5 Faroe haddock

Summary

Being an update assessment, the changes compared to last year are additions of new data from 2013 and 2014 and some minor revisions of recent landings data with corresponding revisions of the catch at age data. The main assessment tool is XSA tuned with 2 research vessel bottom trawl surveys. The results are in line with those from 2013, showing a very low SSB mainly due to poor recruitment but also due to higher than recommended fishing mortalities in recent years. SSB is now estimated well below B_{lim} and is predicted to stay below B_{lim} in 2014-2016 with status quo fishing mortality. Fishing mortality in 2013 is estimated at 0.28 and the average fishing mortality 2011-2013 at 0.27 (F_{MSY} and F_{pa} = 0.25). Landings in 2013 were only 3 100 t, slightly higher than in 2012, which was the lowest in the assessment series back to 1957. This years assessment indicates that the 2013 assessment underestimated the 2012 recruitment by more than 75% (0.5 million versus 1.9 million, which still is the lowest on record), overestimated the fishing mortality in 2012 by 9% (0.25 versus 0.23) and underestimated the 2012 total- and spawning stock biomasses by 17% and 15%, respectively (17 and 15 thous. t versus 20 and 17 thous. t).

5.1 Stock description and management units

Haddock in Faroese Waters, i.e. ICES Sub-Divisions Vb1 and Vb2 and in the southern part of ICES Division IIa, close to the border of Sub-Division Vb1, are generally believed to belong to the same stock and are treated as one management unit named Faroe haddock. Haddock is distributed all over the Faroe Plateau and the Faroe Bank from shallow water down to more than 450 m. A more detailed description of haddock in Farose waters is given in the stock annex. The spatial distribution of the haddock in the summer survey 2013 and in the spring survey 2014 is shown in figure 5.9; the distribuition by year for the whole survey series is in the stock annex. The figures in the stock annex do clearly illustrate the drastic decrease in the stock biomass in recent years.

5.2 Scientific data

5.2.1 Trends in landings and fisheries

Nominal landings of Faroe haddock increased very rapidly from only 4 000 t in 1993 to 27 000 t in 2003, but have declined drastically since and amounted in 2013 to only about 3 100 t. Most of the landings are taken from the Faroe Plateau; the 2013 landings from the Faroe Bank (Sub-Division Vb2), where the area shallower than 200 m depths has been closed to almost all fishing since the fiscal year 2008-2009, amounted to only about 45 t (Tables 5.1 and 5.2). The cumulative landings by month (Figure 5.2) suggest that landings in 2014 may be at the same low level as in 2013.

Faroese vessels have taken almost the entire catch since the late 1970s (Figure 5.1). Due to the dispute on mackerel quota share, there has been no agreement on mutual fishery rights between the Faroe Islands and Norway and EU, respectively, since 2011 and therefore there was no fishery by those parties in Vb in 2012; in 2014 the parties happened to made an agreement again. Table 5.3 shows the proportion of the Faroese landings taken by each fleet category since 1985. The longliners have taken most of

the catches in recent years followed by the trawlers. This was also the case in 2013, where the share by longliners was 78% and that by trawlers 22 (Figure 5.3).

5.2.2 Catch-at-age

For the Faroese landings, catch-at-age data were provided for fish taken from the Faroe Plateau (Vb1). The sampling intensity in 2013 is shown in Table 5.4 showing some improvement compared to 2012 . There is, however, a need to increase the sampling level. Reasons for the inadequate sampling level are shortage of resources (people, money) but also that the total catches (and stock) are so small that it is difficult to obtain enough samples. From late 2011, a landing site has been established in Tórshavn close to the Marine Research Institute and it is the intention that technicians from the Institute will regularly be sampling the landings there; this will increase the sampling level in coming years.

The normal procedure has been to disaggregate samples from each fleet category by season (Jan-Apr, May-Aug and Sep-Dec) and then raise them by the corresponding catch proportions to give the annual catch-at-age in numbers for each fleet This year, all longliners were grouped into 2 fleets (larger and smaller than 100 GRT, respectively), and all trawlers were also grouped into 2 fleets (larger and smaller than 1000 Hp, repsectively)The longliner samples had to be treated by using 2 seasons only (Jan-Jun, Jul-Dec. The results are given in Table 5.4. No catch-at-age data were available from the minor catch by trawlers from Iceland and they were assumed to have the same age composition as the Faroese trawlers > 1000 HP. The most recent data were revised according to the final catch figures. The resulting total catch-at-age in numbers is given in Tables 5.4 and 5.5, and in Figure 5.4 the LN(catch-at-age in numbers) is shown since 1990. LN(catch-at-age in numbers) for the whole assessment period from 1957 onwards can be found in the stck annex.

In general the catch-at-age matrix in recent years appears consistent although from time to time a few very small year classes are disturbing this consistency, both in numbers and mean weights at age. The recent very small year classes need to be very carefully inspected when the FBAR is calculated. Also there are some problems with what ages should be included in the plus group; there are some periods where only a few fishes are older than 9 years, and other periods with a quite substantial plus group (10+). These problems have been addressed in former reports of this WG and will not be further dealt with here (See the 2005 NWWG report). No estimates of discards of haddock are available. However, since almost no quotas are used in the management of the fisheries on this stock, the incentive to discard in order to high-grade the catches should be low. The landings statistics is therefore regarded as being adequate for assessment purposes. The ban on discarding as stated in the law on fisheries should also – in theory – keep the discarding at a low level.

5.2.3 Weight-at-age

Mean weight-at-age data are provided for the Faroese fishery (Table 5.6). Figure 5.5 shows the mean weights-at-age in the landings for age groups 2-7 since 1976. During this period, weights have shown cyclical changes. They were at a minimum in 2007-2009, but have increased again since then In the 3 latest years the weights have been fluctuated without a clear trend and a simple average of these years will be used in the short term predictions (figure 5.5). The mean weights at age in the stock are assumed equal to those in the landings.

5.2.4 Maturity-at-age

Maturity-at-age data is available from the Faroese Spring Groundfish Surveys 1982–2014. The survey is carried out in February-March, so the maturity-at-age is determined just prior to the spawning of haddock in Faroese waters and the determinations of the different maturity stages is relatively easy.

In order to reduce year-to-year effects due to possible inadequate sampling and at the same time allow for trends in the series, the routine by the WG has been to use a 3-year running average in the assessment. For the years prior to 1982, average maturity-at-age from the surveys 1982–1995 was adopted (Table 5.7 and Figure 5.6).

5.3 Information from the fishing industry

There exists a considerable amount of data on fish size in the fishing industry. No such information was used directly in the 2014 assessment but catch per unit effort for some selected fleets (logbook data) is used as an additional information on the status of the stock (see section 5.4.1.1).

5.4 Methods

This assessment is an update of the 2013 assessment, with exactly the same settings of the XSA. The only changes are minor revisions of recent landings according to revised data and corresponding revisions of the c@age input. All other input files (VPA) are the same except for the addition of the 2013 data.

5.4.1 Tuning and estimates of fishing mortality

Commercial cpue series. Several commercial catch per unit effort series are updated every year, but as discussed in previous reports of this WG they are not used directly for tuning of the VPA but as additional information on stock trends (for details see the stock annex). The age-aggregated cpue series for longliners and pair trawlers are presented in Figure 5.7. In general the two series show the same trends although in some periods the two series are conflicting; this has been explained by variations in catchability of the longlines due to changes in productivity of the ecosystem (see chapter 2). Both series, however, indicate that the stock is very low. The longliner cpue's do not decrease as much as the trawler cpue's which in addition to the explanation given above may be attributed to the fact that in the management of the demersal Faroese stocks, large areas have been closed to trawling with the effect that when the haddock stock is small, the distribution of it is mainly outside the "trawl areas".

