4 Faroe Plateau cod

Summary

The input data consisted of the catch-at-age matrix (ages 2-10+ years) for the period 1961-2011 and two age-disaggregated abundance indices obtained from the two Faroese groundfish surveys: the spring survey 1994-2012 (shifted back to the previous year) and the summer survey 1996-2011. The maturities were obtained from the spring survey 1983-2012.

The assessment settings were the same as in the 2011 assessment. An XSA was run and tuned with the two survey indices. The fishing mortality in 2011 (average of ages 3-7 years) was estimated at 0.43, which was higher than the preliminary Fmsy of 0.32 but lower than the limit fishing mortality (when ‘bad things’ may happen) of 0.68. The total stock size (age 2+) in the beginning of 2011 was estimated at 38 000 tonnes and the spawning stock biomass at 24 000 tonnes, which was slightly above the limit biomass (which should be avoided) of 21 000 tonnes.

The short term prediction until year 2014 showed an increasing trend with a stock size in 2014 of around 38 000 tonnes and a spawning stock biomass of around 23 000 tonnes.

The recruitment seems to be positively correlated with the total stock size of cod. It is, therefore, advised to reduce the fishing mortality so that the stock increases.

4.1 Stock description and management units

Both genetic and tagging data suggest that there are three cod stocks present in Faroese waters: on the Faroe Bank, on the Faroe Plateau and on the Faroe-Iceland Ridge. Cod on the Faroe-Iceland Ridge seem to belong to the cod stock at Iceland, and the WG in 2005 decided to exclude these catches from the catch-at-age calculations. The annex provides more information.

4.2 Scientific data

The landing figures were obtained from the Fisheries Ministry and Statistics Faroe Islands (Table 4.2.1) and the working group estimates are presented in Table 4.2.2. The catches on the Faroe-Iceland ridge, i.e. for the large single trawlers and the large longliners were not included in the catch-at-age calculations. In recent years the longliners have taken the majority of the cod catches (Table 4.2.3). The catch-at-age was updated to account for a change in the nominal landings for 2009 and 2010. Landings-at-age for 2011 are provided for the Faroese fishery in Table 4.2.4. Faroese landings from most of the fleet categories were sampled (Table 4.2.5). Catch-at-age from 1961 to 2011 are shown in Table 4.2.6. Catch curves are shown in Fig. 4.2.1. They show atypical patterns in 1996 and to some extent in 2001-2002 when there appears to be an increase over the previous year for ages where a decrease would normally have been expected. This could be due to catchability for longliners depending on fish growth, causing atypical catch curves for longliners.

Mean weight-at-age data for 1961-2011 are provided for the Faroese fishery in Table 4.2.7. These were calculated using the length/weight relationship based on individual length/weight measurements of samples from the landings. The sum-of-products-check for 2011 showed a discrepancy of 0 %.

Figure 4.2.2 shows the mean weight-at-age for 1961 to 2011. For 2012-2014 the values used in the short term predictions are shown on this graph in order to put them in perspective with previous observations. The weights were rather high for the old age-groups in 2010, but are expected to decrease..

The proportion of mature cod by age during the Faroese groundfish surveys carried out during the spawning period (March) are given in Table 4.2.8 (1961 - 2011) and shown in Figure 4.2.3 (1983 - 2011). The observed values in 2012 and the estimated values in 2013-2014 are also shown in order to put them in perspective with previous observations. Full maturity is generally reached at age 5 or 6, but considerable changes have been observed in the proportion mature for younger ages between years.

The spring groundfish surveys in Faroese waters with the research vessel *Magnus Heinason* is used as a tuning series. The catch curves showed a normal pattern (Figure 4.2.4), i.e., a decreasing trend after age 5. The stratified mean catch of cod per unit effort in 1994-2012 is given in Figure 4.2.5. The CPUE increased substantially in 1995 and remained high up to 1998. The CPUE decreased from 2002 to 2004,was low during 2006-2008 and a moderate increase was observed during 2009-2011. However, the 2012 value was very low. Normally the stratified mean catch per trawl hour increases for the first 3-4 years of life of a year class, and decreases afterwards (Figure 4.2.4). From 1994 to 1995, however, there was an increase for all year classes, possibly because of increased availability. A more normal pattern was observed afterwards.

The other tuning series used is the Summer Groundfish Survey. The stratified mean catch of cod per unit effort (kg/trawl hour) 1996-2011 is shown in Figure 4.2.5, and catch curves in Figure 4.2.6. The catch curves show that the fish are fully recruited to the survey gear at an age of 4 or 5 years. Both tuning series are presented in Table 4.2.9.

Two commercial cpue series (longliners and pairtrawlers) are also presented (Tables 4.2.10 and 4.2.11, as well as Figure 4.2.7), although they are not used as tuning series. This year, yet another cpue series is shown, which is the small boats (0-25 GRT) operating with longlines and jigging reels close to land (Table 4.2.12).

4.3 Information from the fishing industry

The sampling of the catches is included in the 'scientific data'. The fishing industry has since 1996 gathered data on the size composition of the landings but this information has not been used in this assessment.

4.4 Methods

This is an update assessment and the results of the assessment is mostly data-driven implying that there may be limited need to use other assessment methods.

4.5 Reference points

The reference points are dealt with in the general section of Faroese stocks. The PA reference points for Faroe Plateau cod are the following: B_{pa} = 40kt, B_{lim} = 21kt, F_{pa} = 0.35 and F_{lim} = 0.68.

The reference points based on the yield-per-recruit curve are the following: F_{max} = 0.25, $F_{0.1}$ = 0.11, F35%SPR = 0.17, F_{med} = 0.41, F_{low} = 0.10, F_{high} = 0.97.

The group adopted in 2011 following preliminary MSY reference points: F_{msy} = 0.32, see section 4.8. The $B_{trigger}$ was set at B_{pa} = 40 kt.

4.6 State of the stock - historical and compared to what is now

Since the current assessment is an update assessment, the same procedure is followed as in the 2011 assessment: to use the two surveys for tuning and not the commercial series. The commercial series showed a similar overall tendency as the surveys (Figure 4.2.7). The XSA-run is presented in Table 4.6.1 and the results are shown in Table 4.6.2 (fishing mortality at age), Table 4.6.3 (population numbers at age) and Table 4.6.4 (summary table).

The log catchability residuals from the adopted XSA run are shown in Figure 4.6.1. There were year effects in both surveys since 2005. The stock estimates for 2011 seemed to be determined more by the summer survey than the spring survey.

The estimated fishing mortalities are shown in Tables 4.6.2 and 4.6.4 and Figures 4.6.2 and 4.6.3. The average F for age groups 3 to 7 in 2011 (F3-7) is estimated at 0.43, somewhat higher than F_{pa} = 0.35.

The F3-7 (Figure 4.6.3) seems to be a problematic measure of fishing mortality for two reasons. Firstly, the fishing mortalities for ages 6-7 are generally overestimated in the terminal year leading to an overestimation of F3-7 for the terminal year. Secondly, the proportion of 6-7 year old cod in the stock or catch is small (normally less than 20%) and therefore get a disproportionate influence on the F3-7. The yield over exploitable biomass (3 years and older) was introduced in the 2004 assessment, but has the drawback not being proportional to fishing effort. Another approach is to weight the fishing mortalities, and three weighting procedures are presented in Figure 4.6.4: weighting by stock numbers, stock biomasses or catch weights. The fishing mortality may have increased slightly since 1996, but there have been oscillations that may be determined by the food availability in the ecosystem.

The stock size in numbers is given in Table 4.6.3. A summary of the XSA, with recruitment, biomass and fishing mortality estimates is given in Table 4.6.4 and in Figure 4.6.2. The stock-recruitment relationship is presented in Figure 4.6.5. The stock trajectory with respect to existing reference points is illustrated in Figure 4.6.6.

The assessment shows the poor recruitment for the 1984 to 1991 year classes, and the strong 1992 and 1993 year classes. Due to the continuous poor recruitment from 1984 to 1991 and the high fishing mortalities, the spawning stock biomass declined steadily from 1983 to 1992 when it was the lowest on record at 21 000 t. It increased sharply to above 80 000 t in 1996 and 1997 before declining to about 45 000 t in 1999. The spawning stock biomass increased to 59 000 t in 2001 but dropped to about 18 000 t in 2007 which is the lowest value observed during the assessment period from 1961 to 2011. The 2002 year class is likely the lowest observed and the 2003-2006 year classes are also weak according to the XSA run. The 2007 year class seems to be at bit stronger (10 millions), and the 2008 year class seems to be of average strength (15 millions). The 2009 year class is estimated at only 4 million individuals. The 2010 year class is in the XSA run estimated at the extremely low value of 0.07 millions, but this estimate relies solely on the spring survey estimate in 2012 (shifted to 2011 in the tuning). This value was adjusted to about 7 millions (see section 4.7).

In order to put the stock estimates in 2011 into a wider perspective, we have estimated the stock biomass back to 1906. A cpue series (tonnes per million tonn-hours) for British trawlers 1924-1972 was available from the data presented in Jákupsstovu and Reinert (1994). The cpue series was also used, and explained, in Jones (1966). There was an overlap between the cpue series and the stock assessment for the years 1961-1972. Another cpue series (cwts per day of absence from port, 1 cwt = 50.8 kg) was available for British steam trawlers 1906-1925. The overlap was two years (1924 and 1925) and the 1906-1925 series was scaled to the 1924-1972 series. The results are presented in Figure 4.6.7. There was a decreasing trend in biomass from around 100 thousand tonnes to around 80 tonnes prior to World War II, and since then a decreasing trend from around 100 thousand tonnes to around 50 thousand tonnes. The biomass in 2011 was very low compared with the entire period.

4.7 Short term forecast

The input data for the short term prediction are given in Table 4.7.1. Considerable uncertainty was associated with the strength of the 2010 year class. The adopted figure was to use the lowest observed value of 3.7 million. Another candidate was 6.84 millions. The value was obtained from a regression between log(B/C) and recruitment, where "B" is the age 3+ biomass in the recruitment year and "C" is the biomass of predatory age 3+ biomass *close to land* the year before the recruitment year (Figure 4.7.1, Figure 4.7.2). "C" was itself obtained from a regression between age 3+ biomass on the Faroe Plateau and the condition factor of cod within the 120 m contour (low condition factor: higher proportion close to land), see also Steingrund *et al*., 2010 and Steingrund, 2012 NWWG WD 31. The strength of the 2011 and 2012 year classes was set at the average of yc 2007 to yc 2009. If the procedure in the Annex is followed (the 2010 year class = the XSA value of 0.066 millions (Table 4.7.3)), a pessimistic forecast is obtained (spawning biomass in 2014 = 35000 t (Table 4.7.4) compared with 40000 t (Table 4.7.2)). Estimates of stock size (ages 3+) were taken directly from the XSA stock numbers. The exploitation pattern was estimated as the average fishing mortality for 2009-2011. The weights at age in the catches in 2012 were estimated from the commercial catches in January-February or the spring survey (ages 2 and 4-6 years). The weights in the catches in 2013 were set to the values in 2012, i.e., rather high values, whereas a lower value (average 2010-2012) was expected in 2014. The proportion mature in 2012 was set to the 2012 values from the spring groundfish survey, and for 2013-2014 to the average values for 2010-2012.

Table 4.7.2 shows that the landings in 2012 are expected to be 11 000 tonnes (the landings from the Faroe-Icelandic ridge should be added to this figure in order to get the total Faroese landings within the Vb1 area). The spawning stock biomass is expected to be 26 000 tonnes in 2012, 23 000 tonnes in 2013 and eventually 23 000 tonnes in 2014. The current short term prediction is therefore somewhat pessimistic. The contribution of the various year-classes to the SSB in 2013 and 2014 is shown in Figure 4.7.3. It shows that the incoming year-classes (YC 2008-YC 2011) dominate the SSB.

A short term projection using the Annex procedures is presented in Table 4.7.3 and Table 4.7.4. It shows that the SSB in 2014 (20000 t) will be below B_{lim} of 21000 t.

4.8 Long term forecast

The input to the traditional long term forecast is presented in Table 4.8.1 and the result is presented in Table 4.8.2 and Figure 4.8.1.

Single species long term forecasts for Faroe Plateau cod indicated F_{msy} values lower than F_{pa}. An FLR procedure (MSE, Management strategy evaluations using FLR standard packages; a simulation of management and stock response over a 20 yr period) for Faroe Plateau cod indicates that F_{msy} is 0.32. This value (0.32) was adopted by the group as a preliminary F_{msy}.

Multispecies models may give very different perception of Fmsy reference points than single-species models. Therefore, a long-term simulation was performed in 2011 NWWG report to evaluate MSY reference points for cod, haddock and saithe, all in the same ecological model (see Steingrund et al., 2011NWWG WD 22). The model settings and the results were presented in the Overview section for the Faroese stocks.

The ecological model was driven by 1) yearly primary production on the Faroe Shelf (<130 m bottom depth), 2) yearly primary production over the outer areas on the Faroe Plateau (130-500 m bottom depth), as well as the fishing mortality of 3) cod, 4) haddock and 5) saithe. The recruitment of saithe, being positively affected by the primary production over the outer areas on the Faroe Plateau and negatively affected by the age 7+ biomass of saithe had a very large influence on the results. For example, when fishing mortality of saithe increased, the age 7+ biomass decreased, which increased the saithe recruitment and biomass. A higher biomass of saithe led to a decrease the condition factor of cod, and hence a decrease of cod recruitment.

Recent work (Steingrund *et al.*, 2012), however, indicates that another ecological model may be more appropriate. There is a moderate positive correlation between primary production on the Faroe Shelf and the subsequent production of cod (Steingrund and Gaard, 2005). There is also a moderate positive correlation for haddock and saithe. However, if all three species are combined, the positive correlation becomes very strong. This indicates that a nearly fixed portion of the energy produced by the primary production goes to predatory demersal fish on the Faroe Plateau, but that the portion to each of the fish species (to cod, haddock or to saithe) may vary much between years. For example, the portion to saithe varied between 30 and 80 % between 1961 and 2008, and was high when sandeels were scarce. Surprisingly, the fit between primary production and cod+haddock+saithe production was not improved by including the outer primary production, i.e., this ecological model is simpler than the former one with regards to primary production. On the other hand, other variables needed to be included in the model, for example the influx of *Calanus finmarchicus* onto the Faroe Shelf. It is hoped that the ecological model work can be done with sufficient pace to be included in future NWWG reports.

The fishing mortality in 2008-2011 (0.50) has been above the preliminary F_{msy} of 0.33. The lower fishing mortality for 2011 (0.43) may be a result of area closures introduced in July 2012. The closure of the nearshore areas for commercial longliners, as well as other areas (for all fishing) (see Figure in overview section for Faroese stocks), were initiated to protect the 2008 and 2009 year classes. The 2008 year class was in the last year's report regarded to be above average size, but is now considered of average size. Figures 4.8.2 and 4.8.3 show the average abundance of 2- and 4-years old cod in March (1994-2012) and August (1996-2011).

4.9 Uncertainties in assessment and forecast

The results from the retrospective analysis of the XSA (Figure 4.9.1) show that there has been a tendency to overestimate recruitment, underestimate total stock/spawning stock biomasses, and to overestimate the fishing mortality. However, the revision of biomasses and fishing mortality from 2010 to 2011 (terminal year) is in the opposite way: decreasing biomasses and increasing F.

Misreporting is not believed to be a problem under the current effort management system. The total catch figures (in sub-divisions Vb1+Vb2) are believed to be accurate, although there may be some minor problems when allocating the catches between the two sub-divisions.

The sampling of the catches for length measurements and length-weight relationships is considered to be adequate but the number of otoliths could be higher.

The quality of the tuning data is considered to be adequate. The same research vessel has been used all the time and the gear as well as sampling procedures of the catch have remained the same. The only exception may be the otolith sampling during 1994-1996 when larger otolith samples were collected from fewer hauls than during the other years (1997 to present). There was a good agreement between the survey indices and when compared to the commercial tuning series.

4.10 Comparison with previous assessment and forecast

The assessment settings were according to the Annex. Unfortunately, the settings last year were, by mistake, slightly different, compared with the Annex: the catchability was not regarded independent of stock size for all ages, but only for ages 3+. Rerunning the 2011 assessment according to the Annex gave a higher 2008 year class (by 4 millions) and a lower 2009 year class (by 4 millions), influencing total stock biomass positively (by 4 thousand tonnes), but nearly not spawning stock biomass and fishing mortality. The estimates of the incoming year classes in the short term projection were obtained in a slightly different way (see section 4.7) than described in the Annex. The Annex procedure estimated the strength of the 2010 year class to be 0.081 millions at age 1 (Figure 4.9.1), corresponding to 0.066 millions at age 2, whereas the alternative procedure gave 6.8 millions at age 2.

Recruitment, total stock biomass, spawning stock biomass in 2010 and 2011 were estimated lower in the current assessment compared to what was estimated/predicted last year, whereas the fishing mortality was higher (Table 4.10.1).

4.11 Management plans and evaluations

There is no explicit management plan for this stock. A management system based on number of fishing days, closed areas and other technical measures was introduced in 1996 with the purpose to ensuring sustainable demersal fisheries in Vb. This was before ICES introduced PA and MSY reference values and at the time it was believed that the purpose was achieved, if the total allowable number of fishing days was set such, that on average 33% of the cod exploitable stock in numbers would be harvested annually. This translates into an average F of 0.45, above the F_{pa} of 0.35. ICES considers this to be inconsistent with the PA and MSY approaches. Work is ongoing in the Faroes to move away from the Ftarget of 0.45 to be more consistent with the ICES advice.

4.12 Management considerations

The current assessment shows that the spawning cod stock was below Blim of 21 000 tonnes in 2007-2008, and will likely stay slightly above Blim the next two years. The primary production was high in 2008-2010, but decreased to below-average in 2011. If the development over time in the primary production, usually oscillating between above-average periods and below-average periods, continues in the near future, the primary production will stay low during 2012-2013. This will likely prevent a recovery of the cod stock in the near future.

