to changes in water temps/habitat/food availability etc. The distribution of species is likely to shift and objectives must address current threats but also safeguard from future threats identified in TARA. Using MPA distribution only as a method of determining threatened species will result in a bias not reflective of the NSW coastline.</i>

1.2d	Review marine park protected and permitted species lists to ensure an evidence-based approach to species protection.	<i>See above.</i>
1.2e	Undertake research to better understand the benefits of marine parks to ecological integrity and function, and any spillover effect in NSW.	<i>We would like to see some more specific language/outcomes around the 'spillover' effect. What markers will result in a positive outcome? Abundance of threatened species? Adults or larvae? Habitat of surrounding areas? Number of invasive species? Amount? Spillover is generally defined as 'movement of fish across the boundary of a reserve into fished grounds'. Are positive effects going to feed straight into commercial fisheries ie for no net ecological gain?</i>
1.2f	Undertake a light pollution risk assessment for each marine park to understand potential impact of existing land and vessel based artificial light on marine wildlife and options for mitigation.	<i>Note cephalopods and predatory sharks (GWS) may take advantage of artificial lighting to extend feeding behaviours.</i>
1.3a	Support implementation of best-practice rock revetment, seawall and breakwater design to maximise community access and environmental values.	<i>Whilst it is good to consider the ecological positives of artificial structures in maintaining biodiversity, they must be balanced with negatives of adding artificial structures to natural areas.</i>
1.3e	Protect dune vegetation, shorebird and turtle nesting sites from the impacts of four wheel drives and domestic dogs, including through spatial and temporal access management.	<i>What about foxes and dingoes? Protection above the high tide mark will require cooperation with other agencies, and this will have to be carefully managed.</i>
1.4a	Undertake a marine pest, disease and aquatic weed risk assessment for each marine park and identify priority actions to minimise risk.	<i>Likewise from the point 1.2C. Pests, diseases and weeds should be assessed not just in MPAs, but in the environment in totality. The nature of invasive species provides the ability to outcompete native species and spread extremely quickly. Having areas which are 'conserved and protected' will have little impact in the long term if pests and invasive species are not managed as an ecosystem that is connected, particularly under the influence of climate change and the transformation of temperate regions.</i>
1.5a	Identify and prioritise sites for habitat rehabilitation and implement on-ground action in accordance with expert designs and advice.	<i>Consider the opportunity for citizen science and ways communities can contribute, ie collection of urchins in barrens or 'adopt a patch of grass' styled initiatives, live streaming of patches of reef etc.</i>
1.5b	Support the use of innovative structures such as shellfish reefs, artificial reefs, best-practice oyster	<i>This may be acceptable so long as primacy is given to restoring and preventing damage to natural habitat.</i>

	lease infrastructure, living seawall modifications and Seahorse hotels to enhance habitat and community values.	
1.5c	Identify opportunities for recreational fishers, commercial fishers and oyster growers to develop and implement habitat rehabilitation and clean-up projects.	<i>This goal has missed entire community groups – snorkelers / divers / ocean swimmers / surfers / kayakers / walkers. These groups comprise the majority of marine park users yet they do not have targeted actions to improve opportunities for citizen science and other projects. How can this be considered “win-win” or “a balanced approach”?</i>
1.6b	Assess cumulative impacts of changing and increasing commercial and recreational marine mammal interactions and identify appropriate management interventions, if any.	<i>Add migration considerations, and ensure that marine mammal management, research, compliance and education are within the remit of NSW Marine Parks.</i>
1.6c	Assess issues and hot spots for incidental capture of non-target fish and marine wildlife species from unattended line and entanglement fishing gear in each marine park and implement actions to minimise impact.	<i>This should be based on the science, not politics. Actions should follow the science and peer-reviewed literature surrounding drum lines, smart drums, shark nets etc, particularly ones near and surrounding marine parks. Accountability and visibility of practices and protocols need to underpin action. Maintenance and expansion of sanctuary zones is critical here.</i>

Objective 2) To improve water quality and reduce marine litter for the environment and community

	Action	Discussion
2.1a	Strengthen land use planning and development consent provisions for new development to protect riparian buffers in marine park catchments.	<i>What does “strengthen” mean ie how will success be measured?</i>
2.2a	Support monitoring programs in accordance with the Key Littered Items Study standard method (including citizen science) to identify priority local marine debris sources and hot spots for remediation.	<i>See 1.6c. using framework from EPA could be appropriate, partnerships with CSIRO and NGOs such as Plastic Oceans is impotent.</i>
2.2b	Deliver marine debris and catchment to coast community education and clean- up programs to change litter practices and reduce litter.	<i>It is vital to identify not just the litter sinks, but their sources. Engage fishers, noting fishing litter is major source of coastal ocean plastic wastes.</i>
2.2c	Undertake targeted education to reduce recreational fishing waste from pelagic floats, cyalume light sticks, soft plastics, bait bags, discarded fishing line.	<i>Tap into influences and sponsorship of prominent figures within fishing communities</i>
2.2d	Explore development of innovative, reusable or biodegradable fishing gear, such as pelagic floats, cyalume light sticks, soft plastics and bait bags to reduce the threat from discarded fishing waste.	<i>Include balloons, high rust rate hooks, barbless hooks, lead-free sinkers and ‘de-snagging’ devices</i>
2.3g	Undertake research to understand the potential impact of chemical and endocrine stressors on ecological values.	<i>Leaching and run off from parks/golf courses should also be included, particularly when adjacent to an estuarine or lagoon structure.</i>

Objective 3) To help understand, mitigate and adapt to the impacts of climate change on the NSW marine estate

