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Bullet Points on the Results of the Assessment Results for Greenland Halibut in Subarea 2 and Divisions 3KLMNO

by

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Abstract

Uncertainties in the assessment of the Assessment Results for Greenland Halibut in Subarea 2 and Divisions 3KLMNO are discussed with regard to their effect on the perception of the trends in the dynamics of the stock and the basis for management advice. The results of the assessment are contrasted with information from up to date survey information.

Introduction

Stock biomass estimates derived from an Extended Survivors Analysis (XSA) assessment of the Greenland Halibut in Subarea 2 and Div. 3KLMNO indicate that there has been a three fold increase in the estimated spawning stock biomass since 1995 (Mahe and Bowering, 2002). Stock abundance is estimated to be currently at its highest level since 1992. However, the trend in the estimated biomass and the high current biomass are in contradiction to the other sources of information that are available for monitoring changes in the stock dynamics.

Survey and Commercial Catch-per-unit Effort

Catch rates from all of the available fishery independent surveys have shown an increase in abundance from the early- to late-1990s, however, the rate of increase is only two fold and was not at the rate estimated by the assessment. Since 1998/1999 the surveys have remained stable or declined they have not exhibited the increase in biomass estimated by the XSA assessment (Bowering, 2002; González Troncoso *et al*., 2002; Vázquez, 2002).

Catch-per-unit effort in the commercial fishery has increased (x1.5) since 1998 but not at the rate that would be predicted from the assessment results (Power, 2002).

The Age Composition of the Population Abundance Estimated by the Assessment

The increase in the XSA estimated stock biomass is conditional on the contribution of the abundance of ages 5, 6 and 7 in 2001, the 1993, 1994 and 1995 year classes (Fig. 1 based on Mahe and Bowering 2002). The assessment (Mahe and Bowering, 2002) is therefore consistent with the ANOVA analyses of year-class strength (Healey *et al*., 2002) which estimated the abundance of the 1993, 1994 and 1995 year-classes to be stronger than the recruitment in

other years. However, retrospective analysis has previously shown that the absolute level of the abundance and the contribution of these large year-classes is highly uncertain.

The Age Composition of Predicted and Observed Catch-at-age Data for 2001

Figure 2 presents the predicted catch-at-age data for the 2001 fishery, derived from the 2001 Greenland halibut stock assessment estimates of population abundance (Mahe and Bowering, 2001), with the observed numbers-at-age. The predictions over-estimated the catch at age 7 by 60%. The 1994 year-class did not contribute as would be expected if the year-class is as abundant as that estimated in the assessment.

Figures 3a and 3b present the proportions of the age-classes present in the catch-at-age data from the fishery. There has been a gradual decline in the contributions of the oldest ages and an increasing trend towards selection the youngest ages. There is no evidence in the commercial catch-at-age data of a substantial contribution from the 1993-95 year-classes.

Discussion

Each of the bullet points discussed previously indicates considerable uncertainty in the status of the Greenland Halibut stock in Subarea 2 and Div. 3KLMNO. The commercial and survey catch-per-unit effort series indicate that the stock has increased in recent years and is currently stable or declining. The differences most likely reflect localized spatial differences in the stock dynamics. The catch-per-unit effort data series do no indicate that the stock is exhibiting the increases predicted by the fitted assessment model.

Analysis of the survey and commercial catches-at-age indicates a potential cause of this uncertainty. Year-classes which are estimated to be relatively strong in survey catches do not appear to contribute to the commercial catch-at-age in subsequent years. Within stock assessment model formulations this inconsistency results in over optimistic predictions of catches and has been noted for this stock in previous years (Bowering, pers. comm.). The inconsistency can arise from discarding unreported landings or slower growth of affected year-classes.

For management purposes there is a danger that if the catch-at-age is over estimated in the current assessment rather than the fishery taking the predicted fish at ages 7-9 the catch could compromise fish of the youngest ages increasing mortality and wasting yield.

