

# The Marine Protected Areas debate: Implications for the proposed Phakisa Marine Protected Areas Network

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**KEYWORDS:**  
oceans management; fisheries; oceans economy; marine ecosystems

**HOW TO CITE:**  
Sink K. The Marine Protected Areas debate: Implications for the proposed Phakisa Marine Protected Areas Network. *S Afr J Sci.* 2016;112(9/10), Art. #a0179, 4 pages. <http://dx.doi.org/10.17159/sajs.2016/a0179>

South Africa recently had the privilege of hosting prominent fisheries scientist Professor Ray Hilborn from Washington University who stimulated lively discussion on global stock status, food production, impacts of trawling on the seabed, fisheries management and Marine Protected Areas (MPAs). Professor Hilborn gave a seminar billed as 'Fisheries Myths' on 25 August 2016 and the following day participated in a formal debate at the Two Oceans Aquarium on South Africa's MPA expansion strategy and the need for additional MPAs. The debate was held between Professors Ray Hilborn and Doug Butterworth (Marine Resource and Assessment Management Group, Applied Mathematics Department, University of Cape Town) speaking against the strategy and expansion, and Dr Jean Harris (Ezemvelo KwaZulu-Natal Wildlife and Pew Fellow) and Professor Colin Attwood (Department of Biological Sciences, University of Cape Town) speaking in favour of additional MPAs. The debate examined the need for MPA expansion; the effect of MPAs on fisheries; and the role of MPAs in fisheries management, food security and biodiversity protection; and interrogated targets to increase ocean protection.

Here I examine key aspects of these discussions in the context of the proposed new Phakisa MPA Network developed through Operation Phakisa Oceans Economy – the presidential initiative to explore and unlock the economic potential of South Africa's marine and coastal environment. This network of 22 proposed MPAs was published for public comment in February this year.

## Oceans under threat and the need for healthy oceans

The opening presentations of this debate by Hilborn and Harris agreed on the increasing threats to ocean ecosystems and the need for healthy oceans. The Phakisa MPA Network is centred in this common ground and aims to support the development of a sustainable oceans economy while establishing some protected ocean spaces that help create certainty and support development in the context of increasing ocean activities. It is recognised that MPAs are not a panacea and cannot address all the challenges faced by marine ecosystems.

## The role of MPAs in management for healthy oceans

There are some challenges such as climate change, ocean acidification and plastic pollution that are global issues that MPAs cannot solve. MPAs are, however, important in the understanding of global change impacts and evidence is emerging that healthy ecosystems within MPAs have greater resilience to climate change.<sup>1,2</sup> MPAs can also reduce other global stressors such as pollution and mitigate negative effects of industrial sounds. In the proposed Phakisa MPA Network, special provisions on pollution management in the regulations will help MPAs address waste management in our oceans, but the need for wider measures is recognised and being advanced through other Phakisa initiatives.

Harris emphasised that MPAs are the only viable means to maintain intact ecosystems and undisturbed seabed communities and to protect fragile habitats from threats such as demersal fisheries and seabed mining. The important reference value of MPAs was also noted, in that research and monitoring of undisturbed areas can help us better understand impacts outside of protected areas. Attwood highlighted the importance of MPAs in providing insurance against scientific uncertainty and management failure, citing the recent discovery of a new whale species as an example of the magnitude of things we may still not know about our oceans. This is relevant for South Africa as many habitats occurring below a depth of 100 m have not been studied. New deep discoveries include fragile deep cold water coral reefs and chemosynthetic seep communities. The role of these unstudied ecosystems in the food web and life history of commercially fished species in South Africa is unknown, but the presence of cold water coral mounds in the kingklip spawning grounds may not be a coincidence. The proposed Phakisa MPA Network provides for both of these sage measures (benchmarking and precaution) in that it aims to include a proportion of such poorly known habitat.