Fisheries independent cpue series. Two annual groundfish surveys are available, one carried out in February-March since 1982 (100 stations per year down to 500 m depth), and the other in August-September since 1996 (200 stations per year down to 500 m depth). The spatial distribution of haddock catches in the surveys in 2013 and 2014 is shown in Figure 5.9 and the spatial distribution in the whole survey series are shown in the stock annex (spring surveys 1994-2014 and summer surveys 1996-2013). Biomass estimates (kg/hour) are available for both series since they were initiated (Figure 5.8). The main trends from the surveys are the same but the summer survey indicates a considerably more depleted stock in recent years than the summer survey. Age disaggregated data are available for the whole summer series, but due to problems with the database (see earlier reports), age disaggregated data for the spring survey are only available since 1994. The calculation of indices at age is based on age-length keys with a smoother applied. This is a useful method but, some artifacts may

be introduced because the smoothing can assign wrong ages to some lengths, especially for the youngest and oldest specimen. As in recent years, the length distributions have been used more directly for calculation of indices at age (ages 0-2), since these ages have length distributions almost without overlap. LN(numbers at age) for the surveys are presented in Figures 5.10-5.11. Further analyses of the performances of the two series are shown in the stock annex. In general there is a good relationship between the indices for one year class in two successive years. The same applies when comparing the corresponding indices at age from both surveys .

A SPALY (same procedure as last year) run, with the same settings of the XSA as in 2013 (tuned with the two surveys combined) (Table 5.8), with 2014 data included and some minor revisions of recent catch figures, gave in general similar results as last year (Table 5.9), although this years assessment indicates that the 2013 assessment underestimated the 2012 recruitment by more than 75% (0.5 million versus 1.9 million, which still is the lowest on record), overestimated the fishing mortality in 2012 by 10% (0.25 versus 0.23) and underestimated the 2012 total- and spawning stock biomasses by 15% and 13%, respectively (17 and 15 thous. t versus 20 and 17 thous. t).

The log q residuals for the two surveys are shown in Figure 5.12.

The retrospective analysis of fishing mortality, recruitment and spawning stock biomass of this XSA is shown in Figure 5.13. The retrospective pattern of the fishing mortality is hampered by strange values of some small poorly sampled year classes which in some years are included in the FBAR reference ages and consequently they will create problems for estimation of the stock (see the 2005 NWWG report); this is not a problem for the time being but the development of recent small year classes should be carefully inspected.

It has been questioned if a rather heavy shrinkage of 0.5 is the most appropriate for a stock like Faroe haddock where biological parameters and fishing mortality (catchability) are closely linked to productivity changes in the ecosystem. In order to investigate the possible effect of the shrinkage, the 2010 NWWG carried out an exploratory XSA without shrinkage (Shr. 2.0). Based on that it was concluded to continue with a shrinkage of 0.5 and this shrinkage was also applied this year.

Results. The fishing mortalities from the final XSA run are given in Table 5.10 and in Figure 5.14. The fishing mortality was high (around 0.6) in the 1950s and early 1960s but declined to around 0.2 from 1965-1975.Since then, fishing mortality has usually been low, the exceptions are peaks in 1977, 1982, 1997-1999 and 2003-2006. They occur near the end of relatively high catch periods and some of the highest values (0.32-0.45) are nearly certainly an artefact of the unweighted fishing mortality. Exploitation ratio (Yield/Biomass) is more stable and may be used to indicate the level of fishing mortality.

5.5 Reference points

The yield- and spawning stock biomass per recruit (age 2) based on the long-term data are shown in Table 5.17 and Figure 5.16. From Figure 5.15, showing the recruit/spawning stock relationship, and from Table 5.17, $\mathbf{F}_{med}$, and $\mathbf{F}_{high}$ were calculated at 0.24 and 0.80, respectively. The F_{max} of 0.60 should not be used since it is very poorly determined due to the flat YPR curve. $F_{0.1}$ is estimated at 0.19. The F35%SPR was estimated at 0.23.

The precautionary reference fishing mortalities were set in 1998 by ACFM with F_{pa} as the $\mathbf{F}_{med}$ value of 0.25 and F_{lim} two standard deviations above $\mathbf{F}_{pa}$ equal to 0.40. The

precautionary reference spawning stock biomass levels were changed by ACFM in 2007. B_{lim} was set at 22 000 t (B_{loss}) and B_{pa} at 35 000 t based on the formula $B_{pa} = B_{lim}e^{1.645\sigma}$, assuming a σ of about 0.3 to account for the uncertainties in the assessment.

The working group in 2012 investigated possible candidates for $F_{MSY.}$ Based on Medium –term projections, Medium-term projections the NWWG suggested, that FMSY preliminary could be set at 0.25 and the MSY $B_{trigger}$ at 35 thous. t (same as B_{pa}) These values were accepted by ACOM. Some further analyses have indicated that these values are acceptable, but it is anticipated that further work will be untertaken in connection with the next benchmark assessment. See the stock annex for more details.

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

The stock size in numbers is given in Table 5.11 and a summary of the VPA with the biomass estimates is given in Table 5.12 and in Figure 5.14. According to this assessment, the period up to the mid 1970s was characterized by relative high and stable landings, recruitment and spawning stock biomass and the stock was able to withstand relatively high fishing mortalities. Since then the spawning stock biomass has shown large fluctuations due to cyclical changes in recruitment, growth and maturity (Figures 5.5 and 5.6). The fishing mortality does not seem to be the decisive factor in this development since it most of the period has fluctuated around the F_{MSY} and F_{pa}. It must though be remembered that the characteristics of the stock in recent decades with long periods of poor recruitment make it less resilient to high fishing mortality.

The most recent increase in the spawning stock is due to new strong year classes entering the stock of which the 1999 year class is the highest on record (103 million at age 2). Also the YC's from 2000 and 2001 are estimated well above average and the 2002 YC above average, but the more recent YC's are all estimated to be very small except the 2009 YC, which is estimated to be slightly above the half of the average for the whole series back to 1957 and the 2012 and 2013 YC's, which are estimated somewhat higher than the other small year-classes. Fishing mortality has been relatively high since 2003, highest whent the stock was large leading to large variability in catches. Currently fishing mortality is estimated close to F_{MSY} (0.25).

5.7 Short term forecast

5.7.1 Input data

The input data for the short-term predictions are estimated in accordance with the procedures last year and explained in Tables 5.13-14. The YC 2014 at age 2 in 2016 is estimated as the geometric mean of the 2-year-olds since 2005. This procedure was introduced in 2011. All available information suggests that using the recent short series with poor recruitment is more appropriate than the longer period used in the past. However, the choice of recruitment in 2016 has little effect on the short term prediction.

5.7.2 Results

Although the allocated number of fishing days for the fishing year 2013-2014was reduced for some fleets as compared to the year before (see section 2), it should not be unrealistic to assume fishing mortalities in 2014 as the average of some recent years, here the average of F(2011-2013), since not all allocated days were actually used; however, possible changes in the catchability of the fleets (which seems to be linked to productivity changes in the environment) could undermine this assumption; price

differences between cod and haddock may also influence this assumption. The landings in 2014 are then predicted to be about 3400 t, and continuing with this fishing mortality will result in 2015 landings of about 3 800 t Table 5.15). The SSB will decline to 16 000 t in 2014, will be 16 800 t in 2015 and increase to 18 600 t in 2016 i.e. will be below B_{lim} (22 000t) in the next years. The results of the short-term prediction are shown in Table 5.15 and in Figure 5.16. The contribution (%) by year-classes to the age composition of the predicted 2014 and 2015 SSB's is shown in Figure 5.17. It should be noted that the YC 2012 which not have entered the fishery in 2013, will contribute by 40% of the SSB in 2016.

5.8 Medium term forecasts and yield per recruit

No medium term projections were made this year; however, last years projections, which were the basis for suggested MSY reference points, are presented in the stock annex.

The input data for the long-term yield and spawning stock biomass (yield-per-recruit calculations) are listed in Table 5.16. Mean weights-at-age (stock and catch) are averages for the 1977–2013 period. The maturity o-gives are averages for the years 1982-2013. The exploitation pattern is the same as in the short term prediction.

The results are given in Table 5.16, in Figure 5.20 and under Reference points (section 5.5).

