

Catch-quota balancing in mixed-fisheries: a bio-economic modelling approach applied to the New Zealand hoki (



Managing adequately the exploitation of commercial species subject to technical interactions is a key step towards the ecosystem approach to fisheries. We evaluate here, using a bio-economic modelling approach building on the ISIS-Fish simulation platform, the relative impact of total allowable commercial catches (TACC) and of taxes applicable to over-quota landings (deemed value) on the sustainability of a selection of species exploited by the New Zealand hoki (*Macruronus novaezelandiae*) fishery. We investigate some aspects of the hoki mixed fisheries, consisting of four fleets and nineteen métiers, by considering the technical interactions between hoki and Southern hake (*Merluccius australis*). The dynamics of effort allocation were modelled using gravity model, using value per unit of effort (VPUE) as attractivity coefficient. Several management scenarios, based on different levels of TACC, effort limits and deemed value have been defined. The impact of these strategies on spawning biomass and catches has been investigated. The results confirm that the deemed value may, in combination with TACC, be an efficient management tool. By increasing the hoki

deemed value, we could somehow limit the decrease in the hoki TACC needed to harvest Western hoki sustainably. Constraining hoki fishing also restricts Southern hake fishing in the Chatham Rise and in the West Coast South Island, but leads to increased targeting of this species in the Sub-Antarctic area. The relative costs of renting/buying quota or paying the deemed value are most constraining when the hoki TACC is at relatively low level and when the hoki deemed value is more than 1.5 times the current value.

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Obtenir le document : EDP Sciences

Mots clés : Fleet dynamics, New Zealand hoki fishery, Deemed value, Fisheries management

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

Date : 2009-10-20

Format : text/xml

Source : <https://doi.org/10.1051/alr/2009033>

Langue : Anglais

Télécharger les documents : <https://www.alr-journal.org/10.1051/alr/2009033/pdf>

Permalien : <https://www.documentation.eauetbiodiversite.fr/notice/catch-quota-balancing-in-mixed-fisheries-a-bio-economic-modelling-approach-applied-to-the-new-zealan0>

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