CCRES
Capturing Coral Reef and Related Ecosystem Services Project

POLICY BRIEF

January 2018

Priority reefs for conservation and fisheries replenishment

This policy brief outlines how policy makers and leaders can support the long-term health of marine fisheries by quickly and easily determining which reefs could be used for general fishing and which ones are best reserved for biodiversity and fisheries replenishment.

KEY GUIDELINES

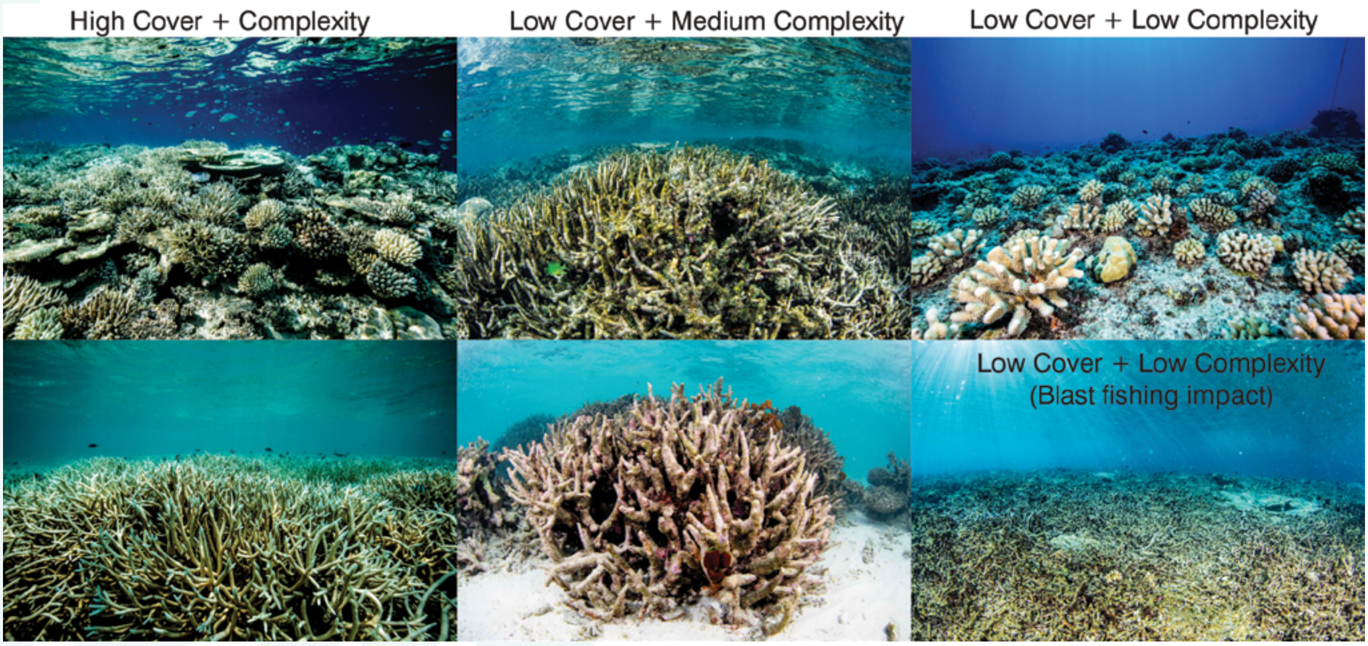
1. **Prioritise reef management based on reef coverage and complexity.**
2. **High coverage, high complexity reefs are best for marine conservation and fisheries replenishment, while other states of reefs are suitable for general fishing.**

Reefs vary hugely in their state, particularly in the cover of living coral and structural complexity, often termed 'rugosity'. Some of these differences are natural and others reflect damage inflicted by people.

Natural differences occur when some reefs are less exposed to damaging conditions such as where cooler or well-mixed water reduces the effects of coral bleaching. In contrast, activities like blast fishing can reduce a reef to rubble for decades.

The present state of reefs can be quantified through field survey and the future or long-term state of reefs can be compared using predictive models, such as Reef React (see www.ccres.uq.edu.au).

