6 Faroe Saithe

Executive summary

The most recent benchmark assessment was completed in 2010.

In the 2013 assessment the spring survey and commercial series were used to calibrate the XSA model. Discrepancies between the spaly and the proposed assessment were negligible.
The introduction of fisheries-independent data in an overly reliable fisheries-dependant assessment was regarded as an improvement to the current model framework.

Nominal landings increased by 20% from 29 000 t. in 2011 to 35 000 t in 2012. The corresponding estimate of fishing mortality in 2012 (average of ages 4-8 years) increased to F=0.46 which is higher than the the historical average (F=0.35) and well above Fmsy=0.32(NWWG 2012) and Fmsy=0.28(NWWG2011). The point estimate of the spawning stock biomass is around 57 000 t., just above Btrigger=55 000 t Recruitment (numbers in the stock at age 3) in 2012 is estimated at 27 million a two-fold drop with respect to 2011.

Last year assessment predicted landings to around 32 000 t while catches in 2012 were recorded at 35 000 t. Recruitment strength for 2012 was predicted at 26 million while the estimate for that year in the present assessment reached 27 million. SSB was overestimated by 23%.

6.1 Stock description and management units.

See the stock annex.

6.2 Scientific data

6.2.1 Trends in landings and fisheries

Nominal landings of saithe from Faroese grounds (Division Vb) have varied cyclically between 10 000 t and 68 000 t since 1961. After a third high of about 60 000 t in 1990, landings declined steadily to 20 000 t in 1996. Since then landings have increased to 68 000 tonnes in 2005 (Table 6.2.1.1, Figure 6.2.1.1) but has declined to 57 000 tonnes in 2008 and 2009. After a substantial drop in landings in 2011 which was the lowest observed since 1999 (33 000 t)landings increased by 20% in 2012 up to 35 000 t. The historical average landings for saith since 1961 is 37 000 t.

Since the introduction of the 200 miles EEZ in 1977, the saithe fishery has been prosecuted mostly by Faroese vessels. The principal fleet consists of large pair trawlers (>1000 HP), which have a directed fishery for saithe, about 50 - 77% of the reported landings in 1992-2011 (Table 6.2.1.2). The smaller pair trawlers (<1000 HP) and single trawlers (400-1000HP) have a more mixed fishery and they have accounted for about 10-20% of the total landings of saithe in the 1997—2011 period while the percentage of total landings by large single trawlers (>1000 HP) has declined drastically to 2.6% which is the lowest since 1985 .Historically the catch composition by the pair-trawler fleet has accounted for about 75% of the total tonnage for saithe but since 2007 it has increased gradually up to 92 in 2012 due mainly to the gear-shifting of single-trawlers to pair-trawling. The share of catches by the jigger fleet was about 8% in the 1985-1998 period but has decreased to less than .5.% since 2000 and it now accounts for

only 2.4% of the total domestic landings for saithe in 2012. Foreign catches that have been reported to the Faroese Authorities but not officially reported to ICES are also included in the Working Group estimates. Catches in Subdivision IIa, which lies immediately north of the Faroes, have also been included. Little or no discarding is thought to occur in this fishery.

Cumulative landings of saithe for the domestic fleets since 2007 are shown in Figure 6.2.1.2. In the first quarter of 2010 monthly landings were higher than average for the 2000-2010 period but by the end of the year they decreased by 10 000 t. Trends in monthly landings in 2011 are among the lowest recorded in the last decade while it improved substantially in 2012 in agreement with a 20% increase in landings for that year although it is still well below historical values. The pattern in the first three months of 2013. The pattern of landings in the first three months of 2013 are well below those in the previous year.

6.2.2 Catch at age

Catch at age is based on length, weight and otoliths samples from Faroese landings of small and large single and pair trawlers, and landing statistics by fleet provided by the Faroese Authorities. Catch at age is calculated for each fleet by four-month periods and the total is raised by the foreign catches. Minor adjustments were made to the catch-at-age matrix for previous due to revised final catch statistics (Tables 6.2.1.1 and 6.2.2.2). The sampling program and sampling intensity in 2012 as well as the approached used catch in numbers is the same as in preceding years. Sampling level went down to 4.9% in 2012 from 8.5% in 2011(Table 6.2.2.3.) The average amount sampled per tonnes landed since 2000 is 5.7%.

6.2.3 Weight at age

Mean weights at age have varied by a factor of about 2 during the 1961—2012 period. Mean weights at age were generally high during the early 1980s and they subsequently decreased from the mid 1980s to the early 1990s (Table 6.2.3.1 and Figure 6.2.3.1). Mean weights increased again in the period 1992-96 but have shown a general decrease thereafter. All age groups from 5 to 10 have showed an increase in weight since 2006. Mean weight of the 2009 year-class (age 3 in 2012) is estimated at 1.03 kg. which is a decrease with respect to that in 2011 (1.11 kg.). Since 1999 all age groups have remained below the historical average with the only exception of 7-years old saithe which reached the long-term mean value (3.785 kg.) in 2012. Mean weights at age in the stock are assumed equal to those in the catch.

6.2.4 Maturity at age

Maturity at age data from the spring survey is available from 1983 onward (Steingrund, 2003.) Due to poor sampling in 1988 the proportion mature for that year was calculated as the average of the two adjacent years. At the 2012 working group a model using maturity at age from the Faroese groundfish spring survey was implemented to derive smoothed trends in maturity by age and year. The fitting was done locally and the smoothing level was chosen as a trade-off between retaining the trend in maturities and reducing the data noise. For 1962 to 1982 the average maturity of predicted ogives of the 1983-2011 period was used (Table 6.2.4.1 and Figure 6.2.4.1.) There is a pronounced long-term decreasing trend for ages 4 to 7 but since 2003 maturities have increased monotonously until 2010 followed by a slight drop in the three most recent years. Faroe saithe begins to mature at 3 years old, 20% are mature at age 4, 50% at 5 years old and 100% are mature at age 8 and onwards.

6.2.5 Indices of stock size

6.2.5.1 Surveys

There are two annual groundfish surveys conducted in Faroese waters. The spring survey series (FGFS1) are available since 1994 , while the summer survey (FGFS2) was initiated in 1996. The design for both bottom-trawl surveys is depth stratified with randomised stations covering the Faroe Plateau area. The total number of stations in the summer and spring is 100 and 200 respectively. Effort is recorded in terms of minutes towed approximately 60 min. Large proportion of saithe is caught in relatively few hauls and the interannual variability of these hauls seems considerable.

Survey catch rates (kg per hour), length composition and age-disaggreagted indices are presented in figures 6.2.5.1.1 to 6.2.5.1.5. Both surveys suggest low abundances of saithe in mid- and late 1990's and increasing numbers from 2001 to 2006 caused by the strong 1998 and 1999 year classes entering the stock. The spring survey shows large numbers of 3- and 4-years old in 2008 and 2009 respectively (2005 year-class). However this year-class is not picked up neither in the spring, summer or commercial indices as 5- and 6-years old in subsequent years. The same pattern is observed with the relatively large 2008 year class showing a stronger signal in the spring than in the summer index although is too early to see how it will show up in the fishery in the following years.

The relation between numbers of saithe in the spring survey-at-age matrix and numbers in the catch-at-age matrix the following year show a good agreement for almost all age groups except for the 4- and 5- years old (R^2(4-5)= 0.249)(Figure 6.2.5.1.6). When it comes to the summer index the correlation deteriorates for the young (3- and 4-years old) and oldest ages (ages>=9)(R^2 <0.3)(Figure 6.2.5.1.7). Given the extreme schooling behaviour of saithe the internal consistency in the spring survey measured by the correlation of numbers in the data matrix for the same year class is reasonably good, with R^2 close to 0.85 for the best defined age groups and below R^2 = 0.3 for some other age classes (Figure 6.2.5.1.8)

The spring survey will be introduced in the current assessment framework along with the commercial fleet as it can provide fishery-independent information on the overly reliable fisheries-based spaly assessment. The spring series is considered superior to the summer series for detecting trends in stock abundances.

6.2.5.2 Commercial CPUE

The CPUE series that has been used in the assessment since 2000 was introduced in 1998 (ICES C.M. 1998/ACFM:19), and consists of saithe catch at age and effort in hours, referred to as the pair trawler series. A GLM model and a survey spatial scaling factor is used to standardised the CPUE series (Stock Annex B.4., Benchmark report, WKROUND 2010.) The benchmark working group regarded this novel approach to developing the commercial series as reasonable (Benchmark report, WKROUND 2010.) Predicted annual CPUEs derived from this approach indicate a sharp downwards trend since 2006 (Figure 6.2.5.1.1)

The correlation between predicted CPUE and the spring and summer surveys is R^2=0.53 and R^2=0.65 respectively.

The age-disaggregated index suggests that stock abundances were low in the 1990s to increase subsequently in the 2000s. The age composition indicates that the pair-trawl

fleet targets mostly age groups 4 to 7. (Figure 6.2.5.2.1) There is a good agreement between age-disaggregated indices in the spring index and indices of the same year class in the commercial matrix one year later (Figure 6.2.5.2.2) as measured by R^2 >0.35 for all age-classes.

6.2.5.3 Information from the fishing industry

No additional information beyond the landings from the commercial fleet was presented for incorporation in the assessment.

6.3 Methods

The assessment model adopted at the benchmark assessment in 2010 is described in the Stock annex (Sec. C) and in the benchmark report (WKROUND 2010.) The 2010 XSA was calibrated with the standardized pair trawlers with catchability independent of stock size for all ages, catchability independent of age for ages ≥ 8, the shrinkage of the SE of the mean = 2.0, and no time tapered weighting. In 2013 the spring groundfish survey (FGFS1) was introduced in the current assessment framework along with the commercial fleet. Spring survey data were considered superior to the summer survey for calibrating the assessment (Section 6.2.5.1). The tunings series used are shown in Table 6.3.1. Commercial catch-at age data (ages 3-14+, years 1961-2012) were calibrated in the XSA model using the spring survey at age data (ages 3-10, years 1993-2012) and the commercial pair-trawl fleet (ages 3-11, years 1995-2012). XSA model diagnostics of the spaly run and the proposed assessment model are presented in Tables 6.3.2 and Tables 6.3.3 respectively. Patterns in log-catchability residuals from the XSA model are relatively random but with large positive blocks in 2006-2010 for 3 to 5 age-classes (Figures 6.3.1 and 6.3.2). Residuals from a separable statistical model predicting catch numbers at age and survey data and modelling selectivities over 3 distinct periods are also presented (Figure 6.3.3)

6.4 Reference points

6.4.1 Biological reference points and MSY framework

In the 2011 assessment for Faroe saithe a Management Strategy Evaluation (MSE) was performed using a harvest control rule in the FLR environment. In the 2012 assessment some changes were included in the simulation framework. Maturity by age and year were modified (and therefore SSB) according to the smoothing technique reported in Section 6.2.4. Extra stochasticity was added to weights at age in the form of autocorrelation and the constraint of running XSAs in the simulations was dropped to reduce the simulation running time. All these changes caused a upward revision of the F_{msy} point estimate from F_{msy}=0.28 to F_{msy}=0.32. The simulation framework is explained below.

The MSE approach requires mathematical representations of two systems: a 'true' system and an 'observed' one. The 'true' system is represented by the operating model (OM) that simulates the real world. In contrast, the 'observed' system represents the conventional management procedure (MP), from the data collection through stock assessment to the management implementation. The present MSE evaluation uses the working group stock assessment as the basis for the Operating Model and makes assumptions about the selection pattern of the fishing fleet and its dynamics. The model comprises a single stock that is fished by a single fleet. It implements a harvest control rule through a management procedure that explicitly models the stock assessment process and time lag in implementing the management

advice (delay between the gathering of data and making a management decision, i.e. setting the current fishing effort) which explicitly address uncertainty in recent parameter estimates. The stock recruitment relation used is the Hockey-stick or segmented regression with random noise on top of it reflecting the high variability in historical recruitment estimates (CV=0.5). Fishing mortality is estimated from effort, catchability (constant) and the selection pattern. The observed selection pattern since 1996 is used in the simulations which correspond with the implementation of the fishing days quota in the Faroese management system. Maturity-at-age is fixed and taken from the smoothing method implemented in 2012 while stochasticity is included in weights-at-age with a CV=0.18 and autocorrelation of Rho=0.35 applied to all age groups to somehow replicate the observed fluctuations pattern. The data sampling of catches and tuning fleets is carried out by multiplying by random errors. Natural mortality is fixed to M=0.2. Simulations were performed 1000 times on a 40-year forward period with the historical period being replicated in the OM.

Unlike the flat curves obtained from traditional yield-per-recruit calculations simulations curve show a relatively well defined maximum at F_{msy} =0.32. The reason for this difference is that when fishing mortality is above certain level (>0.3) some of the stochastic runs will lead to spawning stock being below the break point in the stock-recruitment function so recruitment and subsequent landing s will be reduced. The breakpoint of 55 kt. in the segmented regression or the revised B_{pa}=60 000 t. (see Section 2. Demersal stocks in the Faroe Area, Subsection 2.1.7 Faroe saithe) could be candidates for $B_{trigger}$ the point at which fishing mortality should be reduced according to the MSY framework. The results of the simulations are shown in Figures 6.4.1.1 and 6.4.1.2.

MSY and revised precautionary reference points (Section 2. Demersal stocks in the Faroe Area, Subsection 2.1.7 Faroe saithe) for faroe saithe are listed below:

Biological reference points	NWWG 2012	NWWG 2011
Btrigger	55 000 t.	
Blim	45 000 t.	
Bpa	60 000 t.	
Flim	0.4	
Fpa	0.28	
Fmsy	0.32	0.28

The SSB-R relation with respect to reference fishing mortalities (Fhigh, Fmed and Flow) is presented in Figure 6.5.1.3 or 6.4.1.?? while the history of the stock/fishery in relation to the existing four reference points can be seen in Figure 6.5.1.4 or 6.4.2???.

6.5 State of the stock – historical and compared to what is now

(The assessment model refers to the proposed XSA calibrated with the FGF1 spring index and the commercial pair-trawl fleet unless stated otherwise)

Recruitment in the 1980s was close to the historical average (32 millions). The strongest year class since 1986 was produced in the 1990s and the average for that decade was about 28 millions (Figures 6.5.1 to 6.5.4. and Tables 6.5.1 to 6.5.3) The 1998 (88 millions) and 1999 (106 millions) are the largest observed in the time series. The 2009 year-class (numbers of age-3 saithe in 2012) is estimated at 27 million below the historical average of 32 million.

Relatively low Fs during the 1960s and recruitment above average in early-1970s caused an increase in SSB well above the historical average around the mid-1970s while landings peaked to almost 58 000 t. in 1973. Increasing Fs since 1980 lead to a decrease in the spawning stock biomass of saithe throughout the mid-1980s although recruitment of the 1983 year class rose to 61 000 millions, i.e. double the average from 1961 to 2012. The historically low SSB persisted in 1992-1998 and this along with low Fs caused landings to steeply decline to around 20 000 tonnes in 1996. The SSB increased since 1999 to above 128 000t in 2005 with the maturation of the 1995, 1996, 1997 and 1999 year classes and decreased to 93 000 t in 2009.

The 2013 spaly and proposed assessments indicate that the point estimator of SSB in 2012 is 55 000 t and 57 000 t respectively. Since 2005 SSB has been declining sharply and at present is close to Btrigger=55 000 t. Figure 6.5.5 shows the progression of year classes through the fishery with the 2001, 2002 and 2005 year classes dominant. This also clearly indicates a reasonable age structure up to 2009. However, the reducing age structure in 2010 and 2011 should be a cause for some concern taking into consideration that few fish are mature below 4yrs old and only 70% are mature by age 7yrs. The cause for concern is perhaps most graphically illustrated in figure 6.5.6 which shows the numbers of mature fish in the stock at each age from 3 yrs to 14+ yrs for the two years 2006 and 2011. It is quite clear that there has been a substantial reduction in the numbers of mature fish over the age groups 4 to 8.

Average fishing mortality over age groups 4 to 8 (Fbar) is estimated at Fbar=0.46. Both assessment models suggest a drop in fishing mortality from 2010 to 2011 reflecting the abrupt decline in landings from 44 000 t to 29 000 t. Estimated F increased in 2012 from Fbar=0.43 in 2011 to Fbar=0.46 as a result of the 20% rise in catches. F has been above Fmsy=0.32(NWWG2012) and Fmsy=0.28 (NWWG2011) since 1999.

The relation between stock and recruitment is presented in figure 6.5.7.

PA Precautionary plot is shown in figure 6.5.8

6.6 Short term forecast

6.6.1 Input data

In the 2013 assessment two short term forecasts were performed reflecting the two assessment models presented at the meeting: proposed(1) and spaly(2).

Population numbers at age 3 for the base short term prediction is calculated as the geometric mean of estimated recruitment strength from 2007 to 2011. Natural mortality is set to constant 0.2. As in 2011 in the 2012 assessment weight-at-age for 3-years old saithe is predicted by the year class strength (number of 3-years old in the stock) with a 3 year time lag (Eq. 1) whereas weight for ages 4 to 8 is estimated by weight-at-age the previous year from the same year class (Eq. 2) Weight for ages 9 to 14+ is an average of the most 3 recent years. Diagnostics and results of the model are shown in Figures 6.6.1.1 and 6.6.1.2. For older age groups (9 to 14+) a 3-year average is used.

$W3,y = \alpha N3,y-3 + \beta$ for $a = 3$ (Eq. 1)

$Wa+1,y+1 = \alpha Wa,y + \beta$ for $4 \leq a \leq 8$ (Eq. 2)

$Wa,y = (Wa-3,y\ Wa-2,y\ Wa-1,y)/3$ for $9 \leq a \leq 14+$ (Eq. 3)

Proportion mature for 2012 is taken as the average of predicted maturity ogives from 2012 and 2013 while for 2014 and 2015 it is calculated as the mean of 2011-2013. The exploitation pattern used in this scenario is a 2 year average.

1) Proposed short term prognosis (XSA calibrated with FGFS1 spring survey and commercial fleet.

Input data for the proposed prediction with management options are presented in Table 6.6.1.1a.

2) Spaly short term prognosis (spaly XSA run with calibrated with the commercial pair-trawler fleet)

Input data for the prediction with management options for the spaly scenario are presented in Table 6.6.1.1b.

6.6.2 Projection of catch and biomass

Results from predictions with management option for the proposed and spaly scenarios are presented in Table 6.6.2.1a and Figure 6.6.2.1aand Table 6.6.2.1b and Figure 6.6.2.1b respectively.

At status quo F=0.46 landings would reach 44 000 t in 2013 and 47 000 t in 2014 while spawning stock biomass is expected to around 74 000 tonnes in 2013 and increase to 83 000 tonnes in 2014. Landings in 2013 are predicted to rely on the 2008 and 2009 year classes (55%) while in the SSB these year-classes will contribute to around 73% of the spawning biomass in 2013 (Figure 6.6.2.1a.)

In the spaly assessment at status quo F=0.51 landings would reach 47 000 t in 2013 and 48 000 t in 2014 while spawning stock biomass is expected to around 72 000 tonnes in 2013 and increase to 80 000 tonnes in 2014. Landings in 2013 are predicted to rely on the 2008 and 2009 year classes (65%) while in the SSB these year-classes will contribute to around 73% of the spawning biomass in 2013 (Figure 6.6.2.1b.)

6.7 Yield per recruit and medium term forecasts

No medium term projections were performed for faroe saithe.

Input data to yield per recruit

The input data to long term prediction are shown in Table 6.7.1.1.

Mean weights-at-age for 1981-2012 were used for the long term projection. Natural mortality is set to constant 0.2. Proportion mature-at-age is taken as the average from 1983-2013.

The exploitation pattern was set equal to the average of the last five years (2008-2012) (as suggested from ACFM, 2004). Results from the yield per recruit analysis are shown in Table 6.7.1.2 and Figure 6.7.1.1.

6.8 Uncertainties in assessment and forecast

Sampling of catches for otoliths, length and weight measurements has decreased since 2010. In 2012 the amount of catch sampled was almost 5% which is regarded as adequate.

The assessment of Faroe saithe is relatively uncertain due to lack of good tuning data although the internal consistency in the survey and the commercial fleets used to calibrate the XSA model is reasonable considering the nature of the species that is highly schooling, and widely migrating. The retrospective pattern (Figure 6.8.1) reveals some of the assessment uncertainty. It shows periods of over- and underestima-

tion in average fishing mortality and consequently under- and overestimation in spawning stock biomass. Various factors could explain this phenomena, e.g., by changes in the vertical distribution of the stock or changes in the selection pattern that have been observed in recent years. With respect to recruitment the retrospective trend suggests an overestimation of incoming year-classes. To avoid large year to year fluctuations in the spawning stock biomass (also dependent on age structure) a locally fitting model was implemented in 2012 to reduce variability in maturities.

There are negligible discrepancies among the default spaly and the alternative model integrating the spring survey. Both suggest that SSB is at or slightly about Btrigger=55 000 t. and Fbar around 0.5 well above Fmsy=0.32 (NWWG2012). Recruitment estimates from both the spaly and the alternative model are N_3=29 and N_3=27 million respectively.

Figures 6.8.2 and 6.8.3 show the uncertainty in assessment parameters resulting from bootstrapping (1000 trials) the XSA model (resampling was performed in tunning fleet residuals). The plots show that the year-class 2008, i.e. numbers of age 3 saithe in the stock is quite uncertain ranging from 40 to 110 million while estimated Fbar in 2012 may be as high as Fbar=0.6. Histograms of SSB and recruitment show right-skewed distributions while average F behaves in a more normal fashion.

6.9 Comparison with previous assessment and forecast

The 2013 assessment was calibrated with commercial CPUE data and the Faroese groundfish spring survey (FGFS1). The discrepancies among the 2013 and the spaly assessment were negligible. The introduction of fisheries-independent data in an overly reliable fisheries-dependant XSA-model seems to have improved the quality of the assessment.

The 2012 proposed short-term prognosis predicted recruitment in 2012 to around 27 million which is a figure that the current assessment estimated exactly (Table 6.9.1).Spawning stock biomass and fishing mortality were overestimated by 30% and 39% respectively. The latter deviation was probably caused by a shift of fishing effort to the rapidly developing mackerel fisheries.. Landings for 2012 were predicted at 32 000 t. while actual observed catches in that year reached 35 000 t.

6.10 Management plans and evaluations

No management plan exists for saithe in Division Vb

6.11 Management considerations

Management consideration for saithe is under the general section for Faroese stocks.

Unlike the traditional yield-per-recruit curves the simulations carried out at the 2012 assessment (Sec. 6.4.1) show a relatively well defined maximum at F_{msy} =0.32. Candidates for $B_{trigger}$ might be set to the breakpoint of 55 kt. in the segmented regression or the revised B_{pa}=60 000 t. the point at which fishing mortality should be reduced according to the MSY framework (for more details see Section 6.4.1)

6.12 Ecosystem considerations

No evidence is available to indicate that the fishery is impacting the marine environment. A Ph.D. project was initiated in 2008, with the aim of investigate the role of environmental indicators in the dynamics of Faroe saithe. The results and conclusions of the PhD will be available to the working group in the 2013 assessment.

6.13 Regulations and their effects

It seems to be no relationship between number of fishing days and fishing mortality, probably because of large fluctuations in catchability. Area restriction is an alternative to reduce fishing mortality- and this is used to protect small saithe in Faroese area.

6.14 Changes in fishing technology and fishing patterns

See section 6.2.

6.15 Changes in the environment

According to existing literature the productivity of the ecosystem clearly affects both cod and haddock recruitment and growth (Gaard *et al*., 2002), a feature outlined in Steingrund and Gaard (2005). The primary production on the Faroe Shelf (< 130 m depth), over the period May through June, varied interannually by a factor of five, giving rise to low- or high-productive periods of 2-5 years duration (Steingrund and Gaard, 2005). The productivity over the outer areas seems to be negatively correlated with the strength of the Subpolar Gyre (Hátún et al., 2005; Hátún *et al*., 2009; Steingrund *et al*., 2010), which may regulate the abundance of saithe in Faroese waters (Steingrund and Hátún, 2008). When comparing a gyre index (GI) to saithe in Faroese waters there was a marked positive relationship between annual variations in GI and the total biomass of saithe lagged 4 years (Figure 6.15.1.)

There is a negative relationship between mean weight-at-age and the stock size of saithe in Faroese waters. This could be due to simple density-dependence, where there is a competition for limited food resources. Stomach content data show that the food of saithe is dominated by blue whiting, Norway pout, and krill, and the annual variations in the stomach fullness are mainly attributable to variations in the feeding on blue whiting. There seems to be no relationship between stomach fullness and weights-at-age for saithe (í Homrum *et al*. WD 2009).

6.16 References

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Table 6.2.1.1. Faroe saithe (Division Vb). Nominal catches (tonnes round weight) by countries, 1988-2012, as officially reported to ICES.

Country	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Denmark	94	-	2	-	-	-	-	-	-	-	-	-	-
Estonia	-	-	-	-	-	-	-	-	-	16	-	-	-
Faroe Islands	44402	43,624	59,821	53,321	35,979	32,719	32,406	26,918	19,267	21,721	25,995	32,439	
France [3]	313	-	-	-	120	75	19	10	12	9	17	-	273
Germany	-	-	-	32	5	2	1	41	3	5	-	100	230
German Dem.Rep.	-	9	-	-	-	-	-	-	-	-	-	-	-
German Fed. Rep.	74	20	15	-	-	-	-	-	-	-	-	-	-
Greenland	-	-	-	-	-	-	-	-	-	-	-	-	-
Ireland	-	-	-	-	-	-	-	-	-	-	-	0	0
Netherlands	-	22	67	65	-	-	-	-	-		-	160	72
Norway	52	51	46	103	85	32	156	10	16	67	53	-	-
Portugal	-	-	-	-	-	-	-	-	-	-	-	-	20
UK (Eng. & W.)	-	-	-	5	74	279	151	21	53	-	19	67	32
UK (Scotland)	92	9	33	79	98	425	438	200	580	460	337	441	534
USSR/Russia [2]	-	-	30	-	12	-	-	-	18	28	-	-	-
Total	45027	43,735	60,014	53,605	36,373	33,532	33,171	27,200	19,949	22,306	26,065	33,207	1,161
Working Group estimate [4,5]	45285	44,477	61,628	54,858	36,487	33,543	33,182	27,209	20,029	22,306	26,421	33,207	39,020

Country	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012 [1]
Denmark	-	-	-	-	-	34	-					
Estonia	-	-	-	-	-	-	-					
Faroe Islands	49,676	55,165	47,933	48,222	71,496	70,696	64,552	61,117	61,889	46,686	31,439	38,336
France	934	607	370	147	123	315	108	97	68	46	94	40
Germany	667	422	281	186	1	49	3	3	0			
Greenland	-	125	-			73	239	0	1			2
Irland	5	-	-	-	-	-	-	-	-			
Iceland	-	-	-	-	-	-	-	-	148	-		
Netherlands	0	0	0	0	0	0	3	0	0	0		
Norway	60	77	62	82	82	35	81	38	23	28		
Portugal	-	-	-	5	-	-	-	-	-			
Russia	1	10	32	71	210	104	159	38	44	3		
UK (E/W/NI)	80	58	89	85	32	88	4	-	-			
UK (Scotland)	708	540	610	748	4,322	1,011	408	400	685			
United Kingdom	-	-	-	-	-	-	-	-	-	706	19	
Total	52,131	57,004	49,377	49,546	76,266	72,405	65,557	61,693	62,858	47,469	31,552	38,378
Working Group estimate [4,5,6,7]	51,786	53,546	46,555	46,355	67,967	66,902	60,785	57,044	57,949	43,885	29,087	35,463

[1] Preliminary.
[2] As from 1991.
[3] Quantity unknown 1989-91.
[4] Includes catches from Sub-division Vb2 and Division IIa in Faroese waters.
[5] Includes French, Greenlandic, Russian catches from Division Vb, as reported to the Faroese coastal guard service.
[6] Includes Faroese, French, Greenlandic catches from Division Vb, as reported to the Faroese coastal guard service.
[7] The 2001-2008 catches from Faroe Islands, as stated from Faroese coastal guard service, are corrected in order to be consistent with procedures used previous years.

