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[Morpho-demographic traits of two maërl-forming algae in beds with different depths and
fishing histories.](#)

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Abstract: Maërl is a benthic community composed of accumulations of coralline red algae with an essential eco-biological role in marine ecosystems. This low-resilience community has acquired a high conservation status as many anthropogenic impacts threaten this globally distributed ecosystem. Some of the potentially more important but less studied impacts are those caused by fishing activities due to the lack of proper controls. This study investigates the potential fishing impacts and depth-related differences on the rhodolith morpho-demographic traits of two maërl-forming algae, *Lithothamnion corallioides* and *Spongites fruticosus*, with distinct morphologies (ramified vs nucleated). Rhodolith size and shape (roundness and solidity) indicators were assessed in maërl beds protected from fishing inside a large 25-year old no-take MPA, in a contiguous 6-year no-take zone, and in adjacent fished beds. Rhodoliths of both species were bigger, rounder (spherical) and more solid (structurally less complex) in shallow than in deep beds of the long-term protected area, which was probably a result of a more active hydrodynamic regime and higher irradiance in shallow beds. Fishing effects manifested differently depending on the morphological properties of rhodoliths, which resulted in a decrease in size and complexity in

L. corallioides

and roundness in

S. fruticosus

. Such fishing impacts were significant only inside the short-term 6-year protected area. The most plausible cause of this unexpected observation is the highly localized trammel-net fishing effort with long soak-times along the boundary of the contiguous 25-year MPA, where before closure, fishing effort was concentrated in expectation of greater catches from spillover (i.e. fishing the line). This is the first study to document the impacts of fishing the line on structural species and indicates that boundaries of successful MPAs could be zones of maximum disturbance, a fact that should be taken into account in management conservation decisions.

Keywords: biodiversity conservation, complexity, depth effects, fishing impacts, fishing the line, marine protected area, morphology, rhodolith