Action #	Action	AMSA Comments
3.1a-b	Undertake a climate change risk assessment for each marine park and the NSW marine park network and identify priority research and adaptation actions and options to minimise risk.	<i>Ensure that this review takes into account overall connectivity and includes areas outside MPAs that may impact on MPAs, for example sources of heat-tolerant species / tropical herbivores, etc.</i>
3.1c	Plan for marine park habitat (including seaweed, seagrass, mangrove, saltmarsh, riparian zone, beach and mudflat, shellfish reef) migration or translocation	<i>We agree that this is a key action that will become increasingly important. Planning should account for potential biosecurity implications of moving species and will also need to acknowledge the ethical implications of moving/ translocating habitat-forming species (e.g. which species are prioritised). Explicit inclusion of Indigenous perspectives will be important to consider.</i>
3.1d	Identify blue carbon opportunities within marine parks.	<i>This should include valuing and publicising these opportunities and link them to known co-benefits of blue carbon, e.g. effects on biodiversity, and – importantly- coastal protection.</i>

Objective 4) To partner with Aboriginal people for protection of Aboriginal cultural values and improved marine park management

Action #	Action	AMSA Comments
4.1a	Support development and implementation of Aboriginal cultural resource use agreements, Sea Country plans or other planning tools in accordance with the aspirations of local Aboriginal people to conserve cultural values, facilitate cultural use and conserve significant sites.	<i>AMSA supports the inclusion of this important objective and actions.</i>
4.1b	Provide areas of protection for Aboriginal cultural sites or values.	<i>This must be done in consultation with local Indigenous groups.</i>
4.1c	Support safe and sustainable Aboriginal cultural harvest of shellfish.	<i>This must be done in consultation with local Indigenous groups and allow adequate time and resources for this to be done.</i>
4.1d	Support Aboriginal people to undertake marine wildlife monitoring and respond to marine wildlife strandings, entanglement and other events to engage Aboriginal people in marine wildlife management and ensure consideration of local cultural protocols.	<i>Extend the list of activities in this action to include the full suite of ranger responsibilities, employing Indigenous rangers. This action can also include biocultural restoration more broadly, i.e. the re-establishment of not just ecological communities but an active effort to restore cultural connections to the marine environment</i>
4.2a	Embed traditional Aboriginal knowledge, wisdom and culture in marine park management, including through engagement, training and employment of Aboriginal people.	<i>This must be done respectfully – Indigenous people must give permission for access and use of traditional knowledge, and such knowledge should be received in accordance with Our Knowledge Our Way: https://www.csiro.au/en/research/indigenous-science/indigenous-knowledge/our-knowledge-our-way</i>
4.2b	Support marine park staff and marine park advisory committees to undertake locally-relevant Aboriginal cultural awareness training.	<i>This training should be designed and delivered by Indigenous people.</i>
4.2c	Work with Traditional Owners to identify traditional Aboriginal names for each marine park and include local Aboriginal language in marine park education material.	<i>As above in our comments regarding Aboriginal knowledge.</i>
4.2d	Work with Aboriginal knowledge holders to increase community education, understanding and respect	<i>This must be done in consultation with local Indigenous groups and allow adequate time and resources for this to be done.</i>

	for Aboriginal cultural values for Sea Country and threats to those values.	
S4.1g	Develop site management plans to protect significant Aboriginal cultural sites at Red Rock and Moonee Creek.	<i>This must be done in consultation with local Indigenous groups and allow adequate time and resources for this to be done.</i>

Objective 5) To improve access and opportunity for enhanced social, cultural and economic values from marine parks

Action #	Action	AMSA Comments
5.1a	Work with local stakeholders to map and improve the network of formal boat and watercraft launching, fish cleaning, boat storage and boat maintenance facilities in marine parks to facilitate access for powered and unpowered watercraft and ensure facilities best meet local needs.	<i>If the plan is to aim for win-win, the action should also mention minimising environmental impacts from boat ramp activities, including traffic impacts in surrounding areas. The objective should therefore be written as "...facilitate access... whilst minimising environmental impact".</i>
5.2a	Map and maintain commercial fishing and aquaculture access points, including travel routes, boat ramps and beach access points.	<i>As above, the objective should not just be increasing or securing access, but should also include minimising impacts for example of cleaning stations, anchoring, damage to seagrass from propellers, wash impacts etc. See next comment regarding the appropriateness of commercial activities in general in MPAs.</i>
5.2b-h	Various commercial fishing and aquaculture activities within Marine Parks	<i>The IUCN Guidelines for Marine Protected Areas state that industrial-scale activities are incompatible with all categories of MPA: "Any industrial activities and infrastructural developments (e.g. mining, industrial fishing, oil and gas extraction) are not compatible with MPAs and should be excluded from such areas" Ref: Day, J., et al. (eds.) (2019). See Addendum to this report for an analysis of the emphasis in the Draft Plan regarding support for, vs the threat of, commercial fishing</i>
5.4a	Enhance access and opportunity for outdoor recreation in and adjacent to marine parks, including kayaking, canoeing, snorkelling, scuba diving and walking facilities and infrastructure such as access points, steps, handrails, launch platforms, snorkel trails and artificial reefs.	<i>The IUCN Guidelines for Marine Protected Areas state that industrial-scale infrastructure developments (potentially, in this case, large-scale artificial reefs) are incompatible with all categories of MPA. Ref above. Allocation of funding, resources and infrastructure should be allocated fairly between user categories; currently one group (recreational fishers) receive exclusive attention in this plan in several actions, whilst other groups are excluded. This does not have the appearance of a "balanced approach".</i>
5.5a	Support innovative structures and infrastructure to enhance recreational fishing opportunities, including artificial reefs and fishing platforms.	<i>This should only be secondary to the primary purpose of MPAs – conservation. See above comments regarding in appropriate infrastructure. The IUCN Guidelines for Marine Protected Areas state that industrial-scale</i>