Both sides of the debate recognised the value of MPAs in protection of habitats, although Hilborn noted the limited experimental demonstrations of broader ecosystem and biodiversity benefits of MPAs. There have, however, been multiple demonstrations, including some in our region<sup>3,4</sup>, demonstrating how the exclusion of fishing from MPAs can influence ecosystem composition and functioning. The proposed Phakisa MPA Network aims to increase the representation of marine habitats in South Africa's protected area network. In its current form, it could provide the first protection to 46 of 54 habitats that are currently without protection. Many of these habitat types are affected by fishing, and better understanding of fisheries impacts, particularly in sensitive offshore areas, is needed. MPAs can facilitate such research.

## The role of MPAs in fisheries management

The value of well-managed MPAs as a means of protecting entire ecosystems and supporting resource recovery within their bounds is established, and was agreed on by all debaters. However, the role of MPAs as a fishery management tool was one of the questions at the core of the debate. This issue has been frequently examined in the context of international policy and scientific considerations.<sup>5-8</sup> Unsurprisingly, most agree that MPAs will not outperform effective fisheries management in the management of fisheries resources. As Hilborn noted, MPAs are most likely to benefit fisheries where resources are seriously overfished and when the scale of fish movement is matched by the size of MPAs. In South Africa, the most depleted fisheries resources include linefish, abalone and west coast rock lobster<sup>9</sup> – the types of species for which some fisheries benefits through spillover from unfished

areas have been demonstrated<sup>10,11</sup>. Hilborn himself has co-authored several papers that show the value of spatial management in resource recovery for abalone<sup>12</sup>, rock lobster<sup>10</sup> and severely overexploited species<sup>5</sup> and in the maintenance of spawning aggregations<sup>5,13</sup>.

The value of MPAs in the maintenance of genetic diversity of fished species, highlighted by Attwood, was unchallenged in the debate and is recognised in international fisheries management guidelines. Maintaining genetic variability in a world with increased rates and scales of global changes seems particularly pertinent.

It is worth noting that the proposed Phakisa MPA Network is not primarily aimed at fisheries management, but is aimed at holistic environmental sustainability and mitigating the impacts of accelerated industrial activities on ocean health. The few fisheries support objectives that are included for some of the proposed MPAs, are only for species or life-history phases (e.g. the protection of spawning aggregations) for which such benefits have clearly been demonstrated. In addition, the network includes research or experimental objectives, but these did not drive selection of areas and simply take advantage of the opportunities provided by the contrast within zoned MPAs. Butterworth criticised the proposed Phakisa MPA Network for largely ignoring a key crisis in South Africa's fisheries: the poor status of the west coast rock lobster. Whilst the proposed Robben Island and Namaqua National Park MPAs do help address this issue, he is largely correct and this species may benefit from additional spatial management in the future. It should not be forgotten that existing coastal MPAs may also contribute to rock lobster recovery but improved enforcement and resolution of compliance challenges need to be addressed for current and new MPAs to contribute to the recovery of this valuable resource.

One of the criticisms of MPAs in a fisheries management context is that MPAs simply displace fishing effort which can counter fisheries management goals or displace effort into more sensitive areas.<sup>5</sup> The research and planning efforts for the proposed Phakisa MPA Network took cognisance of these issues and included a substantial amount of fisheries data in planning (among other sector data) to minimise effort displacement and ensure that effort is not displaced into more sensitive areas. The use of a systematic planning approach ensures spatial efficiency and the optimisation algorithms specifically select unfished and lightly fished areas for protection. They also take into account the interests of other sectors such as petroleum, mining, shipping, defence and waste management. This strategy not only reduces the impact of protection on fisheries and other stakeholders but also focuses protection into areas of good ecosystem condition; a win-win scenario. A valid criticism of any management measure applicable to both fisheries management, MPA management and any ocean management measure is non-compliance and poor governance. These challenges, often more pertinent in developing countries, require cooperative management and integrated enforcement efforts to improve compliance. Operation Phakisa includes an Integrated Enforcement Initiative that aims to support multiple compliance efforts including fisheries management and the proposed Phakisa MPA Network. Attwood reflected on the increased importance of MPAs in areas with higher biodiversity, multi-species fisheries and weaker ocean governance, making a case that no-take MPAs assume greater importance under such circumstances, particularly in developing countries.

