



Hol Chan: demonstrating that marine reserves can be remarkably effective

The Hol Chan Marine Reserve lies off Ambergris Cay, in Belize. Covering 2.6 km², the reserve has been protected from all forms of fishing since 1987. Although small, Hol Chan contains a higher biomass of fishes per unit area of reef than we have seen anywhere else in the world. Enormous schools of grunts and snappers, so dense they almost obscure the reef, mingle with huge roving black groupers (*Mycteropera bonaci*) and grey snappers (*Lutjanus griseus*). The standing stock of commercially important species reaches 340 g/m² in the centre of the reserve, while at the periphery it averages 77 g/m², about double that in adjacent fished areas (Polunin and Roberts 1993). This compares with values for lightly fished reefs of 27 g/m² for the Caribbean island of Saba, 65 g/m² for the northern Red Sea (data collected using the same observer and method), and 24 g/m² at French Frigate Shoals (Polovina 1984), 49 g/m² for Bermuda (Bardach 1959), and 65 g/m² for Hawaii (Grigg 1994; data collected using different methods). The reserve also contained seven more species of

commercial fishes than areas subject to fishing. The presence of large fishes in the reserve is particularly important to replenishment because of their disproportionately large contribution to egg production. In addition to boosting reproductive output, the reserve may also play an important role in protection of species which are vulnerable to fishing.

References

- Bardach JE (1959) The summer standing crop of fish on a shallow Bermuda reef. *Limnol Oceanogr* 4:77–85
Grigg RW (1994) Effects of sewage discharge, fishing pressure and habitat complexity on coral ecosystems and reef fishes in Hawaii. *Mar Ecol Prog Ser* 103:25–34
Polovina JJ (1984) Model of a coral reef ecosystem I. The ECOPATH model and its application to French Frigate Shoals. *Coral Reefs* 3:1–11
Polunin NVC, Roberts CM (1993) Greater biomass and value of target coral-reef fishes in two small Caribbean marine reserves. *Mar Ecol Prog Ser* 100:167–176

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Reef sites

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