

Stock Annex: Cod (*Gadus morhua*) in Subdivision 5.b.2 (Faroe Bank)

Stock specific documentation of standard assessment procedures used by ICES.

Stock	Cod
Working Group	North Western Working Group (NWWG)
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A. General

A.1. Stock definition

The Faroe Bank is located approximately 75 km Southwest of the Faroe Islands (60°15' S, 61°30' N, 9° 40' W, 7°40' E) (Eyðfinn, 2002). The Faroe Bank cod is under ICES management unit 5.b.2. Inside the 200 m depth contour, the Faroe Bank covers an area of about 45 × 90 km and its shallowest part is less than 100 m deep. The Faroe Bank cod is distributed mainly in the shallow waters of the Bank within the 200 m depth contour. The cod stock on the Bank is regarded as an independent stock displaying a higher growth rate than that of cod on the Plateau. Tagging experiments have shown that exchanges between the two cod stocks are negligible. The stock spawns from March to May with the main spawning in the first-half of April in the shallow waters of the Bank (<200 m). The eggs and larvae are kept on the Bank by an anti-cyclonic circulation. The juveniles descend to the bottom of the Bank proper in July. No distinct nursery areas have been found on the Bank. It is expected that the juveniles are widely distributed on the Bank, finding shelter in areas difficult to access by fishing gear (Jákupsstovu, 1999).

A.2. Fishery

Due to the decreasing trend in cod landings the Bank was closed to all fishing in 1990. This advice was followed for depths shallower than 200 meters. In 1992 and 1993 longliners and jiggers were allowed to participate in an experimental fishery inside the 200-meter depth contour. The new management regime with fishing days was introduced on 1 June 1996 allowing longliners and jiggers to fish in depths below 200 m while trawlers are allowed to fish in waters deeper than 200 m.

A total fishing ban during the spawning period (1 March to 1 May) has been enforced since 2005.

A.3. Ecosystem aspects

The Faroe Bank is a geographically well-defined and self-contained ecosystem surrounded by an oceanic environment (Eyðfinn, 2002) in which cod spawns from March to May with the main spawning in the first-half of April in the shallow waters of the Bank (<200 m). The eggs and larvae are contained in the anti-cyclonic circulation on the Bank. The juveniles descend to the bottom of the Bank proper in July. No distinct

The design for both bottom-trawl surveys is depth stratified with randomised stations covering the shallow and deeper waters of the Bank. The total number of stations is 29 of which 20 are located within the 200 m. depth contour and the rest in deeper waters off the Bank. Effort is recorded in terms of minutes towed approximately 60 min.

Plots of the spatial distribution of the fall (2000-2004) and spring (2006-2008) Faroese groundfish surveys mean catch rates are given in Figure 2 and 3.

The assessment of cod in the Bank is based on survey trends. It's regarded as an exploratory assessment.

In 2013 a surplus-production model was performed and the results indicate a good agreement between estimated fishing mortality and exploitation rates (ratio of survey biomass index to landings). No sensitivity analysis was carried out to explore the stability of parameter estimation. The model seemed to follow survey trends in the last decade but it failed to predict the abrupt changes in stock biomass observed from 1996 to 2002.

B.4. Commercial CPUE

A commercial cpue series from longliners is available but has never been used by the WG.

B.5. Other relevant data

The number of fishing days by the longline fleet is provided by the Faroese Coastal Guard and consist of realised days at sea.

C. Historical Stock Development

In 2000, an attempt was made to assess the stock using XSA with catch at age for 1992-1999, using the spring groundfish survey as a tuning series (1995-1999) but the WG and ACFM concluded that it could only be taken as indicative due to scarce catch-at-age data. No attempt was made to update the XSA in subsequent years given the poor sampling for age composition particularly for trawl landings. Since then several tools have been used to assess the status of the stock. In 2013 a surplus production model was implemented. The WG has agreed to use the survey catch rates (kg/hr) as indicative to follow stock trends.

D. Uncertainties in assessment and forecast

The landing estimates are uncertain because since 1996 vessels are allowed to fish both on the Plateau and on Faroe Bank during the same trip, rendering landings from both areas uncertain. Given the relative size of the two fisheries, this is a bigger problem for Faroe Bank cod than for Faroe Plateau cod, but the magnitude remains unquantified for both.

The catches of cod on Faroe Bank are sometimes reported on the landing slips and only the vessels larger than 15 GRT are obliged to have logbooks. The Faroes Coastal Guard is splitting the landings into 5.b.1 and 5.b.2 on the basis of landing slips and logbooks. Since small boats do not fill out logbooks and may not sell their catch, the catch figures on the Faroe Bank are actually estimates rather than absolute figures. The error in the catches of Faroe Bank cod may be in the order of some hundred tonnes, not thousand tonnes.

E. Short-Term Projection

F. Medium-Term Projections

G. Long-Term Projections

H. Biological Reference Points

There are not analytical basis to suggest reference points based on XSA, general production and statistical catch at age analysis.

I. Other Issues

J. References

Eyðfinn, 2002. Demersal fish assemblages of Faroe Bank: species composition, distribution, biomass spectrum and diversity

Jákupsstovu, 1999. The Fisheries in Faroese waters. Fleets, Activities, distribution and potential conflicts of interest with an offshore oil industry.