Hilborn's recent article published in *Nature*<sup>14</sup> advocates that fisheries and biodiversity management should be overseen by the same body. He notes:

*Another way to foster collaboration on a national scale would be to merge the various government departments responsible for conservation and fisheries management into a single department of marine management.*

South Africa previously had such an institution in the form of the Marine and Coastal Management (MCM) branch of the then Department of Environmental Affairs and Tourism but the mandates of this branch were split in 2010 between the Department of Agriculture, Forestry and Fisheries and the Department of Environmental Affairs. It was MCM

that gave rise to the Offshore Marine Protected Area Project, which underlies much of the proposed Phakisa MPA Network. MCM also led the establishment of coastal MPAs, building on the establishment of MPAs by the former Sea Fisheries Research Institute. These steps forward in ocean protection lend support to Hilborn's view that effective biodiversity and fisheries management benefits from active collaboration between fisheries and biodiversity in area-based management.

## **MPAs and the South African hake trawl fishery**

Hilborn reflected on the localised impact of demersal trawling in his seminar the day prior to the debate. The audience raised concerns about specific seabed habitats that are sensitive to trawling impacts and the need to better understand variability in seabed ecosystems. Hilborn agreed that sensitive ecosystems require protection and noted that 'effort should go into identifying and protecting these habitats'. The proposed Phakisa MPA Network aims to achieve just this, as emphasised by Harris in the debate. However, MPAs are not the only tools that can be used to protect habitats, and some countries have established benthic or seabed protection areas to protect vulnerable marine ecosystems as a *part* of fisheries management. South Africa still needs to develop habitat management objectives for its fisheries even though good progress has been made in understanding the potential impacts of hake trawling in South Africa. Multiple media reports covering the debate note that South Africa's deep-sea trawl industry is protecting sensitive deep-sea habitats and reducing by-catch. The proposed Phakisa MPA Network aims to provide this first protection to priority habitats affected by hake trawling in South Africa, including those habitats that are currently entirely within the trawl footprint and sensitive habitats such as cold water coral reefs. By-catch management is slowly advancing through other measures although analyses undertaken as part of the technical work for the Phakisa MPAs demonstrate that some sites in the proposed network can contribute to by-catch management and would also represent fish communities that are currently not represented in existing MPAs.<sup>15</sup>

## **MPAs and integrated oceans management**

As with fisheries management, MPAs are unlikely to outperform or replace the need for other sector-specific management approaches (covering one aspect of ocean use), but they can greatly contribute to integrated ocean management. One of the sectors that was not considered by the opponents of MPA expansion was the marine mining sector. As Harris noted, MPAs, particularly the proposed Phakisa MPA Network, will help to safeguard the range of ecosystems that are subject to current and future marine mining and petroleum activities in South Africa. During audience engagement at the seminar, Hilborn noted that, in his experience, such activities operate over remarkably small areas (tens of square kilometres), but this conflicts with our experience in South Africa. When the proposed Phakisa MPA Network was developed, more than 90% of South Africa's mainland marine territory was under petroleum exploration lease. Diamond mining leases covered most of the west coast shelf and large new leases to prospect for phosphates and other minerals have been issued. The most recent phosphate lease covers more than 47 000 km<sup>2</sup> alone and overlaps substantially with prime hake fishing grounds. Debaters from both teams noted that MPAs are a blunter tool than more specific management actions covering a single objective. However, MPAs are very cost effective in their ability to address multiple objectives in a spatially efficient manner. Furthermore, innovation in MPA design and management can sharpen MPA effectiveness. Horizontal and vertical zonation and informed adaptive management can increase flexibility and the achievement of multiple goals. In the proposed Phakisa MPA Network, 18 of the 22 proposed MPAs are zoned with proposed zonation determined through consideration of the compatibility of particular activities with specific objectives of each MPA.

