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# EFFECTS ON CORAL REEF FISH COMMUNITIES FROM FIVE ISLANDS OF NEW CALEDONIA'S SOUTHERN LAGOON MARINE RESERVE

by

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## Abstract

The effect of the marine reserve on coral reef fish communities was studied on five islands located in New Caledonia's Southern Lagoon. Fish communities were sampled by line transect (50 m long, variable width). Sampling was undertaken before the fishing closure and after five years of protection. Reference stations located in unprotected sites were also sampled to assess natural variability on the same time scale. Species richness and density and fish biomass on the protected reefs increased respectively by 67 %, 160 % and 246 %. This increase was far more substantial than the variations observed at the reference stations. An enhancement of the species richness and density and the biomass of the major commercial fish families was ob s-erved: Serranidae (groupers), Lutjanidae (snappers), Lethrinidae (emperors), Mullidae (goatfishes), Labridae (wrasses), Scaridae (parrotfishes), Siganidae (rabbitfishes) and Acanthuridae (surgeonfishes). Chaetodontidae (butterflyfishes), which are thought to be indicators of reef health, had also developed. No significant increase in the mean size of fish was noted among the main species with the exception of the rabbitfish, *Siganus doliatus*. Size structure had, however, generally changed because of the presence of more small specimens after five years of protection. This change to fish community structure can first attributed to the effects of the marine reserve, leading to an increase in the relative abundance of large edible species within the aggregations. Fish populations are also distributed according to an inshore-offshore gradient.This before-and-after study validates several marine reserve benefits: protection of spawning stock biomass, development of fish populations, sustaining of population age structure. Marine reserves also indirectly protect fish populations by improving the habitat.