

---

# Mediterranean Marine Protected Areas: Do they work?

Sylvaine Giakoumi\*<sup>1</sup>, Claudia Scianna<sup>1</sup>, Jeremiah Plass-Johnson<sup>1</sup>, Fiorenza Micheli<sup>2</sup>,  
and Paolo Guidetti\*<sup>1</sup>

<sup>1</sup>ECOMERS, FRE 3729 – CNRS - Université Nice Sophia Antipolis – France

<sup>2</sup>Stanford University – United States

## Abstract

Marine protected areas (MPAs) are a prominent management tool for the conservation and recovery of marine ecosystems and biodiversity. Establishing and implementing MPAs in human dominated regions, such as the Mediterranean Sea, is challenging because multiple users often consider MPAs an obstacle to their activities. Therefore, demonstrating the positive effects of MPAs is particularly important to gain support and compliance for new and current MPAs. We performed a meta-analysis to explore whether the fully and partially protected zones within Mediterranean MPAs have biological effects on fishes and invertebrates. We used data from 27 publications (published between 1988 and 2014) on 25 MPAs in 4 countries (France, Greece, Italy, Spain). We found positive effects of fully protected areas on the biomass and density of fish assemblages as well as on selected commercially targeted species. The mean biomass and density of fish assemblages were about three and two times (respectively) higher in the fully protected areas compared to fished locations outside the MPAs. Conversely, we found negative effects of fully protected areas on sea urchins. In partially protected areas of the MPAs, effects were negligible for most of the biological variables examined. However, partial protection increased the density of *Epinephelus marginatus* by six times when compared with fished areas outside MPA borders. These results, along with other information on Mediterranean MPAs, are presented in the booklet: "The Science of Marine Protected Areas: Mediterranean Edition". The booklet aims to communicate existing scientific knowledge on Mediterranean MPAs to stakeholders and policy makers.

**Keywords:** marine protected areas, reserve effect, meta, analysis, Mediterranean Sea, fish, invertebrates

---

\*Speaker