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## MPA Science Corner: Marine mammals and MPAs - Plastics and MPAs - Coral reef soundscapes - Population assessments with ROVs - Systematic conservation planning

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

**Article:** Passadore, C., Möller, L. M., Diaz-Aguirre, F., and Parra, G. J. Modelling Dolphin Distribution to Inform Future Spatial Conservation Decisions in a Marine Protected Area. *Scientific Reports* 8, (2018).

**Finding:** Bottlenose dolphins in Australia's Coffin Bay, a part of Thorny Passage Marine Park, are most likely to be found outside designated sanctuary zones, where there are multiple uses including vessel traffic, recreational fishing, and oyster farming. The latter, particularly, put them at risk of entanglement with gear. The results demonstrate a broader need to understand what drives the spatial distribution of top marine predators to better inform conservation planning.

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**Article:** Barnes, D. K. A. et al. Marine plastics threaten giant Atlantic Marine Protected Areas. *Current Biology* 28, R1137 - R1138 (2018).

**Finding:** MPAs may effectively protect marine life from some human threats, but plastic pollution is probably not one of them. Marine surveys of five UK territories in the South Atlantic – each an existing or proposed MPA – found major increases in marine debris in recent years. Debris on beaches had increased more than 10-fold in a decade, and concentrations of sea surface plastics also rose 76% on average since 2013, and 92% since 1993. Levels of seamount debris, hundreds of meters below the surface, also increased. Meanwhile, a survey of 26 species found plastics are commonly ingested throughout different levels of the food chain.

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**Article:** Freeman, S. E., Freeman, L. A., Giorli, G., and Haas, A. F. Photosynthesis by marine algae produces sound, contributing to the daytime soundscape on coral reefs. *PLOS ONE* 13, e0201766 (2018).

**Finding:** Marine macroalgae produce sound during photosynthesis as a result of forming and releasing little oxygen bubbles into the water column. Even in the midst of other biological noises, these sounds can be measured and directly correlated to levels of benthic algae cover across a shallow coral reef in Hawaii. Compared to current visual methods, measuring these sounds presents a potentially simpler and faster tool for estimating changes in algae abundance on a reef – a key indicator of ecosystem health.

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**Preprint:** Haggarty, D. R., Shurin, J. B., and Yamanaka, L. Assessing population recovery inside British Columbia's Rockfish Conservation Areas with a remotely operated vehicle. *Fisheries Research* 183, 165 - 179 (2016).

**Finding:** In closing 164 rockfish conservation areas to fishing in the mid-2000s, Canada aimed to help rebuild overfished inshore populations of rockfish. But an underwater survey of 35 of these areas and adjacent unprotected areas in the province of British Columbia, conducted several years after the closures, found little indication that the reserves have had any effect on recovery of populations of six species inside of their borders.

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**Preprint:** Adams, V. M. et al. Implementation strategies for systematic conservation planning. *Ambio* (2018).  
doi:10.1007/s13280-018-1067-2

**Finding:** Conservation planning – the high-level process of deciding on priority areas to protect, often at a regional scale – does not accomplish much if plans never make it into action. This paper analyzes factors that help bridge the “assessment to implementation” gap and proposes a framework for designing implementation strategies that are more integrated into the planning process. It identifies 16 specific planning processes that have an influence on implementation success.

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