		<i>infrastructure developments (in this case, large-scale artificial reefs and other fishing infrastructure) are incompatible with all categories of MPA.</i>
5.5c	Enhance access and opportunity for recreational fishing (including spearfishing) practices where they have been identified as a low or minimal threat to habitat and threatened species.	<i>The assertion that recreational fishing, including spearfishing, is a low threat assumes compliance. Adequate funding is therefore required to ensure that non-compliance is detected and acted upon. For example see Harasti, D., et al. (2019).</i>
5.5e	Undertake research to identify the social objectives, wellbeing, satisfaction, cultural values and economics of recreational fishing in marine parks and promote these values to enhance understanding between marine park users.	<p><i>AMSA is concerned that recreational fishing is being prioritised and disproportionately allocated high resources in this plan. See Addendum to this report for an analysis of the emphasis in the Draft Plan regarding various recreational activities, values and threats.</i></p> <p><i>Recreational fishing is one of many important social activities conducted in MPAs. A recent study of selected sites in central NSW, 2/3 of which were in MPAs, found that recreational fishing was undertaken by 15% of coastal users, vs swimming (47%), snorkeling (24%) and SCUBA diving (22%) for example (Turnbull, J. W. et al. (2020)).</i></p> <p><i>How can action 5.5e be considered “win-win” for all park users, or a “balanced approach” unless it is expanded to all recreational activities, for example understanding the economic value and wellbeing derived from swimming, snorkeling and diving?</i></p> <p><i>Plan actions such as research to understand social values, and funding should be distributed fairly across all user categories.</i></p>
5.6c	Require marine park consent for organised fish feeding to allow consideration of risk to community safety, prohibit discard of fish cleaning waste in areas used for diving, snorkelling, swimming and surfing and prohibit organised shark attraction activities.	<i>Fish feeding should not be permitted in any sanctuary zones</i>
5.7a-b	Identify priority tourism precincts, infrastructure and needs in each marine park.	<i>AMSA supports tourism activities in MPAs however they must pass the test of not being incompatible with the primary goal of MPAs: “to conserve the biological diversity, and maintain ecosystem integrity and ecosystem function, of bioregions in the marine estate” (plan p 11).</i>
5.7c	Undertake a risk assessment to inform development of a policy on	<i>Cruise ship movement, mooring and associated infrastructure is an industrial-scale impact and</i>

	sustainable cruise ship visitation in NSW marine parks.	<i>is therefore incompatible with all levels of protection in MPAs, according to IUCN guidelines.</i>
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Objective 6) To support evidence-based, inclusive and effective decision-making and marine park management

Action #	Action	AMSA Comments
6.1b, d	Identify opportunities for citizen science to fill priority knowledge gaps. Develop a marine park network monitoring plan to ensure appropriate research, monitoring and metrics are in place to assess delivery of marine park management objectives across the network.	<i>We support this action and highlight that it is long overdue, yet it is essential to understand whether MPAs are delivering on objectives. This action must not rely on citizen science to replace activities that should be professionally conducted and managed, and provided there is adequate government funding made available to support citizen science monitoring activities, including training and certification of volunteers, and out of pocket expenses.</i>
6.1c	Identify areas to provide sites for scientific research.	<i>We support this action. Scientific reference sites require sanctuary (IUCN I or II) level protection as a minimum. This should be acknowledged in the plan generally, and in the supporting statement.</i>
6.1g	Develop a robust data system for marine park permitting to improve understanding of social, cultural and economic values and explore opportunities to streamline reporting across NSW and Commonwealth marine parks.	<i>A major gap in understanding fishing pressure is lack of data on recreational catch and effort. Any permitting system inside MPAs should include measures to gather data to understand catch and compliance in aggregate.</i>
6.2b	Identify areas to provide sites for education.	<i>Current levels of sanctuary zone in the MPA network are insufficient to support the conservation of biodiversity, let alone social activities such as education. AMSA's position is that MPAs should include at least 30% sanctuary zone in order to conserve biodiversity, and this level is therefore also a baseline that should be met before considering such areas for other potentially impacting activities.</i>
6.2c	Develop and implement best-practice guidelines and case studies for common activities within marine parks to conserve values and manage threats.	<i>Best practices should be developed using peer-reviewed literature as a priority, if available. Other forms of knowledge are also valuable, however sources and evidence should be transparent and traceable.</i>
6.2e	Develop a strategic, innovative and risk-based compliance strategy for the marine park network.	<i>One of the main issues with compliance is lack of resources allocated to compliance staff and activities – this must be addressed as part of any strategic plan.</i>
6.3a	Engage key stakeholders in marine park management by continuing to operate a marine park advisory committee for each marine park.	<i>Advisory committee recommendations and advice should be formally documented, and management and decision-makers should be</i>

		<p><i>required to give evidence-based rationale for any decisions that go against such advice. Wherever engagement and consultation take place, they should be transparent and the results should be publicly reported in order to respect the efforts of stakeholders and encourage their continued engagement. AMSA requests formal acknowledgement as an advisory body to the marine park management process and strategy. AMSA is the peak body representing marine scientists in NSW. Marine scientists are a key stakeholder of MPAs, both as producers of research that guides marine park management and design, and as users of marine parks particularly sanctuary zones as reference areas.</i></p>
6.4a-c	<p>Undertake a risk assessment to allow low impact activities to operate under a code of conduct or exempt and complying criteria rather than a marine park permit, including consideration of some education, research, tourism, filming, event and Aboriginal cultural fishing activities.</p>	<p><i>AMSA supports streamlining access and compliance in marine parks, particularly to enable research to be more efficiently conducted in marine parks. Streamlining should not, however, provide an excuse to compromise on the primary purpose of MPAs; the conservation of biodiversity and the maintenance of ecosystem integrity and function. These must be backed by sufficient regulation, enforcement and monitoring to effectively enable their achievement.</i></p>



