

CP286 Changes in reef communities in the Punta Frances marine reserve, Cuba

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Marine Reserves (MRs) or Marine Protected Areas (MPAs) have become widely utilized to protect marine ecosystems that are at risk worldwide due to anthropogenic disturbances and overexploitation of marine resources. The number of newly established MRs has increased dramatically in recent years, but they still only represent a small overall proportion of the marine environment. There is growing scientific evidence that considers MRs to be a successful tool in protecting specific species, habitats or diversity hotspots, or increase fisheries yields, although there is also some evidence to suggest that MRs may not always meet their goals, principally due to lack of enforcement. There are many examples worldwide, in both tropical and temperate marine ecosystems where MRs have been successful in achieving their conservation targets and objectives. Examples of MRs that have been considered successful include recovery of kelp forests in New Zealand MRs, coupled with increases of fisheries stocks, including snapper and rock lobster. In tropical ecosystems, increased stocks of different coral reef species including surgeon fish in the Philippines or grouper species the Wakatobi National Marine Park (WNMP) in Indonesia have been recorded in a MR.

The Punta Frances APRM (Marine Protected Area, MPA) was established in 1996 to protect the reefs and reef associated communities around the southwest part of the Isle of Youth. All marine life is protected within the MPA boundaries although some illegal fishing still occurs within the park. However, fishing pressure within the park is several orders of magnitude lower than outside the park. This protection is therefore highly likely to have an influence on the communities inhabiting the park.

Heavily targeted economically important fish and invertebrate species are likely to benefit from the protection from fishing granted by the MPA. Top predatory fish species such as snappers and groupers or invertebrates like lobsters, have been recorded to increase drastically in numbers inside the reserve boundaries in other MPAs around the world. Another potential advantage of the creation of a MPA is the potential enhancement of adjacent fisheries from the movement of this high-value species from the reserve to non-protected areas, a term known as spillover. Several studies have shown both larger increases in fish/lobster numbers and individual lengths in non-protected areas adjacent to an MPA than those further apart. Despite the importance of quantifying the effect of protection on this economically important species no study to date has investigated this for the Punta Frances MPA. Students could collect very valuable data on the distribution of economically important species inside the MPA, as well as comparing inside assemblages with sites outside the MPA. Additionally, tagging studies could be conducted to investigate individual movements in and out the MPA to determine the rates of spillover to adjacent non-protected areas.

Herbivory fish such as surgeonfish and parrotfish are key ecosystem players in Caribbean coral reefs as they feed on macroalgae. These fish species play a crucial role in controlling the competitive interactions between corals and macroalgae, since they compete for space and when herbivores are not present, the faster growing macroalgae overgrow and kill corals and also inhibit coral recruitment. Numbers of herbivory parrotfish are in decline Caribbean wide mainly due to overfishing and this is very important since large fish are disproportionately better grazers than small fish. It is highly likely that parrotfish will benefit from protection inside the MPA and therefore it can be assumed that grazing rates are greater inside the MPA compared to sites outside. However, no data is available on the abundance and diversity of grazing fish species for the Punta Frances MPA. Further research is needed to investigate the effect of protection upon these key fish species and their effect upon algae populations within the MPA.

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