

# The potential of fisheries reserves as a tool for biodiversity conservation. The case of the 25 Nautical Mile Fisheries Management Zone around Malta.



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## Introduction

Fisheries reserves (FRs) are spatially bounded areas where the harvesting of fisheries resources is restricted in some areas by regulating gear, species captured or fishing period (restricted fishing areas), or forbidden outright (no-take zones) and are designed to protect populations of commercially important stocks from overexploitation. However, such reserves may also protect vulnerable and ecologically important habitats, especially if significant areas of such habitats are included, even if the primary objective of the reserve is not habitat protection. We illustrate this using the 25-Nautical Mile Maltese Fisheries Management Zone (FMZ) around Malta as a case study.

Since 1971, Malta has managed a 25-NM Exclusive Fishing Zone, covering an area of 11,980 km<sup>2</sup>, which, after Malta became a member of the European Union in 2004, was retained as a Fisheries Management Zone (FMZ). The objectives of the original Exclusive Fishing Zone (EFZ) were

to protect the local artisanal fisheries from foreign commercial large-scale fishing especially by trawling.

Until recently, the fishing regulations in force in the EFZ were those published in 1934 (Fish Industry Act), with minor changes over the years (Camilleri, 2005), that included a restriction on trawling within the territorial waters (which at the time were 3 nautical miles; the restriction was maintained at 3 nautical miles even after the extension of Maltese territorial waters to 12 nautical miles). Prior to Malta's accession to the EU a new management regime was proposed (Camilleri, 2003), agreed upon and later implemented after accession through Council Regulation EC 813/2004, which, *inter alia*, limited trawling operations to specified areas based on the "trawling" grounds (Fig. 1) identified during a survey in 1978 made in collaboration with the Food and Agriculture Organization (FAO) (Giudicelli, 1978).

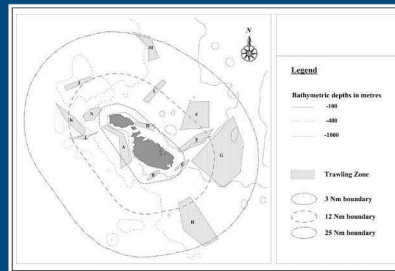


Figure 1. Map of the general sea area around the Maltese Islands, showing the boundary of the 25 nautical mile Fisheries Management Zone and the areas where trawling is allowed within the zone (shaded polygons labelled A-M).

Knowledge of the benthic habitats and seabed characteristics of the protected area around Malta is very limited and it is only in recent years that investigation of the habitats and their biota in this zone and of the physical characteristics of the seabed has begun. During the 1980s and 90s, investigations focused mainly on the relatively shallow waters within the 3-NM no-trawling zone, but presently deeper waters are being studied. These studies have revealed the presence of important habitats (Fig. 2), such as very extensive *Posidonia oceanica* meadows extending to depths of 44 m and which comprise some of the densest meadows in the Mediterranean (Borg & Schembri, 1995) and of equally extensive maerl beds at depths of 50–120 m (Borg et al., 1998; BIOMAERL Team, 2003).

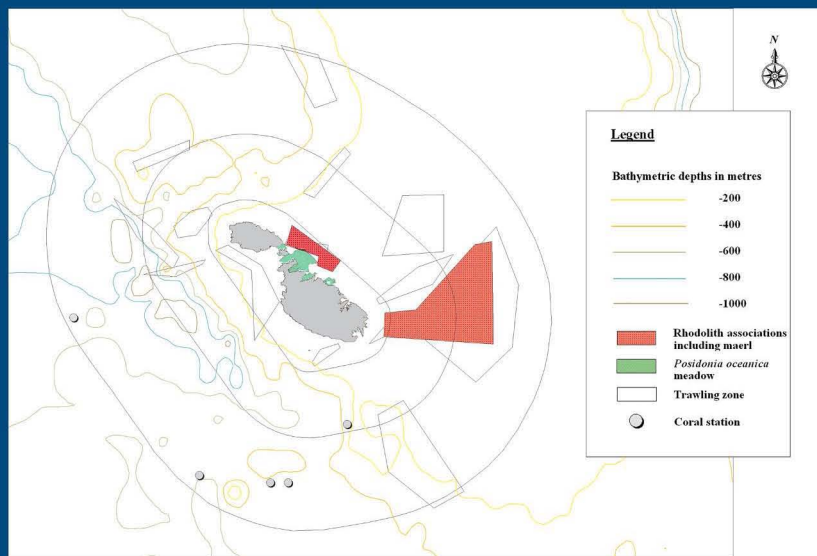


Figure 2. Map of the Maltese 25-NM Fisheries Management Zone and surrounding sea area showing the spatial distribution of *Posidonia oceanica* meadows (green), rhodolith associations including maerl (red) and coral stations (grey dots). The polygons show the distribution of the trawling zones within the FMZ.