Position Statement on Marine Protected Areas (MPAs)

1. Summary

- 1.1. AMSA endorses MPAs as vital to the conservation of Australia's marine biodiversity and biomass and to meet Australia's international obligations.
- 1.2. MPAs should be designed based on sound scientific principles, to achieve a Comprehensive, Adequate and Representative (CAR) network of marine protection.
- 1.3. MPAs with at least 30% sanctuary (no-take) zone are the most effective and therefore the preferred design option.
- 1.4. In addition, MPAs should be effectively enforced and managed, left in place for a decade or more, large in size and located to maximise their ecological benefits.
- 1.5. AMSA supports a balanced approach to managing multiple uses of the resources of marine social-ecological systems which engages all stakeholders, including scientists, and partners with traditional owners.
- 1.6. MPAs are an integral part of ecosystem-based fisheries management.
- 1.7. MPA management should include a published management plan with goals, performance measures, monitoring programs and adequate resourcing.

2. Who does AMSA represent?

- 2.1. The Australian Marine Sciences Association (AMSA) is Australia's largest professional association of marine scientists with more than 700 members nationally.
- 2.2. Our Mission Statement is *Advancing marine science in Australia*.
- 2.3. Our objectives are:
 - *To promote, develop and assist in the study of all branches of marine science in Australia, and*
 - *To provide for the exchange of information and ideas between those concerned with marine science by means of publications, meetings, symposia and such other methods as may be considered appropriate.*
- 2.4. Marine scientists are not only participants in developing MPAs through delivering scientific information and advice; they are also a key stakeholder group since they use the marine environment for scientific research. AMSA wishes to emphasise the importance of this dual role for marine scientists and, as such, they should be included as key stakeholders in MPA consultation processes.

3. Australia's Obligations

- 3.1. Australia is a party to the *United Nations Convention on Biological Diversity (1992)*. The convention's 2011-2020 strategic plan urges party states to conserve, by 2020, 10 per cent of their coastal and marine areas.
- 3.2. The Australian (Commonwealth) Government, and all State and Territory Governments, are committed to the development of a National Representative System of Marine Protected Areas (NRSMPA) which is Comprehensive, Adequate and Representative (CAR).
- 3.3. This commitment has significant implications, as Australia's marine EEZ covers over 13.86 million km² and is the third largest in the world (Symonds, Alcock, & French, 2009).

4. What are marine protected areas?

- 4.1. Marine protected areas (MPAs) are areas of the ocean or coastal seas, securely reserved and effectively protected from a range of local threats through a mixture of regulations, including spatial restriction of certain activities. The level of protection and the intent of protection may both vary. The Great Barrier Reef Marine Park (GBRMP) in Queensland is an example of a large multiple-use, multi-zone MPA 344,000 km² in size, of which around 2/3 is open to fishing and 1/3 fully protected (GBRMPA, 2019). MPAs can also be small with impacts on a local scale, such as Cabbage Tree Bay Aquatic Reserve in Sydney, which is just 0.2 km² in size and 100% sanctuary zone (Turnbull et al., 2018).
- 4.2. Sanctuary zones, also known as fully-protected areas, marine national parks or no-take zones, prohibit all extractive (fishing) activities and the use of fishing gear, and may allow some level of non-extractive activity such as diving and boating. Partially-protected areas prohibit some fishing activities but allow others, for example may prohibit spearfishing but allow line fishing. Sanctuary zones correspond generally with IUCN categories I to II, and partially-protected areas correspond with categories IV to VI, although specific MPA rules may vary (Day et al., 2012).
- 4.3. Australia's MPAs conserve biodiversity across three major oceanic systems; the Pacific, Indian and Southern Oceans. This includes flora and fauna across a broad range of latitudes, and from estuarine to abyssal depths. These marine ecosystems are:
 - characterised by high endemism, particularly in the southern temperate zone;
 - less perturbed when compared to many other places in the world;
 - highly diverse; and
 - often poorly understood and documented (Evans, Bax, & Smith, 2017).

5. Threats to Australia's marine biodiversity

- 5.1. Australia's, and the world's, marine biodiversity faces five major threats, which can often act together. Ranked in order from highest to lowest historical impact in marine systems, these are (Diaz et al., 2019):
 - 1. direct exploitation / fishing:** both from commercial and recreational fishing sectors, with attendant by-catch problems, as well as illegal, unregulated and unreported fishing;
 - 2. habitat loss:** caused by coastal development such as dredging as well as from fishing gear, especially bottom trawling. Damage includes the destruction or modification of coral reefs, vulnerable benthic ecosystems, seagrass meadows, mangroves, coastal foreshores (including coastal wetlands and estuaries) and loss of connection with the ocean;

3. climate change: increased atmospheric carbon dioxide and other gases leading to global temperature increase and other impacts, resulting in changes to oceanic temperatures, acidity, patterns of water movement (including currents, eddies and fronts), storminess and raised sea levels;

4. pollution: both in-sea and land-based, diffuse and point source, which include nutrients, sediments, plastic litter, noise, hazardous and radio-active substances; and ghost fishing and entanglement of wildlife from discarded and lost fishing gear; microbial pollution and trace chemicals such as carcinogens, endocrine-disruptors, and info-disruptors; and

5. invasive species especially those introduced by vessel ballast water and hull fouling, or by population explosion of native invasive species often as a consequence of other threats.