Table 6.2.1.2. Faroe saithe (Division Vb). Total Faroese landings (rightmost column) and the contribution (%) by each fleet category (1985-2012). Averages for 1985-2012 are given at the bottom.

Year	Open boats	Long-liners <100 GRT	Single trawl <400 HP	Gillnets	Jiggers	Single trawl 400-1000 HP	Single trawl >1000 HP	Pair trawl <1000 HP	Pair trawl >1000 HP	Long-liners >100 GRT	Indust-rial trawlers	Others	Total round weight (tonnes)
1985	0.2	0.1	0.1	0.0	2.6	6.6	33.7	28.2	28.2	0.1	0.2	0.2	42598
1986	0.3	0.2	0.1	0.1	3.6	2.8	27.3	27.5	36.5	0.1	0.7	0.9	40107
1987	0.7	0.1	0.3	0.4	5.6	4.1	20.4	22.8	44.2	0.1	1.1	0.0	39627
1988	0.4	0.3	0.1	0.3	6.5	6.8	20.8	19.6	43.6	0.1	1.3	0.1	43940
1989	0.9	0.1	0.3	0.2	9.3	5.4	17.7	23.5	41.1	0.1	1.3	0.0	43624
1990	0.6	0.2	0.2	0.2	7.4	3.9	19.6	24.0	42.8	0.2	0.9	0.0	59821
1991	0.6	0.1	0.1	0.6	9.8	1.3	13.9	26.5	46.2	0.1	0.8	0.0	53321
1992	0.4	0.4	0.0	0.0	10.5	0.5	7.1	24.4	55.6	0.1	1.0	0.0	35979
1993	0.6	0.2	0.1	0.0	9.3	0.6	6.5	21.4	60.6	0.1	0.7	0.0	32719
1994	0.4	0.4	0.1	0.0	12.6	1.1	6.8	18.5	59.1	0.2	0.7	0.0	32406
1995	0.2	0.1	0.4	0.0	9.6	0.9	9.9	17.7	60.9	0.3	0.0	0.0	26918
1996	0.0	0.0	0.1	0.0	9.2	1.2	6.8	23.7	58.6	0.2	0.0	0.0	19267
1997	0.0	0.1	0.1	0.0	8.9	2.5	10.7	17.8	58.9	0.4	0.4	0.0	21721
1998	0.1	0.4	0.1	0.0	8.1	2.8	13.8	16.5	57.6	0.3	0.4	0.0	25995
1999	0.0	0.1	0.1	0.0	5.7	1.2	12.6	18.5	60.0	0.2	1.6	0.0	32439
2000	0.1	0.1	0.2	0.0	3.7	0.3	15.0	17.5	62.3	0.1	0.7	0.0	39020
2001	0.1	0.1	0.1	0.0	2.8	0.3	20.2	16.5	58.8	0.2	0.8	0.1	51786
2002	0.1	0.2	0.1	0.0	1.6	0.1	26.5	10.5	60.8	0.1	0.0	0.0	53546
2003	0.0	0.0	1.9	0.0	0.9	0.4	17.4	14.7	64.7	0.1	0.0	0.0	46555
2004	0.1	0.2	3.7	0.0	1.9	0.4	15.1	14.4	63.8	0.2	0.0	0.0	44605
2005	0.2	0.1	4.4	0.0	2.4	0.2	12.7	20.6	59.2	0.2	0.0	0.0	66394
2006	0.2	0.4	0.3	0.0	3.9	0.1	19.8	20.6	54.1	0.6	0.0	0.0	65394
2007	0.2	0.2	0.2	0.0	2.0	0.1	30.4	16.0	50.6	0.3	0.0	0.0	59711
2008	0.2	0.3	1.5	0.0	3.2	0.2	20.4	16.0	57.7	0.5	0.0	0.0	56532
2009	0.4	0.2	3.3	0.0	4.3	0.1	9.6	15.1	66.8	0.2	0.0	0.0	57247
2010	0.1	0.1	1.2	0.0	3.9	2.4	8.3	15.1	68.3	0.6	0.0	0.0	43223
2011	0.1	0.1	0.5	0.0	3.6	1.3	2.6	14.1	77.1	0.5	0.0	0.0	32268
2012	0.2	0.1	1.9	0.0	2.4	0.1	2.2	18.6	73.5	1.0	0.0	0.0	31633
Average	0.3	0.2	0.8	0.1	5.5	1.7	15.3	19.3	56.1	0.3	0.5	0.0	42800

Table 6.2.2.1. Faroe saithe (Division Vb). Catch number at age by fleet categories in 2012 (calculated from gutted weights).

Age	Jiggers	Single trawlers >1000 HP	Pair trawlers <1000 HP	Pair trawlers >1000HP	Others	Total Division Vb
0	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	0	2	0	2
3	27	6	259	366	45	703
4	263	142	1713	5652	277	8047
5	125	45	757	2332	130	3389
6	26	24	185	756	33	1024
7	18	23	121	554	20	737
8	5	10	41	187	7	249
9	5	10	40	189	7	251
10	5	13	49	252	8	327
11	3	7	29	143	6	188
12	2	5	18	84	3	111
13	1	3	13	54	2	74
14	0	1	3	13	0	17
15	0	0	0	0	0	0
Total No.	481	289	3229	10583	538	15119
Catch, t.	823	691	5883	20510	993	28900

Table 6.2.2.2. Faroe saithe (Division Vb). Catch number at age (thousands) from the commercial fleet(1961-2012)

year	3	4	5	6	7	8	9	10	11	12	13	14+
1961	183	379	483	403	216	129	116	82	45	27	6	49
1962	562	542	617	495	286	131	129	113	71	29	13	63
1963	614	340	340	415	406	202	174	158	94	169	61	44
1964	684	1908	1506	617	572	424	179	150	100	83	47	44
1965	996	850	1708	965	510	407	306	201	156	120	89	76
1966	488	1540	1201	1686	806	377	294	205	156	94	52	79
1967	595	796	1364	792	1192	473	217	190	97	75	38	27
1968	614	1689	1116	1095	548	655	254	128	89	59	40	88
1969	1191	2086	2294	1414	1118	589	580	239	115	100	36	54
1970	1445	6577	1558	1478	899	730	316	241	86	48	46	38
1971	2857	3316	5585	1005	828	469	326	164	100	54	13	33
1972	2714	1774	2588	2742	1529	1305	1017	743	330	133	28	49
1973	2515	6253	7075	3478	1634	693	550	403	215	103	25	58
1974	3504	4126	4011	2784	1401	640	368	340	197	124	45	96
1975	2062	3361	3801	1939	1045	714	302	192	193	126	64	108
1976	3178	3217	1720	1250	877	641	468	223	141	96	60	131
1977	1609	2937	2034	1288	767	708	498	338	272	129	80	121
1978	611	1743	1736	548	373	479	466	473	407	211	146	178
1979	287	933	1341	1033	584	414	247	473	368	206	136	349
1980	996	877	720	673	726	284	212	171	196	156	261	369
1981	411	1804	769	932	908	734	343	192	92	128	176	717
1982	387	4076	994	1114	380	417	296	105	88	56	49	797
1983	2483	1103	5052	1343	575	339	273	98	98	99	25	416
1984	368	11067	2359	4093	875	273	161	52	65	59	18	176
1985	1224	3990	5583	1182	1898	273	103	38	26	72	41	162
1986	1167	1997	4473	3730	953	1077	245	104	67	33	56	69
1987	1581	5793	3827	2785	990	532	333	81	43	5	11	81
1988	866	2950	9555	2784	1300	621	363	159	27	43	15	2
1989	451	5981	5300	7136	793	546	185	83	55	10	2	27
1990	294	3833	10120	9219	5070	477	123	61	60	18	19	42
1991	1030	5125	7452	5544	3487	1630	405	238	128	77	22	19
1992	521	4067	3667	2679	1373	894	613	123	63	37	52	19
1993	1316	2611	4689	1665	858	492	448	245	54	34	10	8
1994	690	3961	2663	2368	746	500	307	303	150	28	19	2
1995	398	1019	3468	1836	1177	345	241	192	104	73	25	19
1996	297	1087	1146	1449	1156	521	132	77	64	45	29	8
1997	344	832	2440	1767	1335	624	165	71	29	48	29	23
1998	163	1689	1934	3475	1379	683	368	77	32	28	24	21
1999	322	655	3096	2551	4113	915	380	147	24	27	5	37
2000	811	2830	1484	4369	2226	2725	348	186	56	18	2	5
2001	1125	2452	8437	2155	3680	1539	1334	293	90	24	19	13
2002	302	8399	5962	9786	862	1280	465	362	33	36	8	1
2003	330	2432	11152	3994	4287	417	419	304	91	40	3	0
2004	76	2011	8544	8762	2125	1807	265	293	146	100	10	2
2005	454	2948	9486	16606	7099	843	810	32	102	27	3	0
2006	1475	5045	7781	7712	10296	3760	640	282	32	12	12	5
2007	831	3320	11305	6473	3781	4294	1538	406	81	11	9	3
2008	4784	3108	3598	9370	3594	2223	2048	444	159	12	6	0
2009	459	7412	4978	1842	5167	2009	1696	1069	292	41	3	1
2010	2324	2916	5298	1125	1009	2098	1248	832	376	51	22	0
2011	1860	2691	1903	1769	468	520	690	511	431	135	33	4
2012	863	9874	4159	1257	905	305	308	401	230	137	91	21

Table 6.2.2.3. Faroe saithe (Division Vb). Sampling intensity in 2000-2012.

Year		Jiggers	Single trawlers >1000 HP	Pair trawlers <1000 HP	Pair trawlers >1000 HP	Others	Total	Amount sampled pr tonnes landed (%)
2000	**Lengths**	2443	2429	9910	28724		43506	10.7
	Otoliths	300	301	1019	2816		4436	
	Weights	300	241	959	2816		4316	
2001	**Lengths**	1788	4388	5613	30341		42130	7.7
	Otoliths	180	450	480	3237		4347	
	Weights	180	420	420	3177		4197	
2002	**Lengths**	1197	9235	5049	30761		46242	5.8
	Otoliths	120	1291	422	3001		4834	
	Weights	120	420	240	2760		3540	
2003	**Lengths**		4959	6393	34812	1388	47552	7.0
	Otoliths		719	960	3719	180	5578	
	Weights		420	239	2999		3658	
2004	**Lengths**	916	2665	3455	35609	1781	44426	5.9
	Otoliths	180	180	240	3537	240	4377	
	Weights	180	120	120	3357	1364	5141	
2005	**Lengths**	1048	4266	6183	32046	1564	45107	3.6
	Otoliths	120	413	690	2760	240	4223	
	Weights	340	385	791	3533	1564	6613	
2006	**Lengths**	1059	7979	8115	23082	1139	41374	3.5
	Otoliths	180	598	1138	2096	60	4072	
	Weights	180	60	1620	5678	812	8350	
2007	**Lengths**	683	10525	10593	18045	381	40227	4.1
	Otoliths	120	748	960	1977	0	3805	
	Weights	120	697	5603	9884	120	16424	
2008	**Lengths**	0	6892	3694	13995	234	24815	2.5
	Otoliths	0	690	600	1500	0	2790	
	Weights	0	0	2517	12914	234	15665	
2009	**Lengths**	511	5273	3695	23352	0	32831	4.1
	Otoliths	97	301	599	2519	0	3516	
	Weights	511	0	3494	19060	0	23065	
2010	**Lengths**	209	1442	3663	25793	151	31258	6.0
	Otoliths	5	119	480	2459	0	3063	
	Weights	5	0	3060	18749	151	21965	
2011	**Lengths**	583	18	1874	19990	753	23218	8.5
	Otoliths	60	0	300	2459	60	2879	
	Weights	583	18	1458	14256	753	17068	
2012	**Lengths**	6	0	1060	24924	211	26201	4.9
	Otoliths	6	0	120	2516	0	2642	
	Weights	6	0	1060	17593	211	18870	

Table 6.2.3.1. Faroe saithe (Division Vb). Catch weights at age (kg) from the commercial fleet (1961-2012)

year	3	4	5	6	7	8	9	10	11	12	13	14+
1961	1.43	2.30	3.35	4.29	5.13	6.16	7.06	7.27	7.50	8.20	9.15	9.99
1962	1.27	2.05	3.29	4.19	5.15	5.66	6.47	6.71	7.15	7.90	8.45	9.66
1963	1.28	2.20	3.21	4.57	5.06	5.93	6.26	8.00	7.27	8.55	9.02	9.82
1964	1.18	2.06	3.27	4.26	5.04	5.69	6.66	6.84	7.69	8.35	8.12	9.42
1965	1.18	2.13	2.94	4.10	4.88	5.93	6.32	7.29	8.07	7.88	9.48	9.85
1966	1.36	2.03	3.06	3.66	4.59	5.52	6.84	7.27	7.66	8.12	10.21	9.88
1967	1.27	1.78	2.53	3.57	4.37	5.31	5.81	6.55	7.81	7.59	8.55	9.14
1968	1.30	1.74	2.04	3.12	4.05	5.18	6.24	7.52	8.05	8.65	8.30	9.75
1969	1.19	1.67	2.30	2.85	3.67	5.00	5.71	6.41	6.55	7.59	7.95	9.10
1970	1.24	1.45	2.25	2.85	3.52	4.42	5.44	5.73	6.66	7.31	9.05	9.63
1971	1.10	1.32	1.82	2.98	3.70	4.27	5.39	5.97	6.49	7.17	7.38	9.61
1972	1.04	1.49	2.06	2.83	3.79	4.18	4.81	5.29	6.95	6.73	7.59	9.61
1973	1.09	1.46	1.58	2.25	3.69	4.39	5.13	5.28	6.73	7.31	8.15	9.26
1974	1.43	1.53	2.21	2.50	3.12	4.60	5.56	5.71	6.26	6.88	7.76	9.59
1975	1.11	1.66	2.26	3.12	3.56	4.10	5.13	6.09	7.20	7.78	8.60	9.55
1976	1.09	1.68	2.88	3.08	4.29	4.35	4.79	5.91	6.62	6.62	7.31	9.10
1977	1.22	1.64	2.66	3.79	4.24	5.60	5.35	5.91	6.84	6.73	6.95	9.26
1978	1.49	2.32	3.07	3.75	4.91	4.37	5.28	5.83	6.05	6.71	7.69	8.52
1979	1.22	1.88	2.62	3.40	4.18	4.95	5.69	6.38	7.02	7.26	8.15	9.62
1980	1.23	2.12	3.32	4.28	5.16	6.42	6.87	7.09	7.93	8.07	8.59	10.14
1981	1.31	2.13	3.00	3.81	4.75	5.25	5.95	6.43	7.00	7.47	8.14	9.43
1982	1.34	1.85	2.95	3.58	4.93	6.24	7.23	7.24	8.35	8.35	8.96	10.23
1983	1.21	2.03	2.97	4.14	4.72	5.90	6.81	7.05	7.25	8.29	9.48	10.51
1984	1.43	1.95	2.47	3.85	5.18	6.35	7.83	6.75	8.64	8.47	8.56	10.80
1985	1.40	2.03	2.97	3.60	5.34	7.20	6.97	9.86	10.67	10.46	10.20	13.05
1986	1.72	1.99	2.62	3.28	4.19	5.59	6.05	6.15	9.54	9.82	7.30	12.77
1987	1.61	1.84	2.40	3.18	4.07	5.15	5.50	6.63	6.34	10.25	8.49	10.48
1988	1.50	1.98	1.98	2.94	3.80	4.42	5.12	6.71	9.04	9.36	9.14	10.22
1989	1.31	1.74	1.91	2.37	3.81	4.67	5.51	5.97	6.94	8.54	9.51	10.48
1990	1.22	1.63	1.83	2.05	2.87	4.47	5.42	6.47	6.34	8.42	7.38	8.64
1991	1.24	1.57	1.86	2.21	2.65	3.38	4.82	5.52	6.41	7.40	8.08	8.67
1992	1.26	1.60	2.07	2.55	3.06	4.08	5.01	6.77	7.75	8.30	7.79	9.30
1993	1.41	1.86	2.32	3.13	3.73	4.39	5.21	6.54	8.40	7.28	9.41	9.64
1994	1.50	1.95	2.27	2.94	4.21	4.97	5.66	5.95	6.89	8.75	9.75	7.99
1995	1.46	2.18	2.42	2.90	3.65	5.06	5.44	6.17	7.08	7.74	7.30	7.10
1996	1.43	1.88	2.50	3.23	3.74	4.96	6.38	6.75	7.47	7.28	8.47	10.13
1997	1.48	1.78	2.03	2.78	3.60	4.77	5.98	7.66	7.88	8.54	9.49	10.41
1998	1.39	1.71	1.95	2.41	3.30	4.22	5.00	6.39	6.67	8.21	8.49	8.85
1999	1.37	1.71	1.91	2.40	2.85	4.12	5.26	5.53	6.96	8.03	8.35	8.91
2000	1.48	1.61	2.08	2.36	2.98	3.48	4.85	5.27	6.52	4.73	8.81	8.97
2001	1.33	1.59	1.79	2.59	3.06	3.87	4.37	5.57	6.70	5.78	7.75	7.77
2002	1.14	1.46	1.65	1.97	3.13	3.59	4.51	5.14	6.42	8.03	4.76	11.36
2003	1.12	1.30	1.61	1.98	2.53	3.97	4.83	5.50	6.10	6.99	5.96	10.00
2004	1.14	1.33	1.45	1.79	2.56	3.16	4.15	5.17	6.02	6.19	7.06	9.39
2005	1.15	1.33	1.52	1.67	2.09	2.98	3.79	6.09	6.13	6.65	7.42	10.00
2006	1.13	1.22	1.46	1.79	2.04	2.44	3.86	4.22	5.15	6.44	6.91	5.37
2007	1.06	1.39	1.41	1.82	2.36	2.68	3.28	4.10	5.00	6.33	7.84	7.97
2008	1.15	1.31	1.67	1.82	2.40	2.90	3.10	3.73	4.77	6.07	6.45	10.00
2009	0.94	1.49	1.89	2.41	2.60	3.15	3.63	4.02	5.01	5.83	6.31	9.01
2010	1.43	1.71	2.17	2.55	3.17	3.41	3.97	4.35	5.08	4.94	5.31	10.00
2011	1.11	1.69	2.25	2.92	3.61	4.20	4.53	5.09	5.42	6.09	6.76	10.00
2012	1.03	1.33	1.63	2.71	3.79	4.45	4.80	5.21	5.56	6.02	7.14	10.00

Table 6.2.4.1. Faroe saithe (Division Vb). Proportion mature at age(1982-2013). Maturities-at-age from 1961 to 1981 are fixed and equal to those in 1982.

ar	3	4	5	6	7	8	9	10	11	12	13	14
1982	0.03	0.22	0.53	0.79	0.92	0.98	0.99	1.00	1.00	1.00	1.00	1.00
1983	0.02	0.27	0.61	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1984	0.04	0.28	0.61	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1985	0.05	0.29	0.59	0.86	0.97	0.99	1.00	1.00	1.00	1.00	1.00	1.00
1986	0.06	0.29	0.58	0.83	0.94	0.98	1.00	1.00	1.00	1.00	1.00	1.00
1987	0.06	0.28	0.56	0.80	0.92	0.97	0.99	1.00	1.00	1.00	1.00	1.00
1988	0.05	0.25	0.53	0.77	0.90	0.96	0.99	1.00	1.00	1.00	1.00	1.00
1989	0.04	0.22	0.50	0.74	0.88	0.95	0.99	1.00	1.00	1.00	1.00	1.00
1990	0.03	0.19	0.48	0.73	0.87	0.95	0.99	1.00	1.00	1.00	1.00	1.00
1991	0.03	0.18	0.48	0.74	0.88	0.96	0.99	1.00	1.00	1.00	1.00	1.00
1992	0.02	0.17	0.49	0.77	0.91	0.98	0.99	1.00	1.00	1.00	1.00	1.00
1993	0.01	0.17	0.50	0.79	0.93	1.00	0.99	1.00	1.00	1.00	1.00	1.00
1994	0.01	0.17	0.50	0.80	0.94	1.00	0.99	1.00	1.00	1.00	1.00	1.00
1995	0.01	0.16	0.49	0.78	0.92	1.00	0.99	1.00	1.00	1.00	1.00	1.00
1996	0.01	0.17	0.46	0.73	0.89	0.99	0.99	1.00	1.00	1.00	1.00	1.00
1997	0.02	0.17	0.44	0.69	0.86	0.98	0.99	1.00	1.00	1.00	1.00	1.00
1998	0.02	0.16	0.41	0.65	0.83	0.96	0.99	1.00	1.00	1.00	1.00	1.00
1999	0.02	0.16	0.39	0.61	0.80	0.94	0.99	1.00	1.00	1.00	1.00	1.00
2000	0.02	0.17	0.38	0.58	0.77	0.92	0.98	1.00	1.00	1.00	1.00	1.00
2001	0.01	0.17	0.37	0.56	0.75	0.90	0.98	1.00	1.00	1.00	1.00	1.00
2002	0.01	0.17	0.36	0.55	0.74	0.89	0.98	1.00	1.00	1.00	1.00	1.00
2003	0.01	0.18	0.37	0.55	0.74	0.88	0.97	1.00	1.00	1.00	1.00	1.00
2004	0.01	0.18	0.38	0.57	0.75	0.88	0.97	1.00	1.00	1.00	1.00	1.00
2005	0.00	0.18	0.39	0.59	0.76	0.89	0.97	1.00	1.00	1.00	1.00	1.00
2006	0.00	0.18	0.40	0.61	0.78	0.89	0.97	1.00	1.00	1.00	1.00	1.00
2007	0.01	0.19	0.42	0.64	0.80	0.91	0.97	1.00	1.00	1.00	1.00	1.00
2008	0.01	0.20	0.44	0.67	0.83	0.92	0.97	1.00	1.00	1.00	1.00	1.00
2009	0.01	0.21	0.46	0.69	0.85	0.94	0.97	1.00	1.00	1.00	1.00	1.00
2010	0.01	0.22	0.46	0.70	0.87	0.95	0.97	1.00	1.00	1.00	1.00	1.00
2011	0.01	0.22	0.46	0.69	0.86	0.96	0.97	1.00	1.00	1.00	1.00	1.00
2012	0.01	0.21	0.44	0.67	0.85	0.95	0.97	1.00	1.00	1.00	1.00	1.00
2013	0.01	0.2	0.42	0.63	0.82	0.94	0.96	1.00	1.00	1.00	1.00	1.00

Table 6.3.1. Faroe saithe (Division Vb). Effort (hours) and catch in number at age for the spring survey (1993-2012) and the commercial pair trawlers (1995-2012)

Spring survey (shifted back to december)										
year	effort	3	4	5	6	7	8	9	10	
1993	100	127	847	470	423	108	68	51	54	
1994	100	157	527	914	916	357	85	58	24	
1995	100	63	270	115	131	105	57	34	16	
1996	100	80	108	254	132	96	64	24	26	
1997	100	335	941	805	1358	323	145	104	23	
1998	100	230	216	723	573	678	90	40	19	
1999	100	215	381	310	1256	503	568	28	12	
2000	100	797	363	1112	291	427	163	130	23	
2001	100	348	8251	3345	3225	229	220	80	39	
2002	100	838	927	3306	964	585	76	49	46	
2003	100	531	5326	7993	4765	297	120	13	28	
2004	100	1417	1208	2774	4592	1497	218	83	26	
2005	100	2726	1145	1991	1470	1480	457	41	25	
2006	100	254	410	1401	536	226	242	111	13	
2007	100	5922	648	481	1333	334	343	223	27	
2008	100	1292	7699	978	274	466	217	206	161	
2009	100	146	401	674	180	200	297	194	144	
2010	100	3723	647	210	235	65	46	92	60	
2011	100	255	2305	602	140	73	43	58	64	
2012	100	281	2203	1130	524	89	82	32	31	
PairTrawlers_GLM_SD										
year	effort	3	4	5	6	7	8	9	10	11
1995	11408	47	180	577	236	146	49	24	19	14
1996	49305	310	958	821	1119	503	282	133	127	70
1997	36299	199	533	1488	1013	768	333	73	33	10
1998	35902	107	656	1148	1486	730	325	170	40	13
1999	44850	174	487	1554	2016	2024	817	190	83	12
2000	45590	434	1566	913	2700	1333	1604	192	106	31
2001	43514	611	1438	4946	1165	1855	748	618	127	29
2002	43329	133	3976	3964	6888	520	682	246	177	25
2003	40309	141	1494	6560	2373	2263	197	212	124	35
2004	37238	43	1200	5089	5116	1035	762	113	116	53
2005	34062	188	1189	4039	7266	3130	320	291	7	43
2006	26337	140	1176	2410	2584	3700	1376	268	85	14
2007	25882	204	879	2913	1815	1034	1215	435	110	19
2008	26284	796	762	947	2641	1063	726	611	156	51
2009	70987	154	4082	3377	1283	3612	1402	1153	751	195
2010	59906	459	2019	3586	737	657	1325	814	518	245
2011	62980	397	1936	1367	1257	323	356	488	366	310
2012	71947	366	5652	2332	756	554	187	189	252	143