Biomass estimates of Faroe Plateau cod reconstructed back in time (Figure 4.6.7) show that the biomass fluctuated around 100 000 tonnes during the period 1906-1957, around 80 000 tonnes during 1958-1987 and eventually around 60 000 tonnes since 1988. The catches fluctuated between 20 000 and 40 000 tonnes, except in 1990-1994 and 2004-2010 when they fluctuated around 10 000 tonnes. Similar catches from smaller biomasses imply that the exploitation rates have increased over time.

There has been a long held view on the Faroe Islands that the cod stock is very resilient to exploitation and that a collapse in the fishery is nearly impossible – people bear in mind the rapid recovery of the cod stock during 1994-1996. The collapse in the fisheries during 1991-1994 has been regarded as an exceptional event. Figure 4.6.7 indicates that, although more resilient than some other cod stocks in the North Atlantic, Faroe Plateau cod does show a decreasing trend since World War II. This trend is likely caused by a combination of environmental factors and fishing effort, but there are reasons to believe that the fishing effort has increased during the period.

The catchability hypothesis presented in the overview section for Faroese stocks, see the report in 2009 (ICES, 2009), states that the fishing mortality is high when the primary production is low and *vice versa*. The primary production was low, or average, during 2002-2007 and the high fishing mortalities in 2002-2005 were therefore not unexpected. The primary production in 2008 to 2010 was above average, but below average in 2011, and is expected to stay so some years to come. Hence, it is expected that the fishing mortality will increase in 2011 and onwards. This might pull the fishing mortalities upwards whereas the area closures introduced in 2011 may act in the opposite way.

A note on nominal and actual fishing days is worthwhile. The assessment F provides the result of the actual fishing days used at sea, and the simulations providing Fmsy, as well as reductions in F (by e.g. 35%), apply to the actual fishing days used. One reason why the fishing mortality has been so low the last years is the fact that as many as 40% of the nominal fishing days have not been used. Hence, in order to obtain the maximal sustainable yield in the future, the nominal fishing days have to be reduced considerably more than the actual fishing days.

Up to 40% of the allocated days have not been used the last 3-4 years, which may have contributed to the comparatively low fishing mortality. However, these un-utilized fishing days seem to represent a major obstacle in rebuilding the cod stock to levels where it is able to produce the maximum long-term yield, because they will likely be activated when more cod can be fished. The number of un-utilized fishing days is largest for the small boats (less than half of the days used) (see Overview section for Faroese stocks).

4.13 Ecosystem considerations

The effects of the cod-fishery on the ecosystem (e.g. damage on the bottom) are expected to be small since the majority of the cod catch is taken by longlines. Regarding the ecosystem effects on fishing, this issue is partly addressed in the ecological modelling work presented in the Overview section for Faroese stocks.

4.14 Regulations and their effects

As mentioned earlier, there seems to be a poor relationship between the number of fishing days and the fishing mortality because of large fluctuations in catchability. Area restrictions may help to reduce fishing mortality, but they cause practical problems for the fishing fleets (e.g. high concentrations of vessels in certain areas). Area restrictions may be best suited to protect certain fish species/sizes in certain areas, whereas the number of fishing days remains the only tool to reduce the overall fishing mortality.

4.15 Changes in fishing technology and fishing patterns

Fishing effort per fishing day may have increased gradually since the effort management system was introduced in 1996, although little direct quantitative information exists. There also seems to have been substantial increases in fishing power when new vessels are replacing old vessels.

The fishing pattern in 2006-2011 has changed in comparison to previous years. The large longliners seem to have exploited the deep areas (> 200 m) to a larger extent (ling and tusk) because the catches in shallower waters of cod and haddock have been so poor – which was also observed in the beginning of the 1990s. This could reduce the fishing mortality on cod and haddock, but the small longliners still exploit the shallow areas.

4.16 Changes in the environment

The primary production has been low for a number of years, albeit high in 2008 to 2010, but it is not believed that this has any relationship with a change in the environment.

4.17 References

ICES, 2009. Report of the North Western Working Group. ICES CM 2009/ACOM: 4. 655 pp.

ICES, 2011. Report of the North Western Working Group. ICES CM 2011/ACOM:7. 975 pp.

Jákupsstovu, S. H. and Reinert, J. 1994. Fluctuations in the Faroe Plateau cod stock. ICES Marine Science Symposia, 198:194-211.

Jones, B. W. 1966. The cod and the cod fishery at the Faroe. Fishery Investigations, London, 24.

Steingrund, P., Gaard, E., Reinert, J., Olsen, B., Homrum, E., and Eliasen, K. 2012. Trophic relationships on the Faroe Shelf ecosystem and potential ecosystem states. Manuscript in PhD-thesis by Eydna í Homrum, submitted in April 2012.

Steingrund, P., Mouritsen, R., Reinert, J., Gaard, E., and Hátún, H. 2010. Total stock size and cannibalism regulate recruitment in cod (*Gadus morhua*) on the Faroe Plateau. ICES Journal of Marine Science, 67: 111-124.

Steingrund, P., Hátún, H., Matras, U., Gaard, E., and í Homrum, E. 2011.A preliminary ecological MSY model for the Faroe Plateau - a technical description. NWWG WD 22, 15 pp.

Steingrund, P. 2012. Estimating the strength of incoming year classes of Faroe Plateau cod. NWWG WD 31, 8 pp.

Table 4.2.1. Faroe Plateau cod (sub-division Vb1). Nominal catches (tonnes) by countries, 1986-2010, as officially reported to ICES.

	Denmark	Faroe Islands	France	Germany	Iceland	Norway	Greenland	Portugal	UK (E/W/NI)	UK (Scotland)	United Kingdom	Total
1986	8	34,492	4	8		83	-		-	-	-	34,595
1987	30	21,303	17	12		21	-		8	-	-	21,391
1988	10	22,272	17	5		163	-		-	-	-	22,467
1989	-	20,535	-	7		285	-		-	-	-	20,827
1990	-	12,232	-	24		124	-		-	-	-	12,380
1991	-	8,203	- [1]	16		89	-		1	-	-	8,310
1992	-	5,938	3 [2]	12		39	-		74	-	-	6,068
1993	-	5,744	1 [2]	+		57	-		186	-	-	5,990
1994	-	8,724	-	2		36	-		56	-	-	8,818
1995	-	19,079	2 [2]	2		38	-		43	-	-	19,166
1996	-	39,406	1 [2]	+		507	-		126	-	-	40,042
1997	-	33,556	-	+		410	-		61 [2]	-	-	34,029
1998	-	23,308	- *	-		405	-		27 [2]	-	-	23,742
1999	-	19,156	- *	39	-	450	-		51	-		19,696
2000			1	2	-	374	-		18	-		395
2001		29,762	9 [2]	9	-	531 *	-		50	-		30,363
2002		40,602	20	6	5	573			42	-		41,248
2003		30,259	14	7	-	447	-		15	-		30,742
2004		17,540	2	3 [2]		414		1	15	-		17,977
2005		13,556	-			201			24	-		13,781
2006		11,629	7	1 [2]		49	5		1	-		11,694
2007		9,905	1 [2]			71	7		3	358		10,347
2008		9,394	1			40				383		9,818
2009		10,736	1			14	7			300		11,058
2010		13,878	1			10				312		14,201
2011 *		11,497	1									11,497

* Preliminary, 1) Included in Vb2, 2) Reported as Vb.

Table 4.2.2. Faroe Plateau cod (sub-division Vb1). Nominal catch (tonnes) of COD in sub-division Vb1 (Faroe Plateau) 1986-2010, as used in the assessment.

		Faroese catches:				Catches reported as Vb2:			Foreign catches:				Used in the
	Officially reported	in Vb1	Corrections in Vb1	on Faroe-Iceland ridge	in IIA within Faroe area jurisdiction	UK (E/W/NI)	UK (Scotland)	UK	French [2]	Greenland[2]	Russia[2]	UK[2]	assessment
1986	34595												34595
1987	21391												21391
1988	22467				715								23182
1989	20827				1229				12				22068
1990	12380				1090	-	205		17				13487
1991	8309				351	-	90						8750
1992	6066				154	+	176						6396
1993	5988					1	118						6107
1994	8818					1	227						9046
1995	19164	3330 [3]				-	551						23045
1996	40040					-	382						40422
1997	34027					-	277						34304
1998	23740					-	265						24005
1999	19696			-1600		-	210						18306
2000	395	21793 *		-1400		-	245						21033
2001	30361		-1766	-700		-	288						28183
2002	41248		-2409	-600		-	218	-					38457
2003	30742		-1795	-4700		-	254	-					24501
2004	17975		-1041	-4000		-	244	-					13178
2005	13781		-804	-4200			1129	-					9906
2006	11692		-690	-800			278						10480
2007	10345		-588	-1800			53			6			8016
2008	9818		-557	-1828			32						7465
2009	11058		-637	-487			38			26	4		10002
2010	14201		-823	-680			54			4.812			12757
2011	11497 *		-682	-918						3.297			9901

*) Preliminary, 1) In order to be consistent with procedures used previous years, 2) Reported to Faroese Coastal Guard, 3) expected misreporting/discard.

Table 4.2.3. Faroe Plateau cod (sub-division Vb1). The landings of Faroese fleets (in percents) of total catch. Note that the catches on the Faroe-Iceland ridge (mainly belonging to single trawlers > 1000 HP) are included in this table, but excluded in the XSA-run.

Year	Open boats	Longliners <100 GRT	Singletrawl <400 HP	Gill net	Jiggers	Singletrawl 400-1000 HF	Singletrawl >1000 HP	Pairtrawl <1000 HP	Pairtrawl >1000 HP	Longliners >100 GRT	Industrial trawlers	Others	Faroe catch Round.weight
1986	9.5	15.1	5.1	1.3	2.9	6.2	8.5	29.6	14.9	5.1	0.4	1.3	34,492
1987	9.9	14.8	6.2	0.5	2.9	6.7	8.0	26.0	14.5	9.9	0.5	0.1	21,303
1988	2.6	13.8	4.9	2.6	7.5	7.4	6.8	25.3	15.6	12.7	0.6	0.2	22,272
1989	4.4	29.0	5.7	3.2	9.3	5.7	5.5	10.5	8.3	17.7	0.7	0.0	20,535
1990	3.9	35.5	4.8	1.4	8.2	3.7	4.3	7.1	10.5	19.6	0.6	0.2	12,232
1991	4.3	31.6	7.1	2.0	8.0	3.4	4.7	8.3	12.9	17.2	0.6	0.1	8,203
1992	2.6	26.0	6.9	0.0	7.0	2.2	3.6	12.0	20.8	13.4	5.0	0.4	5,938
1993	2.2	16.0	15.4	0.0	9.0	4.1	3.6	14.2	21.7	12.6	0.8	0.4	5,744
1994	3.1	13.4	9.6	0.5	19.2	2.7	5.3	8.3	23.7	13.7	0.5	0.1	8,724
1995	4.2	17.9	6.5	0.3	24.9	4.1	4.7	6.4	12.3	18.5	0.1	0.0	19,079
1996	4.0	19.0	4.0	0.0	20.0	3.0	2.0	8.0	19.0	21.0	0.0	0.0	39,406
1997	3.1	28.4	4.4	0.5	9.8	5.1	2.9	4.8	11.3	29.7	0.0	0.1	33,556
1998	2.4	31.2	6.0	1.3	6.5	6.3	5.5	3.1	8.6	29.1	0.1	0.0	23,308
1999	2.7	24.0	5.4	2.3	5.4	5.2	11.8	6.4	14.5	21.9	0.4	0.1	19,156
2000	2.3	19.3	9.1	0.9	10.5	9.6	12.7	5.7	13.9	15.7	0.1	0.1	21,793
2001	3.7	28.3	7.4	0.2	15.6	6.4	6.4	5.2	9.2	17.8	0.0	0.0	28,838
2002	3.8	32.9	5.8	0.3	9.9	6.7	6.6	2.5	7.2	24.4	0.0	0.0	38,347
2003	4.9	28.7	4.0	1.5	7.4	3.0	14.4	2.2	7.4	26.5	0.0	0.0	29,382
2004	4.4	31.1	2.1	0.5	6.6	1.6	12.9	2.2	11.7	26.8	0.0	0.0	16,772
2005	3.7	27.5	5.1	0.8	5.4	2.4	28.1	1.7	6.4	18.8	0.0	0.0	15,472
2006	6.2	35.0	3.2	0.2	7.1	1.6	12.9	2.5	6.6	24.7	0.0	0.0	8,636
2007	5.1	28.2	2.6	0.3	6.1	1.7	17.5	1.7	4.8	32.0	0.0	0.0	8,866
2008	5.1	32.7	4.7	0.7	6.4	3.2	14.6	1.0	3.1	28.6	0.0	0.0	7,666
2009	6.9	41.6	4.3	0.3	10.1	2.5	1.9	2.8	6.5	23.0	0.0	0.0	7,146
2010	6.2	31.9	2.7	0.0	12.6	1.3	1.4	3.4	9.6	30.8	0.0	0.0	10,258
2011	3.6	26.5	3.4	0.1	6.7	1.3	1.4	3.1	21.9	31.9	0.0	0.0	9,502
Average	**4.4**	**26.1**	**5.6**	**0.8**	**9.4**	**4.1**	**8.0**	**7.8**	**12.2**	**20.9**	**0.4**	**0.1**	

Table 4.2.4. Faroe Plateau cod (sub-division Vb1). Catch in numbers at age per fleet in 2010. Numbers are in thousands and the catch is in tonnes, round weight.

Age\Fleet	Open boat	Longliners < 100 GRT	Jiggers	Single trwl 0-399HP	Single trwl 400-1000H	Single trwl > 1000 HP	Pair trwl 700-999 HI	Pair trwl > 1000 HP	Longliners > 100 GRT	Gillnetters	Others (scaling)	Catch-at -age
2	40	182	123	0	11	5	0	23	3	0	-52	335
3	199	1218	434	0	166	113	25	324	295	0	-380	2394
4	65	478	101	0	154	92	22	263	286	0	-201	1260
5	18	140	22	0	45	23	4	64	115	0	-58	373
6	8	71	10	0	18	10	1	29	76	0	-31	192
7	6	49	4	0	10	6	1	17	56	0	-21	128
8	1	11	1	0	4	2	0	6	33	0	-7	51
9	1	4	0	0	1	1	0	6	10	0	-3	20
10+	0	0	0	0	0	0	0	2	0	0	0	2
Sum	338	2153	695	0	409	252	53	734	874	0	-753	4755
G.weight	433	3163	807	0	975	670	141	1924	2220	0	-1413	8920

Others include gillnetters, industrial bottom trawlers, longlining for halibut, foreign fleets, **and scaling to correct catch.**
Gutted total catch is calculated as round weight divided by 1.11.

Table 4.2.5. Faroe Plateau cod (sub-division Vb1). Samples from commercial fleets in 2011.

Fleet	Size	Samples	Lengths	Otoliths	Weights
Open boats		15	2,680	360	2,680
Longliners	<100 GRT	45	9,097	899	8,751
Longliners	>100 GRT	24	4,858	600	4,858
Jiggers		3	484	60	484
Gillnetters		0	0	0	0
Sing. trawlers	<400 HP	0	0	0	0
Sing. trawlers	400-1000 HP	14	2,949	240	2,949
Sing. trawlers	>1000 HP	0	0	0	0
Pair trawlers	<1000 HP	4	832	180	832
Pair trawlers	>1000 HP	24	4,929	660	3,976
Total		129	25,829	2,999	24,530

Table 4.2.6. Faroe Plateau cod (sub-division Vb1). Catch in numbers at age 1961-2011.

	age									
year	1	2	3	4	5	6	7	8	9	10
1961	0	3093	2686	1331	1066	232	372	78	29	0
1962	0	4424	2500	1255	855	481	93	94	22	0
1963	0	4110	3958	1280	662	284	204	48	30	0
1964	0	2033	3021	2300	630	350	158	79	41	0
1965	0	852	3230	2564	1416	363	155	48	63	0
1966	0	1337	970	2080	1339	606	197	104	33	0
1967	0	1609	2690	860	1706	847	309	64	27	0
1968	0	1529	3322	2663	945	1226	452	105	11	0
1969	0	878	3106	3300	1538	477	713	203	92	0
1970	0	402	1163	2172	1685	752	244	300	44	0
1971	0	328	757	821	1287	1451	510	114	179	0
1972	0	875	1176	810	596	1021	596	154	25	0
1973	0	723	3124	1590	707	384	312	227	120	97
1974	0	2161	1266	1811	934	563	452	149	141	91
1975	0	2584	5689	2157	2211	813	295	190	118	150
1976	0	1497	4158	3799	1380	1427	617	273	120	186
1977	0	425	3282	6844	3718	788	1160	239	134	9
1978	0	555	1219	2643	3216	1041	268	201	66	56
1979	0	575	1732	1673	1601	1906	493	134	87	38
1980	0	1129	2263	1461	895	807	832	339	42	18
1981	0	646	4137	1981	947	582	487	527	123	55
1982	0	1139	1965	3073	1286	471	314	169	254	122
1983	0	2149	5771	2760	2746	1204	510	157	104	102
1984	0	4396	5234	3487	1461	912	314	82	34	66
1985	0	998	9484	3795	1669	770	872	309	65	80
1986	0	210	3586	8462	2373	907	236	147	47	38
1987	0	257	1362	2611	3083	812	224	68	69	26
1988	0	509	2122	1945	1484	2178	492	168	33	25
1989	0	2237	2151	2187	1121	1026	997	220	61	9
1990	0	243	2849	1481	852	404	294	291	50	26
1991	0	192	451	2152	622	303	142	93	53	24
1992	0	205	455	466	911	293	132	53	30	34
1993	0	120	802	603	222	329	96	33	22	25
1994	0	573	788	1062	532	125	176	39	23	16
1995	0	2615	2716	2008	1012	465	118	175	44	49
1996	0	351	5164	4608	1542	1526	596	147	347	47
1997	0	200	1278	6710	3731	657	639	170	51	120
1998	0	455	745	1558	5140	1529	159	118	28	25
1999	0	1185	993	799	1107	2225	439	59	17	7
2000	0	2091	2637	782	426	674	809	104	7	1
2001	0	3912	3759	2101	367	367	718	437	36	6
2002	0	2079	7283	3372	1671	470	533	413	290	7
2003	0	678	2128	4572	1927	640	177	91	115	20
2004	0	100	691	1263	2105	736	240	65	42	37
2005	0	494	592	877	1122	823	204	41	19	30
2006	0	1182	1168	499	706	852	355	81	11	3
2007	0	540	1308	771	337	308	273	91	21	3
2008	0	293	776	799	439	191	160	159	58	20
2009	0	875	2267	863	619	297	85	55	43	17
2010	0	2113	2034	861	468	481	178	58	33	38
2011	0	335	2394	1260	373	192	128	51	20	2