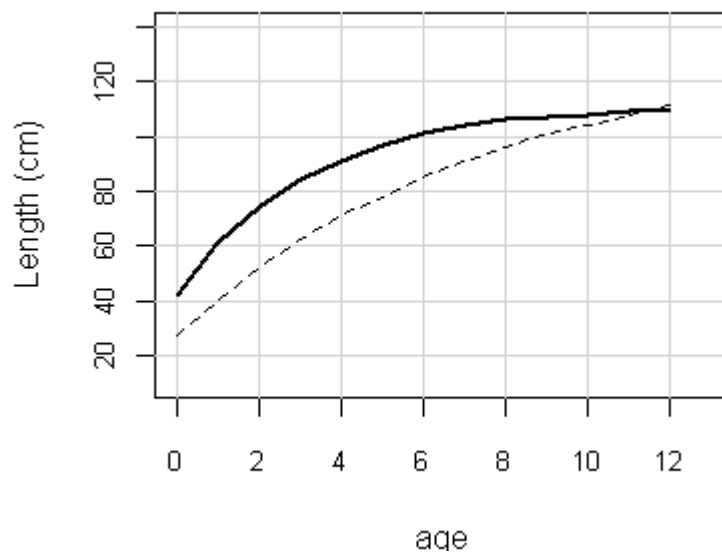


Figure 1. Von Bertalanfy growth equation for the Faroe Bank (thick line) and Faroe Plateau (dash line) cod stocks.

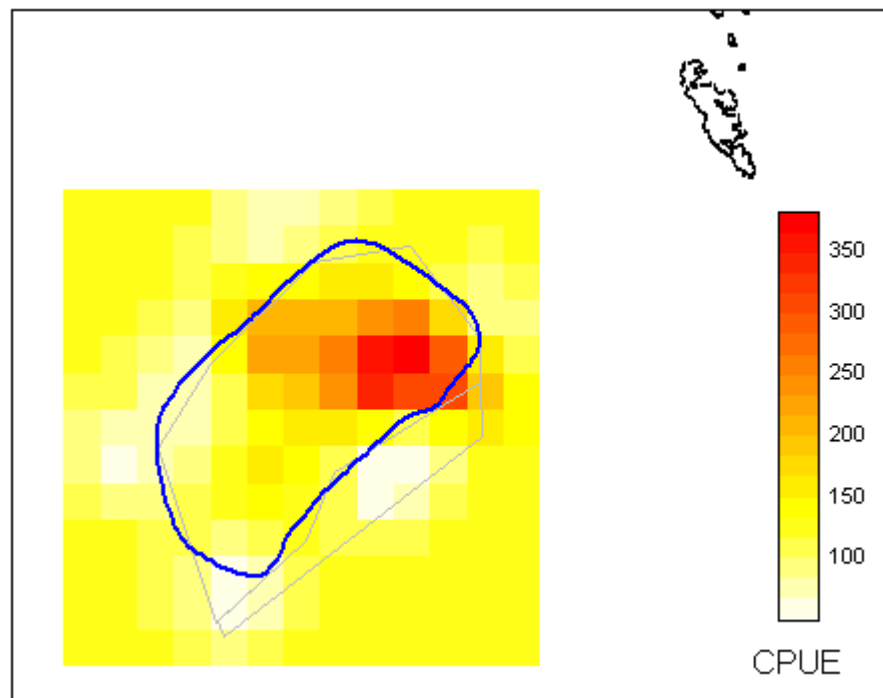


Figure 2. Cod in Division 5.b.2. Catch per unit of effort (CPUE) from the Faroese summer groundfish survey 2000-2004.

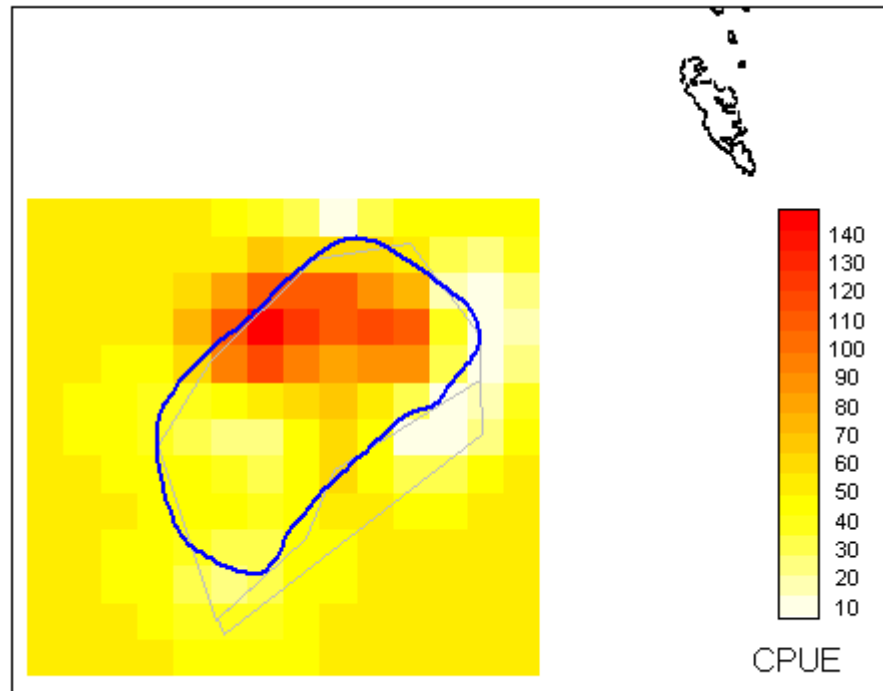


Figure 3. Cod in Division 5.b.2. Catch per unit of effort (CPUE) from the Faroese spring groundfish survey 2006-2008.