6. What are the benefits of MPAs?

6.1. MPAs assist in maintaining healthy ecosystems. Important values and services provided by these ecosystems include the supply of seafood, passive and active recreational opportunities, culture, education, the regulation of coastal climate and habitats, and dilution and assimilation of wastes including greenhouse gases (Wescott & Fitzsimons, 2016). Accordingly, the health and wellbeing of coastal communities can depend heavily on healthy marine ecosystems.

6.2. MPAs serve six main functions, not all of which necessarily apply simultaneously:

- to protect biodiversity and ecosystem function, including the processes on which biodiversity depends;
- to assist in maintaining ecosystem services;
- to provide scientific benchmarks against which anthropogenic modifications to ecosystems and environments can be monitored and evaluated;
- to protect cultural, recreational, spiritual, educational and scientific values;
- to protect from disturbance into the future, representative habitats and species for both their intrinsic value and intergenerational equity.
- to enhance fishery production outside sanctuary zone boundaries.

6.3. All Australian States endorsed the National Strategy for the Conservation of Australia's Biological *Diversity* in 1996. This strategy acknowledges the intrinsic value of our biodiversity.

6.4. *Key scientific results*

The key scientific results from studies of MPAs are listed below and are strongly supported by over one thousand peer-reviewed scientific papers beyond those cited here.

- Well-planned, managed and enforced sanctuary (no-take) zones (IUCN category I and II) are essential to marine science, with numerous scientific benefits particularly as proxies for controls on a planet where human impacts are ubiquitous (Ballantine, 2014).
- To be effective MPAs need at least four, and preferably all five of the NEOLI criteria (Edgar et al., 2014):
 - No-take (sanctuary zone)
 - Effectively enforced and managed
 - Old (in place for 10 years or more)
 - Large (100 km² or more) and
 - Isolated from other areas, for example by expanses of sand or deep water
- Small MPAs, whilst inferior to large MPAs, can have positive effects on a local scale if they are sanctuary zone, located in sheltered areas with complex habitat, and supported by the local community (Turnbull et al., 2018).
- Effective MPAs generally enable higher fish biodiversity, biomass and abundance of large (20 cm+) and fishing targeted species (Edgar et al., 2014; Malcolm et al., 2018; Turnbull et

al., 2018).

- The evidence regarding the effectiveness of partial protection (allowing some fishing activities but not others) is varied, ranging from no benefit compared to unprotected areas (Malcolm et al., 2018; Turnbull et al., 2018) to limited benefits for targeted fish species (Harasti et al., 2018; Zupan et al., 2018). Partial protection may be warranted for socio-economic or political, rather than ecological or scientific reasons (Sciberras et al., 2015), however sanctuary zones should be the priority in order to maximise the ecological effectiveness of limited management budgets (Edgar, 2017; Edgar et al., 2019).
- Whilst MPAs are primarily a tool for conservation of biodiversity, MPAs can also confer fishery benefits particularly when combined with other fisheries management tools in support of Ecosystem-Based Management (EBM) (Halpern et al., 2010), and when MPAs are designed as a network of well-connected zones that allow for recruitment spillover (Harrison et al. 2012).
- Recreational fishers generally support sanctuary zones in MPAs, and this support increases with MPA age as aesthetic, fishery and other benefits become apparent (Navarro et al. 2018).

7. AMSA's position on MPAs

7.1. AMSA endorses MPAs as vital for the conservation of Australia's marine biodiversity and biomass.

7.2. Planning

- AMSA endorses the government's National Representative System of Marine Protected Areas (NRSMPA) and encourages its timely implementation. AMSA stresses the importance of utilising MPA planning principles as set out in several important government documents, for example, The Strategic Plan of Action for the National Representative System of Marine Protected Areas 1999 and Australia's Oceans Policy 1998.
- AMSA supports improved coordination between Federal, State and Territory governments in the design of the NRSMPA. There is a need to ensure adequate protection of those ecosystems and species at a national scale, particularly those situated near or crossing jurisdictional boundaries.
- AMSA endorses the primary goal of the NRSMPA 'to establish and manage a comprehensive, adequate and representative (CAR) planning approach for protection of Australia's marine biodiversity'.
- AMSA encourages the inclusion of more shelf, slope, canyon and canyon head areas within existing and future MPA networks, and increasing the use of no-take sanctuary (rather than partial) protection as the main tool to achieve high-quality conservation outcomes.
- In addition to following the CAR approach and NEOLI criteria, AMSA recommends that MPAs are part of systematic regional networks based on bioregional assessments. It is essential that the selection and design processes for MPAs be guided by sound scientific principles and advice.
- AMSA supports multiple use of the marine environment and strongly supports a protective mix in MPAs that includes at least 30% sanctuary zone. Multiple use, through the incorporation of some partially-protected areas, enables sustainable harvesting opportunities to occur while at the same time optimising biodiversity conservation and ecosystem function in sanctuary zones.

- National and State MPA targets are most useful when part of a systematic regional conservation plan. Where detailed planning has not been undertaken, the minimum requirement to fulfil Australia's international agreements of effective conservation is to protect all major marine ecosystems, with an initial target of at least 10% of all habitat types under full sanctuary protection.
- AMSA considers that a figure of 10% sanctuary protection would slow but not prevent loss of biodiversity. At least 30% sanctuary zone protection for each habitat is necessary to achieve substantial and sustained biodiversity conservation benefits (Green et al., 2014; O'Leary et al., 2016) including restoration of depleted populations and threatened species.
- Rare, threatened and vulnerable ecosystems, communities or populations, breeding aggregations, and migration choke points should be provided with greater protection (Green et al., 2014). When these species, ecosystem, or habitat types are critically endangered, AMSA recommends 100% protection within sanctuary zones.
- Both MPA plans and networks should replicate habitats in at least three reserves and incorporate connectivity (minimum size, spacing, compact shapes encompassing whole ecological units) (Green et al., 2014) to maximise resilience to external shocks.
- When an MPA is declared, AMSA supports the development of clearly articulated aims and performance measures for the MPA, and that management resources are allocated at a scale appropriate to the size of the MPA.
- AMSA supports the role and importance of extensive stakeholder consultation during MPA planning (Giakoumi et al., 2018). Stakeholders should be able to provide a variety of management inputs including both baseline information on ecosystem values and usage, and preferences for the placement of different spatial zones and other management options.
- AMSA supports government partnerships with traditional owners in planning and managing MPAs.
- The selection of MPA planning options must be framed within Australia's national and international commitments to the protection of biodiversity. It is essential that alternative options, provided to, or collected from, stakeholders do not compromise the fundamental goals, and essentially science-based design principles of the network.
- While most attention has focused on the ecological and fisheries values of MPAs, AMSA encourages the creation of MPAs to protect sites of heritage, cultural, geological, or physical oceanographic significance.