5.9 Uncertainties in assessment and forecast

Retrospective analyses indicate periods with tendencies to overestimate spawning stock biomass and underestimate fishing mortality and vice versa. Similar things can be seen with the recruitment. This years assessment indicates that the 2013 assessment underestimated the 2012 recruitment by more than 75% (0.5 million versus 1.9 million, which still is the lowest on record), overestimated the fishing mortality in 2012 by 10% (0.25 versus 0.23) and underestimated the 2012 total- and spawning stock biomasses by 15% and 13%, respectively (17 and 15 thous. t versus 20 and 17 thous. t), see text table below..

Recruitment estimates from surveys are not very consistent for small cohorts..

The sampling of the catches for length measurements, otolith readings and length-weight relationships has improved as compared to 2007-2009, and was considered to be adequate in 2010; the level of sampling decreased again in 2011-2012 and improved marginally in 2013. Although it is regarded to be adequate for the assessment, there is a need to improve it again (see 5.2).

5.10 Comparison with previous assessment and forecast

As explained previously in the report, this assessment is an update of the 2013 assessment. The only changes are minor revisions of recent landings according to revised data and corresponding revisions of the c@age input. All other input files (VPA and tuning fleets) are the same except for the addition of the 2013 data.

Following differences in the 2012 estimates were observed as compared to last year (see text above):

Comparisons between 2013 and 2014 assessment of 2012 data
The year of comparison is 2012

	R at age 2 (thousands	Total B (tonnes)	SSB (tonnes)	Landings (tonnes)	F (3-7)
2013 spaly	453	16725	14641	2613	0.2505
2014 spaly	1854	19581	16886	2634	0.2281
%-change	76	15	13	1	-10

5.11 Management plans and evaluations

There is no explicit management plan for this stock. A management system based on number of fishing days, closed areas and other technical measures was introduced in 1996 with the purpose to ensuring sustainable fisheries. There has been some work with establishing a management plan with a harvest control role for cod, haddock and saithe including a recovery plan, but the proposal has not yet been officially accepted. See overview in section 2 for details.

5.12 Management considerations

Management of fisheries on haddock also needs to take into account measures for cod and saithe.

5.13 Ecosystem considerations

Since on average about 80% of the catches are taken by longlines and the remaining by trawls, effects of the haddock fishery on the bottom is moderate.

5.14 Regulations and their effects

As explained in the overview (section 2), the fishery for haddock in Vb is regulated through a maximum number of allocated fishing days, gear specifications, closed areas during spawning times, closed areas for longlining close to land and large areas closed to trawling. As a consequence, around 80% of the haddock landings derive from long line fisheries. Since the minimum mesh size in the trawls (codend) is 145 mm, the trawl catches consist of fewer small fish than the long line fisheries. Other nations fishing in Faroese waters are regulated by TAC's obtained during bilateral negotiations; their total landings are minimal, however, and in 2011-2013 no agreement could be made between the Faroe Islands and EU and Norway, respectively, due to the dispute on mackerel quota sharing. In 2014, however, the parties managed to get an agreement in place again. Discarding of haddock is considered minimal and there is a ban to discarding.

5.15 Changes in fishing technology and fishing patterns

See section 2.

5.16 Changes in the environment

See section 2.

Table 5.1 Faroe Plateau (Sub-division Vb1) HADDOCK. Nominal catches (tonnes) by countries 2000-2013 and Working Group estimates in Vb.

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013 [2]
Faroe Islands	13,620	13,457	20,776 [6]	21,615	18,995	18,172	15,600	11,689	6,728	4,895	4,932	3,350	2,490	2,846
France[1]	6	8	2	4	1	+	12 [5]	4 [5]	3 [5]	2 [5]	1	3		
Germany	1	2	6	1	6		1							
Greenland	22	0	4 [4]				1	9 [4]		6 [4]	12	+	1 [4]	
Iceland			4										2	26
Norway	355	257	227	265	229	212	57	61	26	8	5			
Russia					16				10					
Spain					49									
UK (Engl. and Wales)	19	4	11 [5]	14	8	1	1							
UK (Scotland)[5]				185	186	126	106	35	60	64				
United Kingdom											73			
Total	14,023	13,728	21,030	22,084	19,490	18,511	15,778	11,798	6,827	4,975	5,023	3,353	2,493	2,872
Used in the assessment	15,821	15,890	24,933	27,072	23,101	20,455	17,154	12,631	7,388	5,197	5,202	3,540	2,634	3,105

1) Including catches from Sub-division Vb2. Quantity unknown 1989-1991, 1993 and 1995-2001.
2) Preliminary data
3)From 1983 to 1996 catches included in Sub-division Vb2.
4) Reported as Division Vb, to the Faroese coastal guard service.
5) Reported as Division Vb.
6) Includes Faroese landings reported to the NWWG by the Faroe Marine Research Institute

Table 5.2 Faroe Bank (Sub-division Vb2) HADDOCK. Nominal catches (tonnes) by countries, 2000-2013.

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013 [2]
Faroe Islands	1,565 [5]	1,948	3,698	4,934	3,594	2,444	1,375	810	556	192	178	194	141	45
France1						+								
Norway	48	66	28	54	17	45	1	8		3	1			
UK (Engl. and Wales)	:	:	:	:	:	1								
UK (Scotland)3	185	148	177	[4]	:	1		15	5	27 [4]	33			
Total	1,798	2,162	3,903	4,988	3,611	1,944	1,376	833	561	222	212	194	141	45

1) Catches included in Sub-division Vb1.
2) Provisional data
3)From 1983 to 1996 includes also catches taken in Sub-division Vb1 (see Table 2.4.1)
4) Reported as Division Vb.
5) Provided by the NWWG

Table 5.3 Total Faroese landings of haddock from Division Vb 1985-2013 by each fleet category (%).

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Open boats	7	7	11	2	3	2	3	2	1	1	1	2	2	2	2	1	2	3	4	4	4	6	6	6	4	6	7	6	8
Longliners < 100GRT	39	39	39	49	58	60	56	46	24	18	23	28	31	30	23	24	29	31	34	40	41	47	35	34	27	27	40	41	35
Longliners > 100GRT	13	12	13	19	18	18	18	22	25	25	38	36	38	40	40	36	38	34	42	42	43	36	39	41	30	47	35	34	35
Otter board trawlers < 1000HP	7	5	7	6	4	4	3	3	11	10	12	13	9	8	7	9	7	6	4	3	3	1	4	7	13	4	4	6	10
Otterboard trawlers > 1000HP	8	5	2	2	2	2	2	1	1	3	2	2	3	3	7	5	5	11	3	1	1	2	8	2	2	2	3	5	8
Pairtrawlers < 1000HP	19	20	17	11	7	5	7	11	13	10	8	7	6	5	6	7	6	4	4	2	2	2	3	3	5	3	2	2	2
Pairtrawlers > 1000HP	6	10	9	9	6	8	11	14	22	29	16	13	12	12	14	19	12	10	8	7	4	5	6	7	18	11	9	5	3
Nets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jigging	1	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	1	2	1	1	1	0	1	0	0	+	1	0	1
Other gears	0	1	1	2	1	1	1	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 5.4

Catch at age 2013

Age	Vb LLiners < 100GRT	Vb LLiners > 100GRT	Vb Trawl < 1000HP	Vb Trawl > 1000HP	Vb Others	Vb All Faroese fleets	Vb Foreign Trawlers	Vb Total All fleets
1	1	0	0	0	0	0	0	0
2	56	22	1	7	0	86	0	87
3	456	42	10	27	0	535	1	537
4	345	344	178	297	0	1163	14	1177
5	57	82	38	52	0	229	2	231
6	24	38	15	22	0	99	1	100
7	20	30	14	18	0	81	1	82
8	27	34	13	17	0	92	1	93
9	29	25	9	12	0	75	1	75
10	33	33	9	13	0	88	1	89
11	8	12	5	7	0	31	0	31
12	2	0	1	1	0	5	0	5
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
Total no.	1058	661	293	473	0	2485	22	2506
Catch, t.	1150	810	319	495	0	2774	23	2797

Notes: Numbers in 1000'
Catch, gutted weight in tonnes
Others includes netters, jiggers, other small categories and catches not otherwise accounted for
LLiners = Longliners OB.trawl. = Otterboard trawlers Pair Trawl. = Pair trawlers