Table 6.3.2. Faroe saithe (Division Vb). Diagnostics from XSA with commercial pair trawler tuning series (spaly)

```
FLR XSA Diagnostics 2013-04-18 13:56:40

CPUE data from indices

Catch data for 52 years 1961 to 2012. Ages 3 to 14.

                fleet first age last age first year last year alpha beta
1 PairTrawlers_GLM_SD         3       11       1995      2012  <NA> <NA>


 Time series weights :

    Tapered time weighting not applied

 Catchability analysis :

     Catchability independent of size for all ages

     Catchability independent of age for ages >   8

 Terminal population estimation :

     Survivor estimates shrunk towards the mean F
    of the final   5 years or the  3 oldest ages.

    S.E. of the mean to which the estimates are shrunk =   2

    Minimum standard error for population
    estimates derived from each fleet =  0.3

    prior weighting not applied

Regression weights
     year
age   2003 2004 2005 2006 2007 2008 2009 2010 2011 2012
  all    1    1    1    1    1    1    1    1    1    1


 Fishing mortalities
    year
age   2003  2004  2005  2006  2007  2008  2009  2010  2011  2012
  3  0.006 0.002 0.007 0.078 0.051 0.178 0.038 0.096 0.028 0.033
  4  0.032 0.043 0.077 0.104 0.253 0.274 0.458 0.357 0.154 0.207
  5  0.280 0.148 0.294 0.298 0.356 0.479 0.961 0.709 0.419 0.378
  6  0.462 0.371 0.477 0.415 0.435 0.568 0.485 0.590 0.546 0.545
  7  0.698 0.480 0.587 0.621 0.368 0.462 0.723 0.541 0.524 0.605
  8  0.602 0.733 0.355 0.726 0.577 0.385 0.512 0.746 0.602 0.796
  9  0.483 1.023 0.895 0.503 0.762 0.606 0.574 0.709 0.590 0.910
  10 0.693 0.756 0.305 0.957 0.706 0.516 0.758 0.625 0.726 0.845
  11 0.524 0.882 0.655 0.572 0.827 0.674 0.781 0.669 0.798 0.883
  12 1.242 2.573 0.385 0.143 0.392 0.265 0.361 0.291 0.540 0.643
  13 0.794 1.393 0.586 0.294 0.151 0.385 0.097 0.335 0.311 0.891
  14 0.794 1.393 0.586 0.294 0.151 0.385 0.097 0.335 0.311 0.891


 XSA population number (Thousand)
      age
year       3     4     5     6     7     8    9   10  11  12  13 14
  2003 64469 86426 50522 11934  9435  1019 1209  672 247  62   6  0
  2004 53818 52484 68559 31273  6157  3845  457  610 275 120  15  3
  2005 69512 43994 41151 48400 17676  3118 1513  135 235  93   7  0
  2006 21689 56501 33352 25108 24601  8048 1790  506  81 100  52 22
  2007 18407 16423 41694 20265 13579 10825 3187  886 159  38  71 24
  2008 32493 14319 10442 23907 10735  7696 4978 1218 358  57  21  0
  2009 13607 22275  8911  5293 11095  5537 4290 2222 595 150  36 12
  2010 27987 10725 11530  2791  2667  4409 2715 1977 852 223  85  0
  2011 73259 20811  6142  4646  1267  1271 1711 1094 866 357 137 16
  2012 28991 58296 14604  3307  2203   614  570  777 433 319 171 39
```

```
 Estimated population abundance at 1st Jan  2013
      age
year     3     4     5    6    7   8   9  10  11  12  13 14
  2013 273 22955 38795 8193 1570 985 227 188 273 147 137 57


 Fleet:  PairTrawlers_GLM_SD

 Log catchability residuals.

    year
age    1995   1996   1997   1998   1999   2000  2001   2002   2003   2004
  3  -0.301  0.594  0.136  0.494 -0.775  0.628 0.112 -1.599 -0.971 -1.901
  4   0.068 -0.620 -0.421 -0.514 -0.065 -0.453 0.040  0.170 -0.986 -0.621
  5   0.476 -0.619 -0.651 -0.400 -0.604 -0.156 0.064  0.431  0.094 -0.447
  6  -0.191 -0.165 -0.079 -0.669 -0.038  0.022 0.348  0.657  0.203  0.046
  7   0.141 -0.403  0.208  0.040 -0.177 -0.036 0.316  0.205  0.346 -0.025
  8   0.065  0.130  0.079 -0.053  0.540  0.244 0.090  0.125 -0.032  0.128
  9  -0.070  0.378 -0.036  0.230 -0.047 -0.144 0.374 -0.203 -0.181  0.469
  10 -0.381  1.043  0.042  0.155  0.203  0.221 0.496  0.266 -0.040  0.096
  11 -0.073  0.146 -0.427 -0.087 -0.583  0.089 0.013 -0.057 -0.375  0.161
    year
age    2005   2006   2007   2008   2009   2010   2011   2012
  3  -0.590  0.571  1.117  1.954  0.122  0.691 -0.499  0.216
  4  -0.349 -0.340  0.692  0.681  1.007  1.158  0.310  0.243
  5  -0.010 -0.057 -0.047  0.254  0.894  0.762  0.250 -0.233
  6   0.097 -0.051 -0.163  0.090 -0.154  0.147  0.102 -0.200
  7   0.163  0.272 -0.503 -0.214  0.096 -0.091 -0.114 -0.226
  8  -0.606  0.324 -0.143 -0.418 -0.367  0.075 -0.107 -0.074
  9   0.255  0.095  0.132 -0.056 -0.280  0.057 -0.094  0.059
  10 -1.308  0.402  0.012 -0.053  0.028 -0.114  0.124  0.010
  11  0.106  0.266  0.025  0.120  0.006 -0.002  0.222  0.043


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

                3        4        5        6        7        8        9
Mean_Logq -15.6573 -13.5631 -12.5100 -12.1099 -11.9627 -11.8417 -11.8417
S.E_Logq    0.9505   0.5999   0.4569   0.2721   0.2429   0.2709   0.2168
               10       11
Mean_Logq -11.8417 -11.8417
S.E_Logq    0.4538   0.2267


 Terminal year survivor and F summaries:

 ,Age 3 Year class =2009

source
                    scaledWts survivors yrcls
PairTrawlers_GLM_SD     0.802     28487  2009
fshk                    0.198      9559  2009

 ,Age 4 Year class =2008

source
                    scaledWts survivors yrcls
PairTrawlers_GLM_SD     0.895     49446  2008
fshk                    0.105     25423  2008

 ,Age 5 Year class =2007

source
                    scaledWts survivors yrcls
PairTrawlers_GLM_SD     0.926      6489  2007
fshk                    0.074      4682  2007

 ,Age 6 Year class =2006

source
                    scaledWts survivors yrcls
```

```
PairTrawlers_GLM_SD     0.963      1285  2006
fshk                    0.037      1631  2006

 ,Age 7 Year class =2005

source
                    scaledWts survivors yrcls
PairTrawlers_GLM_SD      0.96       786  2005
fshk                     0.04      1177  2005

 ,Age 8 Year class =2004

source
                    scaledWts survivors yrcls
PairTrawlers_GLM_SD     0.952       211  2004
fshk                    0.048       360  2004

 ,Age 9 Year class =2003

source
                    scaledWts survivors yrcls
PairTrawlers_GLM_SD     0.947       199  2003
fshk                    0.053       302  2003

 ,Age 10 Year class =2002

source
                    scaledWts survivors yrcls
PairTrawlers_GLM_SD     0.885       276  2002
fshk                    0.115       378  2002

 ,Age 11 Year class =2001

source
                    scaledWts survivors yrcls
PairTrawlers_GLM_SD     0.948       153  2001
fshk                    0.052       184  2001

 ,Age 12 Year class =2000

source
     scaledWts survivors yrcls
fshk         1       275  2000

 ,Age 13 Year class =1999

source
     scaledWts survivors yrcls
fshk         1        67  1999
```

Table 6.3.3. Faroe saithe (Division Vb). Diagnostics from XSA calibrated with commercial pair trawler and the spring series (proposed)

```
FLR XSA Diagnostics 2013-04-19 14:46:42

CPUE data from indices

Catch data for 52 years 1961 to 2012. Ages 3 to 14.

                                      fleet first age last age first year
1 Spring survey (shifted back to december)         3       10       1993
2                      PairTrawlers_GLM_SD         3       11       1995
  last year alpha beta
1      2012  <NA> <NA>
2      2012  <NA> <NA>


 Time series weights :

    Tapered time weighting not applied

 Catchability analysis :

     Catchability independent of size for all ages

     Catchability independent of age for ages >   8

 Terminal population estimation :

     Survivor estimates shrunk towards the mean F
    of the final   5 years or the  3 oldest ages.

    S.E. of the mean to which the estimates are shrunk =   2

    Minimum standard error for population
    estimates derived from each fleet =  0.3

    prior weighting not applied

Regression weights
     year
age   2003 2004 2005 2006 2007 2008 2009 2010 2011 2012
  all    1    1    1    1    1    1    1    1    1    1


 Fishing mortalities
    year
age   2003  2004  2005  2006  2007  2008  2009  2010  2011  2012
  3  0.006 0.002 0.007 0.078 0.051 0.178 0.036 0.078 0.031 0.036
  4  0.032 0.043 0.077 0.104 0.253 0.271 0.461 0.339 0.123 0.229
  5  0.278 0.148 0.295 0.298 0.358 0.479 0.939 0.716 0.388 0.283
  6  0.461 0.368 0.477 0.416 0.435 0.571 0.485 0.563 0.557 0.483
  7  0.699 0.479 0.581 0.621 0.370 0.461 0.732 0.541 0.484 0.627
  8  0.576 0.735 0.354 0.712 0.577 0.388 0.511 0.766 0.601 0.684
  9  0.493 0.927 0.902 0.500 0.732 0.606 0.583 0.706 0.621 0.905
  10 0.696 0.786 0.255 0.974 0.699 0.479 0.758 0.643 0.720 0.944
  11 0.523 0.891 0.710 0.439 0.863 0.661 0.680 0.669 0.847 0.868
  12 1.160 2.560 0.393 0.161 0.263 0.285 0.349 0.233 0.540 0.728
  13 0.768 1.106 0.575 0.303 0.174 0.224 0.106 0.320 0.232 0.890
  14 0.768 1.106 0.575 0.303 0.174 0.224 0.106 0.320 0.232 0.890
```

XSA population number (Thousand)

year \ age	3	4	5	6	7	8	9	10	11	12	13	14
2003	64309	86426	50716	11948	9425	1053	1189	670	247	64	6	0
2004	53842	52353	68559	31432	6168	3838	485	595	274	120	17	3
2005	69304	44013	41044	48401	17806	3127	1507	157	222	92	8	0
2006	21694	56331	33367	25020	24601	8155	1798	501	100	89	51	21
2007	18587	16427	41555	20278	13507	10826	3275	893	155	53	62	21
2008	32370	14466	10445	23793	10746	7637	4978	1289	363	53	33	0
2009	14193	22173	9031	5296	11002	5546	4241	2222	654	154	33	11
2010	34054	11205	11447	2890	2670	4332	2723	1938	852	271	89	0
2011	67088	25779	6535	4578	1348	1273	1648	1100	834	358	176	21
2012	27276	53244	18671	3629	2148	680	572	725	438	293	171	39

Estimated population abundance at 1st Jan 2013

year \ age	3	4	5	6	7	8	9	10	11	12	13	14
2013	0	21551	34658	11523	1834	940	281	189	231	151	116	57

Fleet: Spring survey (shifted back to december)

Log catchability residuals.

age \ year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
3	-0.812	-0.273	-2.056	-1.343	-0.231	0.352	-1.244	0.580	-1.161	-0.476
4	0.598	0.025	-0.494	-2.329	0.319	-1.451	0.077	-1.505	2.164	-0.898
5	-0.041	0.595	-1.500	-0.827	-0.616	-0.206	-1.320	0.967	0.591	1.201
6	0.622	1.036	-1.129	-1.242	0.979	-0.909	0.457	-1.160	2.453	-0.194
7	-0.166	1.360	-0.140	-0.645	0.454	1.043	-0.249	0.154	-0.336	1.615
8	-0.475	0.358	0.262	0.236	0.422	-0.184	1.603	-0.546	0.314	-0.634
9	-0.420	0.022	0.410	0.113	1.503	0.041	-0.534	0.851	-0.071	-0.489
10	0.126	-0.264	-0.483	0.959	0.841	0.584	-0.247	0.191	1.008	0.428

age \ year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
3	-0.431	0.725	1.132	-0.013	3.265	1.309	-0.182	2.222	-1.182	-0.181
4	0.555	-0.417	-0.265	-1.513	0.319	2.938	-0.263	0.782	1.013	0.344
5	1.121	-0.362	-0.041	-0.183	-1.415	0.791	1.001	-0.614	0.689	0.168
6	1.838	0.746	-0.722	-1.128	0.011	-1.602	-0.602	0.344	-0.639	0.843
7	-0.363	1.470	0.495	-1.670	-0.918	-0.269	-0.882	-0.771	-0.026	-0.158
8	0.726	0.180	0.763	-0.490	-0.553	-0.842	-0.091	-1.467	-0.467	0.885
9	-1.697	1.467	-0.397	0.041	0.359	-0.258	-0.180	-0.366	-0.407	0.328
10	-0.164	-0.033	0.756	-0.376	-0.484	0.725	0.334	-0.513	0.191	0.095

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

	3	4	5	6	7	8	9	10
Mean_Logq	-8.7758	-7.7265	-7.1197	-6.7347	-6.846	-6.7660	-6.7660	-6.7660
S.E_Logq	1.2807	1.2437	0.8619	1.1137	0.860	0.7114	0.7143	0.5042

Fleet: PairTrawlers_GLM_SD

Log catchability residuals.

age \ year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
3	-0.296	0.601	0.144	0.493	-0.769	0.633	0.115	-1.593	-0.963	-1.895
4	0.078	-0.609	-0.410	-0.501	-0.062	-0.442	0.049	0.177	-0.975	-0.608
5	0.497	-0.599	-0.630	-0.378	-0.580	-0.144	0.086	0.451	0.111	-0.425
6	-0.182	-0.157	-0.072	-0.661	-0.029	0.034	0.343	0.666	0.210	0.049
7	0.143	-0.398	0.211	0.042	-0.174	-0.032	0.325	0.183	0.351	-0.024
8	0.065	0.137	0.091	-0.043	0.547	0.255	0.101	0.147	-0.065	0.141
9	-0.067	0.370	-0.031	0.244	-0.037	-0.139	0.384	-0.190	-0.151	0.382
10	-0.343	1.039	0.021	0.154	0.220	0.230	0.492	0.275	-0.025	0.145
11	-0.040	0.202	-0.440	-0.133	-0.591	0.113	0.021	-0.075	-0.366	0.182

year

age	2005	2006	2007	2008	2009	2010	2011	2012
3	-0.581	0.577	1.112	1.964	0.085	0.492	-0.404	0.284
4	-0.338	-0.326	0.702	0.680	1.024	1.117	0.091	0.354
5	0.014	-0.037	-0.022	0.274	0.893	0.793	0.196	-0.501
6	0.106	-0.038	-0.155	0.105	-0.146	0.109	0.130	-0.312
7	0.157	0.275	-0.493	-0.212	0.112	-0.089	-0.191	-0.188
8	-0.600	0.315	-0.133	-0.398	-0.359	0.111	-0.099	-0.213
9	0.272	0.100	0.102	-0.046	-0.255	0.063	-0.033	0.064
10	-1.475	0.430	0.013	-0.117	0.038	-0.076	0.126	0.129
11	0.196	0.014	0.078	0.111	-0.120	0.008	0.290	0.035

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

	3	4	5	6	7	8	9
Mean_Logq	-15.6632	-13.5737	-12.5312	-12.1185	-11.9660	-11.8519	-11.8519
S.E_Logq	0.9404	0.5918	0.4667	0.2770	0.2426	0.2749	0.2010

	10	11
Mean_Logq	-11.8519	-11.8519
S.E_Logq	0.4843	0.2339

Terminal year survivor and F summaries:

,Age 3 Year class =2009

source

	scaledWts	survivors	yrcls
Spring survey (shifted back to december)	0.304	17984	2009
PairTrawlers_GLM_SD	0.561	28624	2009
fshk	0.136	9999	2009

,Age 4 Year class =2008

source

	scaledWts	survivors	yrcls
Spring survey (shifted back to december)	0.169	48893	2008
PairTrawlers_GLM_SD	0.744	49387	2008
fshk	0.087	26454	2008

,Age 5 Year class =2007

source

	scaledWts	survivors	yrcls
Spring survey (shifted back to december)	0.215	13633	2007
PairTrawlers_GLM_SD	0.729	6982	2007
fshk	0.056	4776	2007

,Age 6 Year class =2006

source

	scaledWts	survivors	yrcls
Spring survey (shifted back to december)	0.063	4259	2006
PairTrawlers_GLM_SD	0.905	1342	2006
fshk	0.033	1642	2006

,Age 7 Year class =2005

source

	scaledWts	survivors	yrcls
Spring survey (shifted back to december)	0.100	803	2005
PairTrawlers_GLM_SD	0.864	779	2005
fshk	0.036	1195	2005

,Age 8 Year class =2004

source

	scaledWts	survivors	yrcls
Spring survey (shifted back to december)	0.140	681	2004
PairTrawlers_GLM_SD	0.824	227	2004
fshk	0.037	356	2004

```
 ,Age 9 Year class =2003

source
                                        scaledWts survivors yrcls
Spring survey (shifted back to december)     0.137       263  2003
PairTrawlers_GLM_SD                          0.817       202  2003
fshk                                         0.045       301  2003

 ,Age 10 Year class =2002

source
                                        scaledWts survivors yrcls
Spring survey (shifted back to december)     0.417       254  2002
PairTrawlers_GLM_SD                          0.501       263  2002
fshk                                         0.082       383  2002

 ,Age 11 Year class =2001

source
                   scaledWts survivors yrcls
PairTrawlers_GLM_SD     0.949       156  2001
fshk                    0.051       186  2001

 ,Age 12 Year class =2000

source
     scaledWts survivors yrcls
fshk         1       310  2000

 ,Age 13 Year class =1999

source
     scaledWts survivors yrcls
fshk         1        61  1999
```

Table 6.5.1. Faroe saithe (Division Vb). Stock number at age (start of year) (Thousands)(1961-2012)

year	3	4	5	6	7	8	9	10	11	12	13	14
1961	0.026	0.058	0.109	0.143	0.120	0.100	0.110	0.106	0.112	0.181	0.134	0.134
1962	0.052	0.101	0.127	0.156	0.143	0.099	0.138	0.149	0.125	0.098	0.124	0.124
1963	0.035	0.040	0.085	0.118	0.185	0.142	0.185	0.250	0.178	0.491	0.308	0.308
1964	0.052	0.144	0.251	0.218	0.236	0.301	0.180	0.241	0.248	0.235	0.243	0.243
1965	0.050	0.085	0.186	0.253	0.283	0.263	0.370	0.316	0.424	0.532	0.427	0.427
1966	0.026	0.103	0.167	0.283	0.348	0.350	0.308	0.456	0.433	0.493	0.464	0.464
1967	0.027	0.053	0.125	0.158	0.332	0.354	0.349	0.335	0.407	0.384	0.378	0.378
1968	0.030	0.099	0.098	0.140	0.156	0.307	0.326	0.358	0.258	0.467	0.363	0.363
1969	0.034	0.136	0.189	0.175	0.207	0.250	0.493	0.586	0.639	0.518	0.586	0.586
1970	0.044	0.262	0.142	0.179	0.160	0.202	0.206	0.390	0.431	0.609	0.480	0.480
1971	0.086	0.135	0.373	0.128	0.144	0.117	0.130	0.157	0.277	0.534	0.325	0.325
1972	0.094	0.070	0.148	0.316	0.293	0.354	0.400	0.490	0.541	0.730	0.592	0.592
1973	0.125	0.325	0.438	0.304	0.315	0.209	0.246	0.272	0.253	0.320	0.283	0.283
1974	0.222	0.311	0.358	0.307	0.192	0.195	0.164	0.237	0.207	0.227	0.225	0.225
1975	0.141	0.345	0.528	0.293	0.180	0.141	0.132	0.120	0.205	0.198	0.175	0.175
1976	0.196	0.340	0.298	0.328	0.208	0.160	0.129	0.137	0.122	0.149	0.136	0.136
1977	0.146	0.281	0.376	0.382	0.344	0.259	0.179	0.130	0.246	0.156	0.178	0.178
1978	0.085	0.233	0.267	0.163	0.180	0.375	0.272	0.259	0.228	0.307	0.266	0.266
1979	0.037	0.180	0.283	0.251	0.261	0.310	0.338	0.490	0.329	0.172	0.333	0.333
1980	0.088	0.153	0.205	0.224	0.281	0.195	0.258	0.415	0.386	0.226	0.344	0.344
1981	0.014	0.227	0.194	0.447	0.533	0.512	0.383	0.394	0.412	0.471	0.429	0.429
1982	0.028	0.184	0.188	0.477	0.329	0.502	0.399	0.191	0.315	0.477	0.330	0.330
1983	0.070	0.103	0.366	0.419	0.486	0.552	0.736	0.221	0.275	0.711	0.405	0.405
1984	0.016	0.498	0.332	0.575	0.535	0.451	0.558	0.292	0.224	0.265	0.262	0.262
1985	0.062	0.235	0.507	0.276	0.579	0.314	0.304	0.243	0.232	0.415	0.298	0.298
1986	0.021	0.138	0.452	0.774	0.375	0.785	0.518	0.578	0.895	0.518	0.670	0.670
1987	0.037	0.138	0.423	0.570	0.476	0.372	0.598	0.320	0.503	0.141	0.323	0.323
1988	0.022	0.089	0.354	0.631	0.576	0.629	0.470	0.649	0.167	1.598	0.813	0.813
1989	0.018	0.204	0.228	0.491	0.366	0.510	0.383	0.184	0.488	0.086	0.254	0.254
1990	0.016	0.203	0.628	0.786	0.797	0.392	0.202	0.208	0.196	0.290	0.232	0.232
1991	0.047	0.414	0.767	0.880	0.802	0.652	0.689	0.755	0.900	0.414	0.696	0.696
1992	0.030	0.262	0.595	0.707	0.556	0.487	0.548	0.459	0.453	0.725	0.550	0.550
1993	0.063	0.206	0.547	0.599	0.514	0.394	0.484	0.441	0.374	0.475	0.433	0.433
1994	0.046	0.274	0.334	0.596	0.597	0.650	0.459	0.722	0.535	0.339	0.536	0.536
1995	0.011	0.089	0.411	0.407	0.683	0.618	0.774	0.590	0.587	0.545	0.579	0.579
1996	0.014	0.039	0.137	0.300	0.488	0.755	0.510	0.609	0.396	0.548	0.434	0.434
1997	0.011	0.048	0.115	0.324	0.500	0.537	0.573	0.575	0.488	0.589	0.855	0.855
1998	0.014	0.072	0.150	0.238	0.454	0.520	0.716	0.581	0.558	1.352	0.674	0.674
1999	0.006	0.072	0.182	0.303	0.492	0.626	0.623	0.715	0.357	1.466	0.981	0.981
2000	0.025	0.068	0.233	0.420	0.473	0.722	0.518	0.728	0.665	0.499	0.359	0.359
2001	0.014	0.100	0.294	0.627	0.771	0.715	1.001	1.195	1.001	0.683	1.793	1.793
2002	0.003	0.140	0.373	0.662	0.554	0.680	0.487	0.845	0.381	1.835	0.509	0.509
2003	0.006	0.032	0.278	0.461	0.699	0.576	0.493	0.696	0.523	1.160	0.768	0.768
2004	0.002	0.043	0.148	0.368	0.479	0.735	0.927	0.786	0.891	2.560	1.106	1.106
2005	0.007	0.077	0.295	0.477	0.581	0.354	0.902	0.255	0.710	0.393	0.575	0.575
2006	0.078	0.104	0.298	0.416	0.621	0.712	0.500	0.974	0.439	0.161	0.303	0.303
2007	0.051	0.253	0.358	0.435	0.370	0.577	0.732	0.699	0.863	0.263	0.174	0.174
2008	0.178	0.271	0.479	0.571	0.461	0.388	0.606	0.479	0.661	0.285	0.224	0.224
2009	0.036	0.461	0.939	0.485	0.732	0.511	0.583	0.758	0.680	0.349	0.106	0.106
2010	0.078	0.339	0.716	0.563	0.541	0.766	0.706	0.643	0.669	0.233	0.32	0.32
2011	0.031	0.123	0.388	0.557	0.484	0.601	0.621	0.72	0.847	0.54	0.232	0.232
2012	0.036	0.229	0.283	0.483	0.627	0.684	0.905	0.944	0.868	0.728	0.89	0.89

Table 6.3.2. Faroe saithe (Division Vb). Stock number at age (start of year) (Thousands)(1961-2012)

year	3	4	5	6	7	8	9	10	11	12	13	14+
1961	7827	7422	5158	3352	2114	1494	1233	905	468	180	53	431
1962	12256	6243	5734	3786	2379	1535	1107	904	666	343	123	593
1963	19837	9526	4621	4136	2652	1689	1138	789	638	481	254	182
1964	14812	15686	7492	3476	3011	1804	1200	775	503	437	241	224
1965	22363	11508	11116	4771	2287	1947	1093	821	498	322	283	240
1966	21229	17408	8653	7555	3033	1411	1226	618	490	267	155	233
1967	24898	16940	12859	5998	4660	1754	814	738	321	260	134	94
1968	22879	19846	13149	9294	4194	2737	1008	470	432	175	145	317
1969	39799	18177	14720	9755	6618	2938	1648	595	269	273	90	133
1970	37092	31507	12994	9976	6708	4407	1872	825	271	116	133	109
1971	38447	29061	19844	9229	6831	4678	2948	1247	457	144	52	131
1972	33425	28892	20793	11194	6647	4843	3406	2118	873	284	69	120
1973	23622	24910	22050	14682	6684	4058	2784	1868	1062	416	112	258
1974	19421	17064	14737	11651	8874	3994	2696	1782	1165	675	247	525
1975	17327	12730	10238	8436	7020	5997	2691	1874	1151	776	440	740
1976	19709	12321	7381	4943	5152	4802	4264	1930	1361	768	521	1133
1977	13106	13261	7176	4487	2916	3425	3352	3068	1378	986	542	816
1978	8333	9275	8200	4035	2508	1693	2163	2293	2206	882	691	837
1979	8686	6270	6016	5143	2808	1716	953	1350	1450	1438	531	1354
1980	13076	6852	4289	3712	3276	1770	1030	557	677	854	991	1390
1981	33146	9805	4817	2860	2430	2025	1193	652	301	377	558	2253
1982	15679	26766	6395	3248	1498	1168	994	666	360	163	193	3113
1983	40832	12487	18226	4336	1651	883	579	546	450	215	83	1368
1984	26077	31184	9225	10351	2335	831	416	227	358	280	86	840
1985	22332	21017	15517	5419	4771	1120	434	195	139	234	176	690
1986	61930	17177	13597	7653	3367	2189	670	262	125	90	127	154
1987	48579	49648	12256	7085	2891	1894	817	327	120	42	44	322
1988	44793	38342	35406	6572	3281	1471	1069	368	194	60	30	4
1989	28607	35890	28723	20343	2861	1510	642	547	157	135	10	132
1990	20725	23013	23972	18721	10198	1625	742	358	373	79	101	223
1991	24976	16703	15373	10470	6985	3762	899	496	238	251	48	41
1992	19546	19517	9038	5844	3556	2564	1605	370	191	79	136	49
1993	23779	15531	12299	4081	2360	1669	1290	760	191	99	31	25
1994	16887	18278	10353	5827	1835	1156	921	651	400	108	51	5
1995	38970	13201	11381	6067	2628	827	494	476	259	192	63	47
1996	24299	31546	9886	6180	3306	1087	365	187	216	118	91	25
1997	33409	19626	24844	7057	3748	1661	418	180	83	119	56	44
1998	12833	27041	15315	18133	4179	1861	795	193	83	42	54	47
1999	58769	10359	20611	10789	11702	2174	906	318	88	39	9	64
2000	35806	47824	7889	14074	6525	5859	952	398	127	51	7	18
2001	88241	28582	36594	5116	7569	3328	2331	464	157	54	25	17
2002	105895	71227	21182	22327	2239	2867	1332	702	115	47	22	3
2003	64309	86426	50716	11948	9425	1053	1189	670	247	64	6	0
2004	53842	52353	68559	31432	6168	3838	485	595	274	120	17	3
2005	69304	44013	41044	48401	17806	3127	1507	157	222	92	8	0
2006	21694	56331	33367	25020	24601	8155	1798	501	100	89	51	21
2007	18587	16427	41555	20278	13507	10826	3275	893	155	53	62	21
2008	32370	14466	10445	23793	10746	7637	4978	1289	363	53	33	0
2009	14193	22173	9031	5296	11002	5546	4241	2222	654	154	33	11
2010	34054	11205	11447	2890	2670	4332	2723	1938	852	271	89	0
2011	67088	25779	6535	4578	1348	1273	1648	1100	834	358	176	21.2
2012	27276	53244	18671	3629	2148	680.2	572	725	438	293	171	38.7