7.3. Monitoring and research

- AMSA strongly supports evidence-based MPA decision making from the best available science. Australia's marine systems remain poorly studied and improved knowledge and long-term data sets are needed to better understand and monitor Australia's marine environment, habitats and biodiversity, and develop adaptive management solutions for the most pressing threats.
- Well-designed scientific monitoring programs should be part of all MPA planning and management. Baseline monitoring preferably before, or at least at the time of MPA creation, is a vital tool for the study of long-term MPA effects, to assess the performance of the protected area, and to detect impacts or changes.
- AMSA endorses the free and open publication of monitoring and research results

regarding MPAs, following peer-review, in recognised scientific journals.

- Monitoring data from MPAs also helps our ability to manage the wider marine environment. In particular, sanctuary zone MPAs provide reference or control sites for both fisheries and conservation research. MPAs are therefore an essential part of broader research programs.
- Australia lacks an up-to-date, consolidated reporting mechanism on MPAs. The Collaborative Australian Protected Area Database 2016 (CAPAD), maintained by the Commonwealth, lacked comprehensive information on State marine protected areas. Further, the database lacks reporting on the extent of protection of marine habitat, ecosystem, geomorphic province, or even bioregion. These are important gaps and should be addressed at a national scale by the Commonwealth Government as a matter of urgency.
- Australia's marine environment has been impacted by a range of human activities. AMSA considers that the cumulative impact of multiple stressors on the marine environment constitutes a key knowledge gap not adequately addressed by existing scientific programs. A quantitative assessment of cumulative human impacts is required to underpin comprehensive evidence-based decision making related to MPAs.