Comm. Sampling 2013	Vb1 Open Boats	Vb1 LLiners < 100GRT	Vb1 LLiners > 100GRT	Vb1 Trawl <1000HP	Vb1 Trawl <1000HP	Vb1 All Faroese Fleets	Vb2 All Faroese LLiners	Vb2 All Faroese trawlers	Vb2 All Faroese Fleets	Vb Total
No. samples		7	17	11	38	73	0	0	0	73
No. lengths		1630	3995	2512	8805	16942	0	0	0	16942
No. weights		1630	3995	2512	8805	16942	0	0	0	16942
No. ages		240	359	120	660	1379	0	0	0	1379

Tabel 5.5 Faroe haddock. Catch number-at-age

Run title : FAROE HADDOCK (ICES DIVISION Vb) HAD_IND

At 22/04/2014 15:30

Table 1 Catch numbers at age Numbers*10**-3

YEAR, 1957, 1958, 1959, 1960, 1961, 1962, 1963,

AGE

0, 0, 0, 0, 0, 0, 0, 0,

1, 45, 116, 525, 854, 941, 784, 356,

2, 4133, 6255, 3971, 6061, 7932, 9631, 13552,

3, 7130, 8021, 7663, 10659, 7330, 13977, 8907,

4, 8442, 5679, 4544, 6655, 5134, 5233, 7403,

5, 1615, 3378, 2056, 2482, 1937, 2361, 2242,

6, 894, 1299, 1844, 1559, 1305, 1407, 1539,

7, 585, 817, 721, 1169, 838, 868, 860,

8, 227, 294, 236, 243, 236, 270, 257,

9, 94, 125, 98, 85, 59, 72, 75,

+gp, 58, 105, 47, 28, 13, 22, 23,

TOTALNUM, 23223, 26089, 21705, 29795, 25725, 34625, 35214,

TONSLAND, 20995, 23871, 20239, 25727, 20831, 27151, 27571,

SOPCOF %, 89, 90, 90, 88, 88, 89, 89,

Table 1 Catch numbers at age Numbers*10**-3

YEAR, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973,

AGE

0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,

1, 46, 39, 90, 70, 49, 95, 57, 55, 43, 665,

2, 2284, 1368, 1081, 1425, 5881, 2384, 1728, 717, 750, 3311,

3, 7457, 4286, 3304, 2405, 4097, 7539, 4855, 4393, 3744, 8416,

4, 3899, 5133, 4804, 2599, 2812, 4567, 6581, 4727, 4179, 1240,

5, 2360, 1443, 2710, 1785, 1524, 1565, 1624, 3267, 2706, 2795,

6, 1120, 1209, 1112, 1426, 1526, 1485, 1383, 1292, 1171, 919,

7, 728, 673, 740, 631, 923, 1224, 1099, 864, 696, 1054,

8, 198, 1345, 180, 197, 230, 378, 326, 222, 180, 150,

9, 49, 43, 54, 52, 68, 114, 68, 147, 113, 68,

+gp, 7, 8, 9, 13, 12, 20, 10, 102, 95, 11,

TOTALNUM, 18148, 15547, 14084, 10603, 17122, 19371, 17731, 15786, 13677, 18629,

TONSLAND, 19490, 18479, 18766, 13381, 17852, 23272, 21361, 19393, 16485, 18035,

SOPCOF %, 101, 94, 109, 101, 102, 108, 102, 97, 96, 97,

Table 1 Catch numbers at age Numbers*10**-3

YEAR, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983,

AGE

0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,

1, 253, 94, 40, 0, 0, 1, 0, 0, 0, 0,

2, 5633, 7337, 4396, 255, 32, 1, 143, 74, 539, 441,

3, 2899, 7952, 7858, 4039, 1022, 1162, 58, 455, 934, 1969,

4, 3970, 2097, 6798, 5168, 4248, 1755, 3724, 202, 784, 383,

5, 451, 1371, 1251, 4918, 4054, 3343, 2583, 2586, 298, 422,

6, 976, 247, 1189, 2128, 1841, 1851, 2496, 1354, 2182, 93,

7, 466, 352, 298, 946, 717, 772, 1568, 1559, 973, 1444,

8, 535, 237, 720, 443, 635, 212, 660, 608, 1166, 740,

9, 68, 419, 258, 731, 243, 155, 99, 177, 1283, 947,

+gp, 147, 187, 318, 855, 312, 74, 86, 36, 214, 795,

TOTALNUM, 15398, 20293, 23126, 19483, 13104, 9326, 11417, 7051, 8373, 7234,

TONSLAND, 14773, 20715, 26211, 25555, 19200, 12424, 15016, 12233, 11937, 12894,

SOPCOF %, 97, 117, 107, 98, 99, 104, 100, 109, 92, 106,

Table 1 Catch numbers at age Numbers*10**-3

YEAR, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993,

AGE

0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,

1, 25, 0, 0, 0, 0, 0, 0, 0, 0, 43,

2, 1195, 985, 230, 283, 655, 63, 105, 77, 40, 113,

3, 1561, 4553, 2549, 1718, 444, 1518, 1275, 1044, 154, 298,

4, 2462, 2196, 4452, 3565, 2463, 658, 1921, 1774, 776, 274,

5, 147, 1242, 1522, 2972, 3036, 2787, 768, 1248, 1120, 554,

6, 234, 169, 738, 1114, 2140, 2554, 1737, 651, 959, 538,

7, 42, 91, 39, 529, 475, 1976, 1909, 1101, 335, 474,

8, 861, 61, 130, 83, 151, 541, 885, 698, 373, 131,

9, 388, 503, 71, 48, 18, 133, 270, 317, 401, 201,

+gp, 968, 973, 712, 334, 128, 81, 108, 32, 162, 185,

TOTALNUM, 7883, 10773, 10443, 10646, 9510, 10311, 8978, 6942, 4320, 2811,

TONSLAND, 12378, 15143, 14477, 14882, 12178, 14325, 11726, 8429, 5476, 4026,

SOPCOF %, 106, 106, 101, 102, 97, 100, 102, 106, 106, 103,

Table 1 Catch numbers at age Numbers*10**-3

YEAR, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003,

AGE

0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,

1, 1, 0, 1, 0, 0, 9, 73, 19, 0, 0,

2, 277, 804, 326, 77, 106, 174, 1461, 4380, 1515, 133,

3, 191, 452, 5234, 2913, 1055, 1142, 3061, 3128, 14039, 3436,

4, 307, 235, 1019, 10517, 5269, 942, 210, 2423, 2879, 13551,

5, 153, 226, 179, 710, 9856, 4677, 682, 173, 1200, 2224,

6, 423, 132, 163, 116, 446, 6619, 2685, 451, 133, 949,

7, 427, 295, 161, 123, 99, 226, 2846, 1151, 239, 163,

8, 383, 290, 270, 93, 87, 26, 79, 1375, 843, 334,

9, 125, 262, 234, 220, 95, 20, 1, 17, 1095, 858,

+gp, 301, 295, 394, 516, 502, 192, 71, 18, 33, 924,

TOTALNUM, 2588, 2991, 7981, 15285, 17515, 14027, 11169, 13135, 21976, 22572,

TONSLAND, 4252, 4948, 9642, 17924, 22210, 18482, 15821, 15890, 24933, 27072,

SOPCOF %, 100, 103, 100, 103, 101, 100, 103, 100, 100, 100,

Table 1 Catch numbers at age Numbers*10**-3

YEAR, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013,

AGE

0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,

1, 3, 0, 0, 0, 6, 0, 0, 0, 0, 0,

2, 243, 85, 247, 76, 66, 27, 389, 170, 8, 87,

3, 2007, 1671, 446, 982, 204, 329, 445, 773, 960, 537,

4, 4802, 3852, 2566, 547, 918, 402, 426, 324, 513, 1177,

5, 10426, 6753, 3949, 2732, 424, 555, 279, 198, 156, 231,

6, 1163, 6127, 5423, 3309, 1471, 514, 484, 186, 114, 100,

7, 409, 542, 3278, 2758, 1706, 1133, 553, 280, 123, 82,

8, 89, 147, 136, 1117, 1254, 739, 718, 353, 94, 93,

9, 166, 28, 63, 89, 320, 285, 444, 367, 171, 75,

+gp, 811, 154, 70, 9, 39, 48, 159, 187, 114, 125,

TOTALNUM, 20119, 19359, 16178, 11619, 6408, 4032, 3897, 2838, 2253, 2507,

TONSLAND, 23101, 20455, 17154, 12631, 7388, 5197, 5202, 3540, 2634, 3105,

SOPCOF %, 99, 100, 100, 100, 101, 100, 101, 101, 102, 101,

Table 5.6 Faroe haddock. Catch weight-at-age.

