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Closed areas for fisheries management: How much is enough?

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Closed areas for fisheries management: How much is enough?

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Abstract

Closed areas are becoming more and more important for fisheries management. Closed areas benefits for stock enhancement and biodiversity conservation are known but, in most countries, surface closed to fisheries is up to the moment too small. While it has been proposed to protect 10% of the marine environment for biodiversity objectives, several studies point that, for fisheries enhancement, it will be necessary to close at least 20% of marine environment to fisheries. Moreover in most countries, closed areas are biased to protect some particular habitat like shallow water reefs and it will be necessary that the protection expand to include all different

marine habitats. A crucial point to expand the network of marine protected areas is the financing sustainability of protected areas. Different ways to obtain the management budget for protected areas are discussed.

Keywords: Closed areas, Fisheries Management, Stock enhancement, MPAs

Résumé

La fermeture de zones revêt une importance croissante dans le cadre de la gestion des activités de pêche. Les avantages que procurent les zones fermées pour l'amélioration des stocks et la préservation de la biodiversité sont connus, mais dans la plupart des cas, la superficie fermée par les pays reste à ce jour bien trop limitée. Bien qu'il ait été proposé de protéger 10 % de l'environnement marin en vue d'atteindre les objectifs liés à la biodiversité, diverses études indiquent que dans le cas de la gestion des activités de pêche, il sera nécessaire de procéder à des clôtures d'au moins 20 % de l'environnement marin. De plus, la majorité des pays définissent les zones de manière inégale pour protéger un type d'habitat spécifique tel que les récifs d'eau peu profonde ; il conviendra d'étendre la protection et inclure tous les différents habitats marins. La viabilité financière des zones protégées est un point essentiel

à l'extension du réseau ou de la réserve marine. Différentes méthodes de collecte de fonds aux fins de maintenance des zones protégées sont en cours de discussion.

Introduction

Closed areas to fisheries, also called Marine Protected Areas (MPAs), are becoming more and more important for fisheries management. Although there are some differences between both terms (MPAs and closed areas) in this paper they have been considered with the same meaning: an area in which fisheries are completely or partially restricted. Benefits of closed areas for stock enhancement and biodiversity conservation are known (Gell & Roberts, 2002). The cessation or reduction of fishing mortality in marine protected areas (MPAs), promote an increase in abundance and mean size and age of previously exploited populations, that produce an increase in the offspring production and the spillover effect to open areas (Sánchez Lizaso et al 2000, Goñi et al 2008, López-Sanz et al 2011). Benefits for fisheries usually are observed with an increase in effort and catches in the vicinity of MPAs (Goñi et al 2008, Forcada et al 2009) changes in the opinion of fishermen with increased support to MPAs (Badalamendi et al 2000) or some socioeconomic indicators (Ramos et al 1992; Sánchez Lizaso & Giner, 2001)

Surface to be protected

MPAs are effective for fishery enhancement and conservation objectives, but the relevant question for managers is the proportion of the area of distribution of each population that has to be protected. It is necessary to achieve equilibrium between biomass accumulation inside and biomass export to open areas (Sánchez Lizaso et al 2000).

Surface to be protected is dependent on the biology of species. Although small protected areas have been effective for the protection of low mobility species, usually species with more mobility need larger closed areas (Ramos et al 2002, Halpern, 2003).

One of the targets of the Convention on Biological Biodiversity is that, by 2020, at least 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape (https://www.cbd.int/sp/targets/rationale/target-11/). Currently, about 209000 protected areas cover 15.4% of the planet's terrestrial and inland water, and 3.4% of the oceans. 8.4% of all marine areas with-

in national jurisdiction (0-200 nautical miles) are covered with protected areas, while only 0.25% of marine areas beyond national jurisdiction are protected (Juffe-Bignoli et al 2014).

However 10% may not be enough and, for fisheries management, best results have been observed with closed areas that cover higher surface. In Philippines good results have been obtained with closed areas that cover 10-25% of fishing grounds (Rus & Alcala 1999). Moreover in some fisheries, it has been stablished as limit reference point, that Spawning Stock Biomass (SSB) or SSB per recruit (SSP/R) do not fall below some limit relative to the unfished level (Gabriel & Mace, 1999). One way to achieve this objective is to protect a significant proportion of the distribution area of each species (from 20 to 35%). On the other hand, a protected area that covers 65% of fishing grounds, increased CPUE but reduced the number of fishers and catches in Kenia (McClanahan & Kaunda-Arara, 1996).

It also has to be considered that some part of protected areas may be on partial protection status with some fishing allowed inside or may be not effectively implemented (paper parks).

It is important to note that the benefits for fisheries are related with the effective reduction in fishing mortality. In this sense, when we try to estimate surface effectively protected

we should consider only surface completely closed to fishing and effectively implemented. Partial protected areas should be weighted by the reduction of fishing mortality that they allow and paper parks should not be considered at all.

Bias in habitats protected

In many countries MPAs are biased to protect some particular habitat (i.e. coastal reefs). These habitats usually have higher biodiversity or are submitted to more treat. However, the protection of these habitats only benefits species that use these habitats as part of their life cycles and that usually are targeted by artisanal fisheries. But also species that live in low diversity habitats, like sandy/muddy bottoms, may benefit from spatial closures. In fact this low diversity habitats usually support the most important fisheries. The target of surfaces to be protected has to achieve all marine habitats, from coastal to open seas, to benefit all marine species.

How to pay the cost of protection?

If the target is to expand the network of closed areas to fisheries and enforce them effectively, the main constraint in many countries is the financial sustainability of protection (Balmford et al 2004). Inadequate funding is one of the primary reasons

that many MPAs exist as paper parks. Once a MPA is legally established, sufficient funding is rarely allocated to fulfill its mission (Thur 2010). Some protected areas maybe supported by donors at the beginning but donors are unlikely, however, to sustain finances for MPA management in the long-term (McClanahan, 1999). In some countries like Spain, management costs are assumed exclusively by the public administration, which implies that, at this moment, there are more areas waiting the protection than allowable public funding for expanding the network of protected areas.

Given the limitations on financing coastal protection and resource management, the use of alternative mechanisms to generate funding should be considered (Edwards, 2009). Since there are winners and losers of protection (Badalamendi et al 2000), one alternative is that winners pay the cost of protection. At least for coastal protected areas, revenues produced by user fees may contribute significantly to management cost. For example, MPAs in the Red Sea produce 20 times more revenues than management costs, and these revenues are used for maintain the whole network of national parks (including the terrestrial ones), some of them with low number of visitors (Samy et al 2011). It has also been observed that a significant percentage of visitors of some ma-

rine protected areas, will accept support financially through fees their management (Thur, 2010; Durgun, 2013).

But, how to pay enforcement in high sea with no visitors? Enforcement of closed areas in the high sea may be easier and cheaper than coastal areas since usually fishing is done by larger vessels that use Vessel Monitoring System (VMS) and/or Automatic Identification System (AIS) (Mazzini 2013).

Conclusions

– MPAs are effective for protecting marine biodiversity and rebuilding stock biomass

– At least 20 to 30% of all marine habitats have to be closed to fisheries

– Sustainable financing is needed to ensure enforcement

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