

A step toward the definition of ecological indicators of the impact of fishing on the fish assemblage of the Abore reef reserve (New Caledonia)



Marine Protected Areas (MPA) are often contemplated as a tool for the sustainable management of exploited resources and ecosystem conservation. This paper proposes an approach to establish a statistical diagnostic of the effects of MPAs on fish assemblages, and define corresponding ecological indicators. This requires choosing relevant variables (abundance, diversity, demographic parameters ...) and appropriate statistical methods. The study was based on data from the Abore reef Reserve in New Caledonia. Two sets of methods: 1-inferential linear models (ANOVA, GLM); 2- Partial Least Squares (PLS) methods of regression, were used to test the effects of this MPA. PLS enabled us to test simultaneously within a model, density, species richness, biomass and mean size variables of fish community to retain the most sensitive and relevant ones. Habitat variability was also taken into account in these models. Species were grouped according to several criteria: 1- feeding habit; 2- taxonomy; 3- mobility; 4- adult size; 5- demographic strategy. No significant effect of the opening of the Abore reef to fishing was found for mobility. Feeding

habit was the only criterion for which the results from the inferential models and PLS showed a significant effect of reserve status for all variables. Species richness, density, and to a lesser extent mean size, were sensitive to the removal of reserve status, but not biomass. Results from ANOVA and PLS regression were consistent but the latter allows a more holistic approach as it integrates all variables within a single model.

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Obtenir le document : EDP Sciences

Mots clés : Marine protected areas, Fish, Coral reef, Fishing impact, Ecological indicators, PLS regression, New Caledonia

Thème (issu du Text Mining) : MILIEU NATUREL, MOT OUTIL

Date : 2004-06-15

Format : text/xml

Source : <https://doi.org/10.1051/alr:2004022>

Langue : Anglais

Télécharger les documents : <https://www.alr-journal.org/10.1051/alr:2004022/pdf>

Permalien : <https://www.documentation.eauetbiodiversite.fr/notice/a-step-toward-the-definition-of-ecological-indicators-of-the-impact-of-fishing-on-the-fish-assemblag0>

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