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[Maerl beds inside and outside a 25-year-old no-take area.](#)

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Abstract: Maerl beds, which harbour productive, diverse benthic communities, are threatened by human activities. Although some types of fishing activities can impact maerl beds, their effects are poorly studied due to the lack of appropriate un-fished control sites. In this study, we took advantage of the 25 yr old no-take Columbretes Islands Marine Protected Area (MPA) (NW Mediterranean) as the best available reference for pristine conditions and assessed (1) the conservation status of maerl beds in this MPA and (2) the impacts of fishing in nearby beds that are open to this activity. We compared macroalgal species richness (including both calcifying and non-calcifying species), maerl cover and the live proportion of maerl in 3 contiguous zones with different protection histories: inside the 25 yr old MPA (IN25), inside the adjacent 6 yr old MPA (IN6) and in the unprotected grounds surrounding the MPA where fishing continues (OUT). We also analysed differences between shallow (30 to 49 m) and deep (50 to 69 m) beds inside the IN25 area. As expected, all variables were higher in shallow than in deep beds within the IN25, likely because of greater irradiance and water motion in the shallow realm. Maerl cover and algal species richness were greater in deep beds within the IN25 than in the adjacent beds of the OUT region that was composed of similar bathymetric and sediment features, and thus protection from fishing activities in the MPA can best explain these differences. Nonetheless, the proportion of live maerl was similar in both areas. Factors such as differences in light exposure or fragmentation by fishing gear (thus generating new recruits) under a sufficiently intense hydrodynamic regime (thus avoiding burial) may mask fishing impacts on the fraction of live maerl. Similar maerl cover in long- and short-term protected contiguous beds suggests that recovery of such algal beds might occur within 6 yr after fishing cessation.

Keywords: Maerl, Rhodolith cover, Live maerl, Fishing effects, Algal assemblages, Diversity, Marine protected areas, Northwestern Mediterranean