Table 4.2.7. Faroe Plateau cod (sub-division Vb1). Catch weight at age 1961-2011.

	age									
year	1	2	3	4	5	6	7	8	9	10
1961	0	1.080	2.220	3.450	4.690	5.520	7.090	9.910	8.030	10.270
1962	0	1.000	2.270	3.350	4.580	4.930	9.080	6.590	6.660	10.270
1963	0	1.040	1.940	3.510	4.600	5.500	6.780	8.710	11.720	10.820
1964	0	0.970	1.830	3.150	4.330	6.080	7.000	6.250	6.190	14.390
1965	0	0.920	1.450	2.570	3.780	5.690	7.310	7.930	8.090	11.110
1966	0	0.980	1.770	2.750	3.510	4.800	6.320	7.510	10.340	11.650
1967	0	0.960	1.930	3.130	4.040	4.780	6.250	7.000	11.010	10.690
1968	0	0.880	1.720	3.070	4.120	4.650	5.500	7.670	10.950	9.280
1969	0	1.090	1.800	2.850	3.670	4.890	5.050	7.410	8.660	14.390
1970	0	0.960	2.230	2.690	3.940	5.140	6.460	10.310	7.390	9.340
1971	0	0.810	1.800	2.980	3.580	3.940	4.870	6.480	6.370	10.220
1972	0	0.660	1.610	2.580	3.260	4.290	4.950	6.480	6.900	11.550
1973	0	1.110	2.000	3.410	3.890	5.100	5.100	6.120	8.660	7.570
1974	0	1.080	2.220	3.440	4.800	5.180	5.880	6.140	8.630	7.620
1975	0	0.790	1.790	2.980	4.260	5.460	6.250	7.510	7.390	8.170
1976	0	0.940	1.720	2.840	3.700	5.260	6.430	6.390	8.550	13.620
1977	0	0.870	1.790	2.530	3.680	4.650	5.340	6.230	8.380	10.720
1978	0	1.112	1.385	2.140	3.125	4.363	5.927	6.348	8.715	12.229
1979	0	0.897	1.682	2.211	3.052	3.642	4.719	7.272	8.368	13.042
1980	0	0.927	1.432	2.220	3.105	3.539	4.392	6.100	7.603	9.668
1981	0	1.080	1.470	2.180	3.210	3.700	4.240	4.430	6.690	10.000
1982	0	1.230	1.413	2.138	3.107	4.012	5.442	5.563	5.216	6.707
1983	0	1.338	1.950	2.403	3.107	4.110	5.020	5.601	8.013	8.031
1984	0	1.195	1.888	2.980	3.679	4.470	5.488	6.466	6.628	10.981
1985	0	0.905	1.658	2.626	3.400	3.752	4.220	4.739	6.511	10.981
1986	0	1.099	1.459	2.046	2.936	3.786	4.699	5.893	9.700	8.815
1987	0	1.093	1.517	2.160	2.766	3.908	5.461	6.341	8.509	9.811
1988	0	1.061	1.749	2.300	2.914	3.109	3.976	4.896	7.087	8.287
1989	0	1.010	1.597	2.200	2.934	3.468	3.750	4.682	6.140	9.156
1990	0	0.945	1.300	1.959	2.531	3.273	4.652	4.758	6.704	8.689
1991	0	0.779	1.271	1.570	2.524	3.185	4.086	5.656	5.973	8.147
1992	0	0.989	1.364	1.779	2.312	3.477	4.545	6.275	7.619	9.725
1993	0	1.155	1.704	2.421	3.132	3.723	4.971	6.159	7.614	9.587
1994	0	1.194	1.843	2.613	3.654	4.584	4.976	7.146	8.564	8.796
1995	0	1.218	1.986	2.622	3.925	5.180	6.079	6.241	7.782	8.627
1996	0	1.016	1.737	2.745	3.800	4.455	4.978	5.270	5.593	7.482
1997	0	0.901	1.341	1.958	3.012	4.158	4.491	5.312	6.172	7.056
1998	0	1.004	1.417	1.802	2.280	3.478	5.433	5.851	7.970	8.802
1999	0	1.050	1.586	2.350	2.774	3.214	5.496	8.276	9.129	10.652
2000	0	1.416	2.170	3.187	3.795	4.048	4.577	8.182	11.895	13.009
2001	0	1.164	2.076	3.053	3.976	4.394	4.871	5.563	7.277	12.394
2002	0	1.017	1.768	2.805	3.529	4.095	4.475	4.650	6.244	7.457
2003	0	0.820	1.362	2.127	3.329	4.092	4.670	6.000	6.727	6.810
2004	0	1.037	1.154	1.693	2.363	3.830	5.191	6.326	7.656	9.573
2005	0	0.986	1.373	1.760	2.293	3.138	5.287	8.285	8.703	9.517
2006	0	0.839	1.304	1.988	2.386	3.330	4.691	7.635	9.524	11.990
2007	0	0.937	1.324	1.970	3.076	3.529	4.710	6.464	9.461	9.509
2008	0	1.209	1.478	2.104	2.714	3.804	4.669	5.915	7.233	9.559
2009	0	0.805	1.431	2.287	2.723	3.435	5.081	6.281	8.312	9.959
2010	0	1.049	1.642	2.400	3.212	3.678	4.774	5.973	7.094	9.800
2011	0	0.815	1.367	2.413	3.493	4.525	5.076	6.631	6.863	10.089

Table 4.2.8. Faroe Plateau cod (sub-division Vb1). Proportion mature at age 1961-2011. From 1961-1982 the average from 1983-1996 is used (as it was used in the 1990s).

	age									
year	1	2	3	4	5	6	7	8	9	10
1961	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1962	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1963	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1964	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1965	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1966	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1967	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1968	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1969	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1970	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1971	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1972	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1973	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1974	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1975	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1976	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1977	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1978	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1979	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1980	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1981	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1982	0	0.170	0.640	0.870	0.950	1.000	1.000	1.000	1.000	1.000
1983	0	0.030	0.710	0.930	0.940	1.000	1.000	1.000	1.000	1.000
1984	0	0.070	0.960	0.980	0.970	1.000	1.000	1.000	1.000	1.000
1985	0	0.000	0.500	0.960	0.960	1.000	1.000	1.000	1.000	1.000
1986	0	0.000	0.380	0.930	1.000	1.000	0.960	0.940	1.000	1.000
1987	0	0.000	0.670	0.910	1.000	1.000	1.000	1.000	1.000	1.000
1988	0	0.060	0.720	0.900	0.970	1.000	1.000	1.000	1.000	1.000
1989	0	0.050	0.540	0.980	1.000	1.000	1.000	1.000	1.000	1.000
1990	0	0.000	0.680	0.900	0.990	0.960	0.980	1.000	1.000	1.000
1991	0	0.000	0.720	0.860	1.000	1.000	1.000	1.000	1.000	1.000
1992	0	0.060	0.500	0.820	0.980	1.000	1.000	1.000	1.000	1.000
1993	0	0.030	0.730	0.780	0.910	0.990	1.000	1.000	1.000	1.000
1994	0	0.050	0.330	0.880	0.960	1.000	0.960	1.000	1.000	1.000
1995	0	0.090	0.350	0.330	0.660	0.970	1.000	1.000	1.000	1.000
1996	0	0.040	0.430	0.740	0.850	0.940	1.000	1.000	1.000	1.000
1997	0	0.000	0.640	0.910	0.970	1.000	1.000	1.000	1.000	1.000
1998	0	0.000	0.620	0.900	0.990	0.990	1.000	1.000	1.000	1.000
1999	0	0.020	0.430	0.880	0.980	1.000	1.000	1.000	1.000	1.000
2000	0	0.020	0.390	0.690	0.920	0.990	1.000	1.000	1.000	1.000
2001	0	0.070	0.470	0.860	0.940	1.000	1.000	1.000	1.000	1.000
2002	0	0.040	0.370	0.760	0.970	0.930	0.970	1.000	1.000	1.000
2003	0	0.000	0.290	0.790	0.880	0.980	1.000	1.000	1.000	1.000
2004	0	0.000	0.510	0.780	0.920	0.890	0.870	1.000	1.000	1.000
2005	0	0.050	0.660	0.900	0.930	0.980	0.920	1.000	1.000	1.000
2006	0	0.040	0.590	0.800	0.990	0.990	1.000	1.000	1.000	1.000
2007	0	0.000	0.470	0.780	0.910	0.990	0.970	1.000	1.000	1.000
2008	0	0.100	0.780	0.910	0.900	0.950	1.000	1.000	1.000	1.000
2009	0	0.090	0.610	0.810	0.960	0.940	0.960	1.000	1.000	1.000
2010	0	0.080	0.610	0.770	0.940	0.970	1.000	1.000	1.000	1.000
2011	0	0.060	0.510	0.690	0.840	0.930	0.980	1.000	1.000	1.000

Table 4.2.9. Faroe Plateau cod (sub-division Vb1). Summer survey tuning series (number of individuals per 200 stations) and spring survey tuning series (number of individuals per 100 stations).

```
FAROE PLATEAU COD (ICES SUBDIVISION VB1)        Surveys.TXT
102
SUMMER SURVEY
1996 2011
1 1 0.6 0.7
2 8
 200  707     6576.5   3705.1   1298.1   701.5  233.1   48.5
 200  512.7   1500.7   6754.6   1466.6   178.4  137.8   30.1
 200  524.9    505.1    979.4   3675.2   902.6   50     37
 200  373.3   1256.8    753.1    675.3  1422.5  238     40.4
 200 1364.1   1153.3    673.8    309.6   436.9  600.8   35.4
 200 3422.1   2458.7   1537.8    415.9   234.8  283    242
 200 2326     5562.9   1816.5    810.8   147.7   83.3   69.5
 200  354     1038.8   2209.2    565.9   123.4   17.6   11.9
 200  437      839.9   1080.2   1550.2   344.2   80.2   25.7
 200  616.5    735.1    872.1   1166.3   756    142.5   44.8
 200  978.4    684.2    349.3    312     256.6  123     28.2
 200  234.1    448.7    314.2    179.7   134.5   75.9   30.9
 200   68.8    370.1    328      401.2   160.1   52.4   27.5
 200  428.2   1980.6    817.7    551.4   393.1  132.1   47.8
 200 1239.3   1543.9   1012      363.4   243.6  148.9   41.5
 200  301.7   1373.6   1084.2    380.1   160.6  104.6   37.4
SPRING SURVEY (shifted back to December)
1993 2011
1 1 0.9 1.0
1 8
 100   567.8    335.1     906.5     504.7     128.9     186.1    28.5     0.1
 100   706      785.9    1453.4    1480.1    1179       284     349      48.6
 100   393.6   3975      3606.1    1768.2    1314.2     403.6    79.6   161.3
 100    90.7    935.7    5474      2309.5     328.8     223.9    57.8     5.2
 100    76.2    424.4    1548.5    4857.6    1126.2      81.7    40.5    34.8
 100   530.1    644.9     972.5    1204.4    2047.4     250      25.1    13.3
 100   288.8   1402.2     735.7     436.6     502.1     829.6    63.4     3.1
 100   874.1   2282.9    1953.5     448.8     320.4     572.5   128       3.9
 100   345.9   4193.7    2789.9    1544.1     323.2     225.7   174.1   128.1
 100   79.1     720.2    4343.4    1350.6     548.9      63.3    48.2    36.9
 100   426.8    450.2     786.3    1198.8     297.7      65.8    21.9    11.8
 100   293.4    400.4    1100.5    1409.9     837.9     139.7    14       3.8
 100   129.7    144.5     166.1     340.7     281.1      92.1    15.2     3.9
 100    40.5    255.7     270.6     148.3     164.1     102.9    37.5    14.3
 100   147.2    411.3     764.3     445.6     144.4      80.9    38.5    13.3
 100   266.8    464       968.1    1151.1     425.1      73.4    31.4    24.8
 100   734.6   1285       737       534.9     378.8      98.4    40.8    17.1
 100   152.2   1305.1    1229.7     559.7     299.3     237.3    85      21.9
 100     1.6    236      1184.3     314.9      72.4      26.2    23.2     5.7
```

Table 4.2.10. Faroe Plateau cod (sub-division Vb1). Pairtrawler abundance index (number of individuals per 1000 fishing hours). This series was not used in the tuning of the XSA. The season is June – December. The otoliths are selected from deep (> 150 m) locations.

	age							
year	2	3	4	5	6	7	8	9
1989	1200	1638	1783	1381	928	719	297	194
1990	116	2856	2057	834	465	419	200	0
1991	8	148	1401	869	329	225	65	93
1992	84	487	696	1234	760	353	129	62
1993	51	1081	2192	746	1062	398	67	107
1994	1314	2129	1457	2208	697	1241	461	53
1995	577	3645	5178	4199	2769	543	539	106
1996	242	10608	16683	7985	4410	194	0	723
1997	28	674	6038	9375	2413	944	113	0
1998	80	731	1805	5941	4904	801	286	0
1999	444	2082	1933	3008	5136	2220	218	4
2000	3478	3956	1737	956	1003	1694	382	0
2001	3385	6700	3009	555	415	797	862	25
2002	571	6409	5019	1235	432	400	41	228
2003	63	1341	4450	3630	870	270	152	145
2004	23	0	278	2534	2831	1733	274	184
2005	42	399	655	1766	2171	860	148	70
2006	93	135	699	755	1580	612	787	71
2007	64	916	1767	1392	802	656	206	46
2008	54	295	418	573	387	456	487	182
2009	11	734	801	756	448	247	147	105
2010	1578	2917	1787	543	603	190	0	81
2011	24	1636	4485	2164	684	485	105	27

Table 4.2.11. Faroe Plateau cod (sub-division Vb1). Longliner abundance index (number of individuals per 100000 hooks). This series was not used in the tuning of the XSA. The age composition was obtained from all longliners > 100 GRT. The area was restricted to the area west of Faroe Islands at depths between 100 and 200 m.

	age							
year	1	2	3	4	5	6	7	8
1993	405	2610	9306	3330	806	2754	847	258
1994	101	8105	14105	7863	4659	962	1187	71
1995	0	15249	23062	2895	2505	1568	708	1073
1996	0	2269	18658	13265	4153	8435	4513	1147
1997	0	1738	5837	26368	18089	2805	2807	402
1998	1892	4490	2025	2565	11738	2732	131	19
1999	849	10968	3811	985	1891	3759	548	109
2000	2695	10983	6710	998	780	1473	2136	109
2001	287	12999	7409	2660	515	1135	1808	2545
2002	105	6862	20902	10819	7759	1561	1945	1265
2003	16	2099	6057	15910	7778	1830	708	650
2004	59	510	1773	2438	3214	1059	293	71
2005	297	2169	1543	2313	2327	1360	170	13
2006	151	5813	5319	674	2205	2352	1148	56
2007	274	3578	6383	2778	1927	1159	1118	134
2008	1270	2243	4449	4773	2564	1133	816	716
2009	294	2670	15107	6308	3028	2491	683	132
2010	23	20287	16914	8733	2595	4780	1878	864
2011	160	2817	28218	14391	4295	2207	1252	195

Table 4.2.12. Longliner abundance index (number of individuals per day) for longliners < 25 GRT operating mainly nearshore. This series was not used in the tuning of the XSA. The age composition was obtained from all longliners.

	age							
year	1	2	3	4	5	6	7	8
1983	0.9	7.5	4.7	3.8	1.6	0.9	0.5	0.2
1984	0	33.3	32.1	13.2	5.8	6.3	1	0.7
1985	0	3.4	45.8	32.1	23.2	12.9	17.9	5.3
1986	0	5.4	40.4	23.3	14.9	6.6	6	2.1
1987	0	6.2	10.3	15.2	25.2	11.3	4.8	0.8
1988	0	2.5	5.1	10.5	6.9	15.4	5.2	2.1
1989	0	30.9	15.1	14.5	9.8	5.3	11.4	1.6
1990	0	6.4	32.6	7	9.9	5.2	6.3	3.4
1991	0	0	4.5	23.4	7.6	3.4	2.1	0.6
1992	0	5.8	15.9	6.4	3.6	3.4	1.7	1.3
1993	0.4	4.8	20	7.5	1.5	1.4	0.3	1.3
1994	0	13.1	16.2	13.6	5.8	1.8	2.3	0.4
1995	0	44.7	39.9	10.2	7	4.3	1.6	2.6
1996	0	5.8	75	51.2	12.9	28.3	14.1	4.1
1997	0	4.4	15.8	68.3	51.8	7.5	7.3	0.8
1998	4.8	10.1	4.7	6.8	27.6	8.2	0.3	0.3
1999	0.2	23.2	7.9	3.7	5.5	12.6	2	0
2000	5.4	22.5	13.1	0.7	0.7	1.3	2.3	0.3
2001	0.5	82.8	41.7	14.6	2.5	4.9	10.8	11.1
2002	0.1	38.5	78.7	35.2	24.3	5.9	9.3	5.5
2003	0	14.8	31.6	89.8	49.9	10.9	3.4	1.3
2004	0	5.2	16.1	15.7	23.2	6.1	0.2	0
2005	0.4	8.9	12.5	11.2	19.9	9.4	0.9	0
2006	1.4	40.7	32.6	6.3	7.3	9.5	2.8	0.3
2007	0.1	8.8	18.2	7	3.3	3.8	2.8	0.5
2008	0.3	3	14.2	18.4	12.5	2.9	1.3	1.8
2009	1.1	11.4	52.7	19.6	11.6	8	3.3	2
2010	1.4	72.9	79	33.5	14.7	15.3	4.6	1
2011	0	17.9	142.3	59.1	22.9	14.1	7.7	1.8

Table 4.6.1. Faroe Plateau cod (sub-division Vb1). The XSA-run.