Table 6.3.3. Faroe saithe (Division Vb). Summary table.

year	Recruits (age 3)	SSB (tonnes)	Yield (tonnes)	Yield/SSB	Fbar(4-8)
1961	7827	68552	9592	0.13	0.106
1962	12256	72979	10454	0.15	0.125
1963	19837	76518	12693	0.17	0.114
1964	14811	81092	21893	0.27	0.23
1965	22362	84947	22181	0.28	0.214
1966	21229	87493	25563	0.3	0.25
1967	24897	85639	21319	0.24	0.204
1968	22879	94142	20387	0.21	0.16
1969	39798	103696	27437	0.27	0.191
1970	37092	109878	29110	0.27	0.189
1971	38446	122171	32706	0.24	0.179
1972	33424	138220	42663	0.31	0.236
1973	23621	130941	57431	0.44	0.318
1974	19420	134185	47188	0.35	0.272
1975	17327	135578	41576	0.31	0.297
1976	19709	129108	33065	0.26	0.267
1977	13106	122239	34835	0.27	0.328
1978	8333	105354	28138	0.27	0.243
1979	8686	96141	27246	0.28	0.257
1980	13076	96289	25230	0.26	0.211
1981	33145	85131	30103	0.37	0.382
1982	15679	94509	30964	0.34	0.336
1983	40832	97972	39176	0.4	0.385
1984	26077	104944	54665	0.52	0.478
1985	22332	110215	44605	0.43	0.382
1986	61929	93615	41716	0.47	0.505
1987	48578	96506	40020	0.43	0.396
1988	44792	102237	45285	0.45	0.456
1989	28606	105089	44477	0.44	0.36
1990	20725	101341	61628	0.62	0.561
1991	24976	76169	54858	0.72	0.703
1992	19545	60720	36487	0.57	0.521
1993	23779	59634	33543	0.55	0.452
1994	16886	58021	33182	0.56	0.49
1995	38970	55087	27209	0.48	0.442
1996	24299	59736	20029	0.32	0.344
1997	33408	68536	22306	0.33	0.305
1998	12832	74296	26421	0.35	0.287
1999	58768	78637	33207	0.41	0.335
2000	35806	81238	39020	0.47	0.383
2001	88240	83704	51786	0.62	0.501
2002	105894	80761	53546	0.66	0.482
2003	64309	96878	46555	0.48	0.409
2004	53841	113075	46355	0.41	0.355
2005	69303	127556	67967	0.53	0.357
2006	21694	126311	66902	0.53	0.43
2007	18586	120640	60785	0.51	0.399
2008	32369	104598	57044	0.54	0.434
2009	14192	92826	57949	0.62	0.626
2010	34054	67730	43885	0.65	0.585
2011	67087	56549	29087	0.51	0.43
2012	27276	57021	35463	0.62	0.461
2013	**28711**	**74207**	**44021**		**0.4459**
2014	**28711**	**83059**	**46705**		**0.4459**
2015	**28711**	**82014**			
Arith	31672.02	93585.46	37441.00	0.41	0.35

Table 6.6.1.1a. Faroe saithe (Division Vb). Input data for prediction with management options for the proposed XSA model calibrated with commercial and spring series.

2013								
Age	**N**	**M**	**Mat**	**PF**	**PM**	**SWt**	**Sel**	**CWt**
3	28711	0.2	0.01	0	0	1.311	0.034	1.311
4	21542	0.2	0.21	0	0	1.388	0.176	1.388
5	34670	0.2	0.43	0	0	2.111	0.336	2.111
6	11519	0.2	0.65	0	0	2.807	0.520	2.807
7	1833	0.2	0.84	0	0	3.634	0.556	3.634
8	939	0.2	0.95	0	0	4.492	0.643	4.492
9	281	0.2	0.97	0	0	4.434	0.763	4.434
10	189	0.2	1.00	0	0	4.882	0.832	4.882
11	231	0.2	1.00	0	0	5.354	0.858	5.354
12	151	0.2	1.00	0	0	5.682	1.000	5.682
13	116	0.2	1.00	0	0	6.404	1.000	6.404
14	70	0.2	1.00	0	0	10.000	1.000	10.000
2014								
Age	**N**	**M**	**Mat**	**PF**	**PM**	**SWt**	**Sel**	**CWt**
3	28711	0.2	0.01	0	0	1.311	0.0335	1.311
4	-	0.2	0.21	0	0	1.388	0.176	1.388
5	-	0.2	0.44	0	0	2.111	0.3355	2.111
6	-	0.2	0.66	0	0	2.807	0.52	2.807
7	-	0.2	0.84	0	0	3.634	0.5555	3.634
8	-	0.2	0.95	0	0	4.492	0.6425	4.492
9	-	0.2	0.97	0	0	4.434	0.763	4.434
10	-	0.2	1.00	0	0	4.882	0.832	4.882
11	-	0.2	1.00	0	0	5.354	0.8575	5.354
12	-	0.2	1.00	0	0	5.682	1.000	5.682
13	-	0.2	1.00	0	0	6.404	1.000	6.404
14	-	0.2	1.00	0	0	10.000	1.000	10.000
2015								
Age	**N**	**M**	**Mat**	**PF**	**PM**	**SWt**	**Sel**	**CWt**
3	28711	0.2	0.01	0	0	1.311	0.034	1.311
4	-	0.2	0.21	0	0	1.388	0.176	1.388
5	-	0.2	0.44	0	0	2.111	0.336	2.111
6	-	0.2	0.66	0	0	2.807	0.520	2.807
7	-	0.2	0.84	0	0	3.634	0.556	3.634
8	-	0.2	0.95	0	0	4.492	0.643	4.492
9	-	0.2	0.97	0	0	4.434	0.763	4.434
10	-	0.2	1.00	0	0	4.882	0.832	4.882
11	-	0.2	1.00	0	0	5.354	0.858	5.354
12	-	0.2	1.00	0	0	5.682	1.000	5.682
13	-	0.2	1.00	0	0	6.404	1.000	6.404
14	-	0.2	1.00	0	0	10.000	1.000	10.000
Input units are thousands and kg - output in tonnes								

Table 6.6.2.1a. Faroe saithe (Division Vb). Prediction with management option for the proposed XSA model calibrated with commercial and spring series.

2013						
Biomass	SSB	FMult	FBar	Landings		
189651	74207	1.000	0.446	44021		
2014					2015	
Biomass	SSB	FMult	FBar	Landings	Biomass	SSB
185609	83059	0.0000	0.0000	0	231148	123765
.	83059	0.1000	0.0446	5662	224579	118599
.	83059	0.2000	0.0892	11070	218310	113685
.	83059	0.3000	0.1338	16236	212327	109010
.	83059	0.4000	0.1784	21173	206614	104562
.	83059	0.5000	0.2230	25892	201158	100329
.	83059	0.6000	0.2675	30404	195946	96300
.	83059	0.7000	0.3121	34719	190965	92463
.	83059	0.8000	0.3567	38848	186205	88810
.	83059	0.9000	0.4013	42799	181654	85330
.	83059	1.0000	0.4459	46582	177302	82014
.	83059	1.1000	0.4905	50204	173139	78855
.	83059	1.2000	0.5351	53673	169156	75844
.	83059	1.3000	0.5797	56997	165343	72974
.	83059	1.4000	0.6243	60183	161694	70237
.	83059	1.5000	0.6689	63238	158199	67627
.	83059	1.6000	0.7134	66167	154851	65138
.	83059	1.7000	0.7580	68977	151643	62762
.	83059	1.8000	0.8026	71673	148569	60496
.	83059	1.9000	0.8472	74262	145622	58332
.	83059	2.0000	0.8918	76747	142796	56267
Input units are thousands and kg - output in tonnes						

Table 6.6.1.1b. Faroe saithe (Division Vb). Input data for prediction with management options (spaly XSA).

2013								
Age	**N**	**M**	**Mat**	**PF**	**PM**	**SWt**	**Sel**	**CWt**
3	27827	0.2	0.01	0	0	1.311	0.031	1.311
4	22965	0.2	0.21	0	0	1.388	0.181	1.388
5	38805	0.2	0.43	0	0	2.111	0.399	2.111
6	8193	0.2	0.65	0	0	2.807	0.546	2.807
7	1570	0.2	0.84	0	0	3.634	0.565	3.634
8	985	0.2	0.95	0	0	4.492	0.699	4.492
9	227	0.2	0.97	0	0	4.434	0.750	4.434
10	188	0.2	1.00	0	0	4.882	0.786	4.882
11	273	0.2	1.00	0	0	5.354	0.841	5.354
12	147	0.2	1.00	0	0	5.682	1.000	5.682
13	137	0.2	1.00	0	0	6.404	1.000	6.404
14	70	0.2	1.00	0	0	10.000	1.000	10.000
2014								
Age	**N**	**M**	**Mat**	**PF**	**PM**	**SWt**	**Sel**	**CWt**
3	27827	0.2	0.01	0	0	1.311	0.0305	1.311
4	-	0.2	0.21	0	0	1.388	0.1805	1.388
5	-	0.2	0.44	0	0	2.111	0.3985	2.111
6	-	0.2	0.66	0	0	2.807	0.5455	2.807
7	-	0.2	0.84	0	0	3.634	0.5645	3.634
8	-	0.2	0.95	0	0	4.492	0.699	4.492
9	-	0.2	0.97	0	0	4.434	0.75	4.434
10	-	0.2	1.00	0	0	4.882	0.7855	4.882
11	-	0.2	1.00	0	0	5.354	0.8405	5.354
12	-	0.2	1.00	0	0	5.682	1.000	5.682
13	-	0.2	1.00	0	0	6.404	1.000	6.404
14	-	0.2	1.00	0	0	10.000	1.000	10.000
2015								
Age	**N**	**M**	**Mat**	**PF**	**PM**	**SWt**	**Sel**	**CWt**
3	27827	0.2	0.01	0	0	1.311	0.031	1.311
4	-	0.2	0.21	0	0	1.388	0.181	1.388
5	-	0.2	0.44	0	0	2.111	0.399	2.111
6	-	0.2	0.66	0	0	2.807	0.546	2.807
7	-	0.2	0.84	0	0	3.634	0.565	3.634
8	-	0.2	0.95	0	0	4.492	0.699	4.492
9	-	0.2	0.97	0	0	4.434	0.750	4.434
10	-	0.2	1.00	0	0	4.882	0.786	4.882
11	-	0.2	1.00	0	0	5.354	0.841	5.354
12	-	0.2	1.00	0	0	5.682	1.000	5.682
13	-	0.2	1.00	0	0	6.404	1.000	6.404
14	-	0.2	1.00	0	0	10.000	1.000	10.000
Input units are thousands and kg - output in tonnes								

Table 6.6.2.1b. Faroe saithe (Division Vb). Prediction with management options (spaly scenario).

2013						
Biomass	SSB	FMult	FBar	Landings		
189204	71784	1.000	0.478	46594		
2014					2015	
Biomass	SSB	FMult	FBar	Landings	Biomass	SSB
181607	79869	0.0000	0.0000	0	226293	120594
.	79869	0.1000	0.0478	5841	219486	115308
.	79869	0.2000	0.0955	11408	213004	110291
.	79869	0.3000	0.1433	16715	206830	105527
.	79869	0.4000	0.1910	21776	200948	101004
.	79869	0.5000	0.2388	26604	195343	96707
.	79869	0.6000	0.2866	31210	190001	92625
.	79869	0.7000	0.3343	35607	184908	88747
.	79869	0.8000	0.3821	39804	180050	85062
.	79869	0.9000	0.4298	43812	175417	81559
.	79869	1.0000	0.4776	47640	170997	78229
.	79869	1.1000	0.5254	51298	166778	75062
.	79869	1.2000	0.5731	54795	162750	72050
.	79869	1.3000	0.6209	58137	158904	69185
.	79869	1.4000	0.6686	61334	155231	66459
.	79869	1.5000	0.7164	64392	151722	63866
.	79869	1.6000	0.7642	67318	148369	61397
.	79869	1.7000	0.8119	70120	145163	59046
.	79869	1.8000	0.8597	72802	142098	56809
.	79869	1.9000	0.9074	75371	139167	54677
.	79869	2.0000	0.9552	77832	136363	52647
Input units are thousands and kg - output in tonnes						

Table 6.7.1.1. Faroe saithe (Division Vb). Yield per recruit input data.

Yield per recruit								
Input data								
	Age	M	Mat	PF	PM	SWt	Sel	CWt
	3	0.2	0.020	0	0	1.306	0.068	1.306
	4	0.2	0.202	0	0	1.692	0.289	1.692
	5	0.2	0.464	0	0	2.093	0.576	2.093
	6	0.2	0.702	0	0	2.678	0.522	2.678
	7	0.2	0.858	0	0	3.460	0.518	3.460
	8	0.2	0.949	0	0	4.359	0.569	4.359
	9	0.2	0.983	0	0	5.151	0.650	5.151
	10	0.2	1.000	0	0	5.936	0.660	5.936
	11	0.2	1.000	0	0	6.859	0.744	6.859
	12	0.2	1.000	0	0	7.532	0.334	7.532
	13	0.2	1.000	0	0	7.899	0.211	7.899
	14	0.2	1.000	0	0	8.970	0.211	8.970
Weights in kilograms								

Table 6.7.1.2. Faroe saithe (Division Vb). Yield per recruit, summary table.

Yield per recruit results									
FMult	Fbar	CatchNos	Yield	StockNos	Biomass	SpwnNosJ	SSBJan	SpwnNosS	SSBSpwn
0.0	0	0	0	5.499954	20.76975	16.86635	16.86635	16.86635	16.86635
0.1	0.049476	0.159547	0.584549	4.715266	15.62376	11.84369	11.84369	11.84369	11.84369
0.2	0.098952	0.269319	0.909557	4.173838	12.31488	8.64569	8.64569	8.64569	8.64569
0.3	0.148428	0.347997	1.091294	3.785459	10.11512	6.546035	6.546035	6.546035	6.546035
0.4	0.197904	0.406581	1.192969	3.496449	8.602128	5.123762	5.123762	5.123762	5.123762
0.5	0.24738	0.451733	1.249435	3.274059	7.525796	4.12996	4.12996	4.12996	4.12996
0.6	0.296856	0.487604	1.280162	3.097784	6.734847	3.414367	3.414367	3.414367	3.414367
0.7	0.346332	0.516852	1.29616	2.954433	6.135728	2.884298	2.884298	2.884298	2.884298
0.8	0.395808	0.541232	1.303721	2.835289	5.669231	2.481292	2.481292	2.481292	2.481292
0.9	0.445284	0.561934	1.306475	2.734425	5.296984	2.167615	2.167615	2.167615	2.167615
1.0	0.49476	0.579788	1.30653	2.647706	4.993503	1.918336	1.918336	1.918336	1.918336
1.1	0.544236	0.595388	1.305116	2.572168	4.741444	1.716589	1.716589	1.716589	1.716589
1.2	0.593712	0.60917	1.302955	2.505636	4.528714	1.550697	1.550697	1.550697	1.550697
1.3	0.643188	0.621463	1.300464	2.446476	4.346679	1.412386	1.412386	1.412386	1.412386
1.4	0.692664	0.632518	1.297885	2.393435	4.189038	1.29567	1.29567	1.29567	1.29567
1.5	0.74214	0.64253	1.295355	2.345537	4.051092	1.196129	1.196129	1.196129	1.196129
1.6	0.791616	0.651655	1.292944	2.302005	3.929275	1.110435	1.110435	1.110435	1.110435
1.7	0.841092	0.660019	1.290689	2.262216	3.820827	1.036044	1.036044	1.036044	1.036044
1.8	0.890568	0.667724	1.288602	2.225661	3.723582	0.970978	0.970978	0.970978	0.970978
1.9	0.940044	0.674854	1.286685	2.191922	3.635816	0.913679	0.913679	0.913679	0.913679
2.0	0.98952	0.681478	1.28493	2.16065	3.556139	0.862905	0.862905	0.862905	0.862905

Reference point	Absolute F
Fbar(4-8)	0.4948
FMax	0.4453
F0.1	0.1484
Flow	0.1225
Fmed	0.2938
Fhigh	0.6683

Table 6.7.1.2. Faroe saithe (Division Vb). Comparison between the spaly and proposed prognosis In the 2012 assessment and the actual values observed in 2013

	NWWG2012 Prediction Spaly	NWWG2012 Prediction Proposed	NWWG2013 Observed Spaly	NWWG2013 Observed Proposed
Recruitment	25596	25596	28991	27276
Fishing mortality	0.50	0.36	0.51	0.46
SSB	74151	74151	55251	57021
Landings	51123	32257	35463	35463

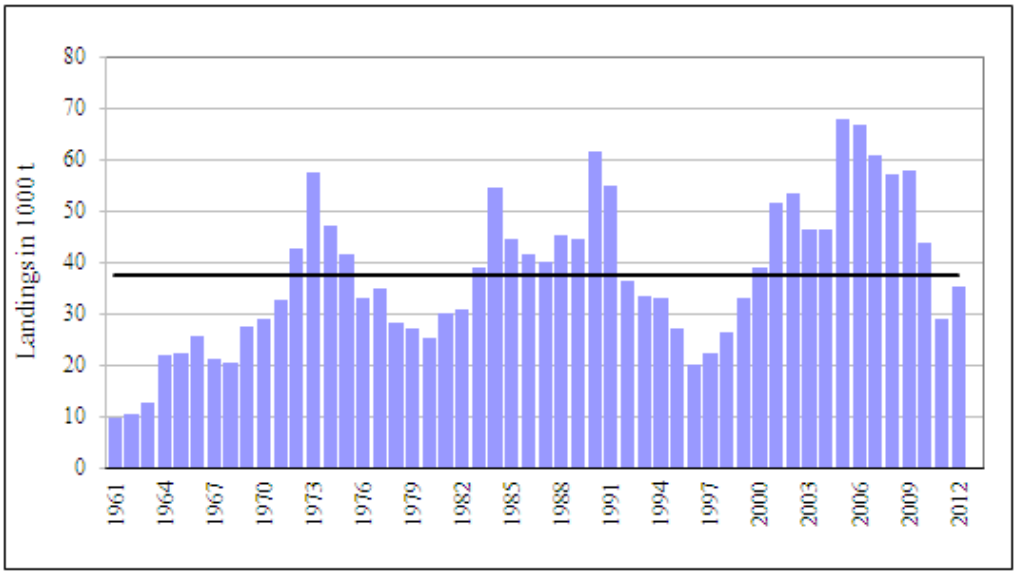

Figure 6.2.1.1. Faroe saithe (Division Vb). Landings in 1000 tonnes (1961-2012). Horizontal line represents historical average landings

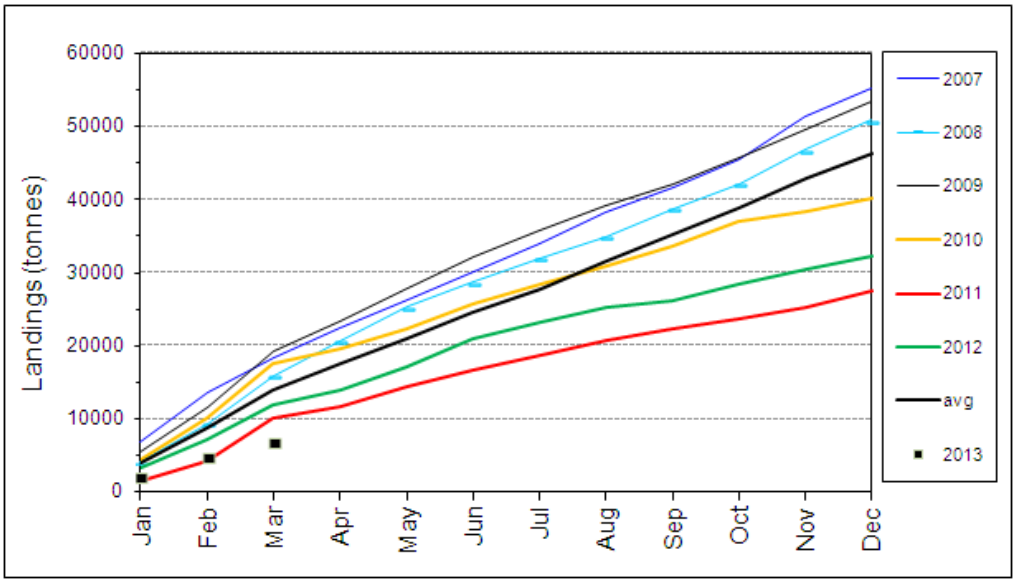

Figure 6.2.1.2. Saithe in the Faroes (Division Vb). Cumulative domestic landings (2007-2012)

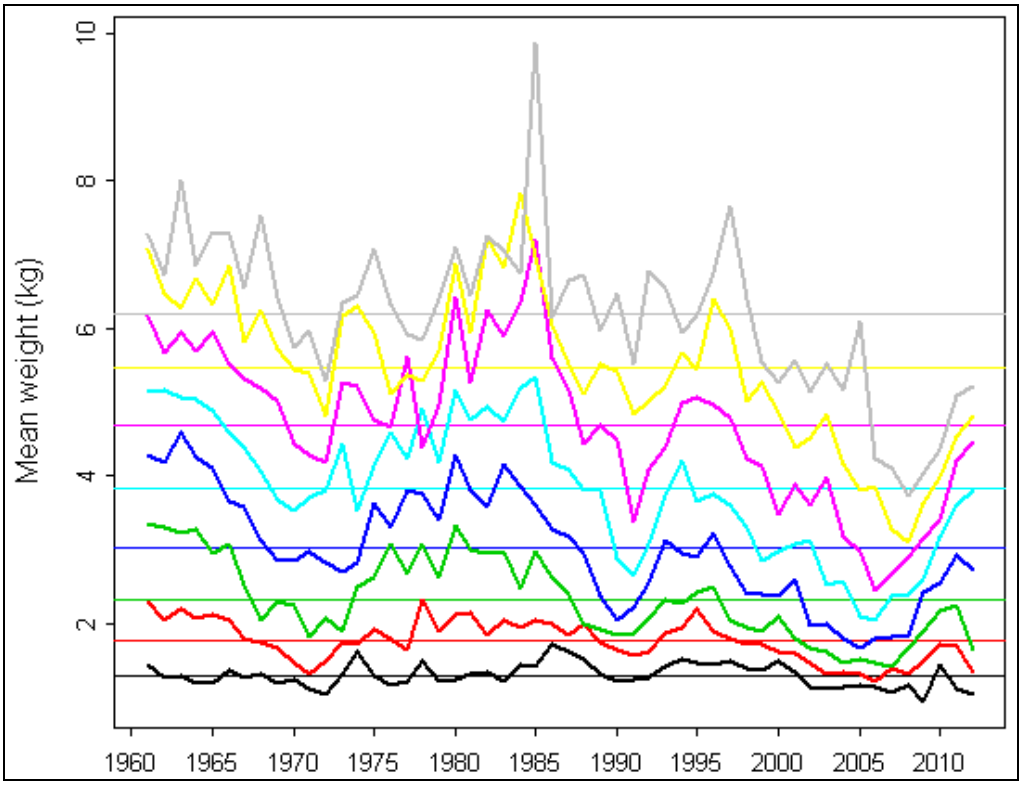

Figure 6.2.3.1. Faroe saithe (Division Vb). Mean weight at age (kg) in commercial catches (ages 3-10) (1961-2012). Horizontal lines show historical average.

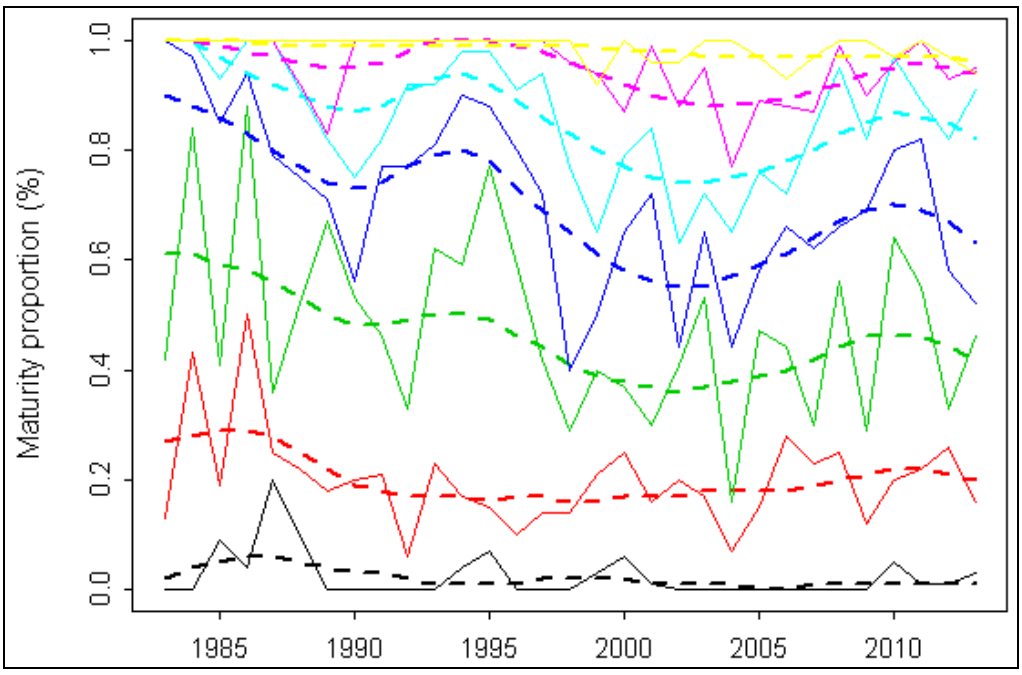

Figure 6.2.4.1. Faroe saithe (Division Vb). Observed (solid line) and smoothed (stapled line) proportion mature at age (ages 3-9)(1983-2013). Smoothed values are used in the assessment.

