

ECOREGION **Widely Distributed and Migratory Stocks**
SUBJECT **Northern hake F_{MSY}**

ICES Advice

ICES advises that a target fishing mortality rate of 0.17 (average on ages 2–6) is not appropriate for exploiting the stock consistently with MSY. ICES advises that a fishing mortality rate of 0.24 (average over lengths 15–80 cm, which corresponds approximately to ages 1–5) is consistent with MSY.

ICES notes that the previously defined precautionary reference points, which are incorporated in the management plan proposal, are no longer appropriate.

Request

“The Commission is aware that ICES will review certain aspects of the assessment of Northern hake early in 2010. The Commission requests that, in the light of such a review, ICES should advise on whether a target fishing mortality rate of 0.17 (averaged on ages 2 to 6) remains appropriate for exploiting the stock consistently with MSY.

ICES is also invited to comment on any new implications that have arisen concerning the Commission's proposal for a Council Regulation establishing a long-term plan for the northern stock of hake and the fisheries exploiting that stock (COM/2009/039).”

Basis of advice

Following concerns over bias in the ageing of hake (and its impact on the age-based stock assessment) and the impossibility for the assessment model to account in a satisfactory manner for discards, a benchmark workshop was conducted early 2010 (ICES, 2010a). Following this workshop, the assessment model has shifted from an age-based approach (XSA, Darby and Flatman, 1994) to a model (Stock Synthesis SS3, Methot, 1990, 2000) that allows direct use of the quarterly length–composition data and explicit modelling of a retention process that partitions total catch into discarded and retained portions. Therefore age data are no longer used in the northern hake assessment.

The benchmark assessment led to a complete revision of the previous assessment which was based on age data at present demonstrated to be biased. Growth rate, which is now estimated by the assessment model, was found to be faster than previously estimated and close to the results obtained from several tagging experiments. A natural mortality of 0.4 was found to be the best value to use for the assessment while before M was assumed to be equal to 0.2. Selectivity is now estimated at fleet level and discards are incorporated into the assessment which has also resulted in a change in the overall selection pattern estimated for this stock. All this has resulted in a modification of the yield per recruit curve (where yield refers to landings) and to the maximum value associated to it. The F_{max} value (0.17) used as a proxy for F_{MSY} and estimated from the previous assessment needs thus to be revised.

The time-series of spawning biomass and recruitment estimated in Stock Synthesis does not have sufficient contrast to allow direct estimation of F_{MSY} . Reference points of $F_{0.1}$, $F_{35\%SPR}$, $F_{30\%SPR}$, and F_{max} were calculated within the SS3 assessment model to provide a range of potential proxies for F_{MSY} . F_{max} (=0.29) would be a potential candidate for F_{MSY} , as the yield-per-recruit curve has a well-defined maximum and discards are incorporated in the assessment and taken into account in the yield-per-recruit computation. Moreover, SSB during the historic period has been capable of increasing under high fishing pressure, suggesting a productive stock. However, an F value of 0.29 corresponds approximately to $F_{24\%SPR}$ (ICES, 2010b), whereas the guidelines provided by ICES (ICES, 2010c) suggest that F values larger than $F_{30\%SPR}$ might lead to recruitment overfishing. ICES further indicated that values around $F_{35\%SPR}$ should be robust F_{MSY} proxies against stock-recruitment functions and recruitment variability (ICES, 2010c). Taking all this into account and the specific aspects of the northern hake stock, a fishing mortality in the range $F_{35\%SPR}$ - F_{max} (i.e. 0.20 – 0.29) should be selected as F_{MSY} . If a single value is to be chosen within that range, $F_{30\%SPR}$ =0.24 could be a suitable candidate.

Due to the new perception of historic stock trends, resulting from the new assessment, the previous defined precautionary reference points are no longer appropriate. In particular, the absolute levels of spawning biomass, fishing mortality and recruitment have shifted to different scales.

Sources

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- ICES. 2010b. Report of the Working Group on the Assessment of Southern Shelf Stocks of Hake, Monk and Megrim (WGHMM), 5– 11 May 2010, Bilbao, Spain, ICES CM 2010/ACOM:11.
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