Lowestoft VPA Version 3.1

16/04/2012 15:46

Extended Survivors Analysis

COD FAROE PLATEAU (ICES SUBDIVISION Vb1) COD_ind_Surveys_revised

CPUE data from file Surveys_revised.TXT

Catch data for 51 years. 1961 to 2011. Ages 1 to 10.

Fleet	First year	Last year	First age	Last age	Alpha	Beta
SUMMER SURVEY	1996	2011	2	8	.600	.700
SPRING SURVEY (shift	1993	2011	1	8	.900	1.000

Time series weights :

Tapered time weighting not applied

Catchability analysis :

Catchability independent of stock size for all ages

Catchability independent of age for ages >= 6

Terminal population estimation :
Survivor estimates shrunk towards the mean F
of the final 5 years or the 5 oldest ages.

S.E. of the mean to which the estimates are shrunk = 2.000

Minimum standard error for population
estimates derived from each fleet = .300

Prior weighting not applied

Tuning converged after 29 iterations

Regression weights
1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000

Fishing mortalities

Age	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
2	.190	.128	.031	.094	.186	.122	.047	.104	.164	.088
3	.490	.304	.186	.256	.334	.323	.258	.599	.372	.283
4	.599	.664	.298	.380	.357	.385	.334	.510	.479	.417
5	.818	.850	.754	.472	.607	.436	.395	.471	.581	.393
6	.827	.897	.980	.772	.818	.588	.476	.512	.848	.502
7	1.365	.895	1.094	.829	.949	.684	.708	.402	.671	.569
8	1.232	.936	1.046	.535	.983	.685	1.201	.567	.532	.408
9	1.240	1.749	2.069	1.077	.264	.754	1.452	1.457	.819	.351

XSA population numbers (Thousands)

	AGE								
YEAR	1	2	3	4	5	6	7	8	9
2002	7.64E+03	1.33E+04	2.08E+04	8.27E+03	3.31E+03	9.24E+02	7.91E+02	6.44E+02	4.51E+02
2003	4.46E+03	6.25E+03	8.98E+03	1.04E+04	3.72E+03	1.19E+03	3.31E+02	1.65E+02	1.54E+02
2004	7.45E+03	3.65E+03	4.51E+03	5.42E+03	4.39E+03	1.30E+03	3.99E+02	1.11E+02	5.31E+01
2005	9.41E+03	6.10E+03	2.90E+03	3.06E+03	3.30E+03	1.69E+03	4.00E+02	1.09E+02	3.18E+01
2006	6.36E+03	7.71E+03	4.55E+03	1.84E+03	1.72E+03	1.69E+03	6.40E+02	1.43E+02	5.24E+01
2007	8.69E+03	5.21E+03	5.24E+03	2.67E+03	1.05E+03	7.66E+02	6.09E+02	2.03E+02	4.38E+01
2008	1.20E+04	7.12E+03	3.77E+03	3.11E+03	1.49E+03	5.58E+02	3.48E+02	2.51E+02	8.37E+01
2009	1.89E+04	9.80E+03	5.56E+03	2.39E+03	1.82E+03	8.20E+02	2.84E+02	1.40E+02	6.20E+01
2010	5.37E+03	1.55E+04	7.23E+03	2.50E+03	1.17E+03	9.30E+02	4.02E+02	1.55E+02	6.52E+01
2011	8.12E+01	4.40E+03	1.07E+04	4.08E+03	1.27E+03	5.38E+02	3.26E+02	1.68E+02	7.47E+01

Estimated population abundance at 1st Jan 2012

0.00E+00 6.65E+01 3.30E+03 6.63E+03 2.20E+03 7.02E+02 2.67E+02 1.51E+02 9.17E+01

Taper weighted geometric mean of the VPA populations:

1.43E+04 1.30E+04 9.83E+03 6.02E+03 3.26E+03 1.60E+03 7.29E+02 2.94E+02 1.19E+02

Standard error of the weighted Log(VPA populations) :

.9600 .6134 .5891 .5942 .5908 .5989 .6302 .6984 .8148

Log catchability residuals.

Fleet : SUMMER SURVEY

Age	1993	1994	1995	1996	1997	1998	1999	2000	2001
1	No data for this fleet at this age								
2	99.99	99.99	99.99	-.23	.14	.28	-.94	.06	.59
3	99.99	99.99	99.99	.14	-.21	-.59	.53	-.41	.08
4	99.99	99.99	99.99	.20	.33	-.58	-.11	.08	.11
5	99.99	99.99	99.99	.70	-.02	.29	-.64	-.73	-.06
6	99.99	99.99	99.99	.19	-.16	.64	.15	-.60	-.54
7	99.99	99.99	99.99	.32	-.01	-.37	.57	.07	-.27
8	99.99	99.99	99.99	-.12	-.24	.11	.39	-.22	-.04

Age	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1	No data for this fleet at this age									
2	1.03	-.14	.55	.42	.71	-.37	-1.96	-.41	.23	.03
3	.61	-.35	.05	.40	-.07	-.64	-.55	.97	.31	-.26
4	.11	.12	-.18	.23	-.19	-.65	-.79	.50	.64	.18
5	.17	-.29	.49	.31	-.27	-.44	-.01	.16	.25	.09
6	-.29	-.69	.31	.70	-.35	-.36	.06	.60	.21	.12
7	-.36	-1.35	.11	.51	-.03	-.64	-.43	.50	.44	.23
8	-.43	-1.02	.22	.46	.02	-.43	-.43	.29	.03	-.24

Mean log catchability and standard error of ages with catchability independent of year class strength and constant w.r.t. time

Age	2	3	4	5	6	7	8
Mean Log q	-7.8191	-6.7775	-6.4063	-6.2118	-6.1701	-6.1701	-6.1701
S.E(Log q)	.7140	.4714	.4011	.3955	.4431	.5137	.3905

Regression statistics :

Ages with q independent of year class strength and constant w.r.t. time.

Age	Slope	t-value	Intercept	RSquare	No Pts	Reg s.e	Mean Q
2	.91	.293	7.93	.45	16	.67	-7.82
3	.94	.306	6.90	.69	16	.46	-6.78
4	.92	.566	6.57	.79	16	.38	-6.41
5	.90	.775	6.39	.80	16	.36	-6.21
6	.95	.269	6.22	.69	16	.44	-6.17
7	.95	.227	6.22	.61	16	.50	-6.21
8	1.27	-1.383	6.53	.65	16	.46	-6.27

Fleet : SPRING SURVEY (shift

Age	1993	1994	1995	1996	1997	1998	1999	2000	2001
1	-.07	-.37	.24	-.54	-.63	.43	-.50	.20	.08
2	-.81	-.86	.28	-.01	-.10	.45	.35	.55	.78
3	-.55	.04	.10	.06	-.08	.17	.14	.27	.36
4	-.48	.05	.61	.02	.27	-.14	-.42	-.06	.41
5	-.52	.81	.40	-.08	.31	.24	-.50	-.28	.12
6	-.63	.88	.49	-.10	-.06	.24	.39	.35	.11
7	-.35	.36	.14	-.16	-.24	-.25	.15	-.74	.03
8	-4.64	.71	.01	-1.50	.89	.01	-1.38	-1.61	.09

Age	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1	-.64	1.58	.69	-.36	-1.13	-.15	.12	.68	.36	.00
2	-.15	.08	.41	-1.07	-.64	.16	-.10	.65	.27	-.26
3	.56	-.48	.43	-.95	-.84	.05	.55	.21	.24	-.27
4	.15	-.14	.33	-.45	-.79	-.03	.72	.38	.35	-.78
5	.37	-.33	.44	-.63	-.39	-.19	.51	.26	.57	-1.11
6	-.32	-.47	.28	-.60	-.44	-.11	.00	-.06	1.02	-.97
7	.08	-.29	-.73	-.91	-.36	-.53	-.16	.02	.66	-.53
8	-.11	-.17	-.80	-1.25	.21	-.50	.40	.01	.12	-1.42

Mean log catchability and standard error of ages with catchability independent of year class strength and constant w.r.t. time

Age	1	2	3	4	5	6	7	8
Mean Log q	-8.3417	-7.0018	-6.0786	-5.8056	-5.8001	-5.9929	-5.9929	-5.9929
S.E(Log q)	.6141	.5300	.4353	.4341	.4998	.5111	.4460	1.3799

Regression statistics :

Ages with q independent of year class strength and constant w.r.t. time.

Age	Slope	t-value	Intercept	RSquare	No Pts	Reg s.e	Mean Q
1	1.02	-.187	8.32	.82	19	.64	-8.34
2	.87	.787	7.29	.69	19	.47	-7.00
3	.85	1.087	6.51	.76	19	.37	-6.08
4	.87	1.002	6.17	.77	19	.38	-5.81
5	.85	.997	6.11	.73	19	.43	-5.80
6	.91	.496	6.10	.63	19	.47	-5.99
7	.94	.378	6.20	.73	19	.38	-6.19
8	.58	1.808	6.06	.52	19	.68	-6.57

```
 Terminal year survivor and F summaries :

 Age  1   Catchability constant w.r.t. time and dependent on age
Year class = 2010

 Fleet                 Estimated    Int       Ext    Var    N Scaled  Estimated
                       Survivors    s.e       s.e  Ratio     Weights    F
 SUMMER SURVEY                1.   .000       .000    .00   0  .000     .000
 SPRING SURVEY (shift        66.   .630       .000    .00   1 1.000     .000

   F shrinkage mean           0.   2.00                        .000     .000

 Weighted prediction :

 Survivors        Int      Ext    N    Var     F
 at end of year   s.e      s.e        Ratio
        66.       .63      .00    1    .000   .000

Age  2   Catchability constant w.r.t. time and dependent on age
Year class = 2009

 Fleet                 Estimated    Int       Ext    Var    N Scaled  Estimated
                       Survivors    s.e       s.e  Ratio     Weights    F
 SUMMER SURVEY             3393.   .736       .000    .00   1  .230     .086
 SPRING SURVEY (shift      3327.   .412       .306    .74   2  .736     .087

   F shrinkage mean        2281.   2.00                        .034     .125

 Weighted prediction :

 Survivors        Int      Ext    N    Var     F
 at end of year   s.e      s.e        Ratio
      3299.       .35      .16    4    .443   .088

Age  3   Catchability constant w.r.t. time and dependent on age
Year class = 2008

 Fleet                 Estimated    Int       Ext    Var    N Scaled  Estimated
                       Survivors    s.e       s.e  Ratio     Weights    F
 SUMMER SURVEY             5823.   .407       .221    .54   2  .359     .316
 SPRING SURVEY (shift      7223.   .304       .273    .90   3  .620     .262

   F shrinkage mean        4692.   2.00                        .021     .380

 Weighted prediction :

 Survivors        Int      Ext    N    Var     F
 at end of year   s.e      s.e        Ratio
      6627.       .24      .16    6    .650   .283

Age  4   Catchability constant w.r.t. time and dependent on age
Year class = 2007

 Fleet                 Estimated    Int       Ext    Var    N Scaled  Estimated
                       Survivors    s.e       s.e  Ratio     Weights    F
 SUMMER SURVEY             2560.   .295       .149    .50   3  .442     .368
 SPRING SURVEY (shift      1947.   .256       .330   1.29   4  .542     .461

   F shrinkage mean        2212.   2.00                        .017     .416

 Weighted prediction :

 Survivors        Int      Ext    N    Var     F
 at end of year   s.e      s.e        Ratio
      2202.       .19      .18    8    .906   .417

Age  5   Catchability constant w.r.t. time and dependent on age
Year class = 2006

 Fleet                 Estimated    Int       Ext    Var    N Scaled  Estimated
                       Survivors    s.e       s.e  Ratio     Weights    F
 SUMMER SURVEY              916.   .256       .353   1.38   4  .517     .314
 SPRING SURVEY (shift       528.   .250       .319   1.28   5  .467     .494

   F shrinkage mean         518.   2.00                        .016     .502

 Weighted prediction :

 Survivors        Int      Ext    N    Var     F
 at end of year   s.e      s.e        Ratio
       702.       .18      .23   10   1.259   .393

Age  6   Catchability constant w.r.t. time and dependent on age
Year class = 2005

 Fleet                 Estimated    Int       Ext    Var    N Scaled  Estimated
                       Survivors    s.e       s.e  Ratio     Weights    F
```

```
 SUMMER SURVEY              307.   .239       .141    .59   5  .525     .449
 SPRING SURVEY (shift       230.   .243       .323   1.33   6  .456     .562

   F shrinkage mean         188.   2.00                        .019     .654

 Weighted prediction :

 Survivors        Int      Ext    N    Var     F
 at end of year   s.e      s.e         Ratio
       267.       .17      .17   12    .966   .502

Age  7   Catchability constant w.r.t. time and age (fixed at the value for age)  6
Year class = 2004

 Fleet                 Estimated    Int       Ext    Var    N Scaled  Estimated
                       Survivors    s.e       s.e  Ratio     Weights    F
 SUMMER SURVEY              158.   .249       .172    .69   6  .474     .549
 SPRING SURVEY (shift       147.   .254       .252    .99   7  .503     .582

   F shrinkage mean         117.   2.00                        .023     .690

 Weighted prediction :

 Survivors        Int      Ext    N    Var     F
 at end of year   s.e      s.e         Ratio
       151.       .18      .14   14    .792   .569

Age  8   Catchability constant w.r.t. time and age (fixed at the value for age)  6
Year class = 2003

 Fleet                 Estimated    Int       Ext    Var    N Scaled  Estimated
                       Survivors    s.e       s.e  Ratio     Weights    F
 SUMMER SURVEY               90.   .233       .149    .64   7  .635     .415
 SPRING SURVEY (shift       101.   .237       .257   1.08   8  .345     .377

   F shrinkage mean          38.   2.00                        .020     .802

 Weighted prediction :

 Survivors        Int      Ext    N    Var     F
 at end of year   s.e      s.e         Ratio
        92.       .17      .13   16    .762   .408

Age  9   Catchability constant w.r.t. time and age (fixed at the value for age)  6
Year class = 2002

 Fleet                 Estimated    Int       Ext    Var    N Scaled  Estimated
                       Survivors    s.e       s.e  Ratio     Weights    F
 SUMMER SURVEY               46.   .216       .113    .52   7  .602     .331
 SPRING SURVEY (shift        40.   .227       .190    .83   8  .372     .377

   F shrinkage mean          31.   2.00                        .026     .461

 Weighted prediction :

 Survivors        Int      Ext    N    Var     F
 at end of year   s.e      s.e         Ratio
        43.          .16                 .10        16           .607        .351
```

Table 4.6.2. Faroe Plateau cod (sub-division Vb1). Fishing mortality at age.