Run title : FAROE HADDOCK (ICES DIVISION Vb) HAD_IND

At 22/04/2014 15:30

Table 2 Catch weights at age (kg)

YEAR, 1957, 1958, 1959, 1960, 1961, 1962, 1963,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .2500, .2500, .2500, .2500, .2500, .2500, .2500,

2, .4700, .4700, .4700, .4700, .4700, .4700, .4700,

3, .7300, .7300, .7300, .7300, .7300, .7300, .7300,

4, 1.1300, 1.1300, 1.1300, 1.1300, 1.1300, 1.1300, 1.1300,

5, 1.5500, 1.5500, 1.5500, 1.5500, 1.5500, 1.5500, 1.5500,

6, 1.9700, 1.9700, 1.9700, 1.9700, 1.9700, 1.9700, 1.9700,

7, 2.4100, 2.4100, 2.4100, 2.4100, 2.4100, 2.4100, 2.4100,

8, 2.7600, 2.7600, 2.7600, 2.7600, 2.7600, 2.7600, 2.7600,

9, 3.0700, 3.0700, 3.0700, 3.0700, 3.0700, 3.0700, 3.0700,

+gp, 3.5500, 3.5500, 3.5500, 3.5500, 3.5500, 3.5500, 3.5500,

SOPCOFAC, .8937, .8983, .9034, .8832, .8832, .8929, .8915,

Table 2 Catch weights at age (kg)

YEAR, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .2500, .2500, .2500, .2500, .2500, .2500, .2500, .2500, .2500, .2500,

2, .4700, .4700, .4700, .4700, .4700, .4700, .4700, .4700, .4700, .4700,

3, .7300, .7300, .7300, .7300, .7300, .7300, .7300, .7300, .7300, .7300,

4, 1.1300, 1.1300, 1.1300, 1.1300, 1.1300, 1.1300, 1.1300, 1.1300, 1.1300, 1.1300,

5, 1.5500, 1.5500, 1.5500, 1.5500, 1.5500, 1.5500, 1.5500, 1.5500, 1.5500, 1.5500,

6, 1.9700, 1.9700, 1.9700, 1.9700, 1.9700, 1.9700, 1.9700, 1.9700, 1.9700, 1.9700,

7, 2.4100, 2.4100, 2.4100, 2.4100, 2.4100, 2.4100, 2.4100, 2.4100, 2.4100, 2.4100,

8, 2.7600, 2.7600, 2.7600, 2.7600, 2.7600, 2.7600, 2.7600, 2.7600, 2.7600, 2.7600,

9, 3.0700, 3.0700, 3.0700, 3.0700, 3.0700, 3.0700, 3.0700, 3.0700, 3.0700, 3.0700,

+gp, 3.5500, 3.5500, 3.5500, 3.5500, 3.5500, 3.5500, 3.5500, 3.5500, 3.5500, 3.5500,

SOPCOFAC, 1.0111, .9383, 1.0885, 1.0117, 1.0246, 1.0787, 1.0249, .9688, .9597, .9690,

Table 2 Catch weights at age (kg)

YEAR, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .2500, .2500, .2500, .0000, .0000, .3000, .0000, .0000, .0000, .0000,

2, .4700, .4700, .4700, .3110, .3570, .3570, .6430, .4520, .7000, .4700,

3, .7300, .7300, .7300, .6330, .7900, .6720, .7130, .7250, .8960, .7400,

4, 1.1300, 1.1300, 1.1300, 1.0440, 1.0350, .8940, .9410, .9570, 1.1500, 1.0100,

5, 1.5500, 1.5500, 1.5500, 1.4260, 1.3980, 1.1560, 1.1570, 1.2370, 1.4440, 1.3200,

6, 1.9700, 1.9700, 1.9700, 1.8250, 1.8700, 1.5900, 1.4930, 1.6510, 1.4980, 1.6600,

7, 2.4100, 2.4100, 2.4100, 2.2410, 2.3500, 2.0700, 1.7390, 2.0530, 1.8290, 2.0500,

8, 2.7600, 2.7600, 2.7600, 2.2050, 2.5970, 2.5250, 2.0950, 2.4060, 1.8870, 2.2600,

9, 3.0700, 3.0700, 3.0700, 2.5700, 3.0140, 2.6960, 2.4650, 2.7250, 1.9610, 2.5400,

+gp, 3.5500, 3.5500, 3.5500, 2.5910, 2.9200, 3.5190, 3.3100, 3.2500, 2.8560, 3.0400,

SOPCOFAC, .9678, 1.1696, 1.0741, .9784, .9947, 1.0380, 1.0017, 1.0870, .9238, 1.0554,

Table 2 Catch weights at age (kg)

YEAR, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .3590, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .3600,

2, .6810, .5280, .6080, .6050, .5010, .5800, .4380, .5470, .5250, .7550,

3, 1.0110, .8590, .8870, .8310, .7810, .7790, .6990, .6930, .7240, .9820,

4, 1.2550, 1.3910, 1.1750, 1.1260, .9740, .9230, .9390, .8840, .8170, 1.0270,

5, 1.8120, 1.7770, 1.6310, 1.4620, 1.3630, 1.2070, 1.2040, 1.0860, 1.0380, 1.1920,

6, 2.0610, 2.3260, 1.9840, 1.9410, 1.6800, 1.5640, 1.3840, 1.2760, 1.2490, 1.3780,

7, 2.0590, 2.4400, 2.5190, 2.1730, 1.9750, 1.7460, 1.5640, 1.4770, 1.4300, 1.6430,

8, 2.1370, 2.4010, 2.5830, 2.3470, 2.3440, 2.0860, 1.8180, 1.5740, 1.5640, 1.7960,

9, 2.3680, 2.5320, 2.5700, 3.1180, 2.2480, 2.4240, 2.1680, 1.9300, 1.6330, 1.9710,

+gp, 2.6860, 2.6860, 2.9220, 2.9330, 3.2950, 2.5140, 2.3350, 2.1530, 2.1260, 2.2400,

SOPCOFAC, 1.0593, 1.0559, 1.0141, 1.0197, .9695, 1.0025, 1.0195, 1.0635, 1.0554, 1.0320,

Table 2 Catch weights at age (kg)

YEAR, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0000, .0000, .3600, .0000, .0000, .2780, .2800, .2800, .0000, .0000,

2, .7540, .6660, .5340, .5190, .6220, .5040, .6610, .6080, .5840, .5710,

3, 1.1030, 1.0540, .8580, .7710, .8460, .6240, .9360, .9400, .8570, .7150,

4, 1.2540, 1.4890, 1.4590, 1.0660, 1.0160, .9740, 1.1660, 1.3740, 1.4050, 1.0080,

5, 1.4650, 1.7790, 1.9930, 1.7990, 1.2830, 1.2200, 1.4830, 1.7790, 1.7990, 1.5370,

6, 1.5930, 1.9400, 2.3300, 2.2700, 2.0800, 1.4900, 1.6160, 1.9710, 1.9740, 1.9110,

7, 1.8040, 2.1820, 2.3510, 2.3400, 2.5560, 2.4560, 1.8930, 2.1190, 2.3010, 2.0910,

8, 2.0490, 2.3570, 2.4690, 2.4750, 2.5720, 2.6580, 2.8210, 2.3730, 2.3700, 2.3010,

9, 2.2250, 2.4900, 2.7770, 2.5010, 2.4520, 2.5980, 3.7490, 2.7500, 2.6260, 2.4060,

