



Protected or not?

Background reading for teachers

This reading gives you background for the analysis.

What students should find

The teaching data is adjusted so that reserves hold clearly more fish biomass and more of the species people catch, at every depth, while total fish numbers differ much less. The strongest driver is enforcement: strongly enforced reserves hold the most, and weakly enforced reserves barely differ from open reefs. The enforcement levels are invented for teaching and do not describe the real sites.

Why enforcement

A global study of 87 marine protected areas found conservation benefits grew sharply with five features: no take, well enforced, old, large and isolated. Reserves with only one or two of them were not ecologically distinguishable from fished sites.¹ In practice, where reserves are placed is often a matter of local politics and agreement, so what makes the difference is what happens afterwards: patrols, wardens, community support and consistent enforcement.

Biomass

Biomass was estimated from each fish's size class with a general length-weight formula, so it is approximate. Biomass data is usually skewed, with a few very high surveys, which is why comparing medians alongside means matters.

Sources

1. Edgar, G.J. and others (2014). Global conservation outcomes depend on marine protected areas with five key features. *Nature* 506: 216-220.
2. Russ, G.R. and others (2004). Marine reserve benefits local fisheries. *Ecological Applications* 14(2): 597-606.

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