

BY ELIZABETH BRUSATI

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How far should a marine protected area extend to provide refuge for fish near coral reefs?

MARINE PROTECTED AREAS PROVIDE a safe place for fish and invertebrates to reproduce without fishing pressure. To design boundaries, managers need to understand how fish respond to habitat patches at the landscape scale. In Virgin Islands National Park (U.S. Virgin Islands), researchers found that reserves must include habitat patches that extend at least 1 kilometer (0.6 mi) away from the reefs.

Habitat diversity is often used to determine reserve boundaries. However, because coral-reef fish vary so much in their habitat requirements, diversity cannot always predict how many fish or which species will use an area. Types of habitat, specifically sea grass, may be more important. *Thalassia testudinum* was the most common species of sea grass in the study area. Sea grass serves as a nursery for juvenile fish and invertebrates. In this study, researchers counted the number of fish in and out of sea-grass patches, classifying them by feeding preference, degree of

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mobility, and age. The 118 species observed included grunts, groupers, and snappers. Measuring the coverage of sea grass patches with simple geographic information system (GIS) tools and habitat maps provided a good prediction of where the most reef fish would occur. Harvested fish species occurred more often within sea grass patches than outside of those areas. Reefs surrounded by large expanses of sea grass had the most species of fish, although even modest amounts of sea grass made a difference.

Many species living near the U.S. Virgin Islands are overfished. The correct placement of reserve boundaries is essential in maintaining populations. While sea grass is not the only factor that makes a good reserve, these results show that fish must be able to move among sea grass patches in order to keep populations healthy.

Reference

Grober-Dunsmore, R., T. K. Frazer, W. J. Lindberg, and J. Beets. 2007. Reef fish and habitat relationships in a Caribbean seascape: The importance of reef context. *Coral Reefs* 26:201–216.

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