+gp, 2.4230, 2.6780, 2.5820, 2.6760, 2.7530, 2.9530, 3.1960, 3.9660, 3.1300, 2.5350,

SOPCOFAC, .9969, 1.0331, 1.0043, 1.0250, 1.0106, .9973, 1.0349, .9960, 1.0010, 1.0049,

Table 2 Catch weights at age (kg)

YEAR, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .3670, .0000, .0000, .0000, .4910, .0000, .0000, .0000, .0000, .0000,

2, .5740, .5380, .4750, .6280, .6360, .4820, .6920, .5530, .6190, .5760,

3, .7700, .6490, .6010, .6690, .7540, .7340, .8700, .8150, .7860, .8300,

4, .8870, .7970, .7680, .8590, .8600, .9850, 1.1490, 1.0860, 1.0690, 1.1490,

5, 1.1590, 1.0200, .9110, .9690, .9910, 1.1300, 1.3080, 1.3030, 1.4050, 1.4650,

6, 1.6380, 1.2450, 1.1260, 1.0600, 1.0820, 1.2640, 1.3860, 1.3870, 1.6160, 1.7100,

7, 1.8700, 1.8430, 1.3740, 1.2450, 1.1510, 1.3570, 1.4290, 1.4690, 1.6560, 1.8270,

8, 2.4380, 2.0610, 2.1580, 1.4750, 1.3790, 1.5450, 1.5680, 1.5380, 1.6750, 1.8860,

9, 2.3570, 2.2630, 2.2110, 2.2660, 1.7270, 1.7920, 1.7400, 1.7020, 1.7270, 1.8560,

+gp, 2.4170, 2.5790, 2.5690, 2.2560, 2.4350, 2.1540, 1.8410, 1.8620, 1.9050, 2.0850,

SOPCOFAC, .9929, .9988, .9987, .9999, 1.0065, .9955, 1.0076, 1.0060, 1.0190, 1.0073,

Table 5.7 Faroe haddock. Proportion mature-at-age.

Run title : FAROE HADDOCK (ICES DIVISION Vb) HAD_IND

At 22/04/2014 15:30

Table 5 Proportion mature at age

YEAR, 1957, 1958, 1959, 1960, 1961, 1962, 1963,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

2, .0600, .0600, .0600, .0600, .0600, .0600, .0600,

3, .4800, .4800, .4800, .4800, .4800, .4800, .4800,

4, .9100, .9100, .9100, .9100, .9100, .9100, .9100,

5, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

6, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

7, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

8, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

9, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

+gp, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

Table 5 Proportion mature at age

YEAR, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

2, .0600, .0600, .0600, .0600, .0600, .0600, .0600, .0600, .0600, .0600,

3, .4800, .4800, .4800, .4800, .4800, .4800, .4800, .4800, .4800, .4800,

4, .9100, .9100, .9100, .9100, .9100, .9100, .9100, .9100, .9100, .9100,

5, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

6, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

7, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

8, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

9, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

+gp, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

Table 5 Proportion mature at age

YEAR, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

2, .0600, .0600, .0600, .0600, .0600, .0600, .0600, .0600, .0800, .0800,

3, .4800, .4800, .4800, .4800, .4800, .4800, .4800, .4800, .6200, .6200,

4, .9100, .9100, .9100, .9100, .9100, .9100, .9100, .9100, .8900, .8900,

5, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

6, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

7, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

8, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

9, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

+gp, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

Table 5.7 Faroe haddock. Proportion mature-at-age (cont.).

Table 5 Proportion mature at age

YEAR, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

2, .0800, .0300, .0300, .0500, .0500, .0200, .0800, .1600, .1800, .1100,

3, .7600, .6200, .4300, .3200, .2400, .2200, .3700, .5800, .6500, .5000,

4, .9800, .9600, .9500, .9100, .8900, .8700, .9000, .9300, .9100, .8500,

5, 1.0000, 1.0000, .9900, .9800, .9800, .9900, 1.0000, 1.0000, 1.0000, .9700,

6, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, .9900,

7, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

8, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

9, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

+gp, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

Table 5 Proportion mature at age

YEAR, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

2, .0500, .0300, .0300, .0100, .0100, .0100, .0200, .0900, .0800, .0700,

3, .4200, .4700, .4700, .4700, .3600, .3500, .3600, .5400, .4900, .4500,

4, .8600, .9100, .9300, .9100, .8700, .8600, .8700, .9300, .9700, .9700,

5, .9600, .9600, .9800, 1.0000, .9900, .9900, .9900, 1.0000, 1.0000, .9900,

6, .9900, .9900, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

7, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

8, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

9, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

+gp, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

Table 5 Proportion mature at age

YEAR, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

2, .0000, .0100, .0100, .0200, .0100, .0100, .0300, .0900, .1700, .1700,

3, .3500, .3400, .4200, .5200, .6400, .6100, .6500, .7400, .8300, .8300,

4, .9400, .9100, .9100, .9100, .9500, .9300, .9600, .9700, .9900, 1.0000,

5, .9900, .9900, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

6, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

7, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

8, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

9, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

+gp, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000, 1.0000,

Table 5.8 Faroe haddock. 2014 tuning file.

FAROE Haddock (ICES SUBDIVISION VB) COMB-SURVEY-SPALY-14-jr.txt

102

SUMMER SURVEY

1996 2013

1 1 0.6 0.7

1 8

200 42362.00 38050.46 60866.49 1138.05 210.25 286.72 238.48 416.44

200 6851.83 12379.93 24184.20 47016.45 852.22 177.11 81.49 163.30

200 18825.00 2793.18 2545.32 14600.59 18399.09 285.78 89.61 73.64

200 24115.03 9521.26 5553.74 1548.70 8698.75 9829.62 204.06 7.89

200 161583.90 18837.41 7340.20 371.40 1301.41 4638.88 5699.14 85.81

200 98708.03 96675.44 11962.07 4424.74 174.57 629.27 2615.71 3209.95

200 89340.23 52092.34 57922.78 5538.84 1909.63 162.47 395.07 1256.27

200 47450.28 36196.89 22847.00 35941.83 3962.64 621.93 101.63 428.87

200 9049.95 33653.00 15117.67 16561.09 16561.09 885.34 185.66 24.20

200 14574.15 7694.99 12936.61 16513.01 11635.42 11963.56 517.84 36.46

200 3484.57 9591.77 2004.49 8968.12 8908.60 6973.94 3364.52 125.74

200 3908.73 7047.44 1676.69 1520.65 4177.57 5114.12 2491.34 552.65

200 4682.23 1967.06 1153.27 2544.21 995.53 3105.84 3178.90 1379.37

200 10461.67 1394.00 410.40 1336.32 1270.33 933.93 2228.54 1224.04

200 24598.14 3779.02 1315.66 1091.24 571.38 809.59 763.94 1276.77

200 642.08 10501.38 1670.76 406.26 355.99 208.31 223.15 290.88

200 2359.69 405.59 5655.72 1081.33 205.64 135.56 147.14 95.56

200 8886.32 215.98 1379.90 5048.56 1039.73 202.49 101.84 157.04

SPRING SURVEY SHIFTED

1993 2013

1 1 0.95 1.0

0 6

100 16009.60 1958.70 216.70 338.10 172.80 305.30 399.60

100 35395.20 19462.60 702.20 216.60 150.70 48.80 141.10

100 6611.80 33206.50 19338.50 663.10 98.20 73.90 56.00
100 371.70 8095.00 15618.00 25478.90 628.10 146.10 37.00
100 3481.60 1545.80 3353.40 10120.10 12687.60 336.20 9.90
100 4459.50 6739.70 112.20 1517.30 4412.30 3139.20 48.70
100 25964.40 8354.40 4858.70 198.10 443.90 1669.60 1940.70
100 25283.30 36311.20 3384.70 1056.60 26.70 106.60 427.70
100 21111.90 17809.30 25760.60 1934.70 684.90 40.60 101.70
100 9391.10 22335.10 13272.70 12734.40 776.10 230.10 19.30
100 1823.10 16068.30 10327.10 7487.70 11212.50 487.50 79.10
100 5798.80 6022.70 7742.00 6165.00 4565.90 4912.80 238.60
100 705.50 6284.80 1574.60 4457.00 3250.40 3267.40 1577.20
100 1191.70 1873.30 4202.40 1008.90 3511.30 3712.50 2875.00
100 667.90 2182.60 820.20 1694.90 599.50 1665.00 1463.80
100 4119.00 2079.00 1125.10 405.90 916.80 371.50 924.90
100 6945.00 4655.30 638.10 418.70 196.20 280.20 265.90
100 101.10 6320.00 1865.90 449.30 260.30 212.60 244.60
100 420.00 367.60 4957.20 908.00 227.80 142.50 293.30
100 3419.90 1232.21 302.60 4022.40 619.60 120.30 103.78
100 3542.60 4099.30 869.80 930.30 2238.40 270.20 90.30