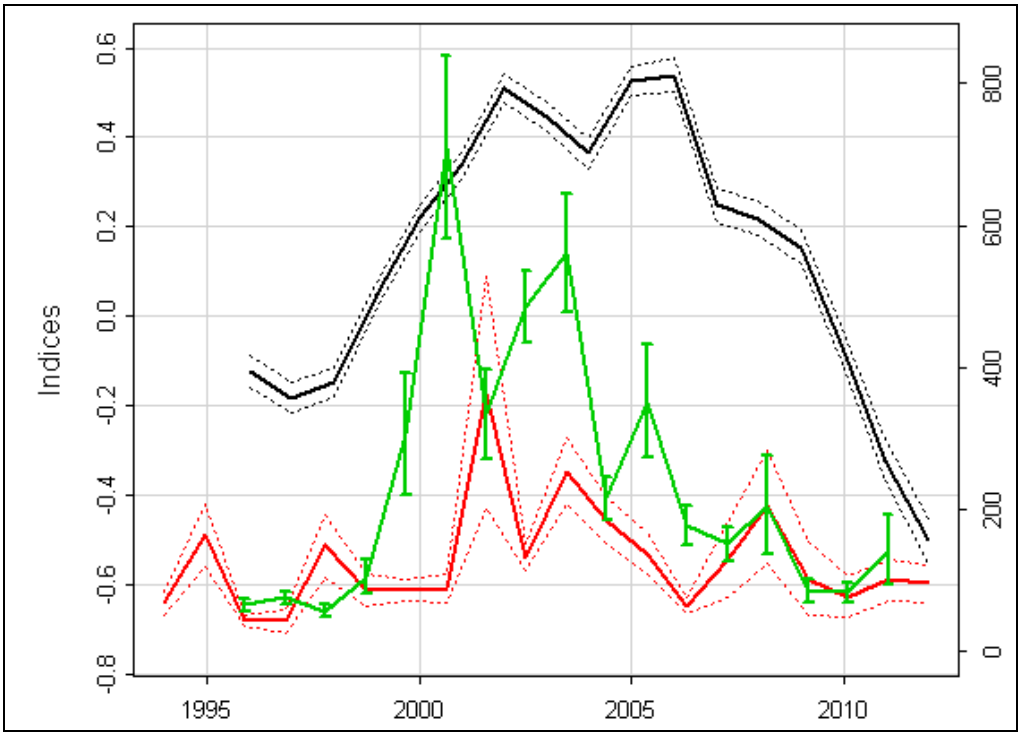

Figure 6.2.5.1.1. Faroe saithe (Division Vb). Predicted catch rates (log-scale) from the commercial fleet (pairtrawlers) used for tunning the assessment (black line). Catch rates (kg/hour) (right-vertical axis) from the Faroese bottom-trawl spring (1994-2013)(red line) and summer survey (1996-2012)(green line). Dotted and arrow lines show standard errors in the estimation of indices.

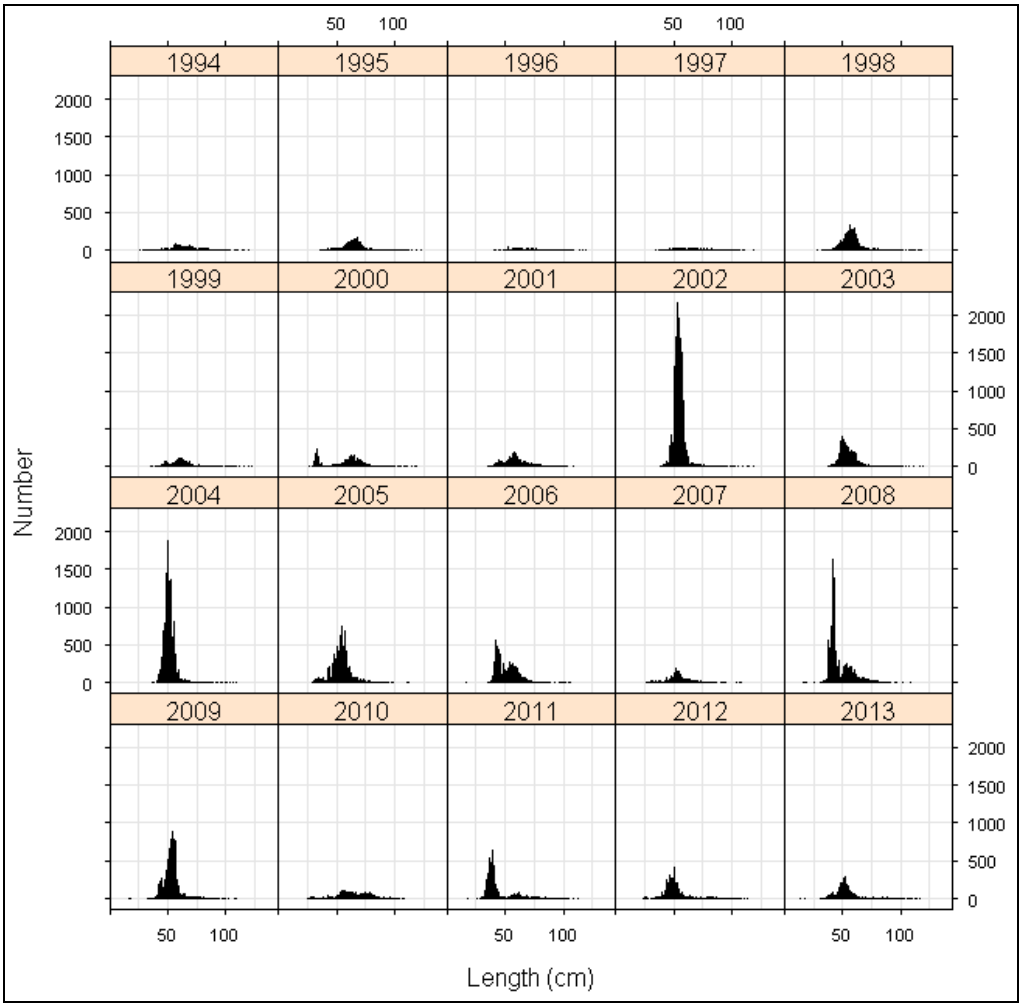

Figure 6.2.5.1.2. Faroe saithe (Division Vb). Length composition from the Faroese bottom-trawl spring survey (1994-2013)

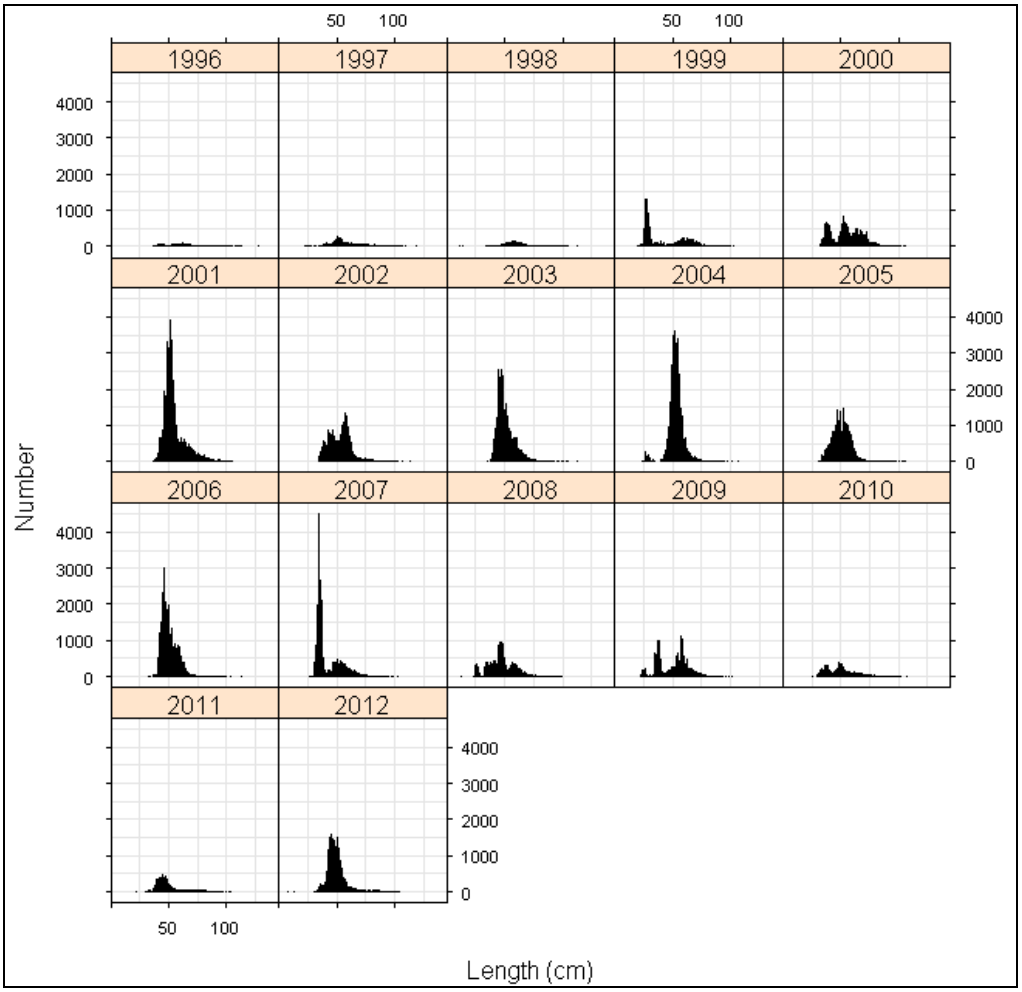

Figure 6.2.5.1.3. Faroe saithe (Division Vb). Length composition from the Faroese bottom-trawl summer survey (1996-2012)

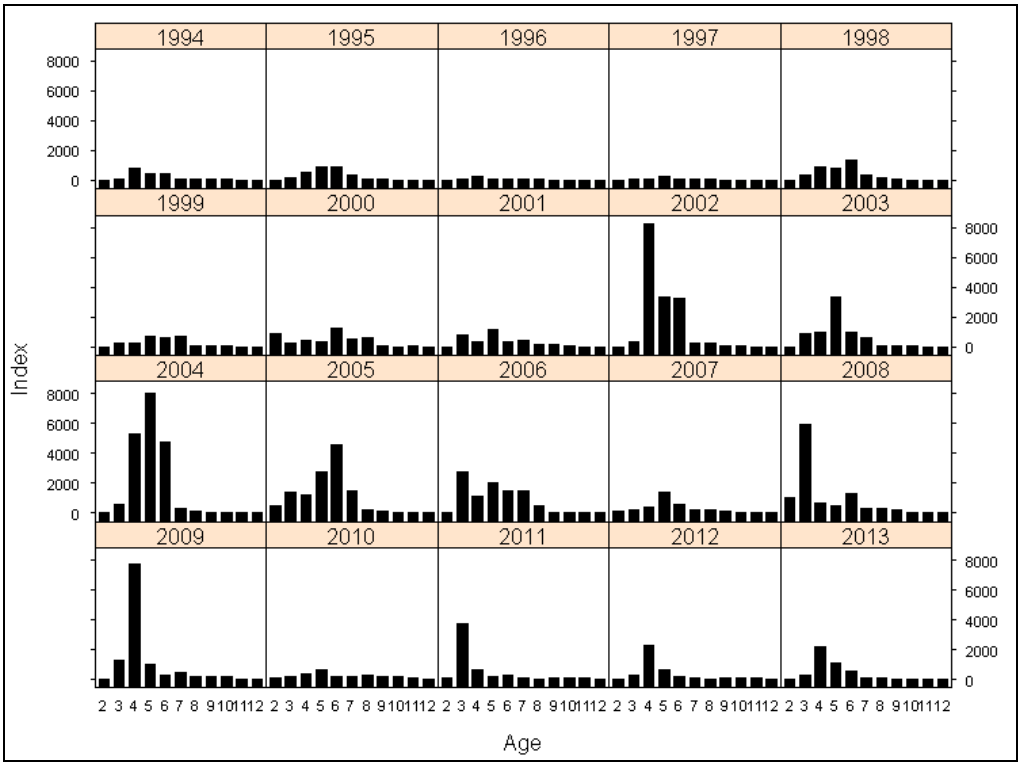

Figure 6.2.5.1.4. Faroe saithe (Division Vb). Age-disaggregated indices in the Faroese bottom-trawl spring survey (ages 2-12, years 1994-2013)

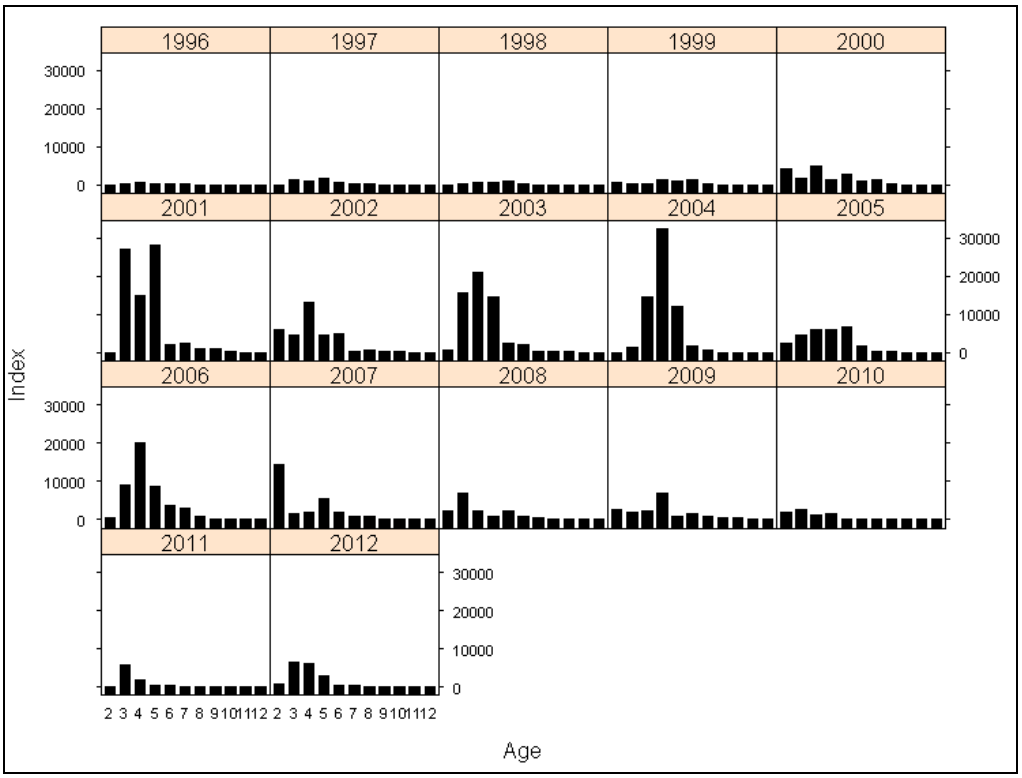

Figure 6.2.5.1.5. Faroe saithe (Division Vb). Age-disaggregated indices in the Faroese bottom-trawl summer survey (ages 2-12, years 1996-2012)

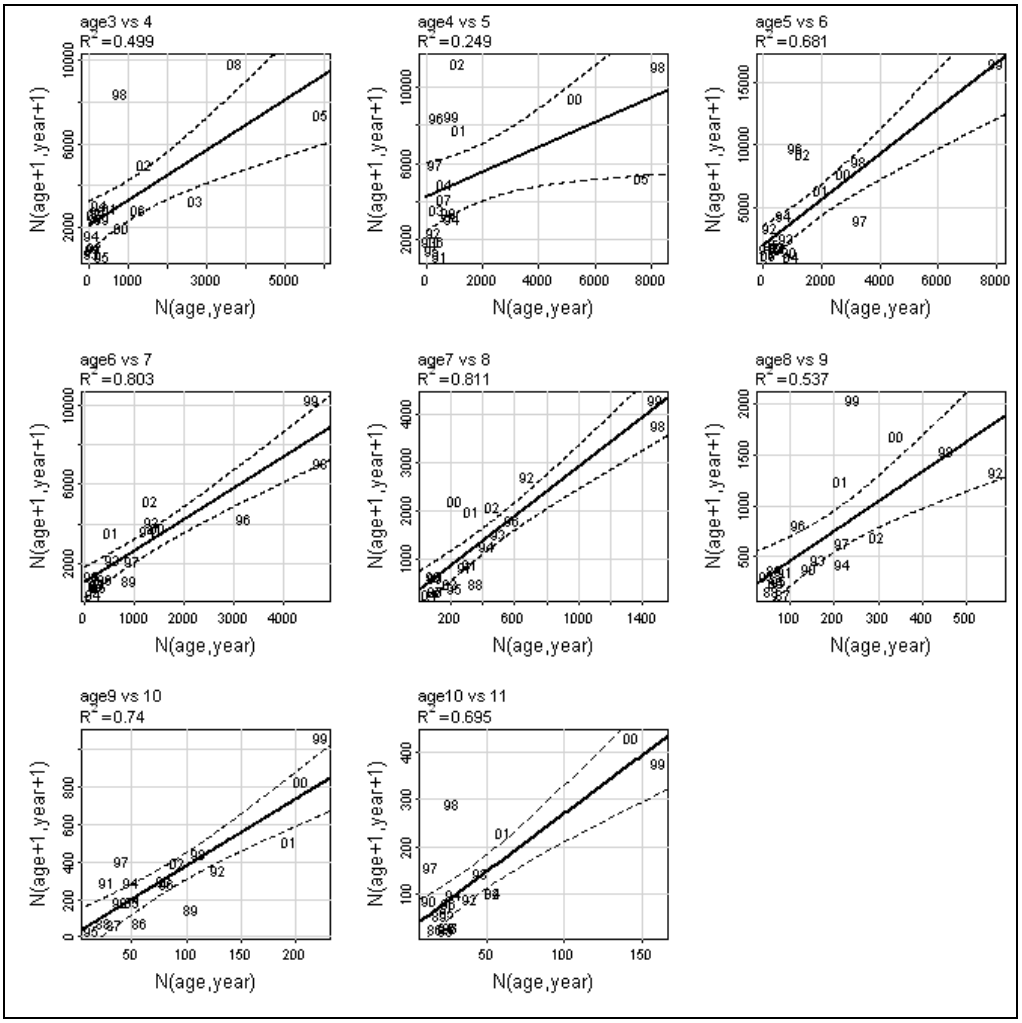

Figure 6.2.5.1.6. Faroe saithe (Division Vb). Indices from spring survey plotted against catch numbers the same year class one year later. The letters in the figure are year classes.

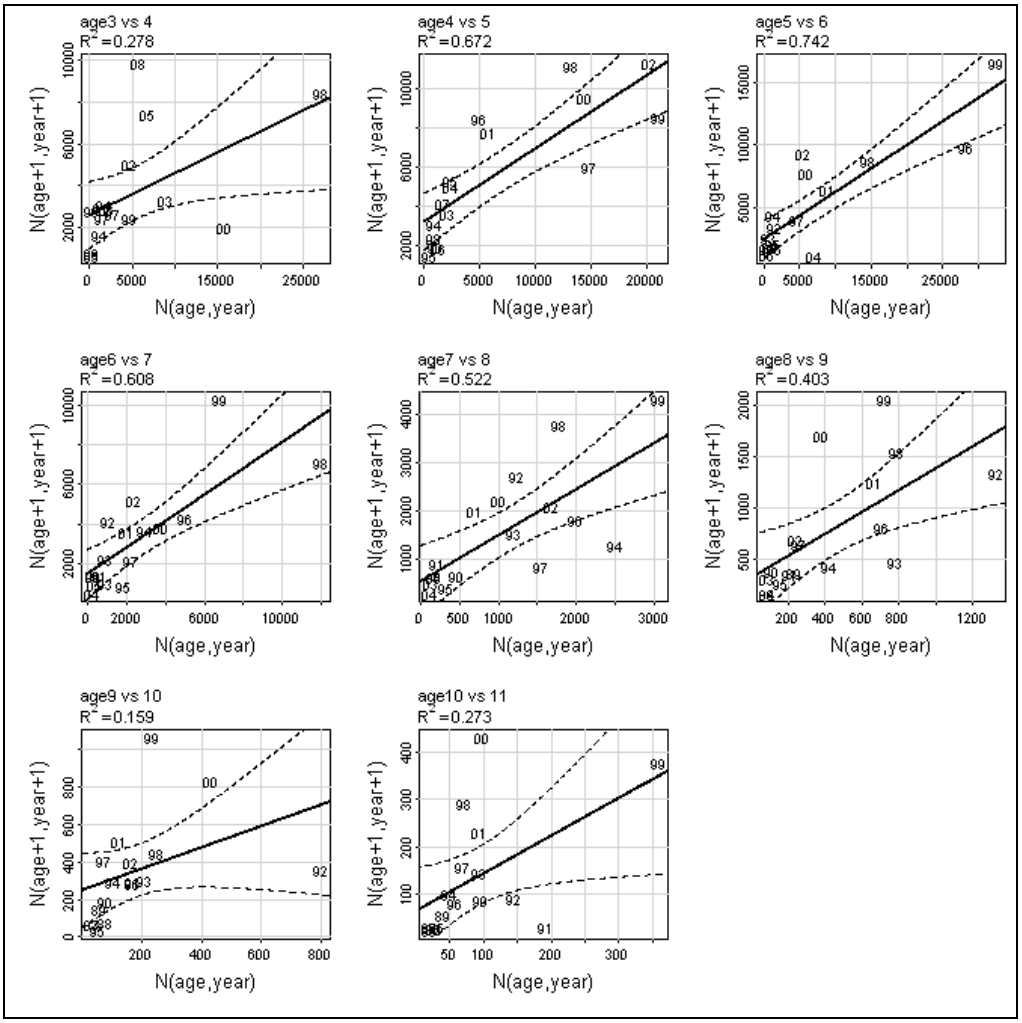

Figure 6.2.5.1.7. Faroe saithe (Division Vb). Indices from summer survey plotted against catch numbers the same year class one year later. The letters in the figure are year classes.

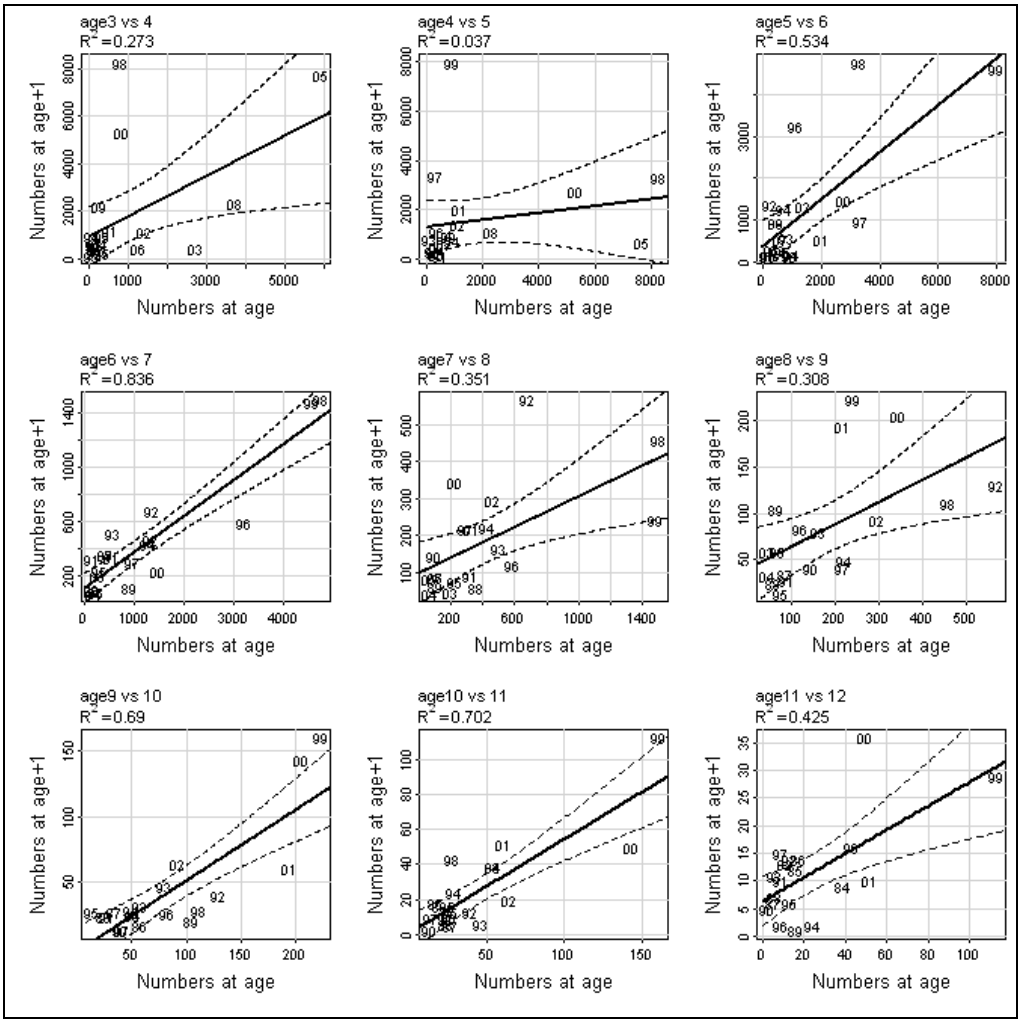

Figure 6.2.5.1.8. Faroe saithe (Division Vb). Indices from spring survey plotted against indices of the same year class one year later. The letters in the figure are year classes.

