ID: W2666914793

TITLE: Population genetic structure and connectivity of deep?sea stony corals (Order Scleractinia) in the New Zealand region: Implications for the conservation and management of vulnerable marine ecosystems

AUTHOR: ['Cong Zeng', 'Ashley A. Rowden', 'Malcolm R. Clark', 'Jonathan P. A. Gardner']

ABSTRACT:

Abstract Deep?sea stony corals, which can be fragile, long?lived, late to mature and habitat?forming, are defined as vulnerable marine ecosystem indicator taxa. Under United Nations resolutions, these corals require protection from human disturbance such as fishing. To better understand the vulnerability of stony corals (Goniocorella dumosa , Madrepora oculata , Solenosmilia variabilis) to disturbance within the New Zealand region and to guide marine protected area design, genetic structure and connectivity were determined using microsatellite loci and DNA sequencing. Analyses compared population genetic differentiation between two biogeographic provinces, amongst three subregions (north?central?south) and amongst geomorphic features. Extensive population genetic differentiation was revealed by microsatellite variation, whilst DNA sequencing revealed very little differentiation. For G. dumosa , genetic differentiation existed amongst regions and geomorphic features, but not between provinces. For M. oculata , only a north?central?south regional structure was observed. For S. variabilis , genetic differentiation was observed between provinces, amongst regions and amongst geomorphic features. Populations on the Kermadec Ridge were genetically different from Chatham Rise populations for all three species. A significant isolation?by?depth pattern was observed for both marker types in G. dumosa and also in ITS of M. oculata . An isolation?by?distance pattern was revealed for microsatellite variation in S. variabilis . Medium to high levels of self?recruitment were detected in all geomorphic populations, and rates and routes of genetic connectivity were species?specific. These patterns of population genetic structure and connectivity at a range of spatial scales indicate that flexible spatial management approaches are required for the conservation of deep?sea corals around New Zealand.

SOURCE: Evolutionary Applications

PDF URL: https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/eva.12509

CITED BY COUNT: 30

PUBLICATION YEAR: 2017

TYPE: article

CONCEPTS: ['Biology', 'Genetic structure', 'Ecology', 'Population', 'Isolation by distance', 'Range (aeronautics)', 'Microsatellite', 'Genetic variation', 'Biochemistry', 'Allele', 'Materials science', 'Demography', 'Sociology', 'Gene', 'Composite material']