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## MPA Science Corner: Gaps in protection - Southern Ocean MPAs - Invasion risk to MPAs - Marine predators - Mediterranean MPAs - Protecting a resilient reef - Priority ABNJ areas - Impact of a small no-take zone - Climate adaptation and MPAs

These recent articles on MPA-related science and policy are all free to access.

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**Article:** Gownaris, N.J. et al. [Gaps in protection of important ocean areas: a spatial meta-analysis of ten global mapping initiatives](#). *Frontiers in Marine Science* 6:650 (2019).

**Finding:** There have been numerous initiatives led by UN agencies or NGOs to map globally important marine areas, with each initiative applying its own set of criteria. This study is the first to overlay these initiatives, quantify consensus among them, and conduct gap analyses at a global scale. It finds that 55% of the ocean has been identified as important by one or more initiatives, and that individual areas have been identified by as many as seven overlapping initiatives.

An interactive version of the overlay map – showing areas of consensus and how they relate to existing MPAs, as well as allowing users to zoom in on areas – [is here](#). A synopsis of the study's main findings [is here](#).

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**Article:** Brooks, C.M. et al. [Progress towards a representative network of Southern Ocean protected areas](#) *PLoS ONE* 15:4 (2020).

**Finding:** This study determines that current Antarctic MPAs are not representative of the full range of benthic and pelagic ecoregions in the Southern Ocean. Implementing additional protected areas, including those currently under negotiation, would substantially improve representativeness, with 17 benthic and pelagic ecoregions achieving at least 10% representation.

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**Article:** Iacarella, J.C. et al. [Unwanted networks: Vessel traffic heightens the risk of invasions in marine protected areas](#) *Biological Conservation* 245, May 2020.

**Finding:** To identify the invasion risk to MPAs from non-native species via vessel ballast or biofouling, this study evaluates vessel traffic patterns for 1346 vessels that connected previously invaded areas to MPAs in Canadian waters. It finds that 70% of the MPAs were connected to previously invaded areas via vessel traffic.

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**Article:** Handley, J.M. et al. [Evaluating the effectiveness of a large multi use MPA in protecting Key Biodiversity Areas for marine predators](#). *Biodiversity Research* (early view online version before inclusion in an issue), April 2020.

**Finding:** This study evaluates whether the management regime of a large MPA (the South Georgia and South Sandwich Islands MPA) adequately conserves sites supporting the persistence of top predators. It concludes that the MPA's fishery management measures do contribute to protecting top predators, and that resource harvesting within the MPA does not currently pose a major threat.

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**Article:** Claudet, J. et al. [Underprotected Marine Protected Areas in a Global Biodiversity Hotspot](#) *One Earth* 2:4 (2020).

**Finding:** This study evaluates MPA coverage in the Mediterranean Sea and finds that the region's 1062 MPAs cover 6% of the basin, falling short of the 10% target for 2020 under the UN Convention on Biological Diversity. Of the total area covered

by these MPAs, 95% lacks sufficient regulations to reduce human impacts on biodiversity and protect ocean health.

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**Article:** Yucharoen, M. et al. Coral Diversity at Losin Pinnacle, an Offshore Reef in the Gulf of Thailand: Toward a Future MPA. *Frontiers in Marine Science* 7:130 (2020).

**Finding:** Severe coral bleaching events in the Gulf of Thailand and along the Andaman Sea coast of Thailand caused widespread coral mortality in 1998 and 2010. However, most colonies in the offshore reef of Losin were still alive after these events. This study of the area's coral diversity was conducted to support a proposal to designate an MPA there.

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**Article:** Visalli, M.E. et al. Data-driven approach for highlighting priority areas for protection in marine areas beyond national jurisdiction. *Marine Policy*, in press (2020).

**Finding:** This study integrates 55 global data layers for areas beyond national jurisdiction (ABNJ) – including species diversity, habitat heterogeneity, benthic features, productivity, and fishing – for the purpose of highlighting priority regions in ABNJ for spatial protection. It found that Instructing the model to avoid areas with high fishing effort resulted in relatively minor shifts in the planning solution compared to a model that did not consider fishing effort.

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**Article:** Stewart, B.D. et al. Marine Conservation Begins at Home: How a Local Community and Protection of a Small Bay Sent Waves of Change Around the UK and Beyond. *Frontiers in Marine Science* 7:76 (2020).

**Finding:** This study describes how evidence of conservation success in a small, 2.67-km<sup>2</sup> no-take zone in Lamlash Bay, Scotland, has in turn supported the development of strong protections for multiple marine sites across the UK and abroad.

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**Article:** Tittensor, D.P. et al. Integrating climate adaptation and biodiversity conservation in the global ocean. *Science Advances* 5:11 (2019).

**Finding:** This study reviews progress in integrating climate change adaptation into MPA design and management, and provides eight recommendations to expedite this process. Climate-smart management objectives – including the use of more dynamic management tools – should become the default for protected areas, and made into an explicit international policy target.

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