	Age								
Year	2	3	4	5	6	7	8	9	10+	FBAR 3-7
1961	0.3346	0.5141	0.4986	0.5737	0.4863	0.9566	0.8116	0.6715	0.6715	0.6059
1962	0.2701	0.4982	0.4838	0.7076	0.5569	0.3662	0.6826	0.5641	0.5641	0.5226
1963	0.2534	0.4138	0.5172	0.5124	0.5405	0.4879	0.3269	0.4806	0.4806	0.4944
1964	0.1086	0.2997	0.4523	0.5229	0.5659	0.6677	0.3531	0.5164	0.5164	0.5017
1965	0.1209	0.2518	0.4498	0.5622	0.6604	0.5305	0.4345	0.5318	0.5318	0.4909
1966	0.0829	0.1969	0.2552	0.4499	0.5016	0.9680	0.8520	0.6106	0.6106	0.4743
1967	0.0789	0.2389	0.2687	0.3442	0.5779	0.5203	1.0438	0.5556	0.5556	0.3900
1968	0.1010	0.2318	0.3949	0.5339	0.4472	0.7132	0.3331	0.4882	0.4882	0.4642
1969	0.1099	0.3063	0.3806	0.4180	0.5709	0.5118	0.8457	0.5499	0.5499	0.4375
1970	0.0530	0.2081	0.3654	0.3409	0.3709	0.6559	0.4208	0.4339	0.4339	0.3882
1971	0.0309	0.1337	0.2225	0.3845	0.5572	0.4651	0.7528	0.4800	0.4800	0.3526
1972	0.0464	0.1476	0.2070	0.2497	0.6058	0.4686	0.2464	0.3578	0.3578	0.3358
1973	0.0657	0.2322	0.3048	0.2813	0.2526	0.3722	0.3259	0.3091	0.3091	0.2886
1974	0.0816	0.1568	0.2046	0.2953	0.3797	0.5330	0.3052	0.3457	0.3457	0.3139
1975	0.0774	0.3193	0.4359	0.4134	0.4544	0.3504	0.4485	0.4235	0.4235	0.3947
1976	0.0933	0.1723	0.3665	0.5568	0.5167	0.7619	0.6429	0.5738	0.5738	0.4749
1977	0.0481	0.3036	0.4748	0.7532	0.7333	1.1138	0.7776	0.7783	0.7783	0.6757
1978	0.0588	0.1896	0.4291	0.4289	0.4851	0.5968	0.5674	0.5054	0.5054	0.4259
1979	0.0433	0.2623	0.4309	0.5049	0.4906	0.4480	0.6903	0.5170	0.5170	0.4273
1980	0.0544	0.2391	0.3695	0.4337	0.5182	0.4119	0.6437	0.4790	0.4790	0.3945
1981	0.0523	0.2877	0.3409	0.4369	0.5644	0.6940	0.5015	0.5115	0.5115	0.4648
1982	0.0586	0.2227	0.3602	0.3887	0.4047	0.6926	0.5526	0.4834	0.4834	0.4138
1983	0.0992	0.4673	0.5585	0.6411	0.7836	1.0780	0.9417	0.8088	0.8088	0.7057
1984	0.1073	0.3712	0.5791	0.6610	0.4534	0.4761	0.4792	0.5341	0.5341	0.5082
1985	0.0658	0.3545	0.5077	0.6136	0.9237	1.1084	1.3206	0.9045	0.9045	0.7016
1986	0.0247	0.3547	0.6229	0.7035	0.8260	0.8404	0.5411	0.7135	0.7135	0.6695
1987	0.0291	0.2211	0.4758	0.4855	0.5563	0.4900	0.6228	0.5303	0.5303	0.4457
1988	0.0669	0.3539	0.5649	0.5500	0.7749	0.8002	0.8658	0.7180	0.7180	0.6088
1989	0.1654	0.4420	0.7646	0.7645	0.9653	1.0625	1.1072	0.9431	0.9431	0.7998
1990	0.0764	0.3281	0.6299	0.7904	0.7039	0.8416	1.1240	0.8264	0.8264	0.6588
1991	0.0323	0.1984	0.4436	0.5981	0.7404	0.5772	0.7134	0.6200	0.6200	0.5115
1992	0.0201	0.1000	0.3242	0.3406	0.6368	0.8761	0.4402	0.5278	0.5278	0.4556
1993	0.0132	0.1019	0.1866	0.2521	0.1973	0.4405	0.5586	0.3290	0.3290	0.2357
1994	0.0255	0.1127	0.1905	0.2499	0.2196	0.1537	0.3211	1.0131	1.0131	0.1853
1995	0.0702	0.1618	0.4641	0.2800	0.3610	0.3330	0.2254	0.7377	0.7377	0.3200
1996	0.0306	0.1930	0.4526	0.8073	0.9044	1.1415	0.9193	0.9474	0.9474	0.6998
1997	0.0348	0.1488	0.4123	0.8347	1.0392	1.3947	1.3569	1.0185	1.0185	0.7660
1998	0.0887	0.1759	0.2730	0.6489	1.0579	0.7766	1.1530	0.8679	0.8679	0.5865
1999	0.0957	0.2839	0.2903	0.3180	0.6596	1.0770	0.7596	0.4803	0.4803	0.5258
2000	0.1246	0.3186	0.3794	0.2476	0.3263	0.5358	0.8213	0.1801	0.1801	0.3616
2001	0.1573	0.3445	0.4544	0.3072	0.3505	0.6973	0.6304	0.7731	0.7731	0.4308
2002	0.1903	0.4902	0.5990	0.8183	0.8267	1.3647	1.2322	1.2448	1.2448	0.8198
2003	0.1276	0.3038	0.6637	0.8499	0.8978	0.8951	0.9360	1.7487	1.7487	0.7220
2004	0.0307	0.1857	0.2975	0.7544	0.9803	1.0967	1.0477	2.0686	2.0686	0.6629
2005	0.0938	0.2558	0.3803	0.4716	0.7719	0.8295	0.5381	1.0815	1.0815	0.5418
2006	0.1858	0.3339	0.3569	0.6068	0.8182	0.9497	0.9854	0.2660	0.2660	0.6131
2007	0.1218	0.3230	0.3850	0.4366	0.5883	0.6845	0.6856	0.7585	0.7585	0.4835
2008	0.0466	0.2580	0.3347	0.3955	0.4764	0.7095	1.2011	1.4558	1.4558	0.4348
2009	0.1039	0.5993	0.5106	0.4718	0.5122	0.4030	0.5687	1.4594	1.4594	0.4994
2010	0.1639	0.3724	0.4792	0.5821	0.8492	0.6727	0.5338	0.8240	0.8240	0.5911
2011	0.0879	0.2831	0.4177	0.3935	0.5038	0.5706	0.4091	0.3525	0.3525	0.4337

Table 4.6.3. Faroe Plateau cod (sub-division Vb1). Stock number at age.

	Age								
Year	2	3	4	5	6	7	8	9	10+	TOTAL
1961	12019	7385	3747	2699	666	668	155	66	0	52630
1962	20654	7042	3616	1863	1245	335	210	56	0	59804
1963	20290	12907	3503	1825	752	584	190	87	0	66807
1964	21834	12893	6986	1710	895	358	294	112	0	55183
1965	8269	16037	7823	3639	830	416	151	169	0	60009
1966	18566	5999	10207	4085	1698	351	200	80	0	69829
1967	23451	13990	4034	6475	2133	842	109	70	0	72579
1968	17582	17744	9020	2525	3757	980	410	31	0	63439
1969	9325	13012	11522	4976	1212	1967	393	240	0	53161
1970	8608	6840	7843	6447	2682	561	965	138	0	48654
1971	11928	6684	4548	4456	3754	1516	238	519	0	59683
1972	21320	9469	4788	2981	2483	1760	779	92	0	59029
1973	12573	16664	6689	3187	1901	1109	902	499	400	81153
1974	30480	9639	10816	4037	1969	1209	626	533	342	106456
1975	38319	23000	6747	7217	2460	1103	581	378	476	102968
1976	18575	29035	13683	3572	3908	1279	636	304	466	83665
1977	9995	13853	20010	7765	1676	1909	489	274	18	69116
1978	10748	7799	8372	10190	2993	659	513	184	154	59930
1979	14997	8298	5282	4463	5433	1509	297	238	103	69423
1980	23582	11759	5226	2811	2206	2723	789	122	52	66369
1981	14000	18286	7579	2957	1491	1076	1477	339	150	74381
1982	22127	10878	11228	4413	1564	694	440	732	348	83151
1983	25157	17085	7128	6412	2449	854	284	207	200	118105
1984	47754	18652	8766	3339	2765	916	238	91	174	103841
1985	17313	35120	10535	4022	1411	1439	466	121	146	82178
1986	9501	13271	20173	5192	1783	459	389	102	81	63036
1987	9895	7589	7621	8859	2103	639	162	185	69	47737
1988	8691	7869	4981	3877	4464	987	321	71	53	51127
1989	16222	6655	4522	2318	1831	1684	363	110	16	38181
1990	3651	11258	3502	1724	884	571	476	98	50	30354
1991	6665	2769	6639	1527	640	358	202	127	57	32912
1992	11403	5283	1859	3488	688	250	165	81	91	35659
1993	10113	9151	3914	1100	2032	298	85	87	98	57621
1994	25171	8171	6766	2659	700	1366	157	40	27	97101
1995	42610	20090	5977	4579	1695	460	959	93	102	92279
1996	12865	32520	13991	3077	2833	967	270	627	83	75117
1997	6455	10215	21952	7285	1124	939	253	88	203	55754
1998	5927	5104	7207	11902	2589	325	190	53	47	50879
1999	14356	4441	3505	4491	5093	736	123	49	20	56904
2000	19723	10682	2737	2146	2675	2157	205	47	7	76650
2001	29695	14256	6359	1534	1372	1581	1034	74	12	72115
2002	13262	20773	8270	3306	924	791	644	451	11	56071
2003	6254	8977	10417	3720	1194	331	165	154	26	35700
2004	3652	4507	5424	4392	1302	399	111	53	45	27339
2005	6102	2899	3065	3298	1691	400	109	32	49	27058
2006	7706	4549	1838	1716	1685	640	143	52	14	24703
2007	5207	5239	2668	1053	766	609	203	44	6	24487
2008	7117	3774	3106	1486	558	348	251	84	28	28724
2009	9801	5561	2388	1820	820	284	140	62	24	39774
2010	15453	7233	2502	1174	930	402	155	65	74	33363
2011	4400	10740	4081	1269	538	326	168	75	7	21686
2012	66	3299	6627	2202	702	267	151	92	47	13453

Table 4.6.4. Faroe Plateau cod (sub-division Vb1). Summary table (1961-2010) and results from the short term prediction (2011-2013) are shown in bold.

	RECRUITS Age 2	TOTALBIO	TOTSPBIO	LANDINGS	YIELD/SSB	FBAR 3- 7
1961	12019	65428	46439	21598	0.4651	0.6059
1962	20654	68225	43326	20967	0.4839	0.5226
1963	20290	77602	49054	22215	0.4529	0.4944
1964	21834	84666	55362	21078	0.3807	0.5017
1965	8269	75043	57057	24212	0.4244	0.4909
1966	18566	83919	60629	20418	0.3368	0.4743
1967	23451	105289	73934	23562	0.3187	0.3900
1968	17582	110433	82484	29930	0.3629	0.4642
1969	9325	105537	83487	32371	0.3877	0.4375
1970	8608	98398	82035	24183	0.2948	0.3882
1971	11928	78218	63308	23010	0.3635	0.3526
1972	21320	76439	57180	18727	0.3275	0.3358
1973	12573	110713	83547	22228	0.2661	0.2886
1974	30480	139266	98434	24581	0.2497	0.3139
1975	38319	153663	109565	36775	0.3356	0.3947
1976	18575	161260	123077	39799	0.3234	0.4749
1977	9995	136211	112057	34927	0.3117	0.6757
1978	10748	96227	78497	26585	0.3387	0.4259
1979	14997	85112	66722	23112	0.3464	0.4273
1980	23582	85037	58886	20513	0.3484	0.3945
1981	14000	88409	63560	22963	0.3613	0.4648
1982	22127	98960	67031	21489	0.3206	0.4138
1983	25157	123244	78539	38133	0.4855	0.7057
1984	47754	152131	96760	36979	0.3822	0.5082
1985	17313	131202	84766	39484	0.4658	0.7016
1986	9501	99221	73661	34595	0.4696	0.6695
1987	9895	78285	62189	21391	0.3440	0.4457
1988	8691	66054	52049	23182	0.4454	0.6088
1989	16222	58953	38300	22068	0.5762	0.7998
1990	3651	38219	29188	13487	0.4621	0.6588
1991	6665	28850	21213	8750	0.4125	0.5115
1992	11403	35914	20953	6396	0.3053	0.4555
1993	10113	51363	33353	6107	0.1831	0.2357
1994	25171	84218	42794	9046	0.2114	0.1853
1995	42610	144614	54578	23045	0.4222	0.3201
1996	12865	142643	85401	40422	0.4733	0.6999
1997	6455	96647	81372	34304	0.4216	0.7660
1998	5927	66026	55667	24005	0.4312	0.5864
1999	14356	64903	44879	18306	0.4079	0.5256
2000	19723	91004	46031	21033	0.4569	0.3615
2001	29695	109841	58926	28183	0.4783	0.4307
2002	13262	98292	55918	38457	0.6877	0.8197
2003	6254	60535	40488	24501	0.6051	0.7218
2004	3652	37148	27144	13178	0.4855	0.6623
2005	6102	32030	23616	9906	0.4195	0.5416
2006	7706	30520	21054	10480	0.4978	0.6129
2007	5207	27665	17549	8016	0.4568	0.4832
2008	7117	30860	20792	7465	0.3590	0.4343
2009	9801	32158	20412	10002	0.4900	0.4987
2010	15453	45320	24065	12757	0.5301	0.5900
2011	4400	38344	23813	9901	0.4158	0.4326
2012	**6844**	**36794**	**25829**	**11368**	**0.4401**	**0.5071**
2013	**9885**	**39100**	**24769**	**11507**	**0.4646**	**0.5071**
2014	**9885**	**40361**	**24973**			
Avg.61-11	15517	83927	57866	22526	0.4036	0.5040

Table 4.7.1. Faroe Plateau cod (sub-division Vb1). Input to management option table.

		Recr.	Source
2011	YC2009	4400	XSA-output
2012	YC2010	3651	Minimum observed
2013	YC2011	9885	Average R 2009-11
2014	YC2012	9885	Average R 2009-11

Age	Stock size 2012	Source
2	3651	Minimum
3	3299	XSA-output
4	6627	XSA-output
5	2202	XSA-output
6	702	XSA-output
7	267	XSA-output
8	151	XSA-output
9	92	XSA-output
10+	47	XSA-output

	Maturity			Exploitation pattern (not rescaled)			Weights		
	Observed	Av. 10-12	Av. 10-12	Av. 09-11	Av. 09-11	Av. 09-11		As 2012	Av.10-12
Age	2012	2013	2014	2012	2013	2014	2012	2013	2014
2	0.00	0.05	0.05	0.1185	0.1185	0.1185	1.011	1.011	0.958
3	0.63	0.58	0.58	0.4179	0.4179	0.4179	1.399	1.399	1.469
4	0.85	0.77	0.77	0.4685	0.4685	0.4685	1.762	1.762	2.192
5	0.94	0.91	0.91	0.4816	0.4816	0.4816	3.128	3.128	3.278
6	0.97	0.96	0.96	0.6203	0.6203	0.6203	4.412	4.412	4.205
7	1.00	0.99	0.99	0.5473	0.5473	0.5473	4.739	4.739	4.863
8	1.00	1.00	1.00	0.5022	0.5022	0.5022	8.19	8.19	6.931
9	1.00	1.00	1.00	0.8757	0.8757	0.8757	6.787	6.787	6.915
10+	0.83	0.94	0.94	0.8757	0.8757	0.8757	10.009	10.009	9.966

Table 4.7.2. Faroe Plateau cod (sub-division Vb1). Management option table.

2012 Biomass	SSB	FMult	FBar	Landings
33565	25829	1.0000	0.5071	11040

2013 Biomass	SSB	FMult	FBar	Landings	2014 Biomass	SSB
35861	22891	0.0000	0.0000	0	50490	34403
.	22891	0.1000	0.0507	1287	48907	32974
.	22891	0.2000	0.1014	2514	47401	31615
.	22891	0.3000	0.1521	3684	45965	30323
.	22891	0.4000	0.2028	4799	44597	29093
.	22891	0.5000	0.2536	5863	43293	27923
.	22891	0.6000	0.3043	6878	42050	26810
.	22891	0.7000	0.3550	7847	40865	25751
.	22891	0.8000	0.4057	8771	39734	24742
.	22891	0.9000	0.4564	9654	38655	23781
.	22891	1.0000	0.5071	10497	37626	22866
.	22891	1.1000	0.5578	11303	36643	21995
.	22891	1.2000	0.6085	12073	35705	21165
.	22891	1.3000	0.6592	12809	34808	20373
.	22891	1.4000	0.7100	13513	33952	19619
.	22891	1.5000	0.7607	14186	33134	18900
.	22891	1.6000	0.8114	14830	32352	18214
.	22891	1.7000	0.8621	15447	31605	17560
.	22891	1.8000	0.9128	16037	30890	16935
.	22891	1.9000	0.9635	16603	30206	16340
.	22891	2.0000	1.0142	17144	29552	15772

Input units are thousands and kg - output in tonnes

Table 4.7.3. Faroe Plateau cod (sub-division Vb1). Input to management option table. Procedures according to the Annex.

		Recr.	Source
2011	YC2009	4400	XSA-output
2012	YC2010	66	XSA-output
2013	YC2011	9885	Average R 2009-11
2014	YC2012	9885	Average R 2009-11

Age	Stock size 2012	Source
2	66	XSA-output
3	3299	XSA-output
4	6627	XSA-output
5	2202	XSA-output
6	702	XSA-output
7	267	XSA-output
8	151	XSA-output
9	92	XSA-output
10+	47	XSA-output

	Maturity			Exploitation pattern (not rescaled)			Weights		
	Observed	Av. 10-12	Av. 10-12	Av. 09-11	Av. 09-11	Av. 09-11		As 2012	Av.10-12
Age	2012	2013	2014	2012	2013	2014	2012	2013	2014
2	0.00	0.05	0.05	0.1185	0.1185	0.1185	1.011	1.011	0.958
3	0.63	0.58	0.58	0.4179	0.4179	0.4179	1.399	1.399	1.469
4	0.85	0.77	0.77	0.4685	0.4685	0.4685	1.762	1.762	2.192
5	0.94	0.91	0.91	0.4816	0.4816	0.4816	3.128	3.128	3.278
6	0.97	0.96	0.96	0.6203	0.6203	0.6203	4.412	4.412	4.205
7	1.00	0.99	0.99	0.5473	0.5473	0.5473	4.739	4.739	4.863
8	1.00	1.00	1.00	0.5022	0.5022	0.5022	8.19	8.19	6.931
9	1.00	1.00	1.00	0.8757	0.8757	0.8757	6.787	6.787	6.915
10+	0.83	0.94	0.94	0.8757	0.8757	0.8757	10.009	10.009	9.966

Table 4.7.4. Faroe Plateau cod (sub-division Vb1). Management option table. Procedures according to the Annex.