## **The role of MPAs in the economy**

Harris noted the role of MPAs in the tourism economy, education and training, and conflict resolution. International case studies reflect on other such MPA benefits, beyond the biodiversity and fisheries aspects including their value in increasing tourism revenue, job creation, community upliftment and the preservation of culture and history.<sup>16-18</sup>

MPAs provide opportunities for marine ecotourism including snorkelling, scuba diving, bird and marine mammal watching, and shark tourism. Key proposed Phakisa MPAs that aim to increase benefits through their marine tourism assets and their role in the preservation of South African culture and heritage include Namaqua National Park, Robben Island, Protea Banks and Aliwal Shoal. Approaches to increase such benefits is an area of active research in South Africa and is likely to inform future protection priorities.

## MPA targets

The debate chair, Kevin Cochrane (Rhodes University), framed this debate in light of South Africa's National Protected Area Expansion Strategy, a policy document published by the South African government in 2008. This strategy sets out targets for lengths of coastline and areas of ocean to receive protection, based on a 20-year protection target of 20%. Attwood shed light on the origin of this target in a fisheries context and Harris cited advances in research on targets for marine protection where, even though a range of targets has been published, all targets indicate the need for greater protection than we currently provide (see O'Leary et al.<sup>19</sup> for examples). Butterworth questioned the need for targets and the science behind protected area targets in particular. It was clear that there is confusion around ecosystem specific biodiversity targets, time-bound protected area targets and international action targets (such as the 10% ocean protection target set by the Convention on Biological Diversity, or the 20–30% target advocated at the Worlds Park Congress). This lack of agreement on targets notwithstanding, during the debate no-one advocated that we should have zero protection in the ocean. The proposed Phakisa MPA Network aims to advance the current 0.4% protection of South Africa's mainland ocean territory to a modest 5%. The Convention on Biological Diversity target for ocean protection is twice this amount and ecosystem-specific biodiversity targets suggest that a higher percentage is needed.<sup>20–23</sup> In my personal view, protracted debate around targets can detract from the real work that needs to happen to maintain ocean ecosystem health and secure the valuable ecosystem services provided by well-managed fisheries. The proportion of protected area required to achieve these goals will vary between different types of ecosystems, different species and fisheries, and will depend on the state of ecosystems and management outside of MPAs as well as many other factors. Science should continue to advance in the area of targets, without holding up implementation of protection.

## Final reflections

The Phakisa MPA Network is a unique initiative developed in a unique context, with participation from 17 ministries as part of the Operation Phakisa Oceans Economy Lab. The points debated during Professor Hilborn's visit were considered by the team that planned the proposed MPA network, building on decade-long efforts to develop the more than 800 map layers that underpin the 22 proposed MPAs. The proposed Phakisa MPA Network is not designed to address overfishing. Rather, the network represents a step forward in integrated ocean management through representation of more of South Africa's diverse marine ecosystems, in areas where the last remnants of threatened ecosystems are still in good condition *and* where there is the least impact on the activities of all other stakeholders who use the ocean. The proposed Phakisa MPA Network has multiple objectives, with specific objectives set out for each individual MPA, and is aligned with fisheries management. The detailed spatial information that was used to develop the proposed network can support further work towards Marine Spatial Planning in South Africa (another Operation Phakisa initiative). The 5% protection target set by the Marine Protection Services and Ocean Governance component of Operation Phakisa is a measure to gauge progress in protected area expansion, which was recognised as an important need in light of the accelerated industrial development promoted by Operation Phakisa.

Robust debate about ocean protection targets is important, but uncertainty about the upper limits of protection targets should not delay implementation of critical protection as South Africa speeds up ocean development to ensure greater benefits from our ocean economy. Such protection must be designed in collaboration not only with fisheries but also with other ocean-use sectors. The proposed Phakisa MPA Network

seeks to achieve this through integrated planning covering all affected marine sectors and through optimisation algorithms that minimise impacts of MPAs on all stakeholders, to deliver a spatially efficient MPA network that achieves multiple protection objectives. The opportunity to expand South Africa's MPA network exists, the need is urgent, and the proposed Phakisa MPA Network stands to provide well-focused protection based on sound evidence and a strongly participatory process.

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