## Maerl beds

Maerl is biogenic sediment characterised by accumulations of live and dead unattached coralline algae in the form of nodules or unattached branched growths known as rhodoliths. Due to its complex structure, maerl generally provides a heterogeneous bottom with a range of microhabitats, and consequently it has a high biotic diversity.

Because of this rich benthic diversity, maerl grounds support an equally rich fish fauna and are good fishing grounds (BIOMAERL Team, 2003). In Maltese waters, an extensive maerl bed covering about 20 km<sup>2</sup> of the seabed occurs at depths of between 40 m and 80 m off the northeastern coast of Malta and Gozo (Borg et al., 1998) (Figure 2). In two years of sampling, some 400 species of macroflora and macrofauna were recorded from two sites within this ground, including some species that, while common on the maerl bed, were rare in other benthic habitats. The main rhodolith-forming algae in Maltese maerl beds are *Lithothamnion corallioides*, *Lithothamnion minervae* and *Phymatolithon calcareum* (Lanfranco et al., 1999).



Figure 4. Grab sample of maerl from off the NE coast of Malta.



Figure 5. Live rhodolith accumulations.

The main threat to Maltese maerl grounds seems to be from bottom trawling although changes in the sedimentary regime due to coastal development may pose an additional threat in some areas (Bordehore et al., 2002; BIOMAERL Team, 2003). In 2004, another maerl bed was discovered off the eastern part of Malta during a routine marine benthic survey (Dimech et al., 2004), while later, rhodolith accumulations were discovered during trawl surveys (Dimech & Schembri, 2005; MD unpublished data).

The presence of rhodoliths qualifies the sites for inclusion in national inventories of natural sites of conservation interest as required by the Protocol for Specially Protected Areas and Biodiversity in the Mediterranean (SPABIM) of the Barcelona Convention. Furthermore, the coralline algae *Lithothamnion corallioides* and *Phymatolithon calcareum* are listed in Annex V (Animal and plant species of Community interest whose taking in the wild and exploitation may be subject to management measures) of the European Union's Habitats Directive as amended post-EU27 enlargement.

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## Posidonia oceanica

Beds of the seagrass *Posidonia oceanica* serve as feeding and nursery grounds for many species, including commercially important fishes (Bell & Harmelin-Vivien, 1982), and constitute important marine autotrophic ecosystems, since they contribute a source of net oxygen release and act as a carbon sink (Hemminga & Duarte, 2000).



Figure 3. *Posidonia oceanica* meadow.

Because of these important features, *P. oceanica* beds are arguably the single most important shallow-water marine habitat in the Mediterranean Sea and consequently have been listed in the EU's 'Habitats Directive' as a priority habitat whose protection requires 'Special Areas of Conservation' to be designated. More recently, this seagrass has been adopted by Mediterranean EU states as a bioindicator of the ecological status of coastal water bodies in the implementation of the EU's 'Water Framework Directive'.

## Deep water coral beds

Very recently (2003–2006), living deep-water coral assemblages of the *Lophelia pertusa*, *Madrepora oculata* and *Desmophyllum dianthus* triad, were discovered at depths of 390–620 m within the Maltese FMZ, and more recently still (July 2007) another site with live coral was located about 24 NM west of Malta (MD unpublished data).

The finding of live framework-building deep-water corals close to the Maltese islands is noteworthy, especially since up to the date of discovery of the south Malta coral bank, there was only one previous record of large banks of healthy colonies of *Lophelia pertusa* in the Mediterranean (off the coast of Santa Maria di Leuca, Apulia, Italy).

Small colonies of *L. pertusa* and individuals of *D. dianthus* have also been found attached to nylon rope and other anthropogenic material at other stations south of Malta, suggesting active recruitment of the corals (Schembri et al., 2007).

The coral sites off western and southern Malta are located within the Maltese FMZ. At present, there is only a very limited amount of trawling in the Malta FMZ, while none of the Malta coral sites occur in an area where trawling is presently allowed (Council of the European Union, 2004).



Figure 6. *Lophelia pertusa*

Figure 7. *Madrepora oculata*



## Conclusion

Although the 25 nautical mile 'reserved area' was primarily set up to protect fish stocks, especially commercial demersal resources, of the Maltese shelf area, the restriction and regulation of trawling activities within the zone serve also to protect benthic habitats that have a high ecological and conservation value, including seagrass meadows, maerl beds and coral banks. However to the east of Malta, where there is a large area with rhodolith accumulations, trawling is presently permitted. Regulations should be amended to limit the allowed trawling grounds in this area and thus to reduce trawling impacts.