2012 Biomass	SSB	FMult	FBar	Landings
29941	25829	1.0000	0.5453	10672

2013 Biomass	SSB	FMult	FBar	Landings	2014 Biomass	SSB
32214	20776	0.0000	0.0000	0	45811	30801
.	20776	0.1000	0.0545	1152	44421	29519
.	20776	0.2000	0.1091	2249	43098	28302
.	20776	0.3000	0.1636	3294	41838	27145
.	20776	0.4000	0.2181	4289	40639	26045
.	20776	0.5000	0.2727	5238	39497	25000
.	20776	0.6000	0.3272	6142	38410	24007
.	20776	0.7000	0.3817	7004	37373	23062
.	20776	0.8000	0.4362	7827	36385	22163
.	20776	0.9000	0.4908	8611	35444	21308
.	20776	1.0000	0.5453	9360	34546	20495
.	20776	1.1000	0.5998	10076	33689	19720
.	20776	1.2000	0.6544	10758	32872	18983
.	20776	1.3000	0.7089	11411	32091	18281
.	20776	1.4000	0.7634	12035	31347	17612
.	20776	1.5000	0.8180	12631	30635	16975
.	20776	1.6000	0.8725	13201	29956	16368
.	20776	1.7000	0.9270	13746	29306	15789
.	20776	1.8000	0.9815	14268	28686	15238
.	20776	1.9000	1.0361	14767	28092	14712
.	20776	2.0000	1.0906	15246	27524	14210

Input units are thousands and kg - output in tonnes

Table 4.8.1. Faroe Plateau cod (sub-division Vb1). Input to yield per recruit calculations (long term prediction).

	Expl. pattern	Weight at age	Prop mature
Age	Average 2000-2011 Not rescaled	Average 1978-2011	Average 1983-2012
2	0.1195	1.0395	0.07
3	0.3389	1.5647	0.56
4	0.438	2.2704	0.83
5	0.5276	3.0638	0.94
6	0.6579	3.8379	0.98
7	0.7832	4.8622	0.99
8	0.798	6.0937	1.00
9	1.0153	7.6254	1.00
10+	1.0153	9.5570	0.99

Table 4.8.2. Faroe Plateau cod (sub-division Vb1). Output from yield per recruit calculations (long term prediction).

Reference point	F multiplier	Absolute F
F_{bar}(3-7)	1.0000	0.5491
F_{Max}	0.4494	0.2467
$F_{0.1}$	0.2061	0.1131
$F_{35\%SPR}$	0.3145	0.1727
F_{low}	0.1844	0.1013
F_{med}	0.7411	0.4070
F_{high}	1.7736	0.9739

Weights in kilograms

Table 4.10.1. Faroe Plateau cod (sub-division Vb1). Population variables in 2010 and 2011, as observed in the current assessment, compared with what was estimated for 2010 and predicted for 2011 in last years assessment.

Variable	Assm. 2011	Assm. 2012	Change%
Year	2010	2010	
Recruitment	19456	15453	-21
Total stock biomass	58732	45320	-23
Spawning stock biomass	31404	24065	-23
Fishing mortality	0.41	0.59	42

Modelled

Variable	Assm. 2011	Assm. 2012	Change%
Year	2011	2011	
Recruitment	21654	4400	-80
Total stock biomass	78779	38344	-51
Spawning stock biomass	39754	23813	-40
Fishing mortality	0.4114	0.4326	5

Annex

Variable	Assm. 2011	Assm. 2012	Change%
Year	2011	2011	
Recruitment	10200	4400	-57
Total stock biomass	51618	38344	-26
Spawning stock biomass	29801	23813	-20
Fishing mortality	0.4114	0.4326	5

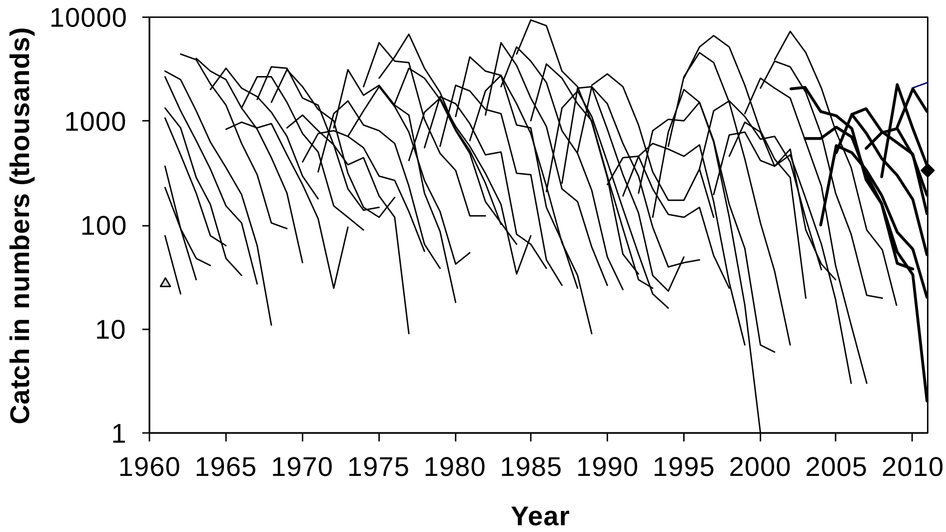


Figure 4.2.1. Faroe Plateau cod (sub-division Vb1). Catch in numbers at age shown as catch curves.

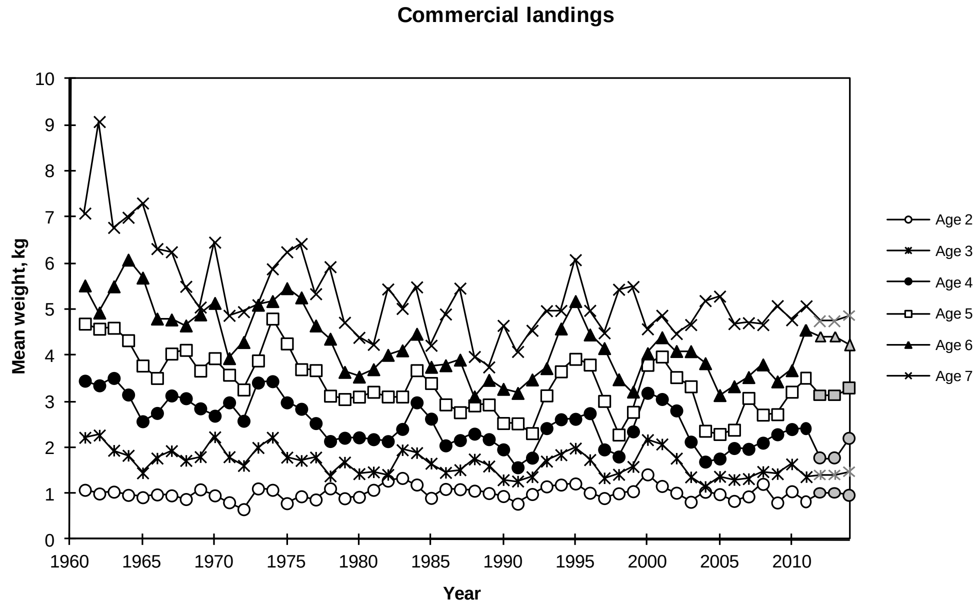


Figure 4.2.2. Faroe Plateau cod (sub-division Vb1). Mean weight at age 1961-2011. The estimated weights in 2012 are also shown. The weights in 2013 are set to the 2012 values. The weights in 2014 are set to the average values for 2010-2012.

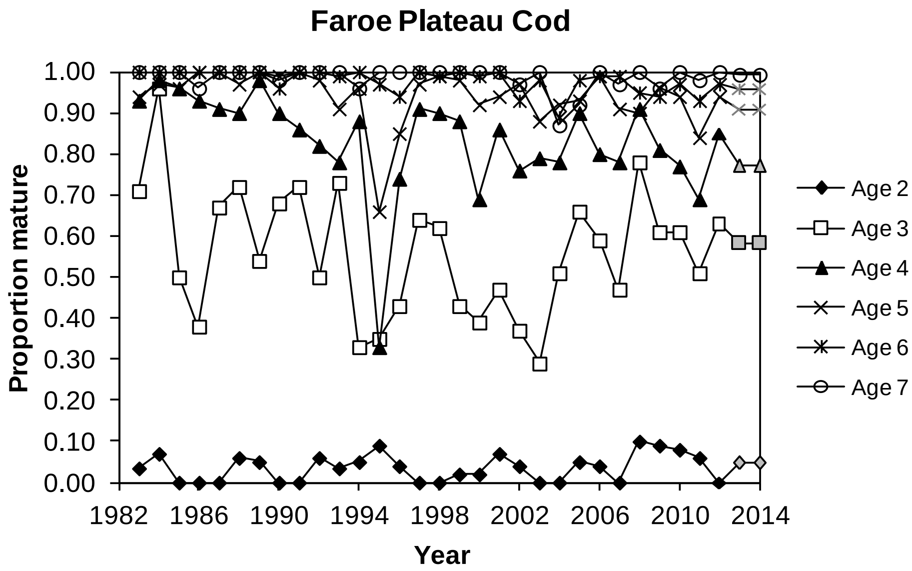


Figure 4.2.3. Faroe Plateau cod (sub-division Vb1). Proportion mature at age as observed in the spring groundfish survey. The values in 2013 and 2014 are estimated as the average of the 2010-2012 values.

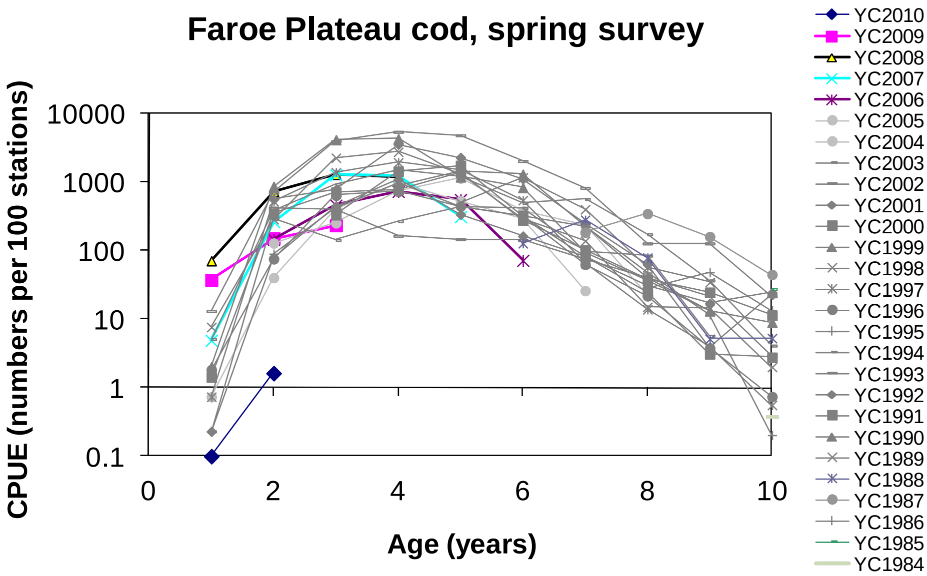


Figure 4.2.4. Faroe Plateau cod (sub-division Vb1). Catch curves from the spring groundfish survey.

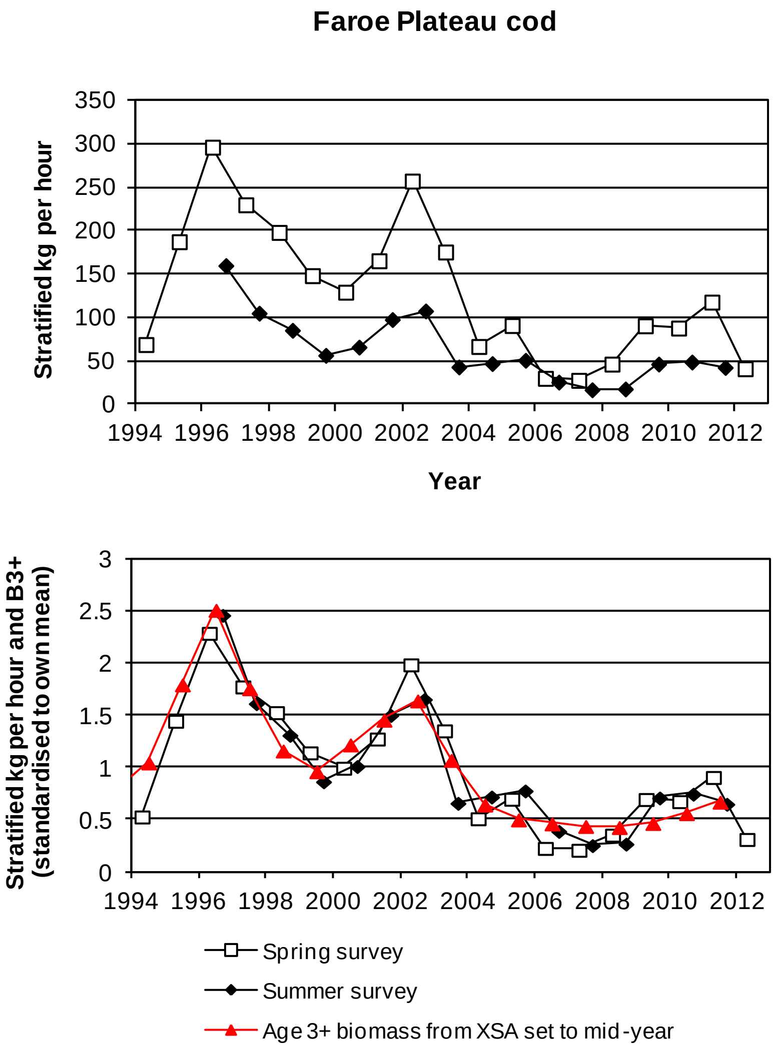


Figure 4.2.5. Faroe Plateau cod (sub-division Vb1). Stratified kg/hour in the spring and summer surveys. The age 3+ biomass obtained from the assessment is also included as an index.

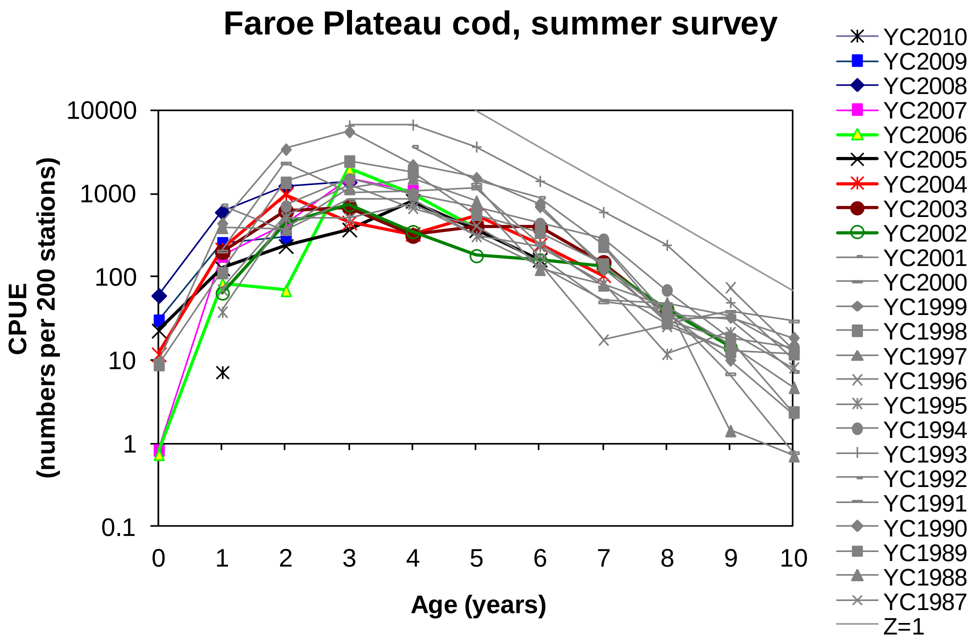


Figure 4.2.6. Faroe Plateau cod (sub-division Vb1). Catch curves from the summer groundfish survey.

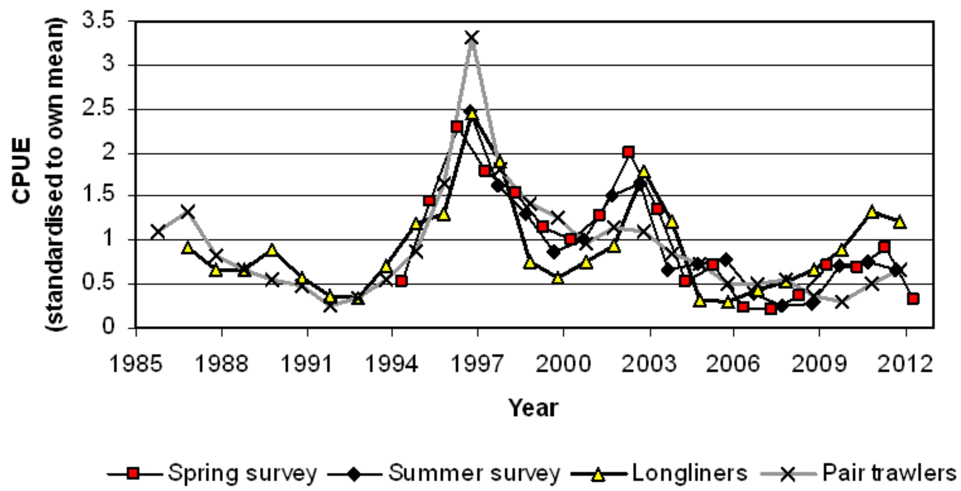
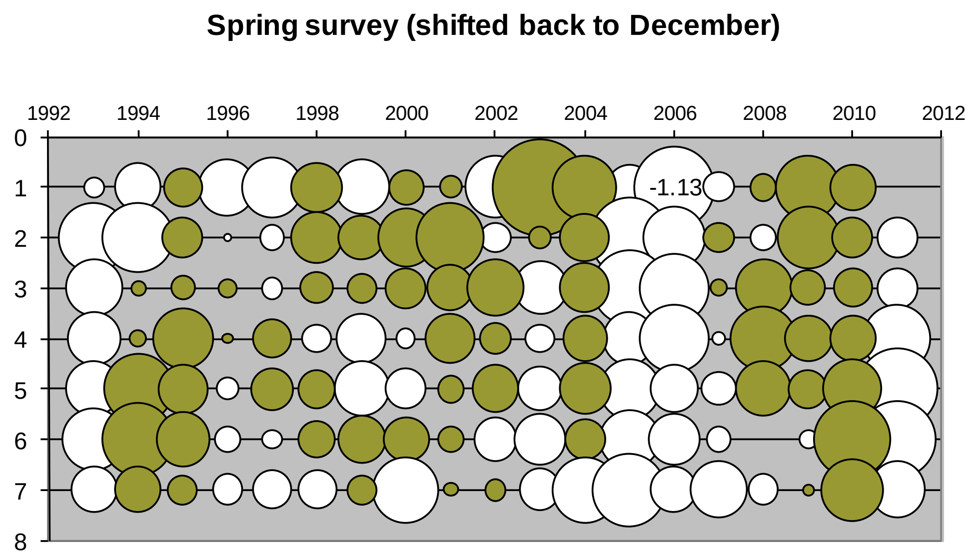


Figure 4.2.7. Faroe Plateau cod (sub-division Vb1). Standardised catch per unit effort for pair trawlers and longliners. The two surveys are shown as well.



