

# *The Effect Of Fully And Partially Protected Marine Reserves On Coral Reef Fish Populations In Zanzibar, Tanzania*

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## **Abstract**

Marine reserves, areas in which fishing is prohibited or regulated, have become a popular way of managing coral reef fisheries and conserving fish species. This is important as coral reef ecosystems and the livelihoods of fishermen continue to be threatened by overfishing. Evidence suggests that fully protected marine reserves fulfill these aims by increasing fish populations inside them. However, there are still major gaps in our knowledge. (1) Few studies have provided evidence for spillover (net emigration of adult fish from marine reserves to surrounding fisheries). (2) Partially protected marine reserves, where fishing is allowed but regulated, have been poorly assessed. (3) No studies have measured the effect of fully protected marine reserves on total fish species richness from all coral reef fish families. This thesis helps to fill these knowledge gaps.

(1) Measuring gradients across the boundaries of a fully protected marine reserve, estimating emigration of adult fish using tag and recapture and interviewing fishermen, suggest that spillover is occurring, but only benefiting fisheries within 1 km of a reserve.

(2) Only commercial species richness was greater by 61% at multiple sites within, than outside a partially protected marine reserve.

(3) The total number of fish species per sample was greater by four species in fully protected marine reserves, but only at shallow depths, where fishermen primarily operate. These results support the use of fully protected marine reserves in protecting commercial fish stocks and fish species richness and suggest that partially protected reserves may have a role in conserving fish species richness. However, more work is required to assess the effects of partially protected marine reserves.