

Applying geoscience to biodiversity monitoring: Case studies from an Australian marine park

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Short description: How geophysics and sedimentology can be used to inform marine ecology using our recent examples from a northern Australia MPA.

Following the establishment of the world's largest network of marine protected areas, Australia is now tasked with implementing national plans to manage a huge range of marine environments, from tropical to sub-Antarctic climates and shallow reef to abyssal depths. Monitoring (i.e. condition assessment and trend detection) is one of the key objectives of associated management plans. As part of a national effort to acquire baseline data for future monitoring purposes from 2009 to 2012, we collected geoscientific (bathymetry, backscatter, sub-bottom profiles, sediment grain-size) and biological data (assemblages and richness of infauna, sponges and pelagic fish) using a variety of gear (grab, sled, pelagic baited video, multibeam sonar, sparker) from the Oceanic Shoals Australian Marine Park in northern Australia. In this presentation, we describe how the integration of such data (including derived geoscientific products) helped to inform sampling design, map habitats, predict the distribution of benthic and pelagic communities at varying spatial scales, and better understand ecosystem processes. We hope to encourage ecologists and marine managers to incorporate geoscientific methods into their research and policy in order to further improve sampling design, data collection, robust modelling, and informed decision-making.