Table 5.9 Faroe haddock 2014 xsa.

```
Lowestoft VPA Version 3.1

 22/04/2014  15:28

Extended Survivors Analysis

FAROE HADDOCK (ICES DIVISION Vb)              HAD_IND

CPUE data from file D:\Vpa\vpa2014\input-files\comb-survey-spaly-14-jr.txt

Catch data for  57 years. 1957 to 2013. Ages  0 to  10.

   Fleet,           First, Last, First, Last, Alpha,  Beta
                ,    year, year,  age ,  age
SUMMER SURVEY       ,  1996, 2013,   1,     8,   .600,   .700
SPRING SURVEY SHIFTE,  1993, 2013,   0,     6,   .950,  1.000

Time series weights :

   Tapered time weighting not applied

Catchability analysis :

   Catchability independent of stock size for all ages

   Catchability independent of age for ages >=    6

Terminal population estimation :

   Survivor estimates shrunk towards the mean F
```

of the final 5 years or the 5 oldest ages.

S.E. of the mean to which the estimates are shrunk = .500

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

Prior weighting not applied

Tuning converged after 37 iterations

Regression weights
, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000

Fishing mortalities

Age	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
0	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
1	.000	.000	.000	.000	.002	.000	.000	.000	.000	.000
2	.009	.011	.035	.025	.027	.012	.074	.012	.005	.049
3	.066	.082	.072	.189	.086	.181	.271	.205	.087	.499
4	.157	.173	.176	.119	.272	.243	.377	.324	.204	.146
5	.463	.346	.270	.287	.128	.263	.266	.301	.255	.133
6	.611	.549	.521	.382	.247	.226	.385	.285	.284	.259
7	.709	.653	.650	.552	.346	.306	.404	.404	.310	.340
8	.863	.604	.332	.480	.526	.247	.325	.492	.228	.409
9	.657	.749	.569	.378	.243	.214	.230	.274	.471	.287

Table 5.9 Faroe haddock 2014 xsa (cont.)

XSA population numbers (Thousands)

	AGE								
YEAR ,	0,	1,	2,	3,	4,	5,	6,	7,	8,	9,
2004 ,	1.19E+04,	1.06E+04,	2.88E+04,	3.49E+04,	3.65E+04,	3.11E+04,	2.81E+03,	8.90E+02,	1.70E+02,	3.81E+02,
2005 ,	5.11E+03,	9.71E+03,	8.71E+03,	2.33E+04,	2.68E+04,	2.55E+04,	1.60E+04,	1.25E+03,	3.58E+02,	5.87E+01,
2006 ,	4.11E+03,	4.19E+03,	7.95E+03,	7.06E+03,	1.76E+04,	1.84E+04,	1.48E+04,	7.58E+03,	5.32E+02,	1.60E+02,
2007 ,	3.82E+03,	3.36E+03,	3.43E+03,	6.29E+03,	5.37E+03,	1.21E+04,	1.15E+04,	7.18E+03,	3.24E+03,	3.13E+02,
2008 ,	9.03E+03,	3.13E+03,	2.75E+03,	2.74E+03,	4.26E+03,	3.90E+03,	7.42E+03,	6.44E+03,	3.39E+03,	1.64E+03,
2009 ,	2.36E+04,	7.39E+03,	2.56E+03,	2.19E+03,	2.06E+03,	2.66E+03,	2.81E+03,	4.75E+03,	3.73E+03,	1.64E+03,
2010 ,	2.77E+03,	1.93E+04,	6.05E+03,	2.07E+03,	1.50E+03,	1.32E+03,	1.67E+03,	1.84E+03,	2.86E+03,	2.39E+03,
2011 ,	2.97E+03,	2.26E+03,	1.58E+04,	4.60E+03,	1.29E+03,	8.41E+02,	8.28E+02,	9.32E+02,	1.00E+03,	1.69E+03,
2012 ,	1.19E+04,	2.43E+03,	1.85E+03,	1.28E+04,	3.07E+03,	7.65E+02,	5.10E+02,	5.10E+02,	5.09E+02,	5.03E+02,
2013 ,	1.75E+04,	9.75E+03,	1.99E+03,	1.51E+03,	9.61E+03,	2.05E+03,	4.85E+02,	3.14E+02,	3.06E+02,	3.32E+02,

Estimated population abundance at 1st Jan 2014

,	0.00E+00,	1.43E+04,	7.98E+03,	1.55E+03,	7.51E+02,	6.80E+03,	1.47E+03,	3.07E+02,	1.83E+02,	1.66E+02,

Taper weighted geometric mean of the VPA populations:

, 2.36E+04, 1.98E+04, 1.66E+04, 1.34E+04, 9.28E+03, 5.53E+03, 3.32E+03, 1.89E+03, 9.48E+02, 4.55E+02,

Standard error of the weighted Log(VPA populations) :

, 1.1161, 1.1218, 1.1208, 1.0611, 1.0221, 1.0161, 1.0001, .9913, 1.1124, 1.3690,

Log catchability residuals.

Fleet : SUMMER SURVEY

Age , 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003

0 , No data for this fleet at this age

1 , 99.99, 99.99, 1.19, .25, -.16, -.24, .09, .13, .38, .14

2 , 99.99, 99.99, .13, .62, .03, -.18, .23, .27, .17, .14

3 , 99.99, 99.99, .34, .17, -.41, 1.53, .21, .39, .35, -.16

4 , 99.99, 99.99, -.36, .49, .09, -.45, -.62, .34, .19, .41

5 , 99.99, 99.99, -.05, .09, .15, .19, -.06, -.86, .23, .64

6 , 99.99, 99.99, .26, .48, -.23, .10, .11, -.31, -.46, -.09

7 , 99.99, 99.99, .02, -.30, 1.02, .32, .07, .00, -.33, -.23

8 , 99.99, 99.99, -.03, .20, .66, .47, .30, -.07, -.27, .42

Age , 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013

0 , No data for this fleet at this age

1 , -.32, .25, -.34, -.01, .24, .19, .08, -1.42, -.19, -.25

2 , .47, .19, .51, 1.04, -.01, -.30, -.12, -.10, -1.21, -1.89

3 , -.26, .00, -.67, -.66, -.27, -1.02, .26, -.34, -.22, .77

4 , -.11, .21, .02, -.60, .24, .31, .51, -.37, -.33, .03

5 , .36, .13, .14, -.19, -.59, .12, .03, .03, -.46, .10

6 , -.06, .77, .29, .14, -.01, -.25, .23, -.49, -.44, .00

7 , -.41, .24, .31, .00, .22, .14, .09, -.47, -.34, -.20

8 , -.69, -1.19, -.53, -.76, .14, -.25, .11, -.22, -.82, .30

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

Age , 1, 2, 3, 4, 5, 6, 7, 8

Mean Log q, -5.0092, -5.4718, -5.7055, -5.7486, -5.8585, -5.8694, -5.8694, -5.8694,

S.E(Log q), .4991, .6577, .5886, .3730, .3486, .3372, .3573, .5254,

S.E(Log q), .3417, .3333, .5630, .3923, .3611, .3470, .3448, .4918,

Regression statistics :

