



# SCIENCE FOR ENVIRONMENT POLICY

## Extending full protection in marine protected areas can meet fishery and conservation goals



18<sup>th</sup> November 2020 /  
Issue 553

**Subscribe to free  
bi-weekly News Alert.**

**Source:**

Belharet, M., Di Franco, A., Calò, A., Mari, L., Claudet, J., Casagrandi, R., Gatto, M., Lloret, J., Sève, C., Guidetti, P., and Melià, P. (2020) Extending full protection inside existing marine protected areas, or reducing fishing effort outside, can reconcile conservation and fisheries goals. *Journal of Applied Ecology* 00:1-10.

**Contact:**

[mokrane.belharet@gmail.com](mailto:mokrane.belharet@gmail.com)  
[paco.melia@polimi.it](mailto:paco.melia@polimi.it)

**Marine fisheries provide a major source of food and livelihood for hundreds of millions of people worldwide. However, many fish stocks are being overfished, with major cascading impacts on marine biodiversity.** Identifying effective strategies for fishery management is, therefore, a matter of urgency. To assess stock status and sustainability, this study models three ecologically and economically important coastal fish species inside and outside Mediterranean marine protected areas (MPAs).

Overfishing of marine fishery stocks is a matter of significant concern on a global scale<sup>1</sup>. To combat this, there is a pressing need for further improved fishery management, enforcement and control. Traditional management has focused on overseeing fishing activity in order to guarantee 'maximum sustainable yields' (MSYs) — the maximum catch that can be removed from a stock over time without depleting it. Defining MSYs relies upon biological reference points such as stock biomass and fishing mortality rate, which are used to assess the status of a species or fishery. For many species however, including those important in small-scale or recreational fisheries, these reference points are unknown because of a lack of scientific data.

Fisheries management in coastal areas also relies upon [MPAs](#): geographically distinct zones with defined protection objectives and measures (e.g. regions that aim to protect a specific species or habitat as a protection objective, with associated conservation or management measures such as limiting resource extraction or human activity). While often not established primarily with fisheries in mind, MPAs can provide multiple benefits to fisheries, with their ecological effectiveness dependent on their level and focus of protection. The EU recognises the efficacy of MPAs as a way to manage and enhance marine ecosystems — in 2018, [the EU met Aichi Target 11](#) (under the [Convention on Biological Diversity](#)) of classifying 10% of its sea surface as MPAs, and is working to extend this coverage to 30% under the [EU Biodiversity Strategy for 2030](#)<sup>2</sup>.



# SCIENCE FOR ENVIRONMENT POLICY

## Extending full protection in marine protected areas can meet fishery and conservation goals (continued)

### Read more about:

[Biodiversity](#), [Emerging risks](#), [Environment information services](#), [Marine ecosystems](#), [Sustainable consumption and production](#)

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission. Please note that this article is a summary of only one study. Other studies may come to other conclusions.

### To cite this article/service:

[“Science for Environment Policy”](#):

European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol..

### Subscribe to free bi-weekly News Alert.

1. Various factors make fisheries management especially difficult in the Mediterranean, including the time taken to integrate and adapt the [Common Fisheries Policy](#) to suit the region; lack of quotas; ecological and geographical characteristics; geopolitics; external pressures; and the fact that most Mediterranean waters are international, contrary to other EU basins, therefore requiring greater cooperation.

2. EU Biodiversity Strategy for 2030 Bringing nature back into our lives COM/2020/380: <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&uri=CELEX:52020DC0380>

3. MPAs that afford different levels of protection, restriction and permission to multiple types of activity (e.g. cultural, natural, ecological). Multiple-use MPAs can be uniform, zoned, or zoned with no-take areas. For example, a zoned multiple-use MPA may allow some extractive activities across its area but prohibit them within defined sanctuaries or refuges in the MPA. This study explores the benefits of increasing the size or presence of ‘fully protected’ zones.

This study assesses the role of MPAs as a tool to support fisheries management of three key coastal species in part of the north-western Mediterranean Sea: the white seabream (*Diplodus sargus*), the two-banded seabream (*Diplodus vulgaris*) and the dusky grouper (*Epinephelus marginatus*). The study region encompassed 62 nationally designated MPAs covering a total of 11 255 square kilometres (525 of which are ‘fully protected’). The researchers first tested the effects of regulating fishing mortality rates for these species (i.e. reducing fishing efforts), and then tested the importance of ‘fully protected’ MPA areas (in terms of presence and size) in determining the effectiveness of multiple-use MPAs<sup>3</sup>. They used a spatially explicit model of fish population size and connectivity and evaluated the results in terms of three conservation indicators: stock biomass (total weight of all fish), fisheries’ catch and total value of catch.

The results show that white seabream is currently moderately overfished, while the two-banded seabream and dusky grouper are being highly overfished (with fishing mortality rates reaching twice those associated with MSY). For stock biomass levels to recover for the latter two species, current fishing mortality rates must reduce by around 50%; this would enable stock biomass to increase by 50% for the two-banded seabream and 75% for the dusky grouper after 15 to 30 years, and fisheries’ catch to increase by 15% and 30%, respectively.

However, as enforcing control of fishing activity is a challenging endeavour, the model also identifies an alternative strategy, reliant upon the existing system of MPAs, that brings both conservation and fisheries’ benefits for stock protection. Ensuring that loss in fishing ground is offset by gains in catch is key for successful fisheries management in MPAs, say the researchers. While the extent of the effects is species-dependent, they find that doubling the size of fully protected areas within fishable regions of Mediterranean MPAs would help stock biomass increase for all three species, without substantially affecting overall fishery productivity or the total economic value of the catch.

Overall, the study shows that conservation benefits, such as increased fish biomass, can be obtained by either reducing fishing in unprotected areas, or increasing the size of fully protected areas within MPAs (i.e. not increasing the overall size of an MPA, but altering the levels of protection offered within it). This aligns with the goals of the EU Biodiversity Strategy for 2030: protection of 30% of EU waters, with 10% of waters being ‘fully protected’. The researchers suggest that their analysis must be extended to other regions and fishery-relevant species, to help more effectively manage vulnerable species and reconcile conservation and fishery goals.