

Bio-economic management strategy evaluation of deepwater stocks using the FLBEIA model

Deepwater fish are characterized by long lifespans, late maturity and low productivity. This implies slow recovery from low biomass levels and it is, therefore, important to manage these stocks correctly to avoid overfishing. However, these stocks are generally data poor, which makes it difficult to apply quantitative assessment models on which to base their management. The management strategy evaluation (MSE) approach consists in evaluating the performance of management strategies by simulation before their implementation. In the evaluation, the main sources of uncertainty in a fishery system and its management process should be taken into account in order to find robust management strategies. Thus, the MSE approach is relevant to the management of data-poor stocks. We used the FLBEIA software, an FLR library coded in the R statistical language, to conduct a bio-economic impact assessment of fisheries management strategies. We evaluated the performance of several management strategies in three different deepwater case studies using the MSE approach: beaked redfish (*Sebastes mentella*) in the Norwegian Sea, blackspot seabream (*Pagellus bogaraveo*) in the Strait of Gibraltar, and French mixed deepwater fisheries in the North East Atlantic. In conclusion, we found that the *S. mentella* stock is very sensitive to the stock recruitment relationship chosen. For *P. bogaraveo*, simulations showed that the present constant catch management is as good as more sophisticated strategies. Finally, in mixed fisheries, case study fleet dynamics were key for the success of management strategies.

Auteurs du document : Dorleta Garcia, Agurtzane Urtizberea, Guzman Diez, Juan Gil, Paul Marchal

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