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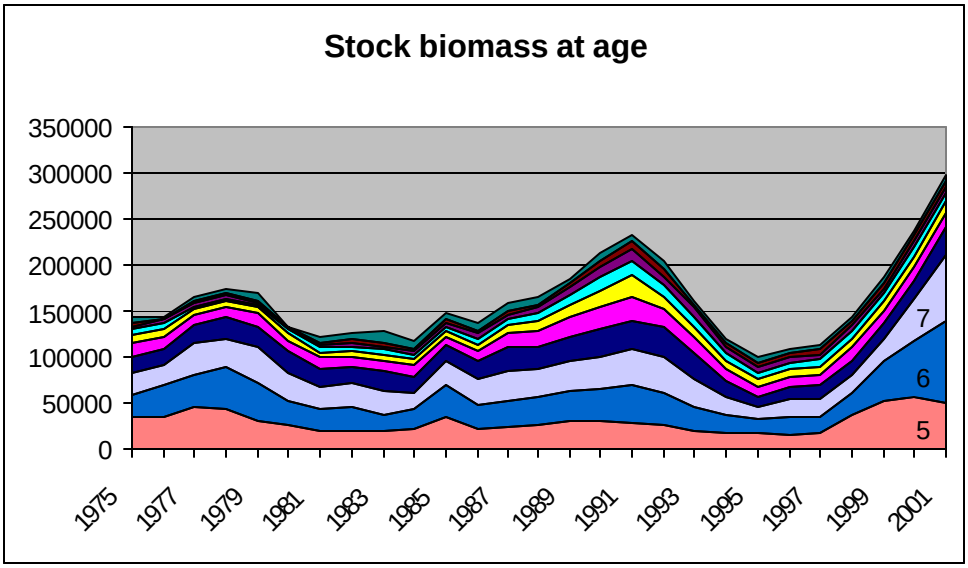

Fig. 1. XSA estimated Greenland halibut in Subarea 2 + 3KLMNO stock biomass-at-age, illustrating the estimated dominance in the stock structure of ages 5, 6 and 7 the 1993, 1994 and 1995 year-classes.

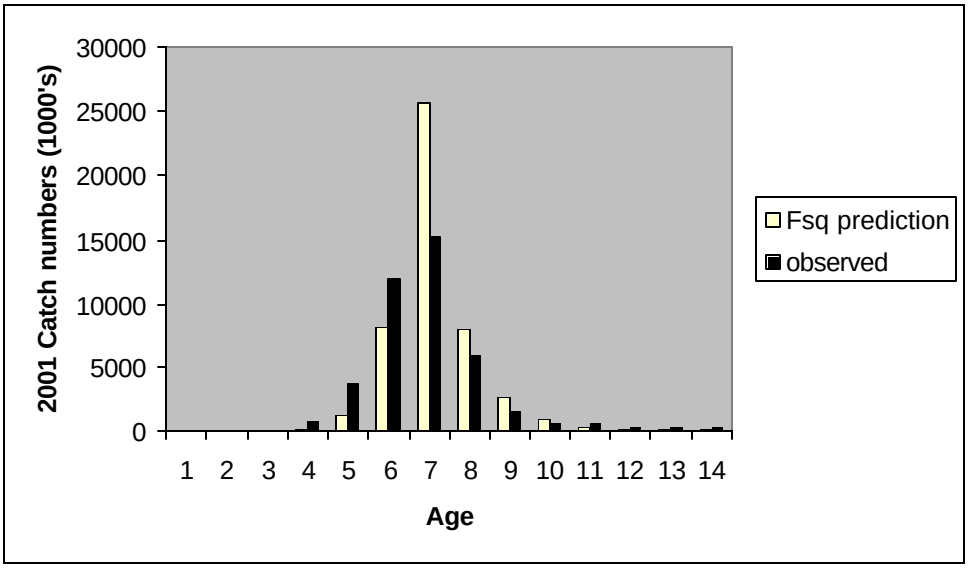

Fig. 2. XSA based predicted catch numbers-at-age in 2001 for the fishery for Greenland halibut in Subarea 2 + 3KLMNO stock and the values observed in the fishery of that year.