7.4. Fisheries

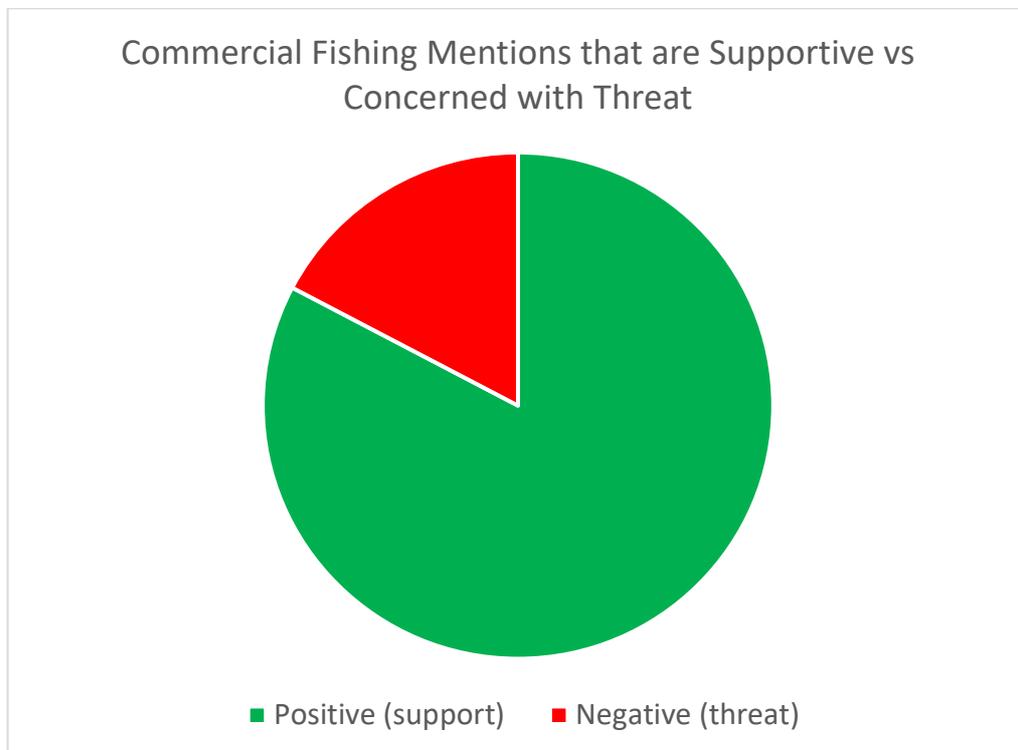
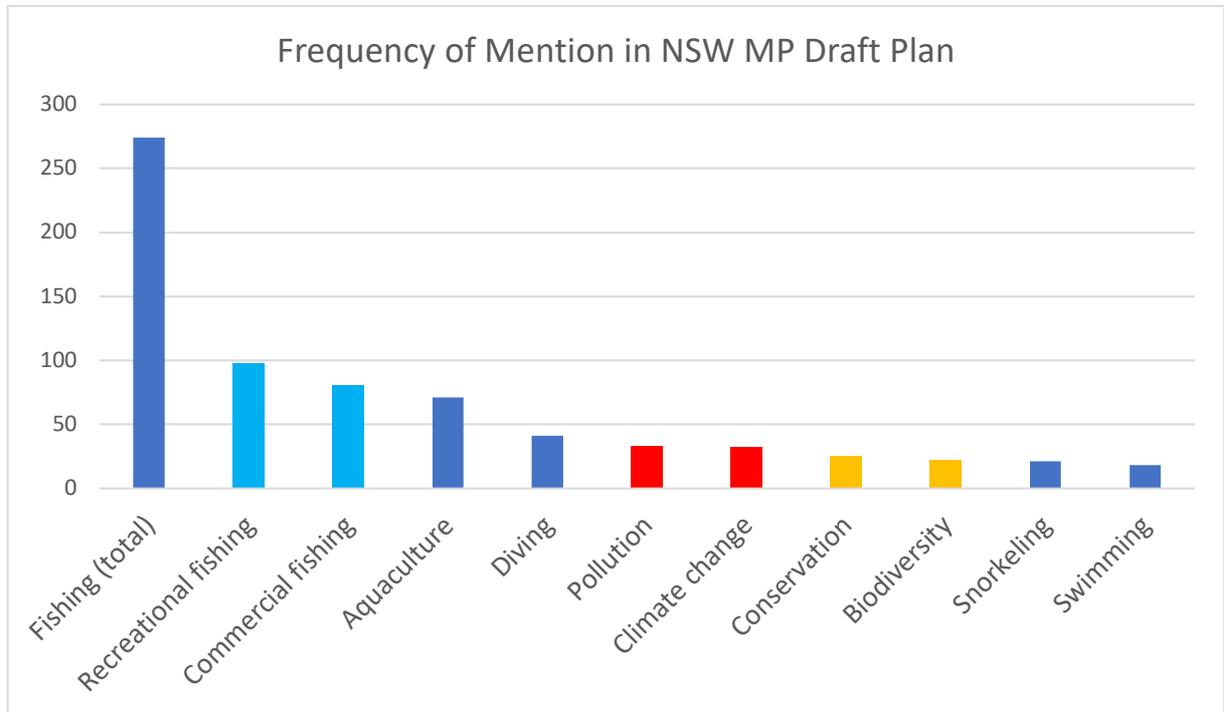
- Good fisheries management is essential for the sustainable use of marine resources and the protection of marine biodiversity. AMSA recognises that MPAs are complementary to other methods, such as input and output controls, for well-managed fisheries.
- AMSA supports improved fisheries management in conjunction with the development of MPA networks in the context of Ecosystem-Based Management. For example, MPAs enable research into key processes (growth, mortality, recruitment) in the absence of harvest pressure.
- AMSA strongly supports greater cooperation, integration and collaboration between scientists and managers working in ecology, conservation and fisheries management.
- AMSA supports the incorporation of Social-Ecological Systems approaches in order to understand and manage the relationships between humans and marine ecosystems.
- The establishment of sanctuary zone MPAs may result in displacing fishing effort to other areas, which may have negative impacts. To avoid effort transfer, MPA designation should be accompanied by appropriate reductions in overall fishing effort or catch for affected fisheries, particularly those which are at, or near, full exploitation levels.
- AMSA acknowledges that the extent of impact, and the process of fishing effort displacement from MPAs to other sites (particularly for recreational fisheries) is poorly understood. More research into this issue is needed.
- AMSA endorses the use of structural adjustment packages to buy out and retire fishing effort from industry following establishment of MPAs. These packages are designed to avoid displacement of fishing effort and, also, where MPAs remove substantial and valuable legal entitlements, alleviate stakeholders suffering significant financial hardship.
- AMSA supports the wide application of ecosystem-based and precautionary approaches to the management of both commercial and recreational fisheries, both within and outside of MPAs.
- In some cases spatial management provides the only viable option for avoiding overfishing.

For example, there is currently no way to monitor the total catch taken by recreational fishers, which creates a high risk of local over-depletion, especially site-attached target species. Well-managed sanctuary zones ensure that at least one part of a breeding stock is protected from harvest, which can then replenish fished areas in a connected network of MPA zones.

7.5. Management

- AMSA recognises that ongoing community and stakeholder consultation has been demonstrated, both in Australia and internationally, to be vital to successful MPA management.
- In supporting management, decisions should be based on the best scientific evidence and advice available. Where evidence is inadequate, a precautionary stance should be taken, in line with Australia's commitment to the precautionary principle. In addition, where feasible, evidence should be sought before major decisions are made.
- The selection of any management options by the community and stakeholders needs to be framed within the goals of the MPA. It is important that MPA managers have the authority to resist options that may compromise the goals and design principles of the MPA.
- AMSA supports, whenever appropriate, regional management of MPAs and recognises that having staff based near MPAs, who are part of the local community, is an effective approach.
- Networks of MPAs should be adequately resourced from inception to ensure that they are properly managed. There are costs involved both in establishing, and maintaining, networks of MPAs. These include scientific research, stakeholder consultation, education, compliance and enforcement, as well as scientific monitoring to determine the effects and performance of MPAs.
- Compliance operations in MPAs should have adequate resourcing and professional enforcement officers. Successful management needs to include adequate education, information, communication and awareness programs, and clear, simple and easy to understand boundaries, signage and regulations for MPAs.
- AMSA emphasises that MPAs require effective management strategies across the entire marine environment. This includes targeted activities and programs to address major environmental stressors such as climate change, invasive species, overfishing, pollution and habitat loss.
- AMSA encourages improved coordination between Federal, State and Territory governments in the management of MPAs.

