

Healthy fisheries through marine reserves

The policy brief outlines how policy makers and leaders can help deliver a more reliable food supply to fishing communities in Indonesia and the Philippines through marine reserves that rebuild and maintain healthy fisheries.

GUIDELINES

- 1 **Strictly protect 20–30% of fished habitat by establishing a network of no-take marine reserves.**
- 2 **Marine reserves should be large enough to protect adult fishes and small enough to ensure that 30% or more of locally produced larvae are exported.**

Communities across Indonesia and the Philippines depend on fishing for food and economic security, yet, in many areas, overfishing is threatening the sustainability of coastal marine biodiversity and the long-term productivity of fisheries.

Research completed by a multi-national cross-organisational team as part of the Capturing Coral Reef & Related Ecosystem Services (CCRES) project has shown that, by protecting 20–30% of fished habitats, the long-term productivity of almost any unregulated coral reef fishery should be maintained or rebuilt.

This is important because the enforcement of strict no-take marine reserves on coral reefs is critical to combat ongoing biodiversity loss, but is feasible only if reserves also benefit, or at least do not diminish, fishery catches.

Both Indonesia and the Philippines have signed the Convention on Biological Diversity (www.cbd.int) that aims, as stated in Aichi Target 11, to protect 10% of all national coastal and marine areas by 2020. The CCRES research provides evidence that this target is viable inasmuch as that this level of protection can help ensure ongoing yields of fish catch. However, higher protection targets are likely to rebuild overfished fish populations and fisheries more effectively while also better protecting biodiversity.

TARGET OUTCOME

Healthy fisheries that deliver a long-term food supply to communities in Indonesia and the Philippines.

AIM

This policy brief provides guidelines for the establishment of marine reserves to:

1. Rebuild depleted fisheries; and
2. Sustain currently healthy fisheries without impairing their long-term productivity.

Marine reserves can be used to rebuild and maintain healthy fisheries to support improved food security.

Photo: P Mumby



EVIDENCE

CCRES researchers used a framework of spatial models to determine the trends in unregulated fisheries around marine reserves under a wide range of biological and environmental conditions and fishing contexts.

Unregulated fisheries were considered healthy if they delivered 'Pretty Good Yield' (PGY), which is a catch greater than or equal to 80% of the 'Maximum Sustainable Yield'. Fisheries were considered depleted if they delivered less than PGY.

Using simulations based on empirical data that compared catch before and after marine reserves were established, the study developed guidelines for reserves that could be incorporated into policies that support:

1. The rebuilding of depleted fisheries, and
2. The conservation of biodiversity without impairing the long-term productivity of healthy fisheries.

Although large reserves exporting less than 30% of locally produced fish larvae might reduce catch at neighbouring fishing grounds, multiple 1–20km wide marine reserves that together protect 10–30% of fished habitat, were found likely to benefit the long-term productivity of almost any unregulated fishery.

SCIENTIFIC REFERENCE

Krueck NC, Ahmadi GN, Possingham HP, Riginos C, Treml EA, Mumby PJ (2017) Marine reserve targets to sustain and rebuild unregulated fisheries. *PLoS Biology* 15(1): e2000537.

FREQUENTLY ASKED QUESTIONS

1. Do these recommendations work for any fishery?

The CCRES study investigated millions of possible fishery contexts to identify generally suitable marine reserve coverage targets. Meeting the generic target does not mean that all fisheries will benefit. However, overall positive impacts on long-term fisheries productivity are likely, while negative impacts on long-term fisheries' productivity are highly unlikely.

2. How can we ensure that reserves protect adult fishes but export enough larvae?

This work incorporates empirical data on adult movements and dispersal distances of larvae. Even without specific information on some local fishery species, establishing reserves with a minimum diameter of 1–20km should help ensure that adults are protected, and that more than 30% of locally produced larvae of common fishery species are exported.

3. Does the size of reserves affect how much fishing ground reserves should cover?

Decisions on the size and total coverage of marine reserves within a network are largely independent as long as the area of enforcement is not very small, and as long as the total reserve coverage does not exceed approximately 50%. However, a few large reserves will generally be harder to enforce than many smaller ones, because the effects on local fisheries of large reserves are more pronounced.

4. What spatial scale does this reserve coverage recommendation apply to?

The policy guidelines outlined here are independent of spatial scale. However, fishery benefits are likely to be restricted to the direct surroundings of reserves (e.g. presumably about 20km around reserve boundaries) within the planning area.

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CAPTURING CORAL REEF AND RELATED ECOSYSTEM SERVICES

The Capturing Coral Reef and Related Ecosystem Services (CCRES) Project is a regional technical support project that seeks to unlock new, sustainable income streams for coastal communities in the East Asia-Pacific region. CCRES is developing knowledge products to inform the design of global, regional and national projects, plans and policies, and technical models and planning tools to help with the preparation of community-based coastal resource management plans.

