



Managing Parrotfish Fisheries in the Caribbean



A March 2014 study in the journal *Fish and Fisheries* describes a new approach to ecosystem-based fisheries management of coral reefs in the Caribbean Sea. The study, written by Peter J. Mumby, Ph.D., Pew marine fellow and professor at the University of Queensland in Australia, focuses on parrotfish, the target of an important fishery. Parrotfish also contribute to healthy coral ecosystems by consuming algae on certain parts of the reef. Mumby recommends that if the fishery must exist, managers should consider regulations that prevent fishing for parrotfish on the part of the reef where they play this important role, though fishing for other species could still occur.

The role of parrotfish on a coral reef

- Parrotfish graze on algae, a competitor of coral, preventing algae from overtaking the reef.
- Healthy coral, with low algal cover, provides a structurally complex reef habitat.
- Complex reefs can support a high density and diversity of fish, and therefore, can also support much higher fisheries production.

Divide management strategies to maintain habitat quality and a sustainable fishery

In the Caribbean, a large share of fishing occurs on the outer part of the reef, farthest from shore. This part of the reef can be divided into two principal habitat types. In one—the *Orbicella* reef, parrotfish are key to conserving reef resilience. Their grazing on algae contributes to the growth of multiple corals, including the massive star corals from the genus *Orbicella* that build the reef. On the other habitat type—the gorgonian plain, a flat area dominated by sea fans, or gorgonian corals—algae has little to no effect on corals, and a productive parrotfish fishery might be allowed without major consequences for the ecosystem. Advantages to fishing for parrotfish on the gorgonian plain instead of on the *Orbicella* reef include fewer gear snags on delicate corals and increased catchability because traps provide refuge in a flat environment.

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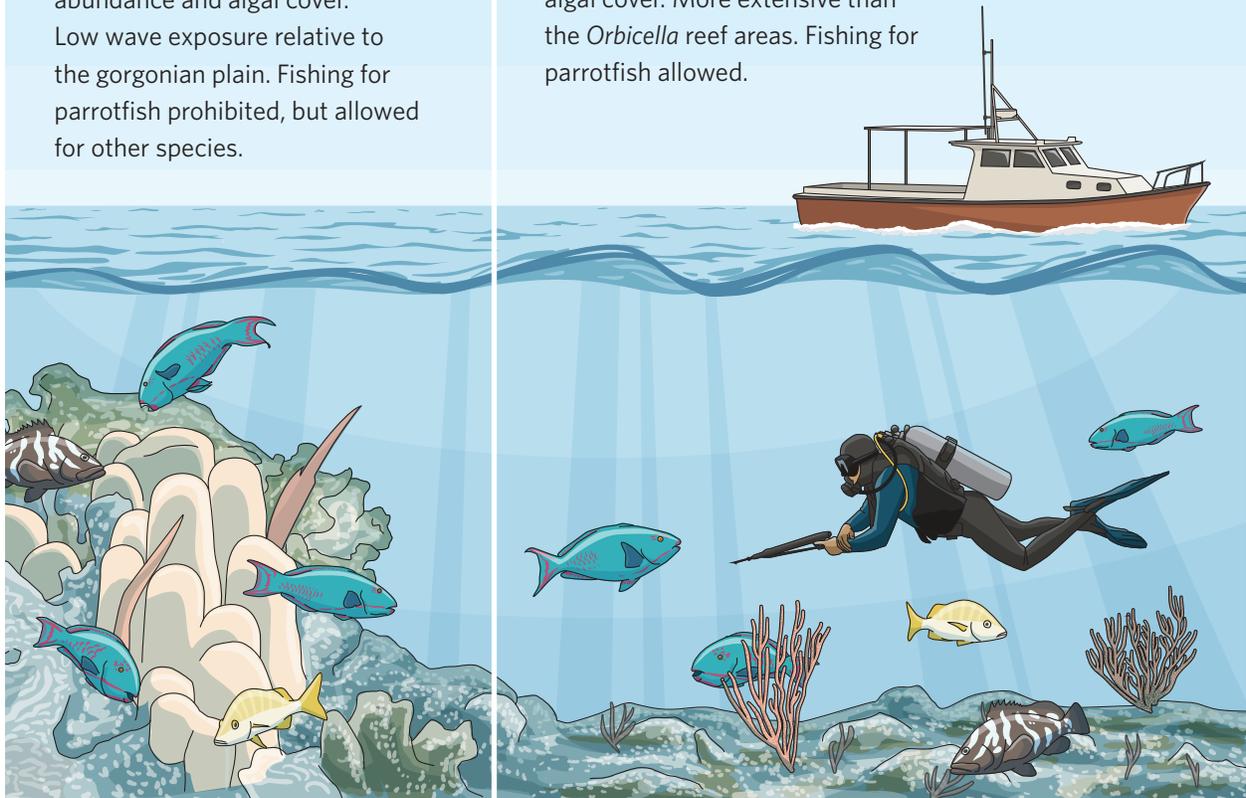
Protecting these animals on one part of the reef may allow for abundant populations of other fish throughout the reef

Orbicella reef

Complex, massive corals. Strong relationship between parrotfish abundance and algal cover. Low wave exposure relative to the gorgonian plain. Fishing for parrotfish prohibited, but allowed for other species.

Gorgonian plain

Flat and few corals. No strong relationship between parrotfish and algal cover. More extensive than the *Orbicella* reef areas. Fishing for parrotfish allowed.



Peter J. Mumby, "Stratifying Herbivore Fisheries by Habitat to Avoid Ecosystem Overfishing of Coral Reefs," *Fish and Fisheries* (2014), doi: 10.1111/faf.12078.

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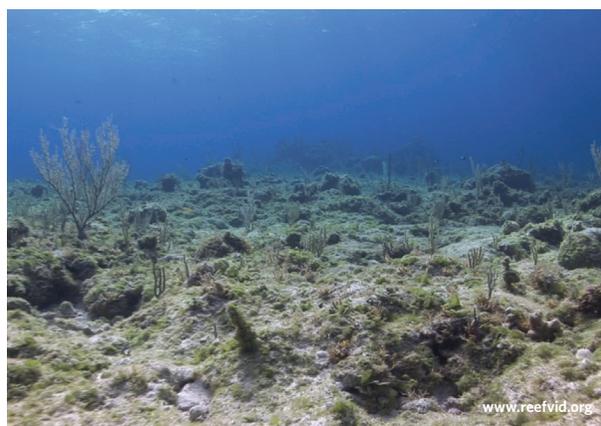
Putting This Method Into Practice

The study offers three methods of distinguishing and mapping the two habitats, which could form the basis for this management approach. The noticeable separation of these two habitats makes this novel approach to fisheries management feasible.

- **Maps of wave exposure:** The *Orbicella* reef has low wave exposure relative to the gorgonian plain.
- **High-resolution airborne or satellite images:** These high-quality photos allow experts to distinguish visually between the two habitats. The gorgonian plain areas are much more extensive than the *Orbicella* reef areas.
- **Vessel-based acoustic surveys of the seafloor:** Experts can detect and measure underwater objects and terrain using pulses of sound and listening for echoes. The gorgonian plain can be detected easily because it is relatively flat and sandy, as opposed to the complex corals of the *Orbicella* reef.



Orbicella reef



Gorgonian plain

Source: Peter J. Mumby, "Stratifying Herbivore Fisheries by Habitat to Avoid Ecosystem Overfishing of Coral Reefs," *Fish and Fisheries* (March 17, 2014), doi:10.1111/faf.12078.

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