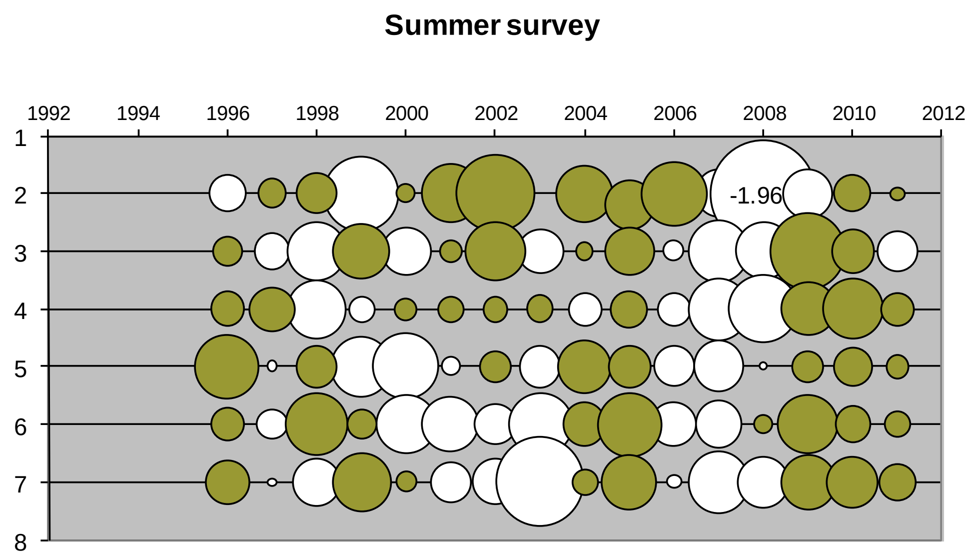


Figure 4.6.1. Faroe Plateau cod (sub-division Vb1). Log catchability residuals for the spring and summer survey. The residuals for age 8 are not presented because some values were off scale. White bubbles indicate negative residuals.

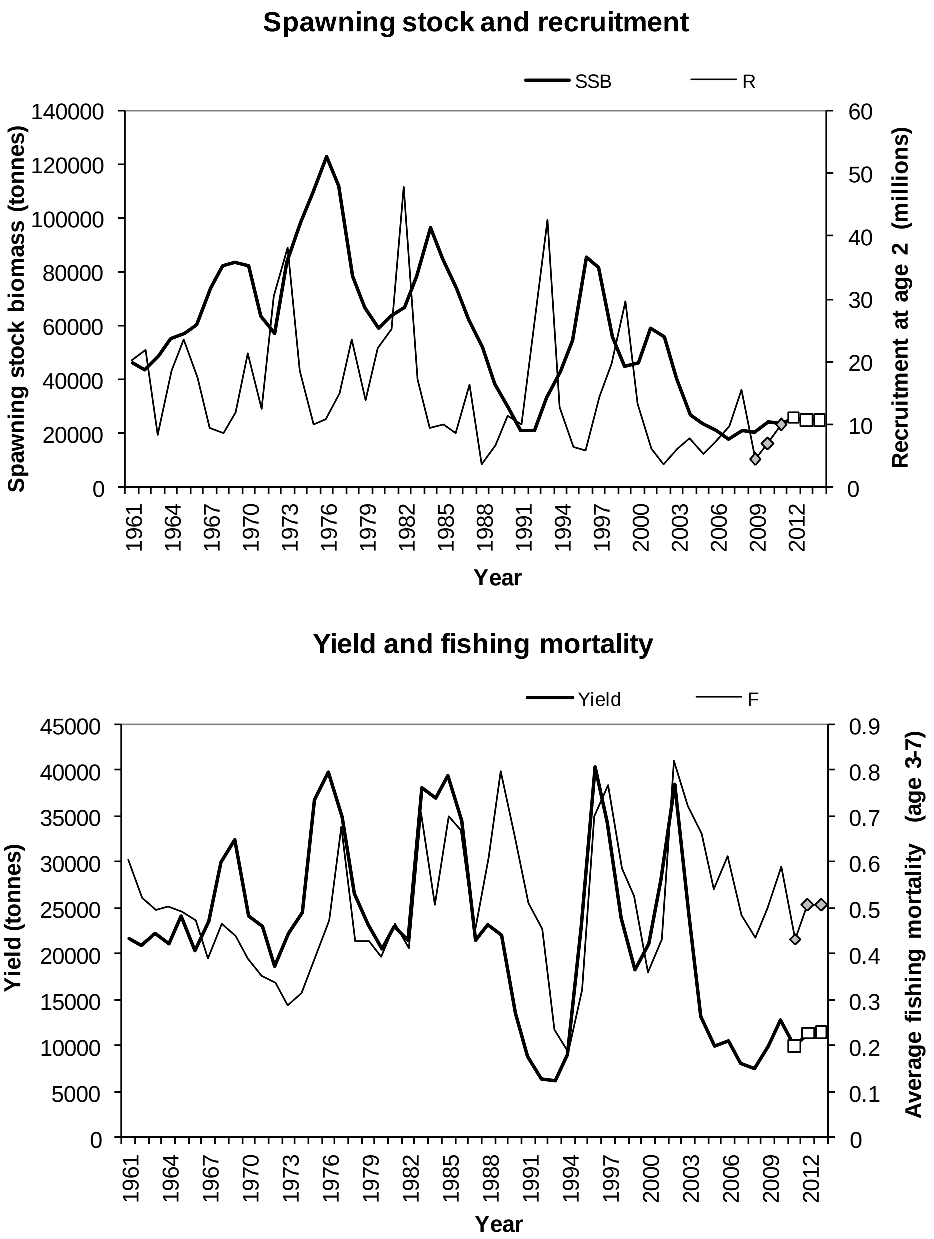


Figure 4.6.2. Faroe Plateau cod (sub-division Vb1). Yield and fishing versus year. Spawning stock biomass (SSB) and recruitment (year class) versus year. Points (white and grey) are taken from the short term projections.

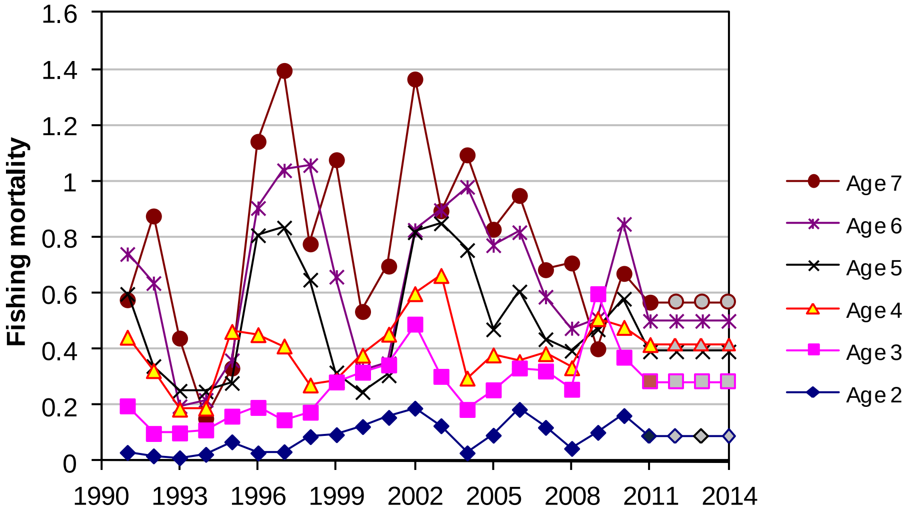


Figure 4.6.3. Faroe Plateau cod (sub-division Vb1). Fishing mortalities by age. The F-values in 2012-2014 are set to the average values in 2009-2011.

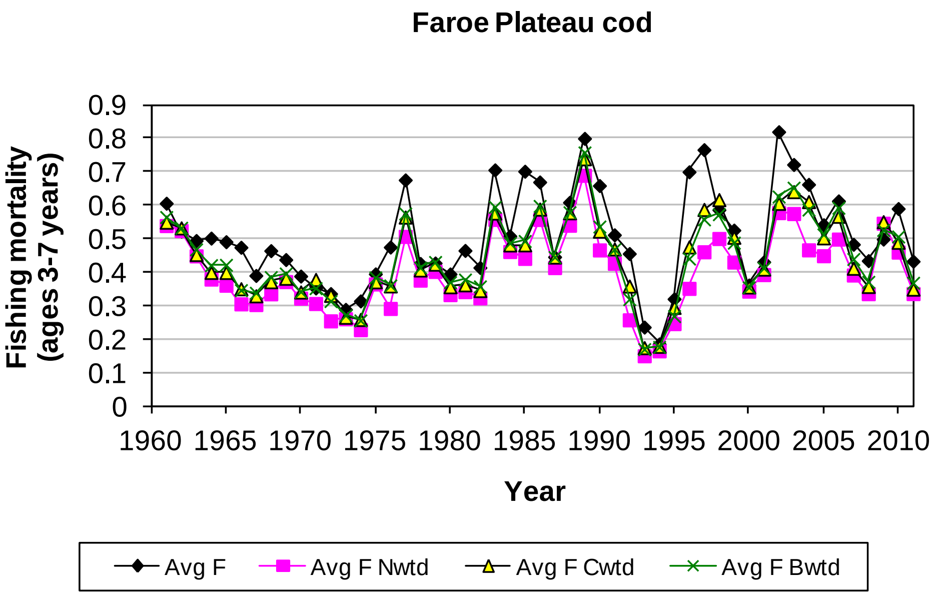


Figure 4.6.4. Faroe Plateau cod (sub-division Vb1). Different measures of fishing mortality: straight arithmetic average (Avg F), weighted by stock numbers (Nwtd), weighted by stock biomass (Bwtd) or weighted by catch (Cwtd).

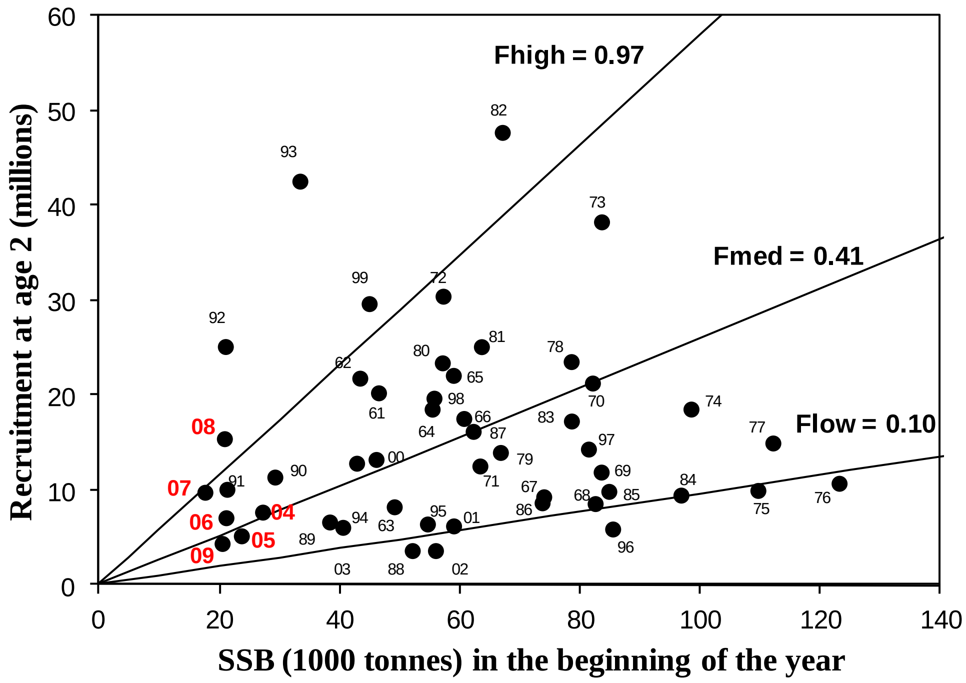


Figure 4.6.5. Faroe Plateau cod (sub-division Vb1). Spawning stock – recruitment relationship 1961-2009. Years are shown at each data point.

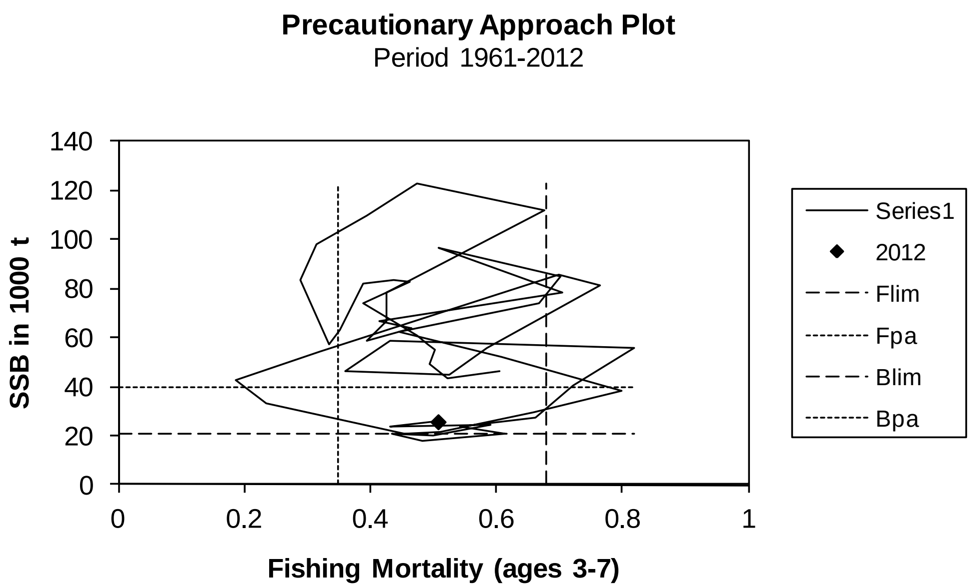


Figure 4.6.6. Faroe Plateau cod (sub-division Vb1). Spawning stock biomass versus fishing mortality 1961-2012.

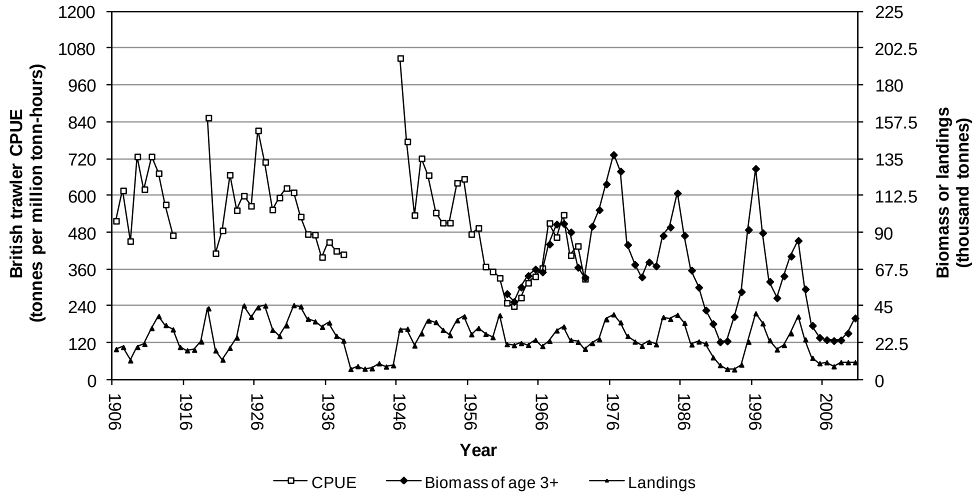


Figure 4.6.7. Faroe Plateau cod (sub-division Vb1). Stock development 1906-2010 based on cpues from british steam trawlers (1906-1925: cwts per days of absence from port), cpues from british trawlers (1924-1972: tonnes per million tonn hours) and the XSA-estimates (1961-2010: absolute biomass). The 1906-1925 series was scaled to the 1924-1972 series and the CPUEs refer to the first (left) axis while the XSA-estimates refer to the second axis.