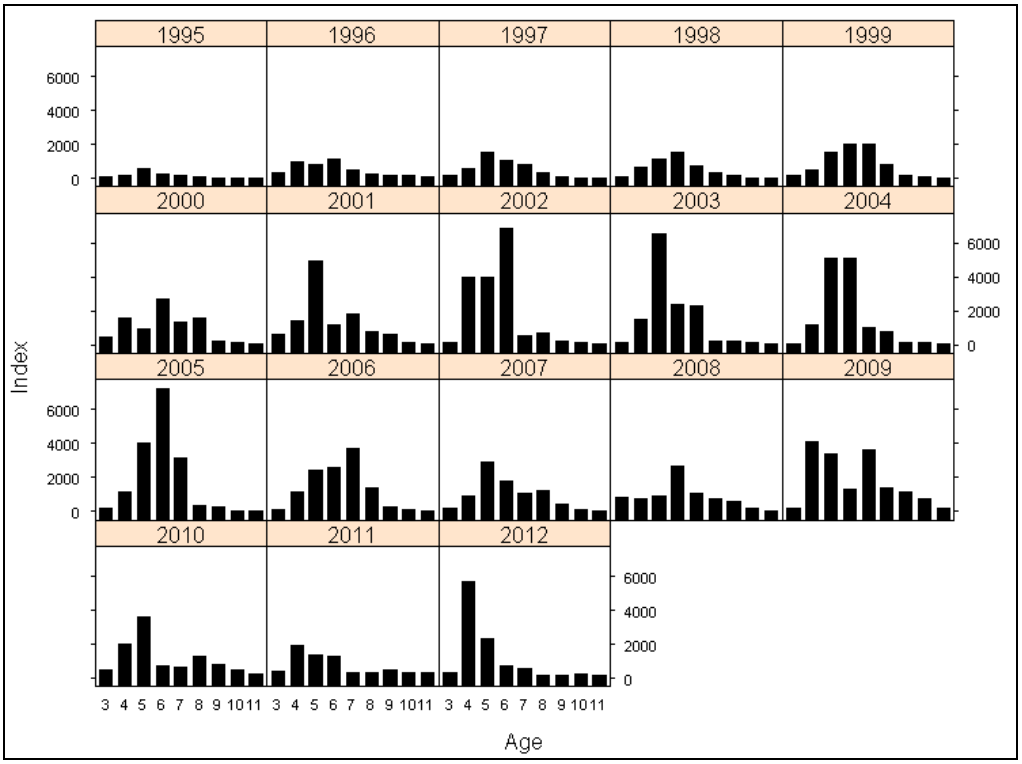

Figure 6.2.5.2.1. Faroe saithe (Division Vb). Age-disaggregated indices in the commercial pair-trawl fleet (ages 3-11, years 1995-2012)

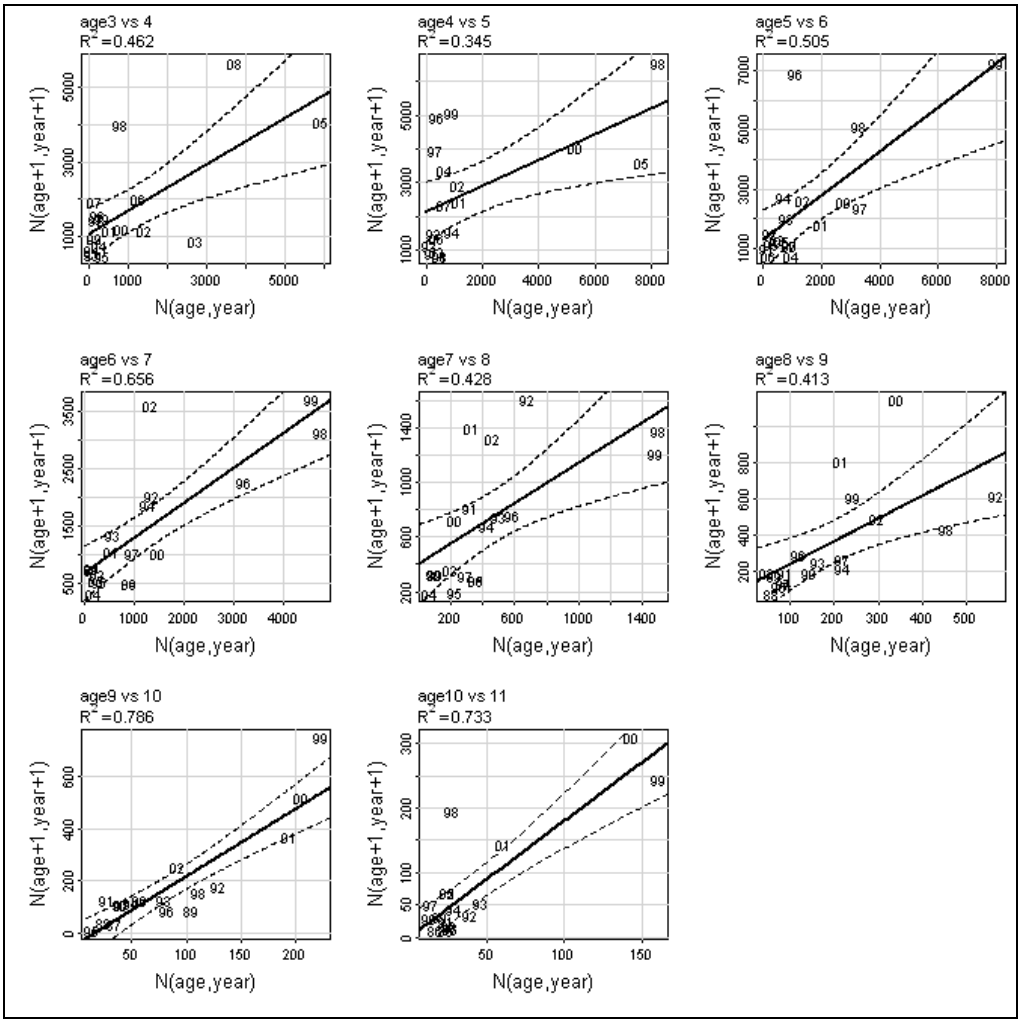

Figure 6.2.5.2.2. Faroe saithe (Division Vb). Indices from spring survey plotted against indices of the same year class one year later in the commercial pair-trawl fleet. The letters in the figure are year classes.

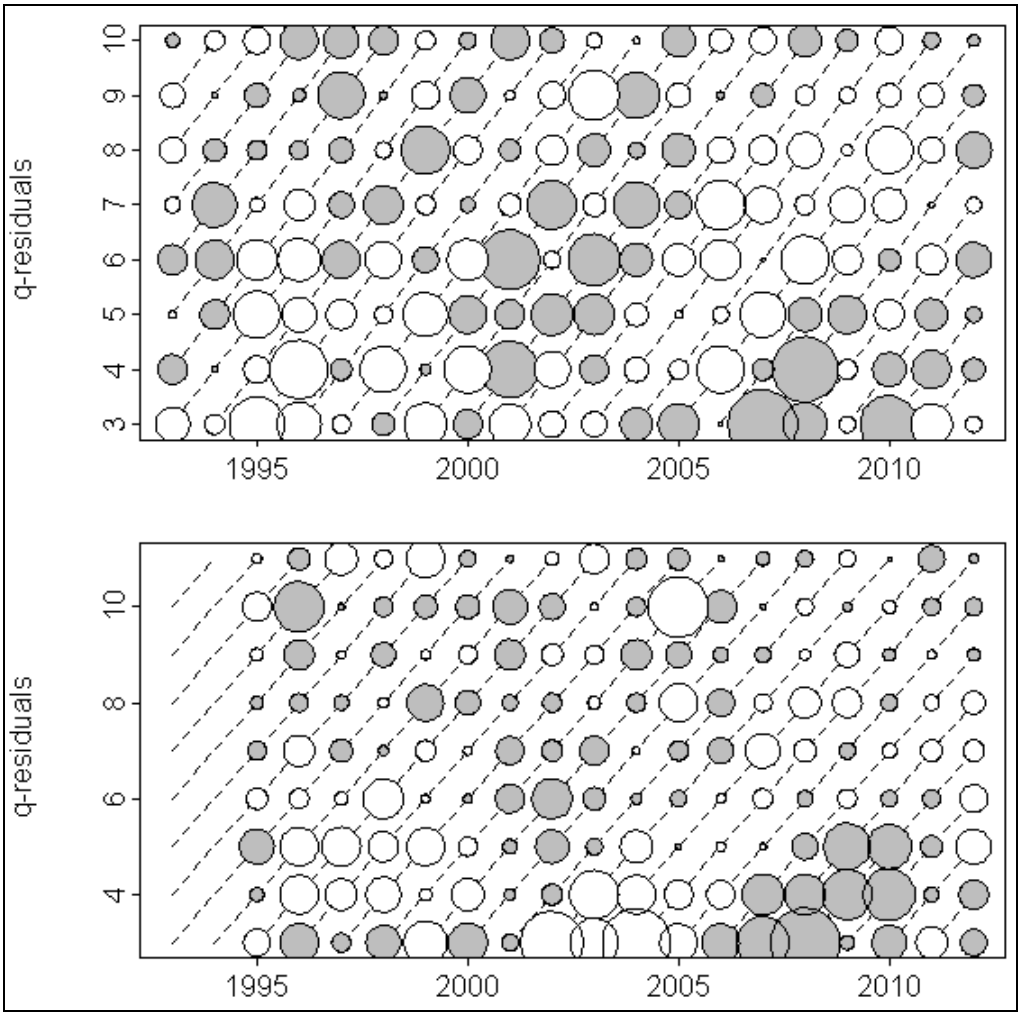

Figure 6.3.1. Faroe saithe (Division Vb). Log-catchability residuals of the XSA calibrated with the spring(ages 3-10, years 1993-2012) and commercial series (ages 3-11, years 1995-2012)

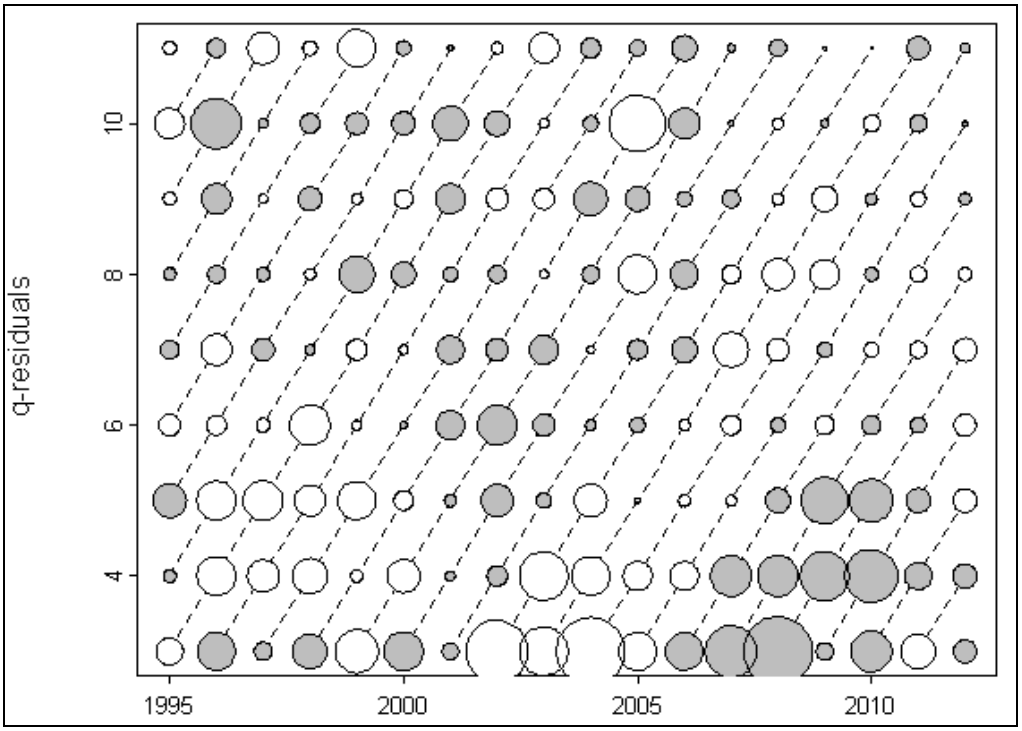

Figure 6.3.2. Faroe saithe (Division Vb). Log-catchability residuals of the XSA calibrated with the commercial series (ages 3-11, years 1995-2012)(spaly)

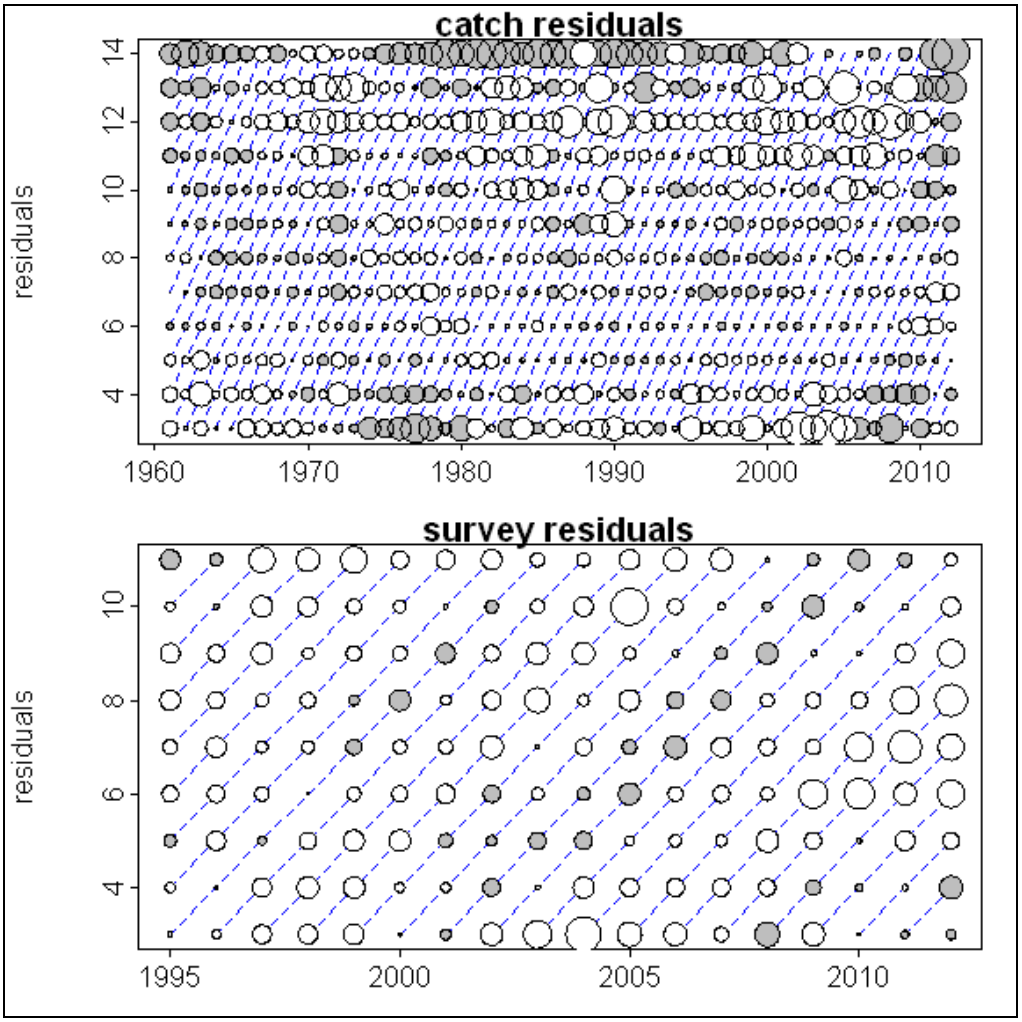

Figure 6.3.3. Faroe saithe (Division Vb). Catch- (ages 3-14, years 1961-2012) and survey-at-age (ages 3-11, years 1995-2012) residuals from a statistical separable model using three different selection periods.

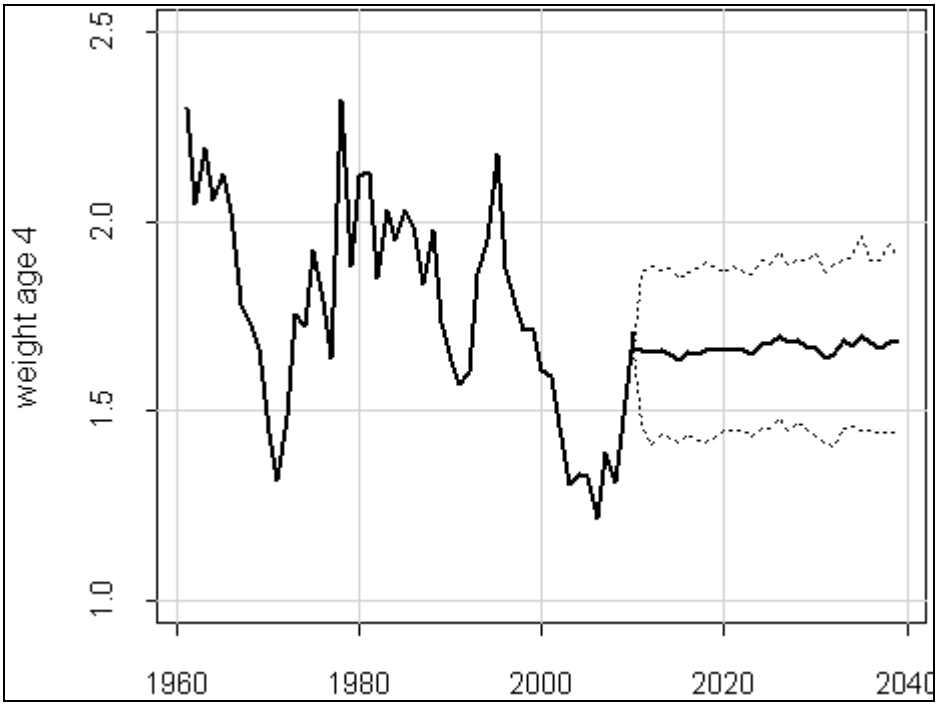

Figure 6.4.1.1. Faroe saithe (Division Vb). Development of weights (age 4) in the MSY simulations. Solid and discontinuous lines represent mean weight and 25% and 75% percentiles respectively.

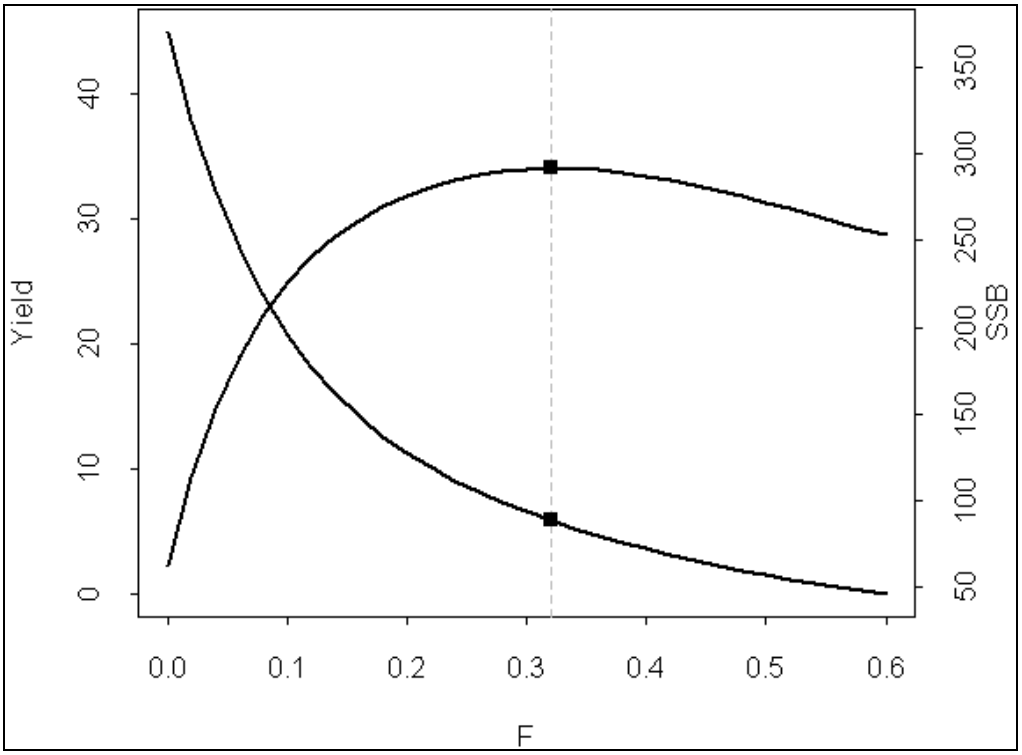

Figure 6.4.1.2. Faroe saithe (Division Vb). Yield and spawning per-recruit from the simulations. Fmsy=0.32, Ymsy=34 kt. and SSBmsy=89 kt.

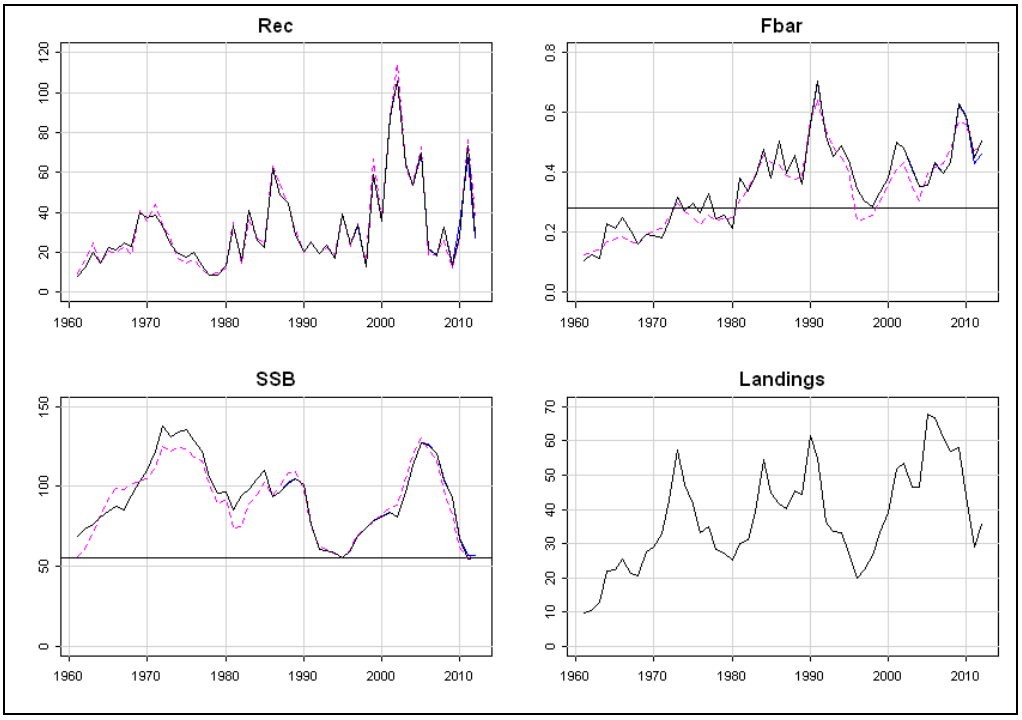

Figure 6.5.1. Faroe saithe (Division Vb). Recruitment (age 3) in millions (top-left), spawning stock biomass (thousand tonnes) (bottom-left), Fbar (ages 4 to 8)(top-right) and landings (thousands tonnes) (bottom-left). Black line represents the spaly run. Blue line indicates the proposed assessment and the stapled-line shows the result from a separable statistical model.

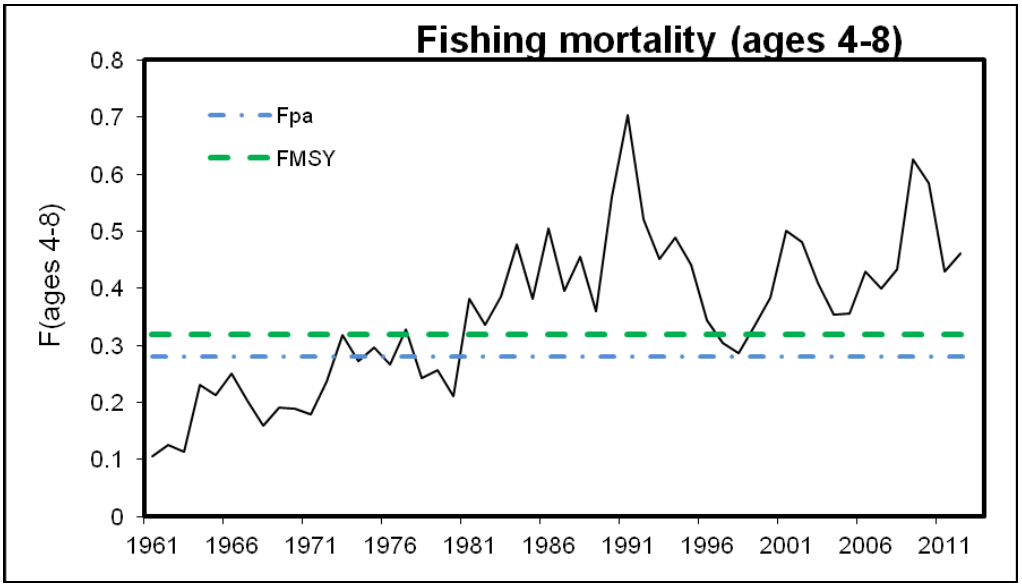

Figure 6.5.2. Faroe saithe (Division Vb). Fishing mortality (average over ages 4-8)(1961-2012)

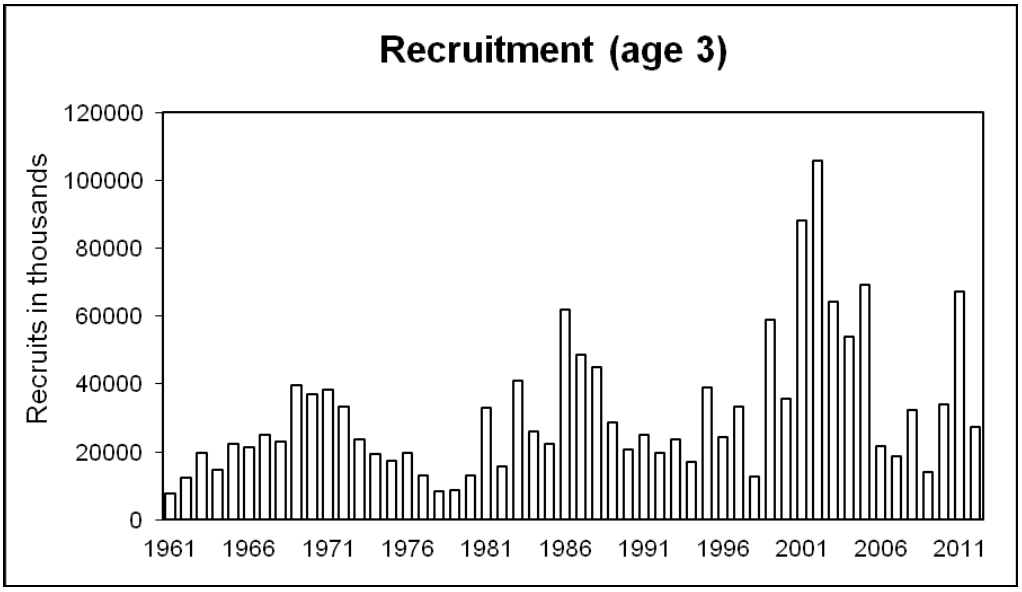

Figure 6.5.3. Faroe saithe (Division Vb). Recruitment at age 3 (tousands)(1961-2012).

