ID: W1952752159

TITLE: Seamount megabenthic assemblages fail to recover from trawling impacts

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ABSTRACT:

Abstract Because the nature, tempo and trajectories of biological changes that follow the cessation of trawling are unknown for seamounts, it is unclear whether closing them to trawling will lead to a recovery of the fauna and, if so, over what time scales. This paper reports on a ?test of recovery? from repeated towed camera surveys on three seamounts off New Zealand in 2001 and 2006 (5 years apart) and three off Australia in 1997 and 2006 (10 years apart). In each region, seamounts where trawling had ceased were compared to adjacent seamounts where trawling was still active, and to seamounts that had never been trawled. If recovery signals existed, the likelihood of detecting them was high because the seamounts were relatively small and topographically simple, and because quantitative survey methods were employed. Multivariate patterns showed no change in the megafaunal assemblage consistent with recovery over a 5?10 year timeframe on seamounts where trawling had ceased. Results based on the number of species and diversity were equivocal, with some cases of increase and decrease on seamounts where trawling had ceased. A few individual taxa were found at significantly higher abundance in the later surveys where trawling had occurred. We suggest this may have resulted from their resistance to the direct impacts of trawling (two chrysogorgid corals and solitary scleractinians), or from protection in natural refuges inaccessible to trawls (unstalked crinoids, two chrysogorgid corals, gorgonians, and urchins). Alternatively, these taxa may represent the earliest stages of seamount recolonisation. They have potential to be dominant for long periods because the pre?trawling composition of benthic assemblages on seamounts includes taxa that grow slowly and/or have an association with ?thickets? of a single keystone stony coral (Solenosmilia variabilis) that has generated biogenic habitat over millennia. Resilience of seamount ecosystems dominated by corals is low compared to most other marine systems subject to disturbance by bottom trawling because there are no alternative habitats of the same value for supporting associated species, and because trawling typically removes coral habitat from large areas of individual seamounts. Management to conserve seamount ecosystems needs to account for changing oceanographic conditions (ocean acidification), as well as the direct impacts of human activities such as bottom trawling. Networks of spatial closures that include intact habitats over a range of depths, especially <1500 m, and on clusters and isolated seamounts, may be effective by maintaining the resilience of seamount benthic communities.

SOURCE: Marine ecology

PDF URL: None

CITED BY COUNT: 183

PUBLICATION YEAR: 2010

TYPE: article

CONCEPTS: ['Trawling', 'Seamount', 'Fauna', 'Oceanography', 'Fishery', 'Bottom trawling', 'Octocorallia', 'Megafauna', 'Geography', 'Ecology', 'Coral', 'Geology', 'Biology', 'Fishing', 'Paleontology', 'Cnidaria', 'Coelenterata', 'Pleistocene']