

Management strategies for red shrimp (



We present a simulation bioeconomic model based on an age-structured population biological sub-model and an economic sub-model with vessel-specific dynamics, applied to two red shrimp (*Aristeus antennatus*) stocks in the NW Mediterranean. The model is dynamic, the economic sub-model is disaggregated at the level of vessel and the two sub-models are linked by means of a fishing mortality vector. We analyzed the projection of selected indicators (catches, overall profits, fishing mortality and spawning stock biomass) for the target species of the deep-water trawl fishery in the NW Mediterranean, red shrimp. We built three alternative management scenarios based on input control and we examined the performance of these management strategies against the current management policies. The three alternative management strategies were: i) increase the cost of effort by eliminating the fuel tax exemption currently in place, ii) limit the nominal effort level (days at sea) to current levels, in order to offset the increasing trend observed in the last decade, and iii) change the selectivity patterns of the trawl by increasing mesh size. Our results show that for the two stocks analyzed, any of the three management measures (input controls) would be beneficial both to the stock and the fleets (over the medium and long terms) when compared with the projections over time of the status quo. Improving the selectivity of the fishing gear is more beneficial than limiting nominal effort or increasing the cost of effort. Comparing the performance of the management strategies on two stocks, one heavily fished and the other moderately so, we show that none of these management measures is able to substantially redress the situation of a heavily fished stock, implying that for the full recovery of heavily fished red shrimp stocks, we need to contemplate even stricter measures of management.

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Obtenir le document : EDP Sciences

Mots clés : Bioeconomic analysis, Fishery management, Input control, Simulation, Deep-water fisheries, Red shrimp, NW Mediterranean

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

Date : 2006-6-22

Format : text/xml

Source : <https://doi.org/10.1051/alr:2006014>

Langue : Anglais

Télécharger les documents : <https://www.alr-journal.org/10.1051/alr:2006014/pdf>

Permalien : <https://www.documentation.eauetbiodiversite.fr/notice/management-strategies-for-red-shrimp0>

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