Addendum (added 7th February 2022): Thematic analysis of mentions in the Draft Plan of various stakeholder groups, pressures, values and valence (supportive vs threat-based mentions) of commercial fishing mentions



References

- Ballantine, B. (2014). Fifty years on: Lessons from marine reserves in New Zealand and principles for a worldwide network. *Biological conservation*, 176, 297-307.
- Day, J., Dudley, N., Hockings, M., Holmes, G., Laffoley, D. D. A., Stolton, S., & Wells, S. M. (2012). Guidelines for applying the IUCN protected area management categories to marine protected areas. IUCN.
- Day, J., et al. (eds.) (2019). Guidelines for applying the IUCN protected area management categories to marine protected areas. Second edition. Gland, Switzerland: IUCN.
- Diaz, S., Settele, J., Brondizio, E., Ngo, H., Guèze, M., Agard, J., . . . Butchart, S. (2019). Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.
- Edgar, G. J. (2017). Marine protected areas need accountability not wasted dollars. *Aquatic Conservation*, 27, 4-9.
- Edgar, G. J., Stuart-Smith, R. D., Willis, T. J., Kininmonth, S., Baker, S. C., Banks, S., . . . Berkhout, J. (2014). Global conservation outcomes depend on marine protected areas with five key features. *Nature*, 506(7487), 216-220.
- Edgar, G. J., Ward, T. J., & Stuart-Smith, R. D. (2019). Weaknesses in stock assessment modelling and management practices affect fisheries sustainability. *Aquatic Conservation: Marine and Freshwater Ecosystems*.
- Evans, K., Bax, N., & Smith, D. (2017). Australia state of the environment 2016: marine environment, independent report to the Australian Government Minister for the Environment and Energy. *Australian Government Department of the Environment and Energy, Canberra*.
- GBRMPA. (2019). *Great Barrier Reef Outlook Report 2019*: Great Barrier Reef Marine Park Authority.
- Giakoumi, S., McGowan, J., Mills, M., Beger, M., Bustamante, R. H., Charles, A., . . . Gelcich, S. (2018). Revisiting “success” and “failure” of marine protected areas: a conservation scientist perspective. *Frontiers in Marine Science*, 5, 223.
- Green, A. L., Fernandes, L., Almany, G., Abesamis, R., McLeod, E., Aliño, P. M., . . . Pressey, R. L. (2014). Designing marine reserves for fisheries management, biodiversity conservation, and climate change adaptation. *Coastal Management*, 42(2), 143-159.
- Halpern, B. S., Lester, S. E., & McLeod, K. L. (2010). Placing marine protected areas onto the ecosystem-based management seascape. *Proceedings of the National Academy of Sciences*, 107(43), 18312-18317.
- Harasti, D., Williams, J., Mitchell, E., Lindfield, S., & Jordan, A. (2018). Increase in relative abundance and size of snapper *Chrysophrys auratus* within partially-protected and no-take areas in a temperate marine protected area. *Frontiers in Marine Science*, 5, 208.
- Harasti, D., et al. (2019). Illegal recreational fishing causes a decline in a fishery targeted species (Snapper: *Chrysophrys auratus*) within a remote no-take marine protected area. *PLoS One*, 14(1), e0209926
- Harrison, H. B., Williamson, D. H., Evans, R. D., Almany, G. R., Thorrold, S. R., Russ, G. R., . . . Jones, G. P. (2012). Larval export from marine reserves and the recruitment benefit for fish and fisheries. *Current Biology*, 22(11), 1023–1028.
- Malcolm, H. A., Williams, J., Schultz, A. L., Neilson, J., Johnstone, N., Knott, N. A., . . . Jordan, A. (2018). Targeted fishes are larger and more abundant in ‘no-take’ areas in a subtropical marine park. *Estuarine, coastal and shelf science*, 212, 118-127.
- Navarro, M., Kragt, M. E., Hailu, A., & Langlois, T. J. (2018). Recreational fishers’ support for no-take marine reserves is high and increases with reserve age. *Marine Policy*, 96, 44–52
- O’Leary, B. C., Winther-Janson, M., Bainbridge, J. M., Aitken, J., Hawkins, J. P., & Roberts, C. M. (2016). Effective Coverage Targets for Ocean Protection. *Conservation Letters*, n/a-n/a. doi:10.1111/conl.12247
- Sciberras, M., Jenkins, S. R., Mant, R., Kaiser, M. J., Hawkins, S. J., & Pullin, A. S. (2015). Evaluating the relative conservation value of fully and partially protected marine areas. *Fish and Fisheries*, 16(1), 58-77.
- Symonds, P., Alcock, M., & French, C. (2009). Setting Australia’s limits: understanding Australia’s marine jurisdiction. *AusGeo News*, 93, 1-8.
- Turnbull, J. W., Esmaeili, Y. S., Clark, G. F., Figueira, W. F., Johnston, E. L., & Ferrari, R. (2018). Key drivers of effectiveness in small marine protected areas. *Biodiversity and Conservation*, 27(9), 2217-2242.
- Turnbull, J. W., Johnston, E. L., Kajlich, L., & Clark, G. F. (2020). Quantifying local coastal stewardship reveals motivations, models and engagement strategies. *Biological conservation*, 249, 108714.

- Turnbull, J. W., Johnston, E. L., & Clark, G. F. (2021). Evaluating the social and ecological effectiveness of partially protected marine areas. *Conservation Biology*. doi: <https://doi.org/10.1111/cobi.13677>
- Wescott, G., & Fitzsimons, J. (2016). *Big, Bold and Blue: Lessons from Australia's Marine Protected Areas*: CSIRO PUBLISHING.
- Zupan, M., Fragkopoulou, E., Claudet, J., Erzini, K., Horta e Costa, B., & Gonçalves, E. J. (2018). Marine partially protected areas: drivers of ecological effectiveness. *Frontiers in Ecology and the Environment*, 16(7), 381-387.