



FORCE Policy Brief #1 for Caribbean Reef Management

Conservation of Parrotfishes to Aid Reef Recovery

The Issue

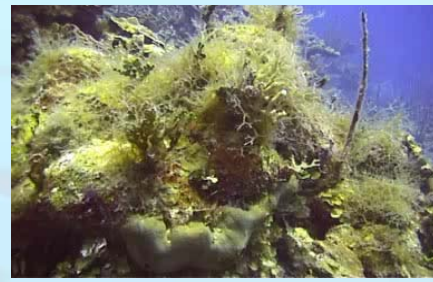
The coral on many Caribbean reefs is currently in a degraded state, often being below 10% cover whereas it should ideally exceed 40-50%. If corals remain in this degraded state for long periods of time then the benefits that people derive from reefs will be threatened. It is the corals that build the reef structure needed to provide habitat for reef fisheries, generate sand for beaches, and protect coastal areas from wave erosion.

There are many causes of this decline which include mass coral bleaching events, outbreaks of coral disease, hurricanes, mass regional decline of long-spined sea urchins, overfishing, and eutrophication. The precise causes will vary from place to place.

It has recently been shown that coral recovery can be helped by taking practical steps to manage parrotfishes. Parrotfishes are the main grazers of algae and high levels of parrotfishes are able to reduce the amount of algae on reefs. Algae can interfere with coral recovery in two ways. Firstly, by taking up space, algae prevent larval corals finding a place to settle on the reef and this effectively cuts off the supply of new corals. Secondly, algae smother established corals, which either stunts their growth or reduces their size.



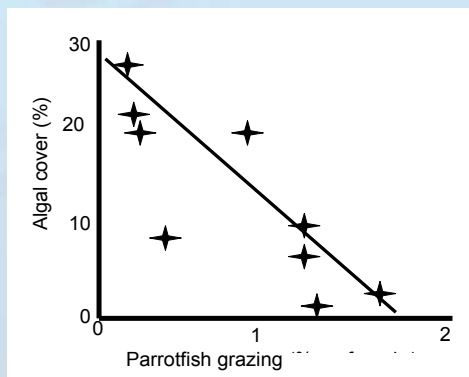
Stoptlight parrotfish (photo: Bob Steneck)



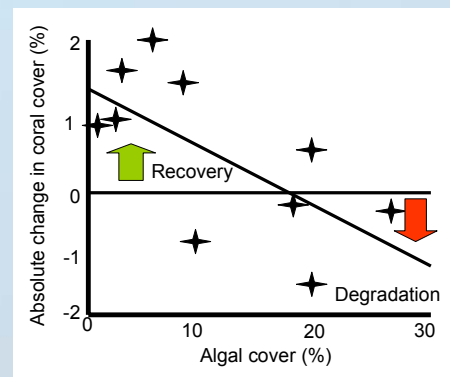
Algae overgrowing coral

The Evidence

A no-take marine reserve was established and actively enforced in the Bahamas. Parrotfishes are fished outside the reserve although most of the catch is accidental bycatch inside traps that are used to target snapper and grouper. Researchers monitored the recovery of corals at 10 sites, 4 of which were in the reserve, over a 2.5 year period. They found that the amount of algae was set by the number of parrotfish so that there was far less algae in the reserve where parrotfishes were large and plentiful. They also found that the recovery of corals was strongly related to the amount of algae. Corals showed positive recovery at sites with little algal cover but further degradation was found where algal cover was high. In short, the protection of parrotfish reversed the trend in corals from one of decline to recovery.



Parrotfish control algae



Algae control coral



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Policy Options

- 1) **Most conservative:** Draft legislation to outlaw the catch or selling of parrotfish as has been done in Belize. This policy may help sustain the long-term livelihoods of fishermen by helping to preserve the reef habitat needed by their target species.
- 2) **Less conservative:** Vastly reduce the use of fish traps which cause much parrotfish bycatch. Educate fishers to retrieve the traps regularly, haul them to the surface slowly, and return surviving parrotfishes.
- 3) **Least conservative:** Educate fishers to reduce their impact on parrotfishes and try to reduce fishing effort. The most important parrotfishes are the larger-bodied individuals. The most important species are the stoplight (*Sparisoma viride*), rainbow (*Scarus guacamaia*), queen (*Scarus vetula*), and princess (*Scarus taeniopterus*).

Management expectations

Protecting parrotfishes will not return reefs back to their former, pristine states: there is simply too much stress on corals for a full recovery to take place in most locations. However, protecting parrotfishes is a concrete step that will help recovery and help stem the loss of reef services such as fisheries productivity.

Frequently asked questions

1) If my reefs still have lots of coral do I still need to bother?

Yes. Experience has shown that coral cover can suddenly decline if the reef is struck by a hurricane, bleaching event, or disease outbreak. These events are unpredictable and recovery will be very slow or nonexistent if steps have not been taken to help natural processes of coral recovery.

2) There are lots of long-spined urchins on my reefs so are parrotfish still important?

Yes. Urchin recovery has occurred in several parts of the Caribbean but it is usually limited to the shallowest few metres. Parrotfish remain the main grazer below this depth so the case for conservation remains.

3) People don't eat parrotfishes in my country so should I still consider these policies?

Yes, it is ideal to implement these policies while popular resistance is low. Typically, parrotfish become targeted once more desirable fish species have been fished out. In Belize, for example, parrotfish harvest went from virtually unheard of to the most heavily-targeted species within a period of 10 years.

4) Are parrotfishes really good for reefs if they eat coral?

It is true that some species of parrotfish take bites from live coral. However, all the evidence to date has shown that this impact is vastly outweighed by their positive impact in reducing algae. Corals suffer much more from algae than they do from parrotfishes.

Further Information

www.force-project.eu

Mumby PJ, Harborne AR. 2010. Marine reserves enhance the recovery of corals on Caribbean reefs. PLOS One 5: e8657. Available free at

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0008657>



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