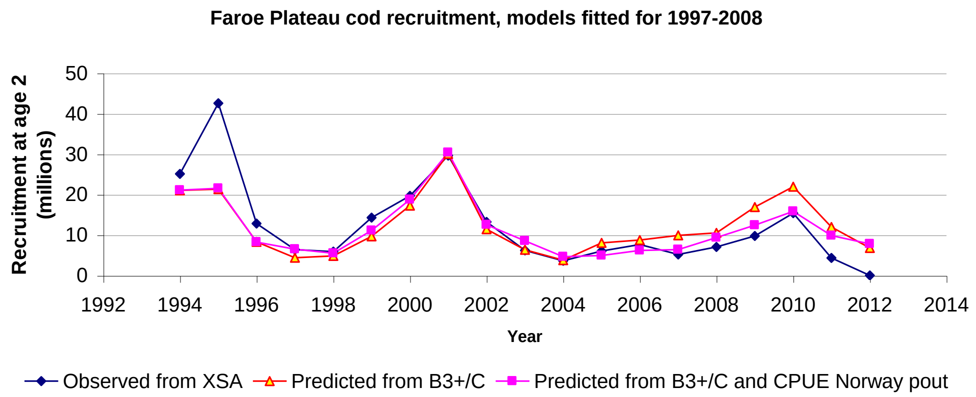


Figure 4.7.1. Faroe Plateau cod (sub-division Vb1). Modelling cod recruitment from the amount of cannibalistic nearshore cod (C) and age 3+ biomass (B3+) (R-square = 0.88), as well as when CPUE of Norway pout in the March survey was included in the model (adjusted R-square = 0.94). Note that both models give quite similar results for the recruitment in 2011 and 2012, which are higher than the estimates from the XSA run.

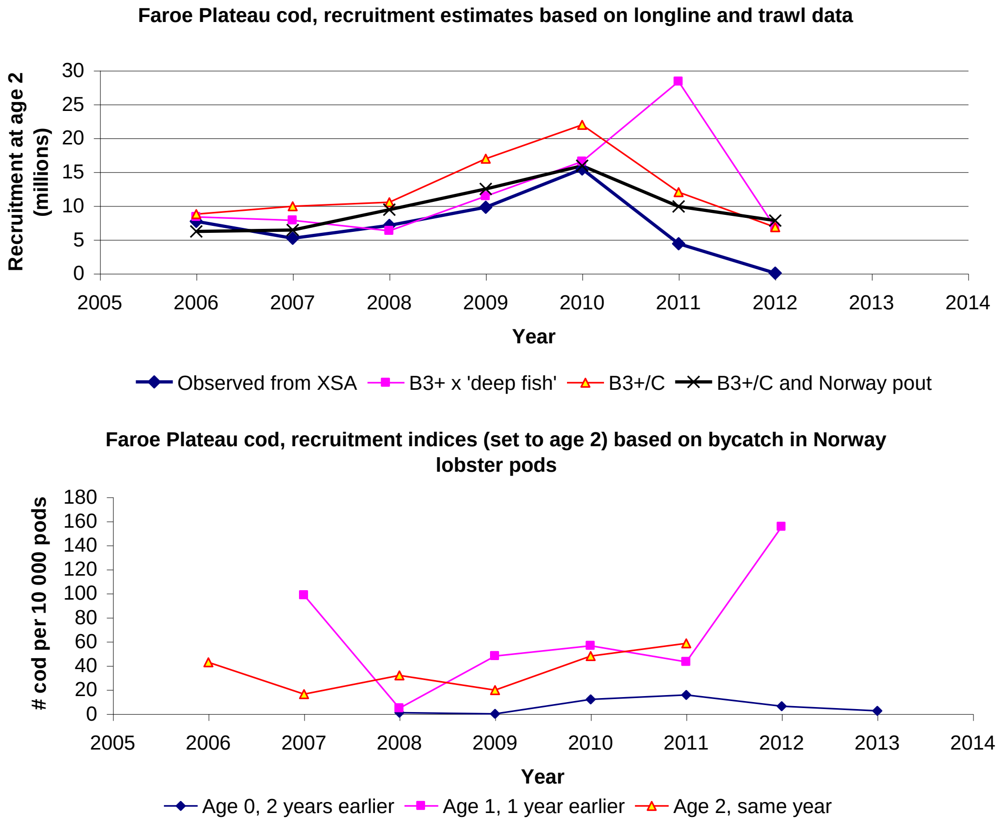


Figure 4.7.2. Faroe Plateau cod (sub-division Vb1). Recruitment estimates based on longline and trawl data already presented in the two figures before (upper panel). The lower panel shows the bycatch of juvenile cod in nearshore Norway lobster pods, and the data are shifted in such a way that they correspond to the recruitment at age 2. The recruitment in 2012 was estimated as the average of the values obtained from the 'B3+ x deep fish' model and the 'B3+/C' model.

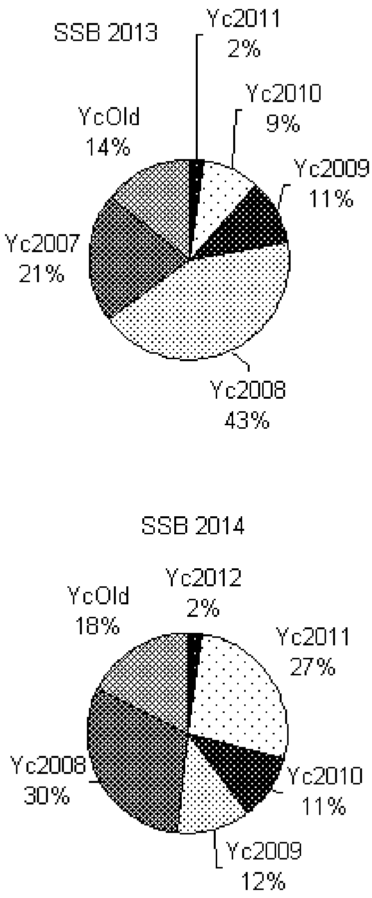
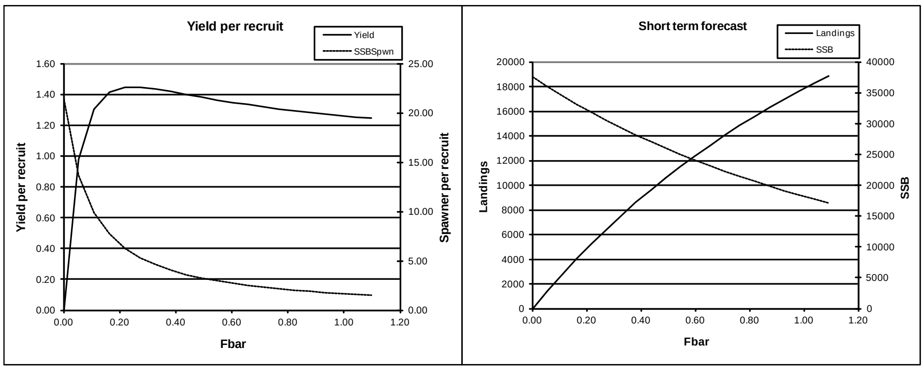


Figure 4.7.3. Faroe Plateau cod (sub-division Vb1). Contribution of various year classes to the spawning stock biomass in 2013 and 2014.



MFYPR version 2a
Run: Cod2
Time and date: 19:28 30/04/2012

Reference point	F multiplier	Absolute F
Fbar(3-7)	1.0000	0.5491
FMax	0.4494	0.2467
F0.1	0.2061	0.1131
F35%SPR	0.3145	0.1727
Flow	0.1844	0.1013
Fmed	0.7411	0.4070
Fhigh	1.7736	0.9739

Weights in kilograms

MFDP version 1a
Run: Cod1
Index file 27/4-2012
Time and date: 15:17 27/04/2012
Fbar age range: 2-10

Input units are thousands and kg - output in tonnes

Figure 4.8.1. Faroe Plateau cod (sub-division Vb1). Yield per recruit and spawning stock biomass (SSB) per recruit versus fishing mortality (left figure). Landings and SSB versus Fbar (3-7).

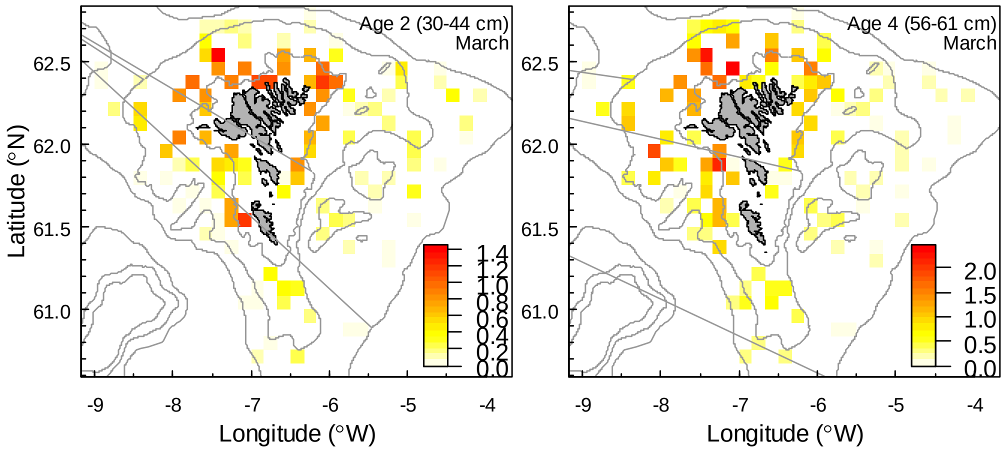


Figure 4.8.2. Faroe Plateau cod (sub-division Vb1). Mean abundance (log_{10}(numbers+1)) of 2 and 4 year-old cod in March 1994-2012 as observed in the spring groundfish survey. 100 m depth contours are shown.

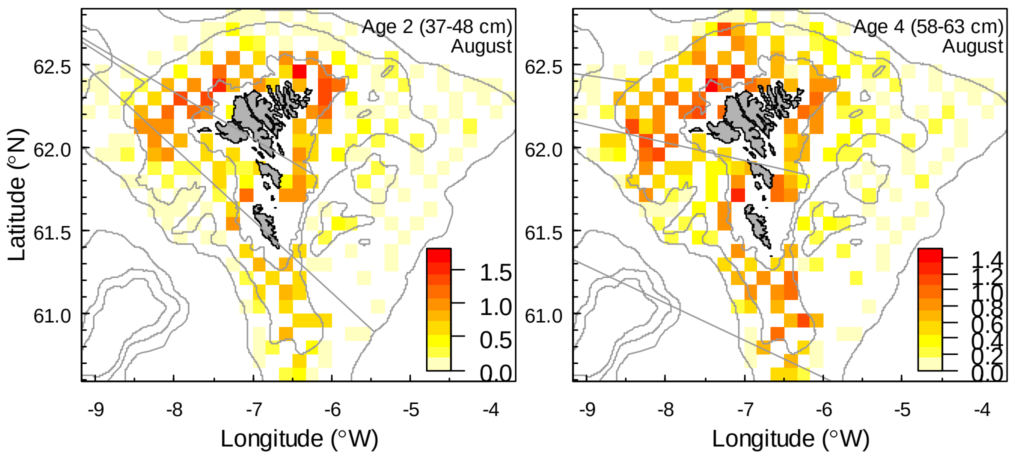


Figure 4.8.3. Faroe Plateau cod (sub-division Vb1). Mean abundance (log_{10}(numbers+1)) of 2 and 4 year-old cod in August 1996-2012 as observed in the summer groundfish survey. 100 m depth contours are shown.

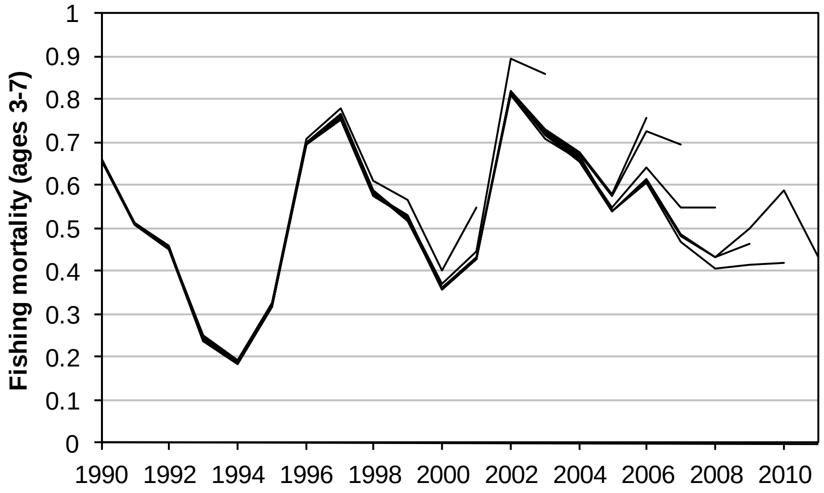
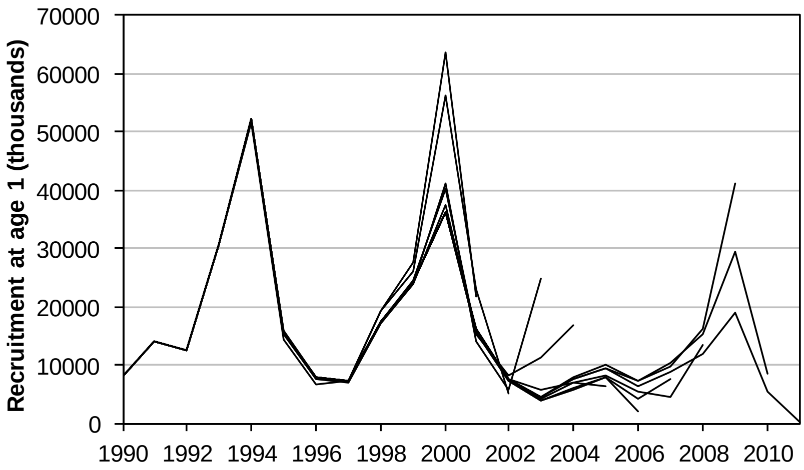


Figure 4.9.1. Faroe Plateau cod (sub-division Vb1). Results from the XSA retrospective analysis.



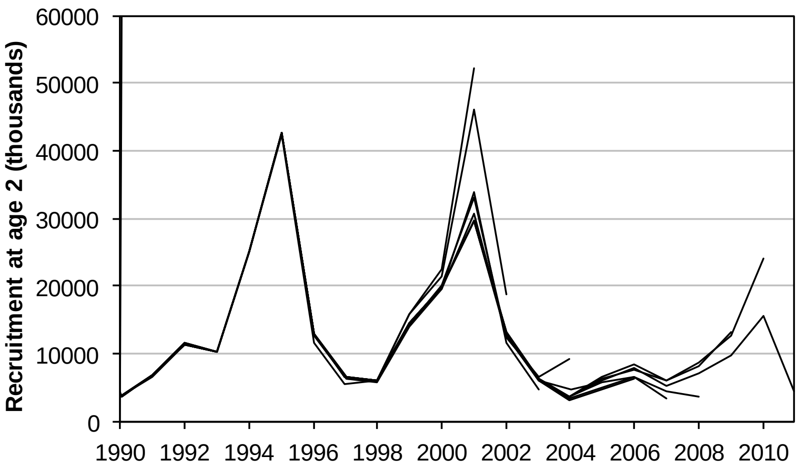


Figure 4.9.1. Faroe Plateau cod (sub-division Vb1). Results from the XSA retrospective analysis (continued).

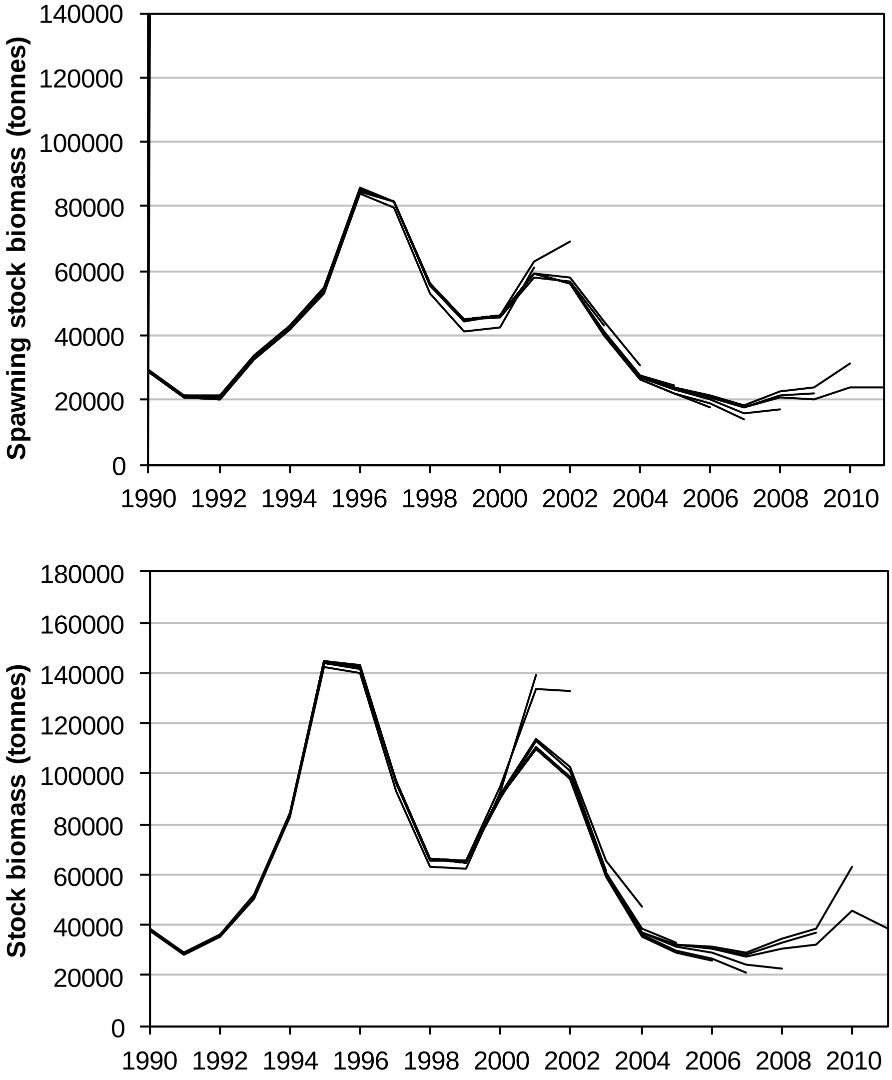


Figure 4.9.1. Faroe Plateau cod (sub-division Vb1). Results from the XSA retrospective analysis (continued).