To help coastal managers and policy makers match different reefs with appropriate management, researchers from the Capturing Coral Reef & Related Ecosystem Services (CCRES) project have developed a process to assess how reefs of different states should be prioritised for management actions. The work highlights which reefs are ideally suited for use as no-take reserves either for biodiversity or fisheries management.



EVIDENCE

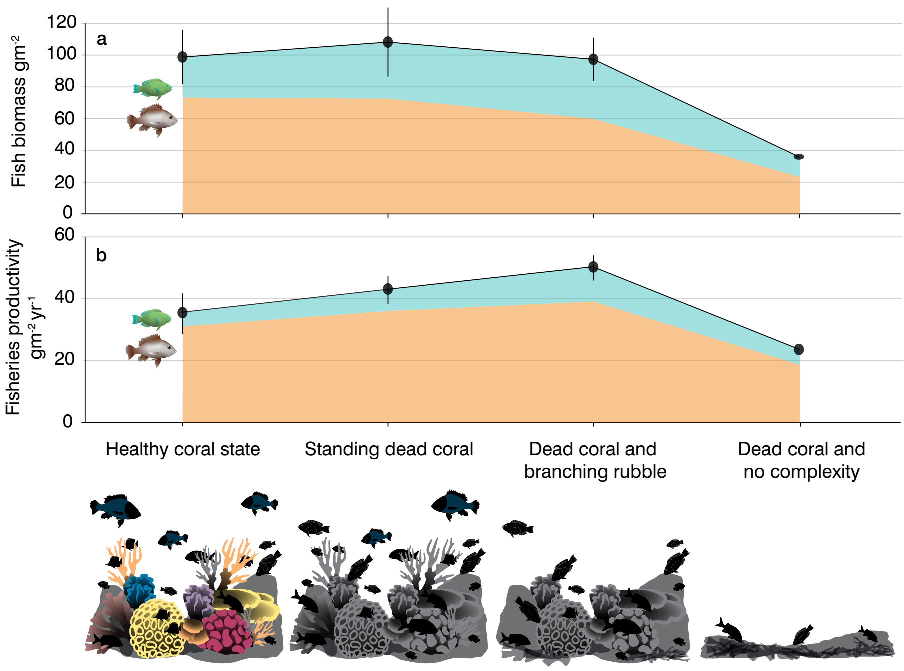
The CCRES researchers developed detailed models to examine the effects of habitat complexity on the consumption of prey by reef fish. Smaller fish have more hiding places in a complex reef which can affect the growth rate of predators.

When fish can hide effectively, it is harder for predators to access food. The model predictions were tested against known fish assemblages and once validated it was used to create a series of predictions.

SCIENTIFIC REFERENCES

Rogers A, Blanchard JL, Newman SP, Dryden CS, Mumby PJ (2018) High refuge availability on coral reefs increases the vulnerability of reef-associated predators to overexploitation. Ecology (*in press*).

Rogers A, Blanchard JL, Mumby PJ (2018) Fisheries productivity under progressive coral reef degradation. Journal of Applied Ecology (*in press*).



Fish biomass and productivity based on different reef states.

Prioritise reef management based on reef coverage and complexity.

TYPE OF REEF	WHAT IT'S IDEALLY SUITED TO	REASONING
High or medium coral cover + High complexity	Marine reserve for biodiversity or sustaining fisheries*.	1. Tend to have highest biodiversity. 2. High complexity reduces the productivity of predatory fishes (they cannot find as much prey). 3. Predatory fishes are more vulnerable to over-exploitation where their food supply is limited.
Low coral cover + Medium complexity (recently dead)^	Fishing (general use).	1. Highest fisheries productivity as the recently-dead coral is loaded with invertebrates that feed fish. 2. Access to productive food is high at medium complexity (low complexity supports too few prey and high complexity allows prey to hide efficiently).
Low complexity (but not blasted)	Fishing (general use).	Low complexity reduces its biodiversity potential and value in supporting high fisheries productivity or brood stock for replenishing fishing grounds.
Low complexity (blast fishing)	Fishing (general use) but productivity will be low.	Fine rubble appears to take decades to stabilise. Restoration required if financially feasible.

* Assuming it is located in an area that can supply larvae to important fishing locations.
^ In time, the reef will likely lose its complexity unless the system is resilient.

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CCRES
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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.

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