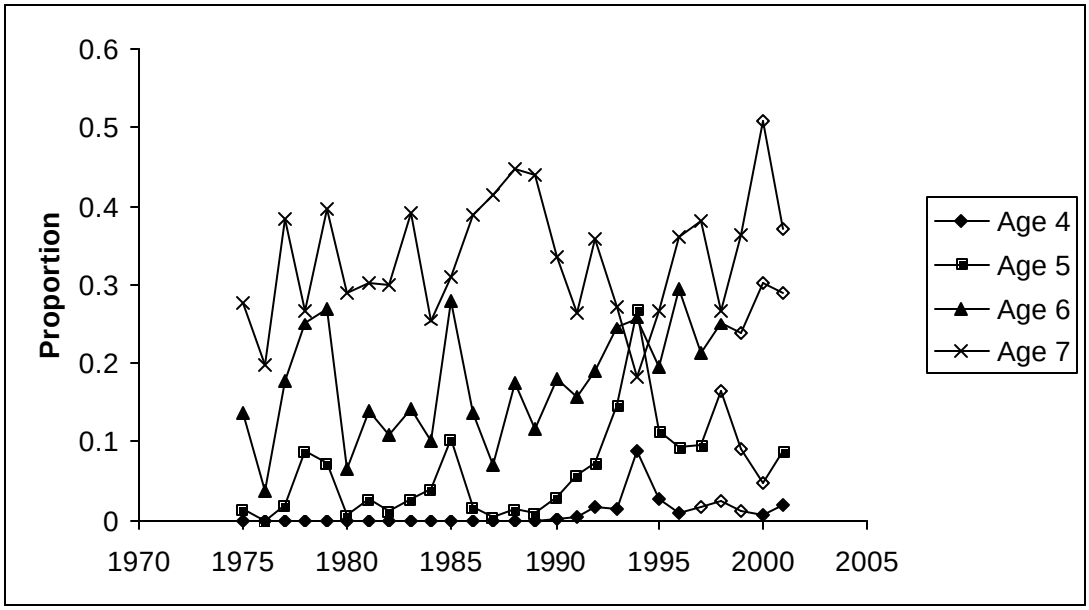

Fig.3(a). The contribution of the catch numbers at each age to the total catch numbers-at-age. Hollow diamonds indicate the 1993-995 year-classes which are estimated from the surveys to be dominant in the population.

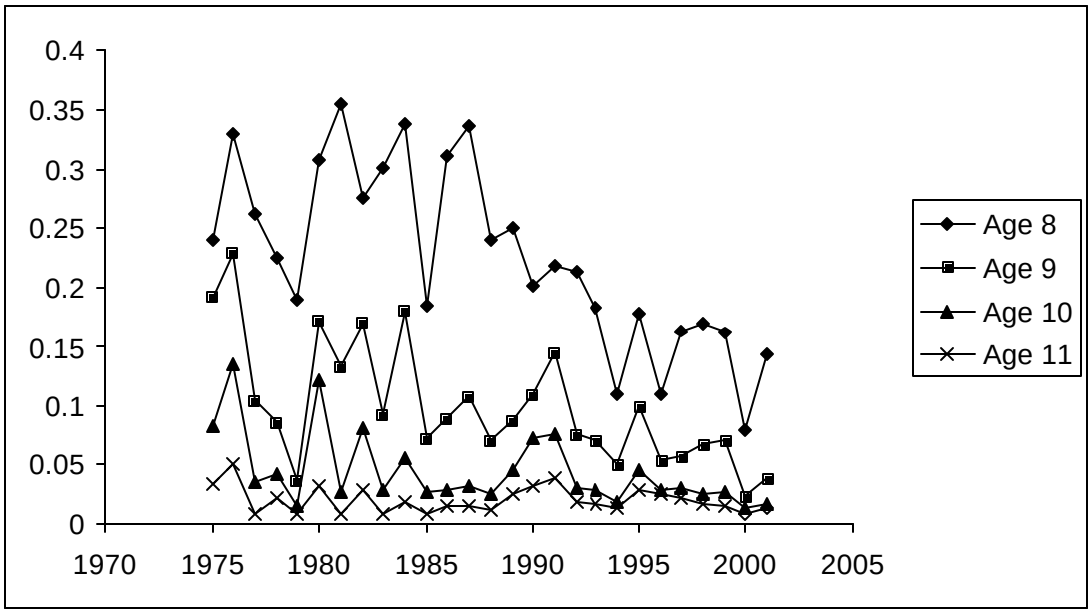

Fig.3(b). The contribution of the catch numbers at each age to the total catch numbers-at-age. Hollow diamonds indicate the 1993-1995 year-classes which are estimated from the surveys to be dominant in the population.