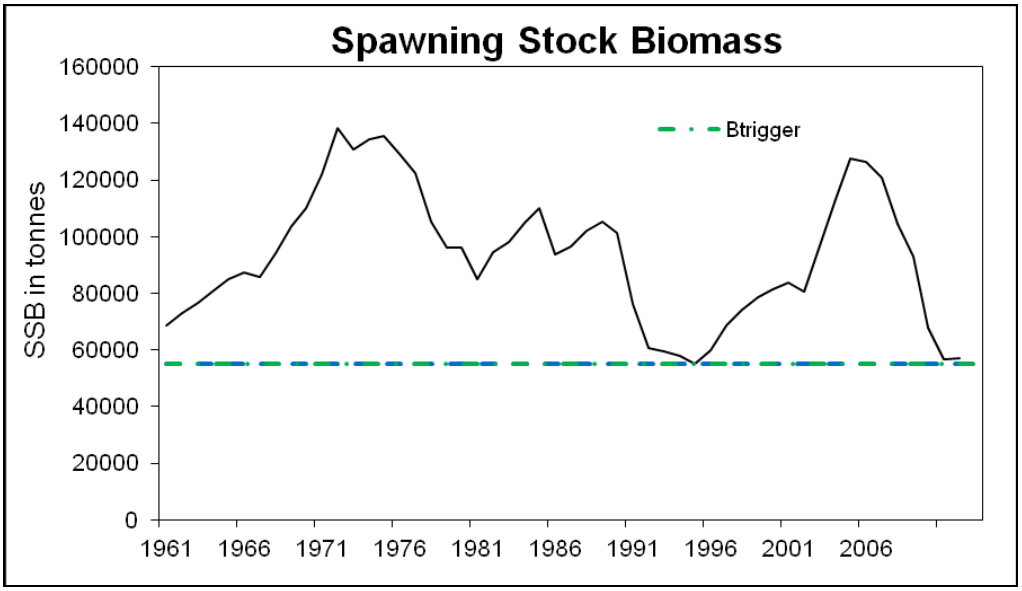

Figure 6.5.4. Faroe saithe (Division Vb). Spawning stock biomass (tonnes)(1961-2012).

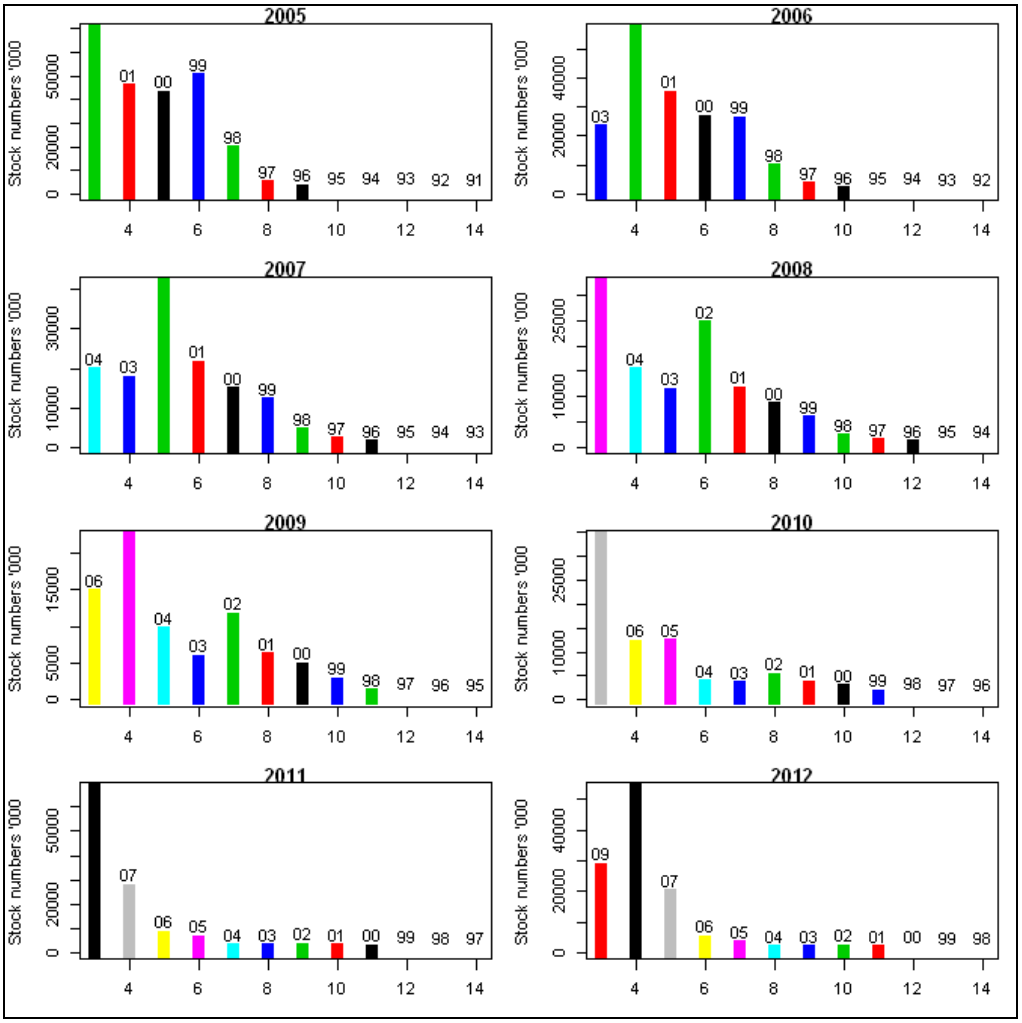

Figure 6.5.5. Faroe saithe (Division Vb). Progression of year classes through the fishery since 2005.

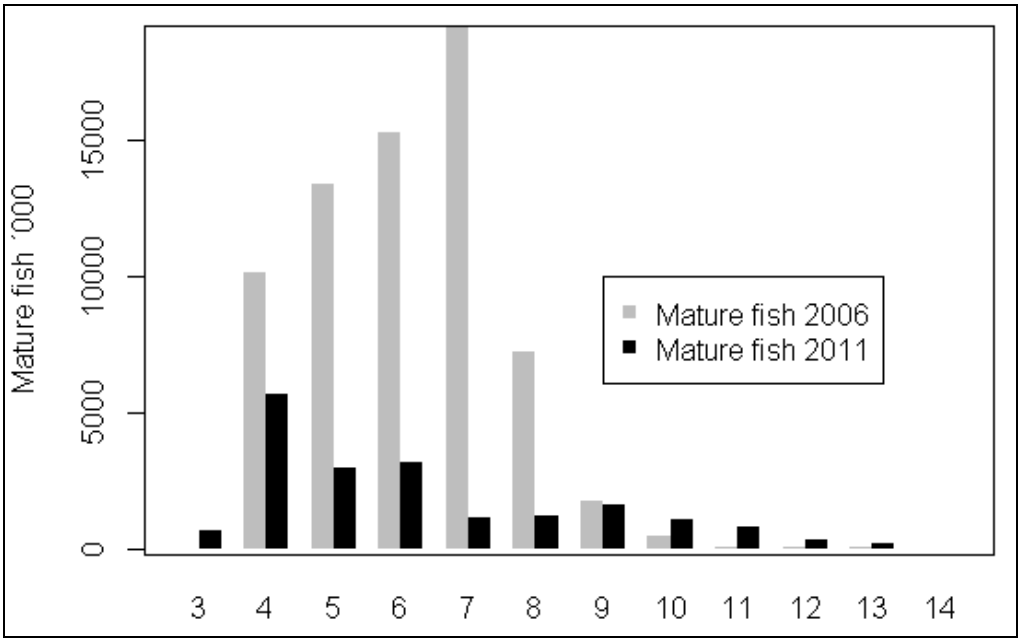

Figure 6.5.6. Faroe saithe (Division Vb). Numbers of mature fish in the stock at each age (3-14+) for 2006 and 2011.

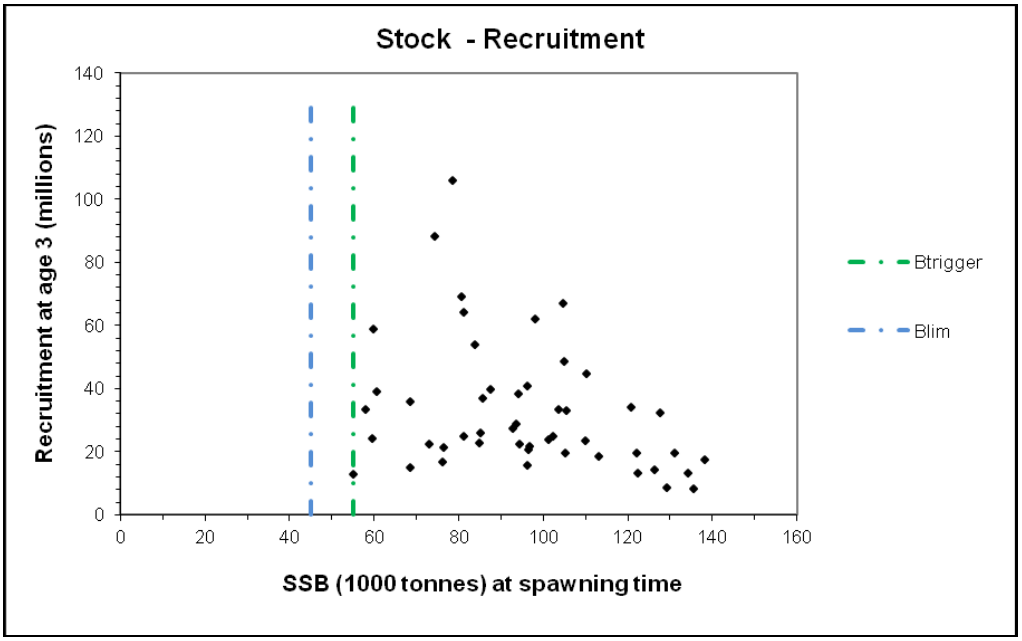

Figure 6.5.7. Faroe saithe (Division Vb). SSB - Recruitment (age 3) plot. Btriger=55 000 t and Blim=45 000 t.

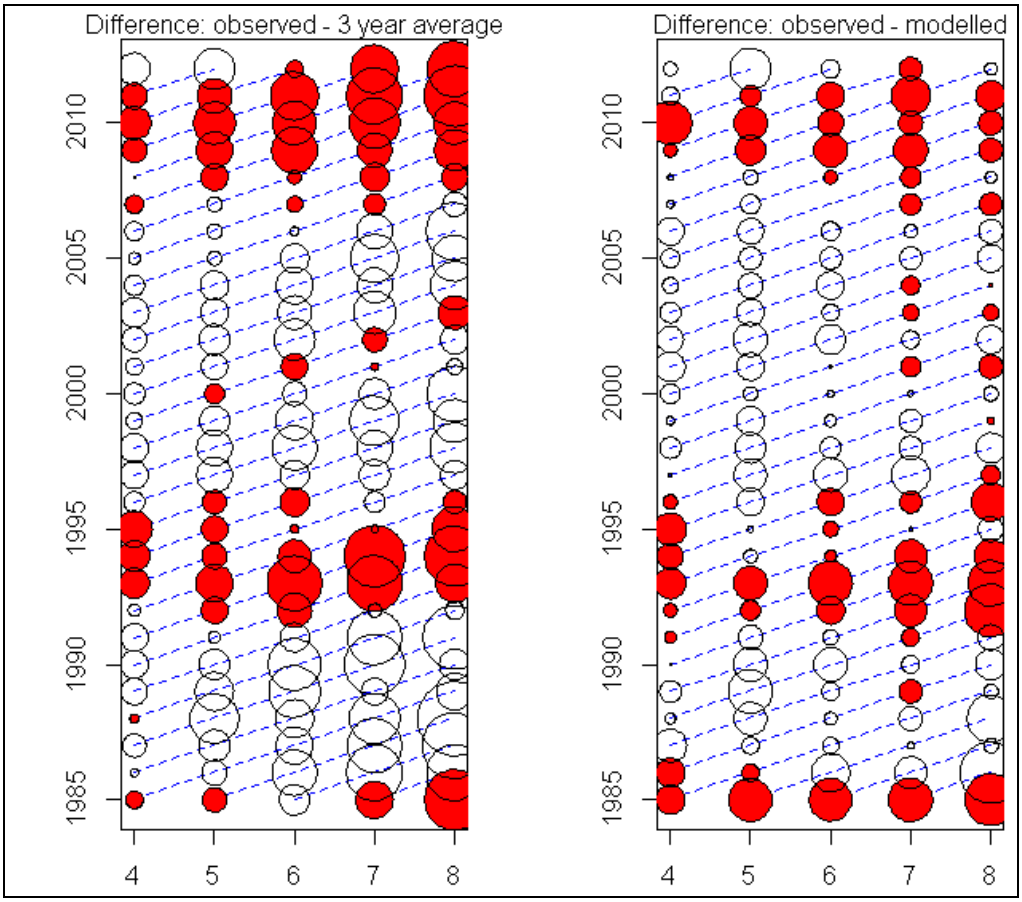

Figure 6.6.1.1. Faroe saithe (Division Vb). Residual plots from a 3-year average weight model and the predicted weight from previous year in the same year class model.

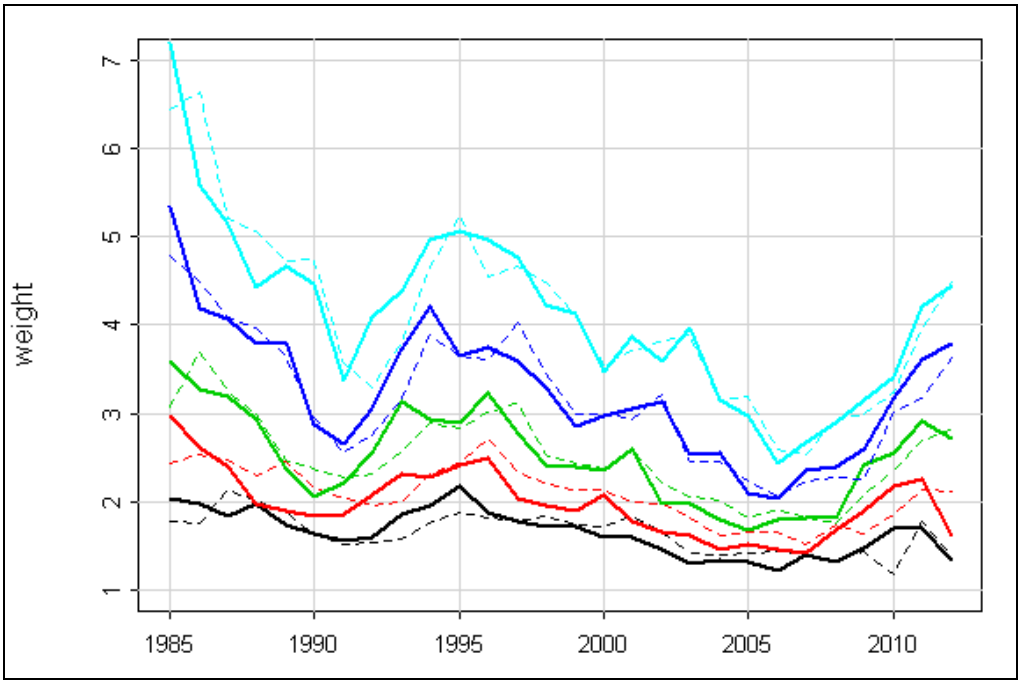

Figure 6.6.1.2. Faroe saithe (Division Vb). Observed (stapled lines) and predicted weights (aes 4-8, years 1985-2012)

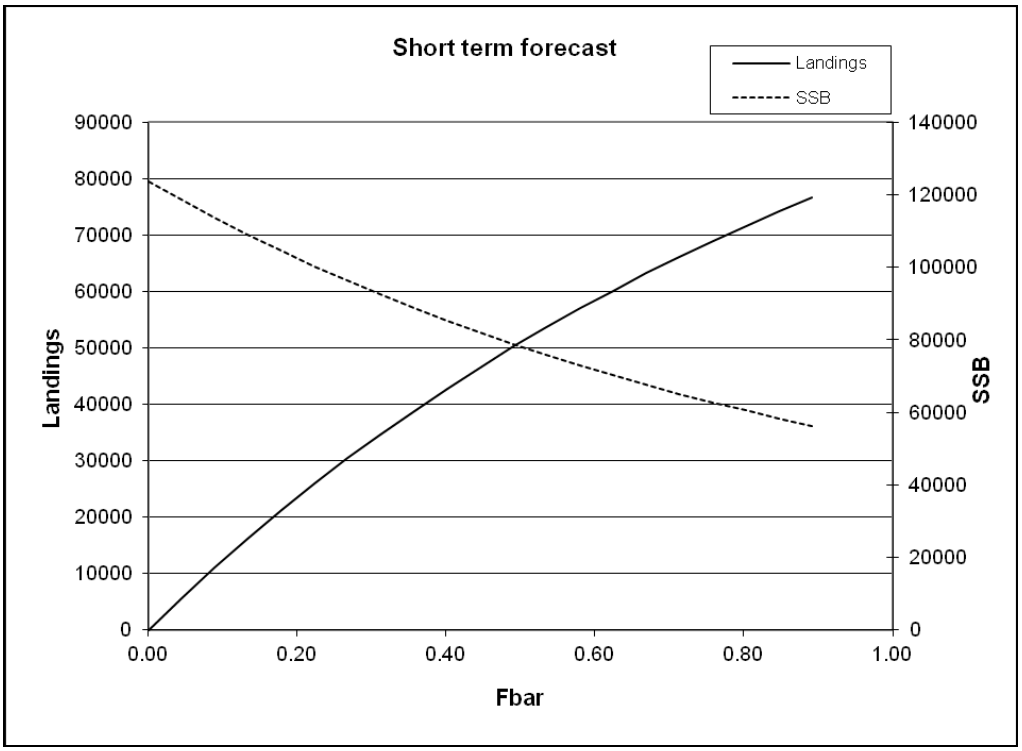

Figure 6.6.2.1a. Faroe saithe (Division Vb). Prediction output from proposed assessment.

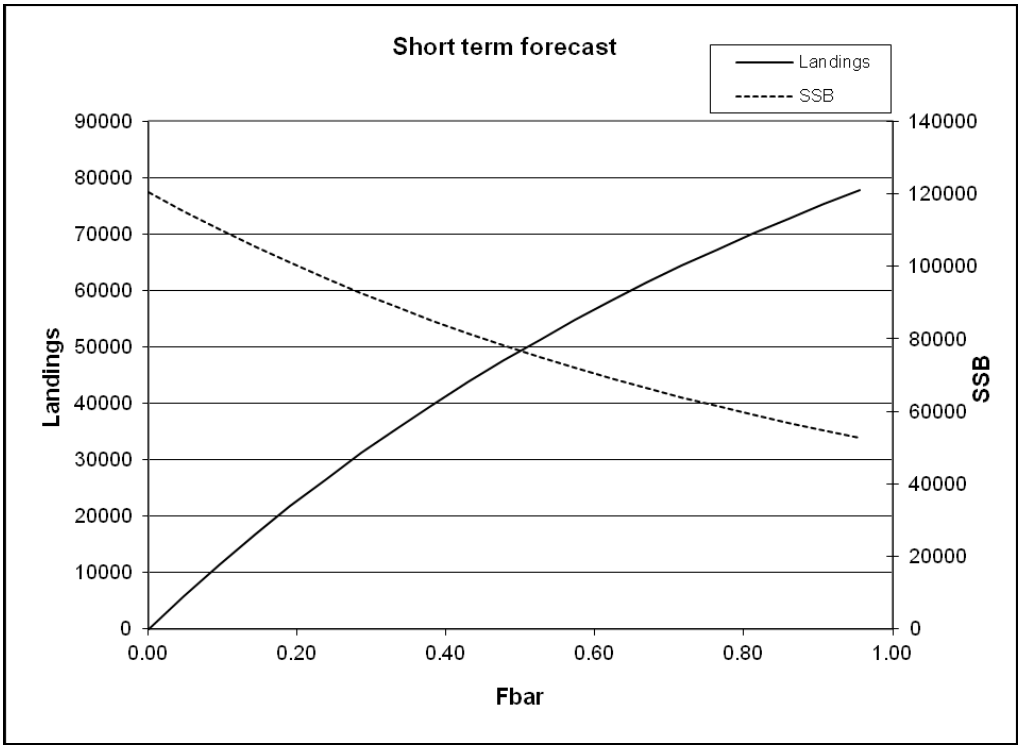

Figure 6.6.2.1b. Faroe saithe (Division Vb). Prediction output from spaly assessment.

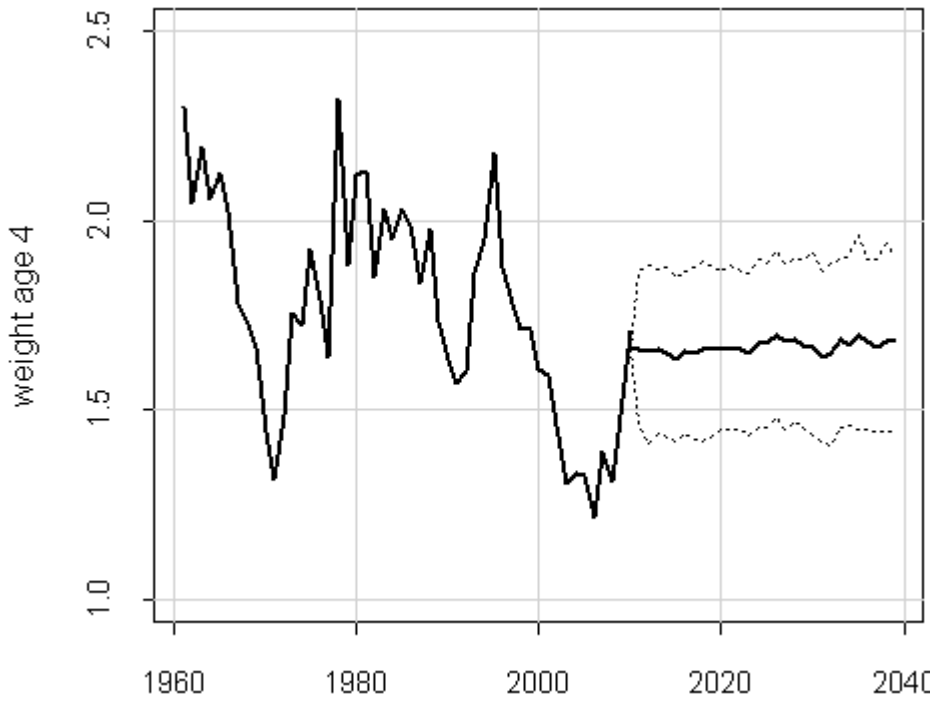

Figure 6.4.2.1. Faroe saithe (Division Vb). Development of weights (age 4) in the MSY simulations. Solid and discontinuous lines represent mean weight and 25% and 75% percentiles respectively.

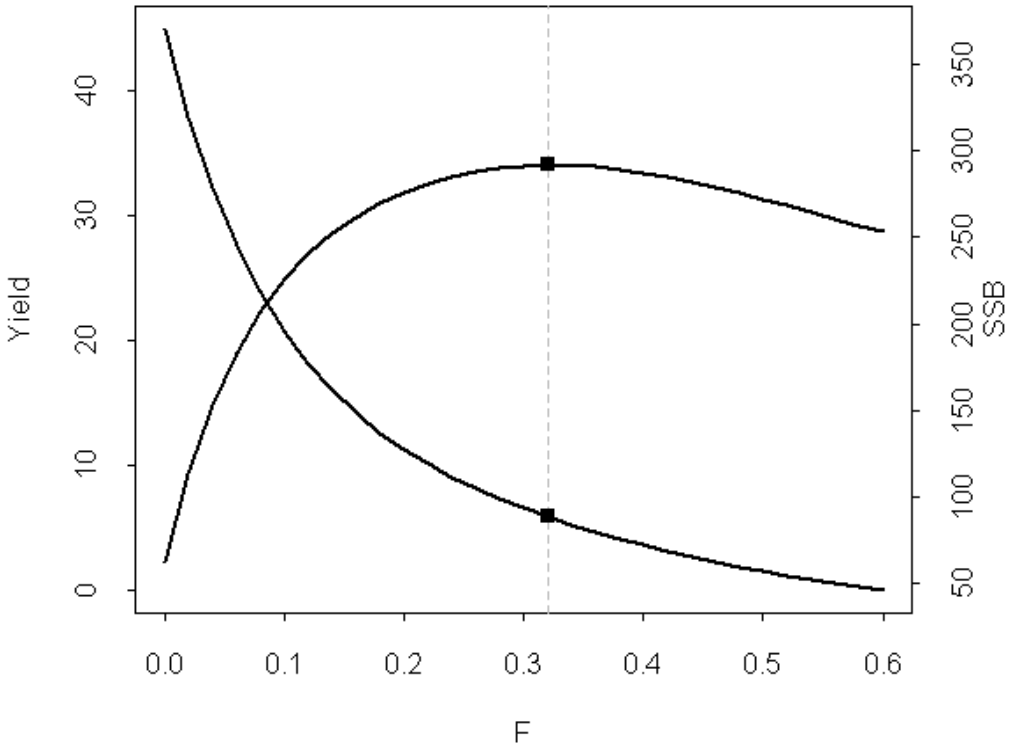

Figure 6.4.1.2. Faroe saithe (Division Vb). Yield and spawning per-recruit from the simulations. Fmsy=0.32, Ymsy=34 kt. and SSBmsy=89 kt.

