When and how can we apply environmental indices that covary with stock dynamics? - A North Sea sandeel case study

Mikael van Deurs, Lotte Worsøe, Brian R. MacKenzie

Abstract: There is currently much discussion and interest in forecasting biological responses of fish (e. g., recruitment, growth) to ecosystem fluctuations and the assimilation of environmental data into stock assessments and advice. Words such as multispecies models and ecosystem based management are phrases used frequently in the literature. In the first part of the present study we used North Sea sandeel and fluctuations in growth conditions, to demonstrate some of the challenges encountered when attempting to establish and implement solid ecosystem drivers. The hypothesis is that larval and juvenile growth is strongly linked to survival and therefore recruitment to the exploited fraction of the stock. We compared several candidate predictors of growth and survival and identified simple models, some of which explained more than fifty percent of inter-annual variation in recruitment and catch rates. In the second part of the study, we explored possible ways of implementing these correlates in current advice procedures. Finally, we ask: What is the "added value" of applying environmental correlates and how do we judge if a given correlate is sufficiently reliable to justify application in an advice context?

Corresponding author: Brian R. MacKenzie email: brm@aqua.dtu.dk , mobile: +45 21 31 58 14

Technical University of Denmark
Charlottenlund Slot Jægersborg Allé 1
2920 Charlottenlund