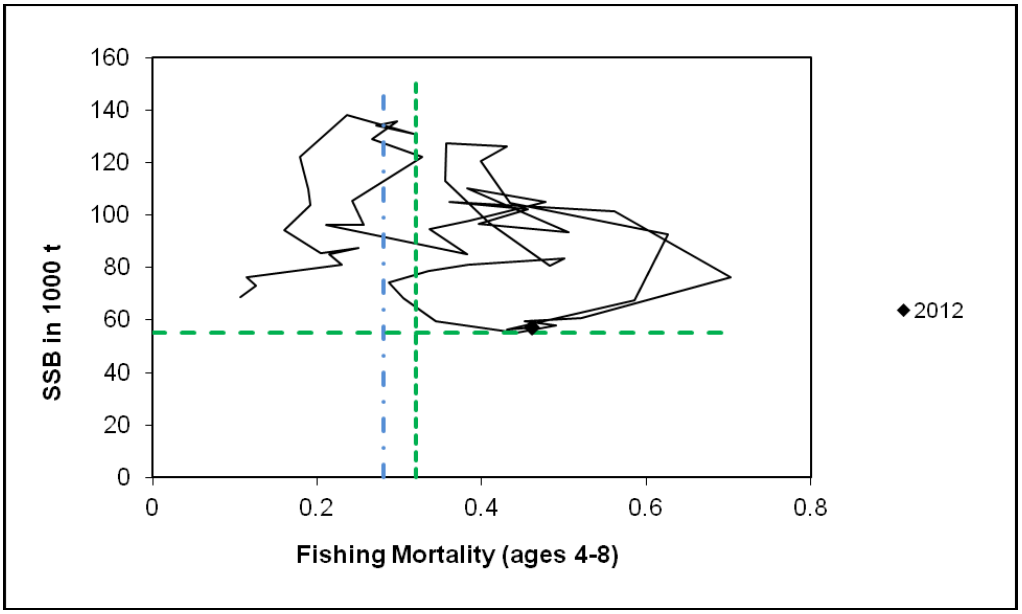

Figure 6.5.8. Faroe saithe (Division Vb). Precautionary approach plot, period 1961-2012. The history of the stock/fishery in relation to the four reference points.

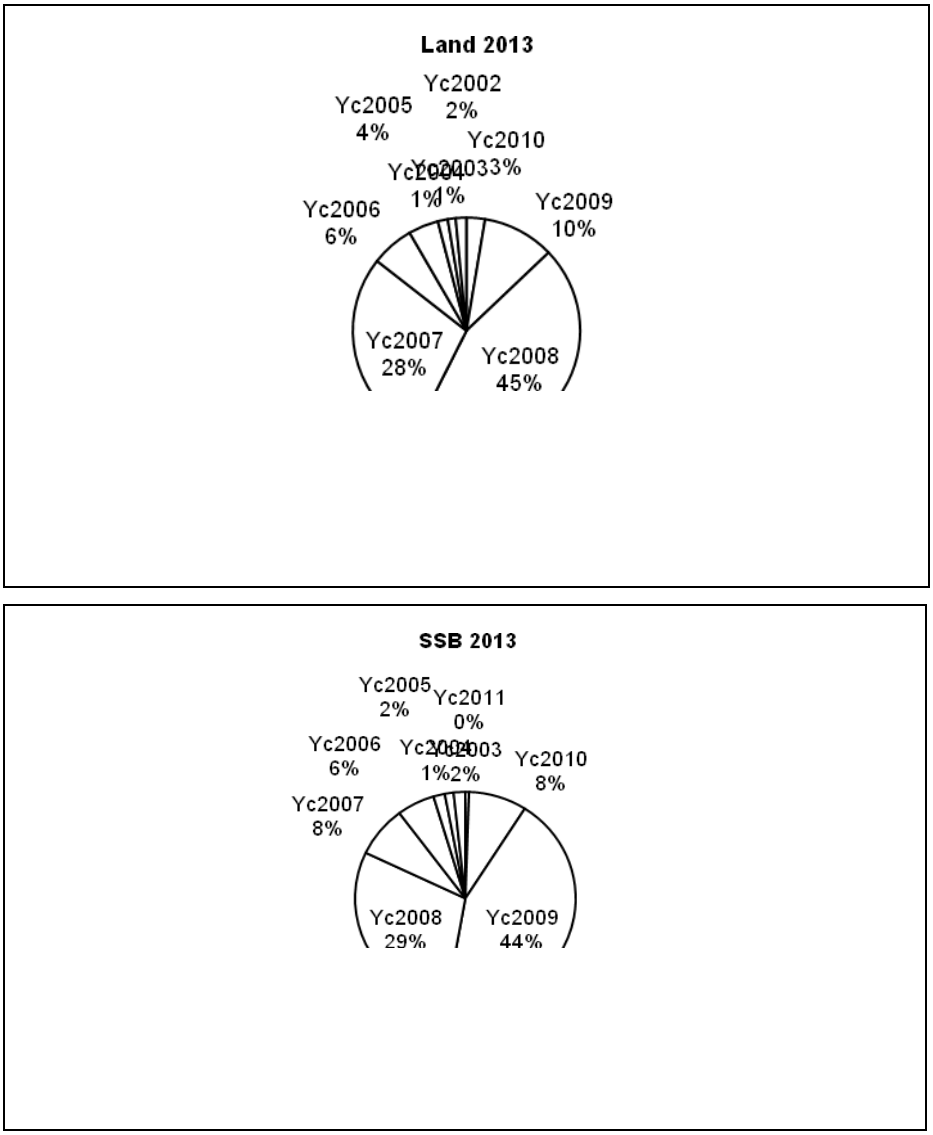

Figure 6.6.2.1a Faroe saithe (Division Vb). Composition in landings (upper figure) and SSB (lower figure) by year classes in 2013 (proposed assessment model)

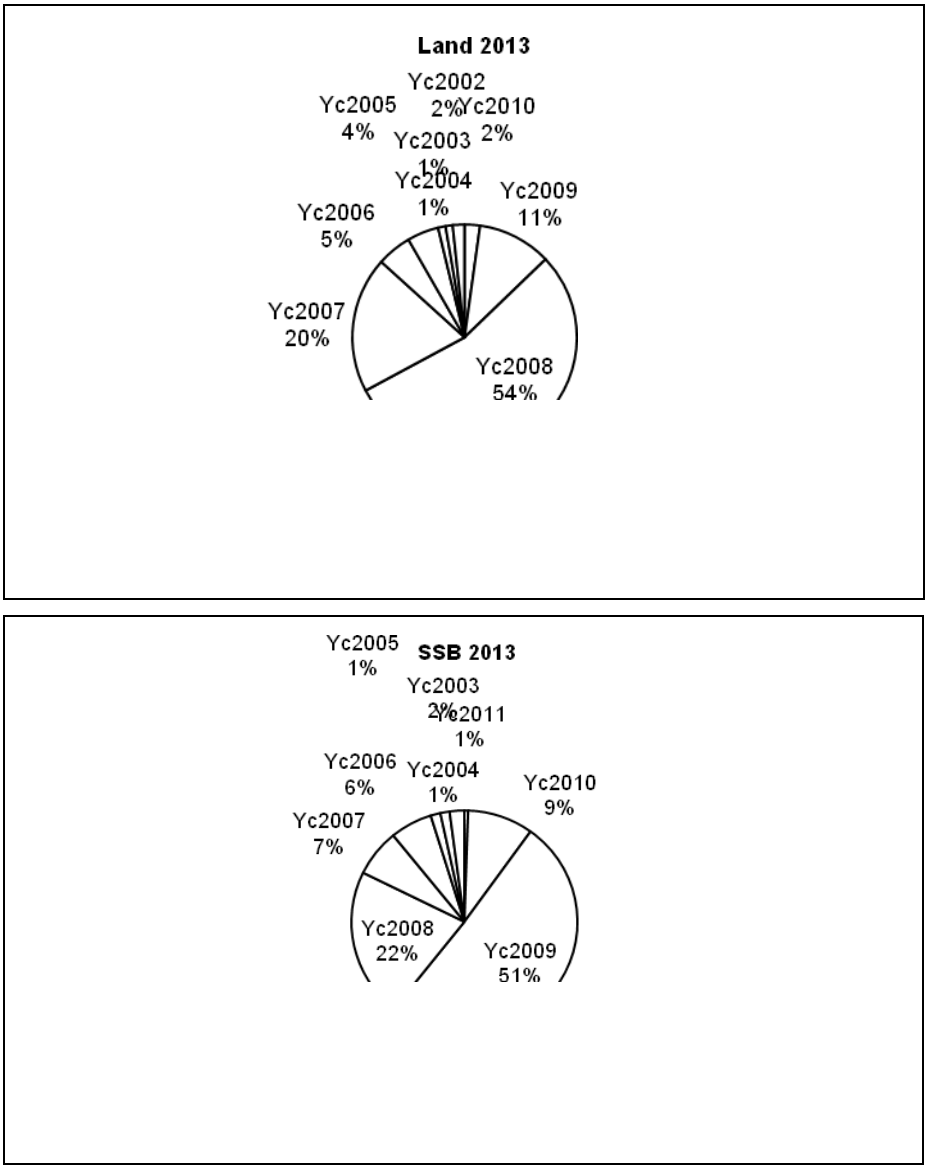

Figure 6.6.2.1b. Faroe saithe (Division Vb). Composition in landings (upper figure) and SSB (lower figure) by year classes in 2013 (spaly assessment model)

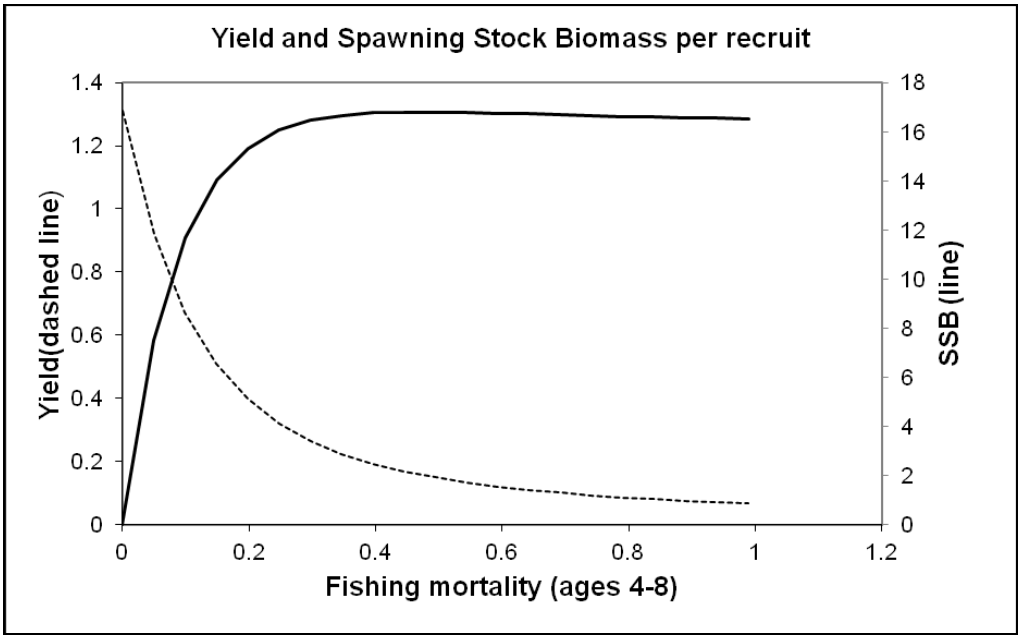

Figure 6.7.1.1. Faroe saithe (Division Vb). Yield and spawning per-recruit calculations.

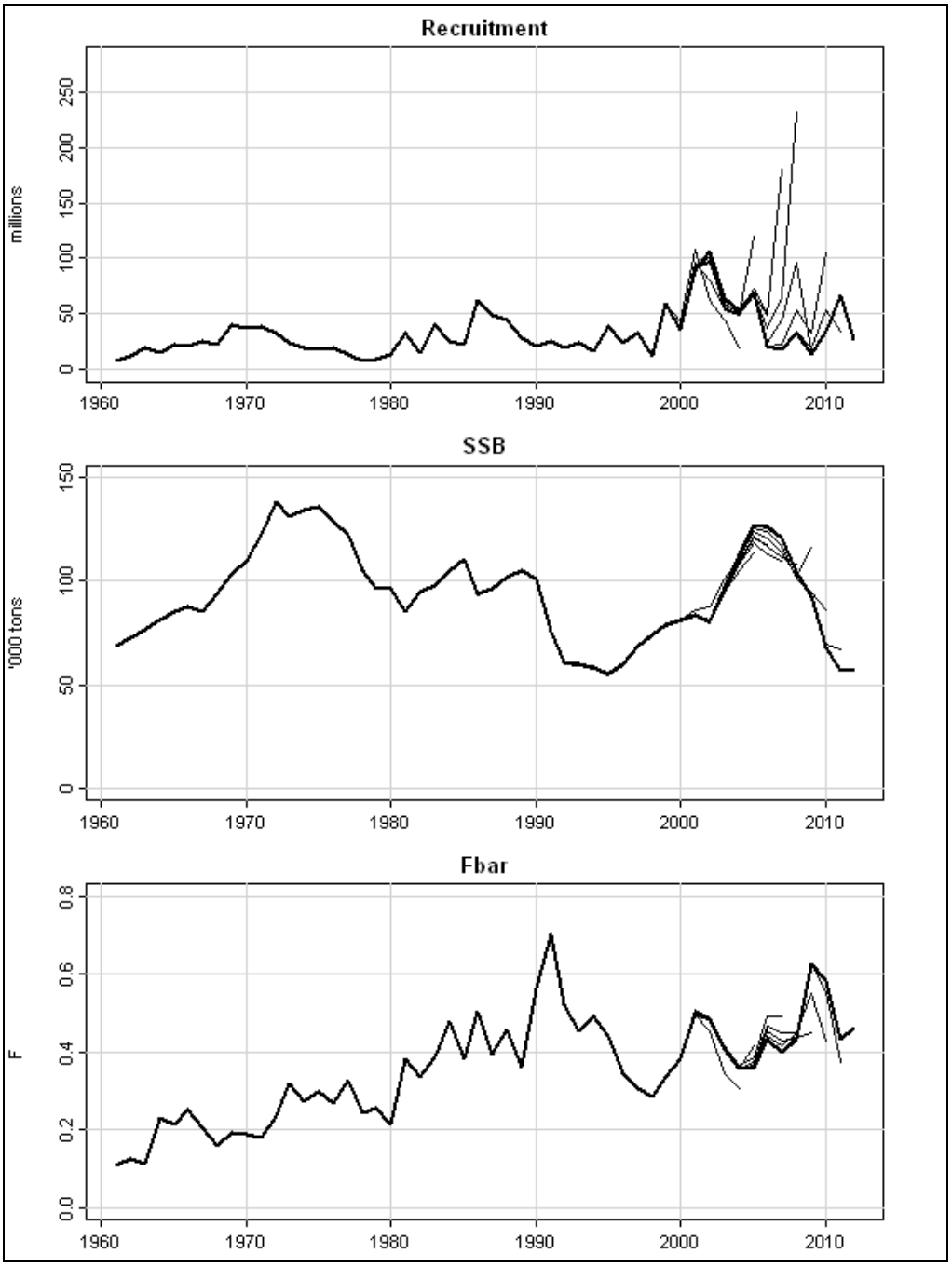

Figure 6.8.1. Faroe saithe (Division Vb). Retrospective analysis of recruitment at age 3, spawning stock biomass and average fishing mortality over age groups 4-8 from the 2013 adopted assessment.

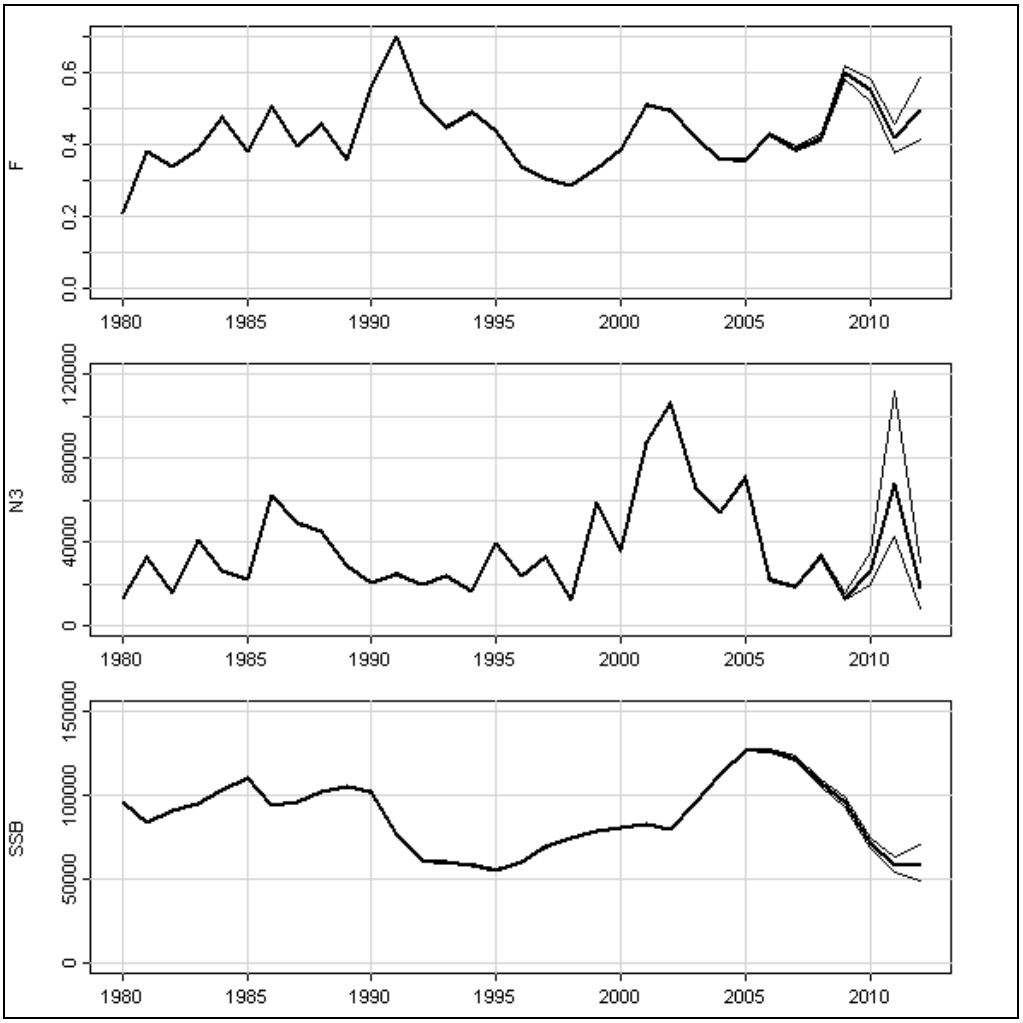

Figure 6.8.2. Faroe saithe (Division Vb). Bootstrap XSA model (resampling was carried out in the tunning fleets residuals.)

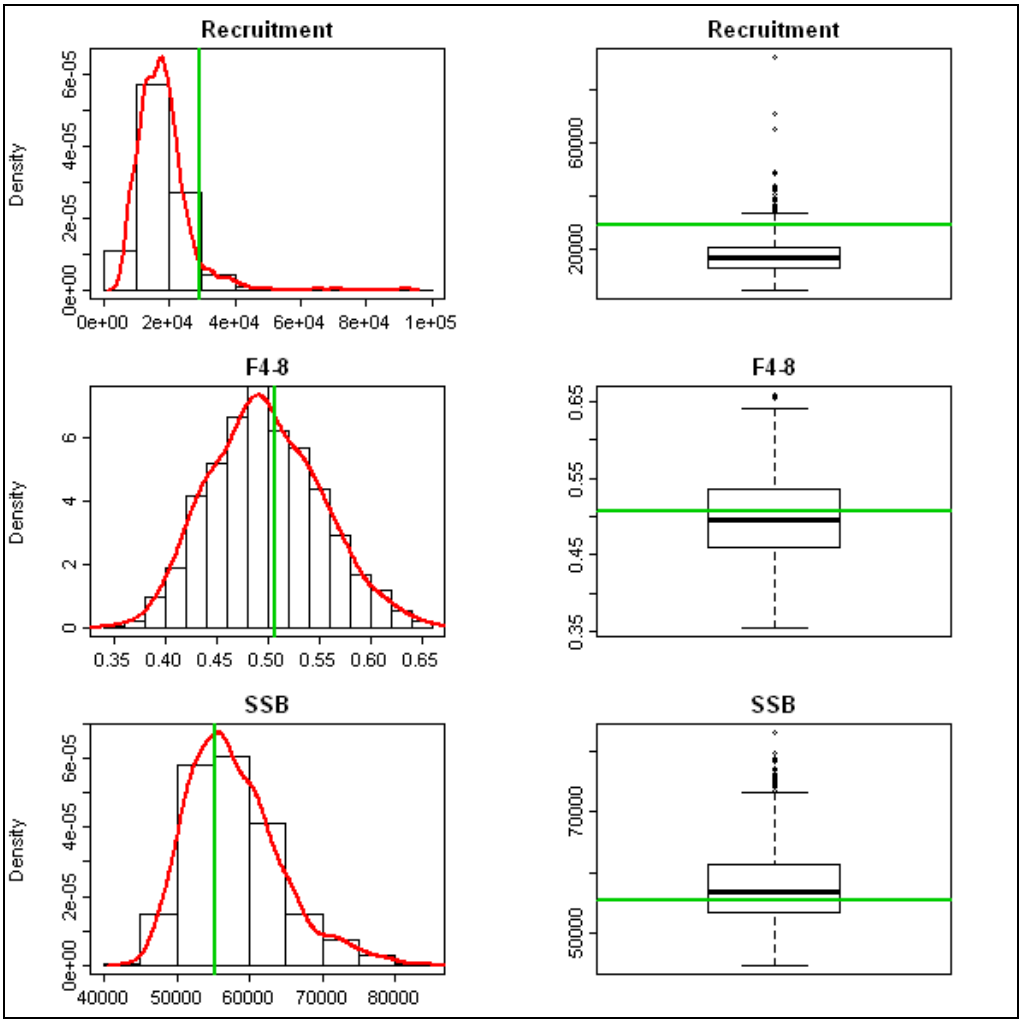

Figure 6.8.3. Faroe saithe (Division Vb). Histograms of stock parameters from the bootstrap XSA model (resampling was carried out in the tunning fleets residuals.) Vertical green line represents the most recent estimate (2012)

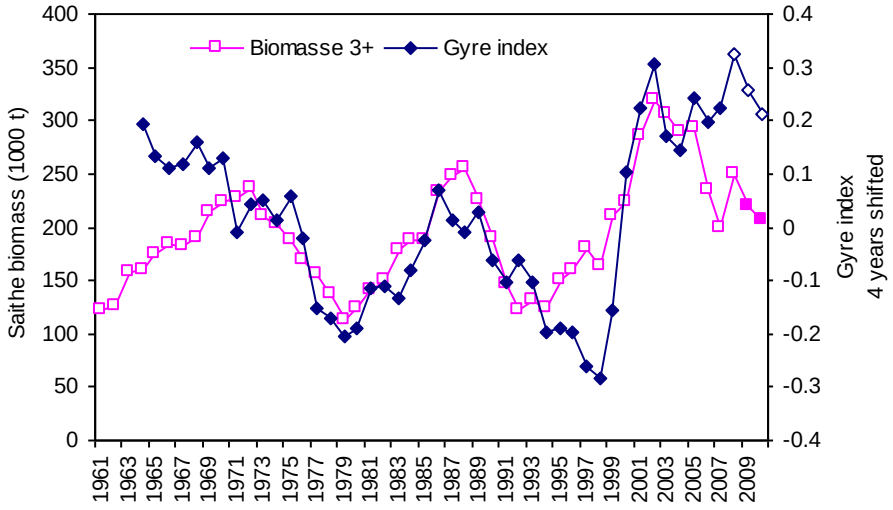

Figure 6.15.1. Faroe saithe (Division Vb). Relationship between the Gyre index (4 years shifted) and saithe biomasse (age 3+) in Faroese waters.

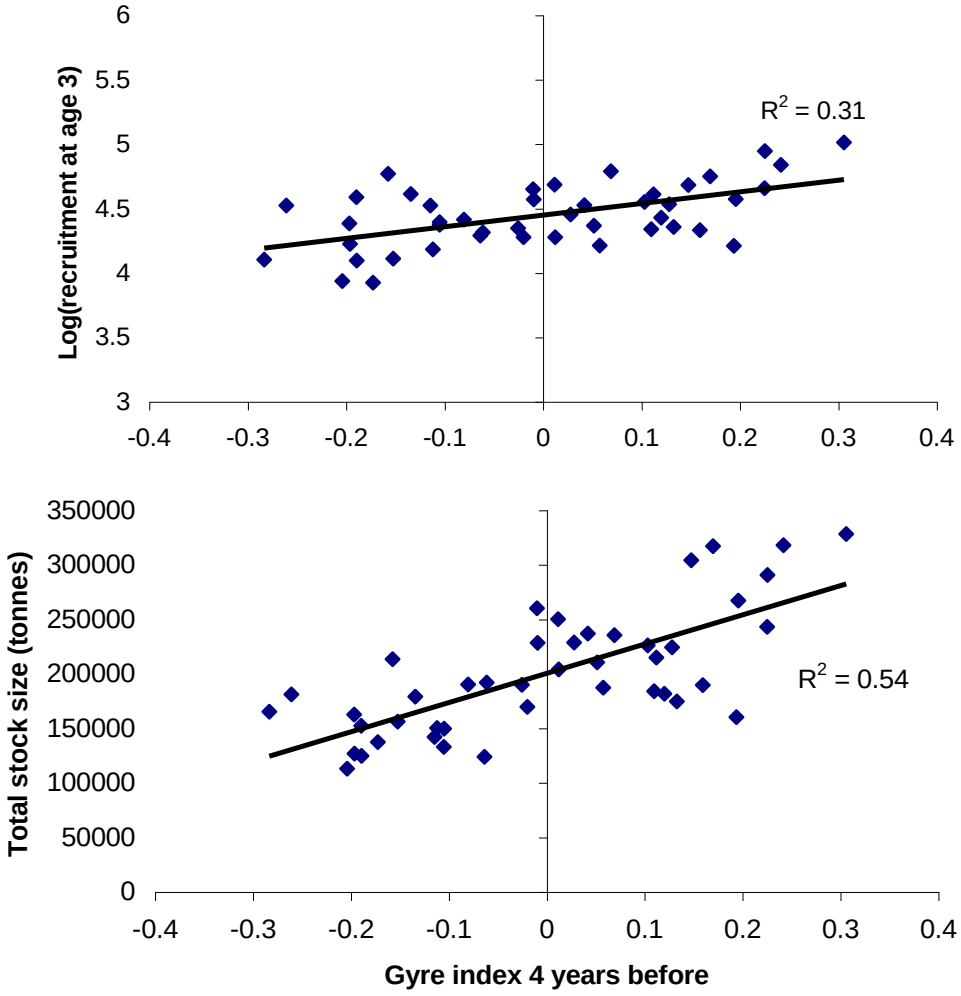

Figure 6.15.2. Relationship between the gyre index and both recruitment (top figure) and total stock biomass estimates (bottom figure.) Note that a large gyre index indicates a small subpolar gyre, and, consequently, a large influx of plankton-rich warmer-than-average water to the outer areas (bottom depth > 150 m) around the Faroes, where saithe typically are found.