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

Age, Slope , t-value , Intercept, RSquare, No Pts, Reg s.e, Mean Q

1, .88, 1.356, 5.52, .89, 18, .43, -5.01,
2, .81, 1.939, 6.18, .87, 18, .50, -5.47,
3, .99, .114, 5.75, .83, 18, .60, -5.71,
4, .89, 1.875, 6.11, .95, 18, .31, -5.75,
5, .90, 2.067, 6.12, .96, 18, .29, -5.86,
6, .91, 1.727, 6.04, .96, 18, .29, -5.87,
7, .99, .174, 5.88, .94, 18, .36, -5.86,
8, 1.08, -.902, 5.94, .88, 18, .56, -5.99,

Fleet : SPRING SURVEY SHIFTE

Age , 1993
0 , -.60
1 , -.48
2 , -.60
3 , -.17
4 , -.35

5 , -.31

6 , .21

7 , No data for this fleet at this age

8 , No data for this fleet at this age

Age , 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003

0 , .95, .89, -1.11, -.29, -.37, -.18, .32, .49, .08, -.37

1 , -.89, .40, .60, -.17, -.12, -.22, -.33, -.51, .06, .13

2 , -.71, -.14, .39, .48, -2.02, .31, -.31, .12, -.04, .04

3 , -.18, -.40, .47, .31, .11, -.64, -.65, -.37, -.11, -.27

4 , -.22, -.16, .40, .49, .21, -.38, -1.95, -.14, -.42, .59

5 , -1.10, -.27, 1.01, .60, -.22, -.06, -1.19, -.95, -.46, .02

6 , -.56, -.47, -.27, -.84, -.41, -.01, -.77, -.65, -1.11, -.54

7 , No data for this fleet at this age

8 , No data for this fleet at this age

Age , 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013

0 , .88, -.38, .36, -.15, .81, .38, -1.71, -.36, .35, .00

1 , .34, .48, .11, .48, .50, .45, -.20, -.91, .23, .05

2 , .15, -.24, .85, .05, .59, .08, .35, .31, -.35, .68

3 , -.15, -.06, -.35, .39, -.30, .04, .26, .10, .45, 1.52

4 , -.10, -.12, .38, -.26, .55, -.29, .44, .40, .42, .51

5 , .59, .27, .64, .28, -.24, -.01, .42, .50, .38, .09

6 , .22, .31, .97, .40, .25, -.04, .55, 1.33, .78, .67

7 , No data for this fleet at this age

8 , No data for this fleet at this age

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

Age , 0, 1, 2, 3, 4, 5, 6

Mean Log q, -6.0087, -5.3226, -5.8677, -5.9298, -6.2310, -6.3934, -6.5042,

S.E(Log q), .6731, .4464, .6129, .4793, .5729, .5870, .6528,

Table 5.9 Faroe haddock 2014 xsa (cont.)

Regression statistics :

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

Age, Slope , t-value , Intercept, RSquare, No Pts, Reg s.e, Mean Q

0, .87, 1.287, 6.50, .83, 21, .57, -6.01,
1, 1.13, -1.449, 4.79, .87, 21, .49, -5.32,
2, .94, .619, 6.08, .84, 21, .58, -5.87,
3, 1.03, -.403, 5.82, .87, 21, .51, -5.93,
4, .87, 1.588, 6.55, .89, 21, .48, -6.23,
5, .96, .412, 6.47, .85, 21, .58, -6.39,
6, .92, .744, 6.60, .83, 21, .61, -6.50,

Terminal year survivor and F summaries :

Age 0 Catchability constant w.r.t. time and dependent on age

Year class = 2013

Fleet, Estimated, Int, Ext, Var, N, Scaled, Estimated
, Survivors, s.e, s.e, Ratio, , Weights, F
SUMMER SURVEY , 1., .000, .000, .00, 0, .000, .000
SPRING SURVEY SHIFTE, 14345., .689, .000, .00, 1, 1.000, .000

F shrinkage mean , 0., .50,,,, .000, .000

Weighted prediction :

Survivors, Int, Ext, N, Var, F
at end of year, s.e, s.e, , Ratio,

14345., .69, .00, 1, .000, .000

Age 1 Catchability constant w.r.t. time and dependent on age

Year class = 2012

Fleet, Estimated, Int, Ext, Var, N, Scaled, Estimated
, Survivors, s.e, s.e, Ratio, , Weights, F
SUMMER SURVEY , 6205., .513, .000, .00, 1, .355, .000
SPRING SURVEY SHIFTE, 9174., .381, .140, .37, 2, .645, .000

F shrinkage mean , 0., .50,,,, .000, .000

Weighted prediction :

Survivors, Int, Ext, N, Var, F
at end of year, s.e, s.e, , Ratio,
7984., .31, .15, 3, .505, .000

Age 2 Catchability constant w.r.t. time and dependent on age

Year class = 2011

Fleet, Estimated, Int, Ext, Var, N, Scaled, Estimated
, Survivors, s.e, s.e, Ratio, , Weights, F
SUMMER SURVEY , 691., .408, .817, 2.00, 2, .305, .108
SPRING SURVEY SHIFTE, 1934., .326, .256, .79, 3, .481, .040

F shrinkage mean , 3006., .50,,,, .214, .026

Weighted prediction :

Survivors, Int, Ext, N, Var, F

at end of year, s.e, s.e, , Ratio,
1552., .23, .35, 6, 1.547, .049

Age 3 Catchability constant w.r.t. time and dependent on age

Year class = 2010

Fleet, Estimated, Int, Ext, Var, N, Scaled, Estimated
, Survivors, s.e, s.e, Ratio, , Weights, F
SUMMER SURVEY , 381., .339, .697, 2.06, 3, .302, .823
SPRING SURVEY SHIFTE, 626., .271, .693, 2.56, 4, .470, .575

F shrinkage mean , 2678., .50,,,, .228, .167

Weighted prediction :

Survivors, Int, Ext, N, Var, F
at end of year, s.e, s.e, , Ratio,
751., .20, .48, 8, 2.426, .499

Age 4 Catchability constant w.r.t. time and dependent on age

Year class = 2009

Fleet, Estimated, Int, Ext, Var, N, Scaled, Estimated
, Survivors, s.e, s.e, Ratio, , Weights, F
SUMMER SURVEY , 6683., .254, .062, .24, 4, .426, .148
SPRING SURVEY SHIFTE, 8672., .246, .144, .59, 5, .441, .116

F shrinkage mean , 3218., .50,,,, .134, .286

Weighted prediction :

Survivors, Int, Ext, N, Var, F
at end of year, s.e, s.e, , Ratio,
6800., .17, .13, 10, .787, .146

Age 5 Catchability constant w.r.t. time and dependent on age

Year class = 2008

Fleet, Estimated, Int, Ext, Var, N, Scaled, Estimated
, Survivors, s.e, s.e, Ratio, , Weights, F
SUMMER SURVEY , 1363., .211, .109, .52, 5, .508, .143
SPRING SURVEY SHIFTE, 2030., .232, .100, .43, 6, .369, .098

F shrinkage mean , 757., .50,,,, .123, .244

Weighted prediction :

Survivors, Int, Ext, N, Var, F
at end of year, s.e, s.e, , Ratio,
1469., .15, .12, 12, .768, .133

Age 6 Catchability constant w.r.t. time and dependent on age

Year class = 2007

Fleet, Estimated, Int, Ext, Var, N, Scaled, Estimated
, Survivors, s.e, s.e, Ratio, , Weights, F
SUMMER SURVEY , 258., .187, .112, .60, 6, .564, .301
SPRING SURVEY SHIFTE, 445., .229, .091, .40, 7, .303, .185

F shrinkage mean , 272., .50,,,, .133, .287

Weighted prediction :

Survivors, Int, Ext, N, Var, F
at end of year, s.e, s.e, , Ratio,
307., .14, .09, 14, .650, .259

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

Year class = 2006

Fleet, Estimated, Int, Ext, Var, N, Scaled, Estimated
, Survivors, s.e, s.e, Ratio, , Weights, F
SUMMER SURVEY , 156., .173, .134, .77, 7, .622, .389
SPRING SURVEY SHIFTE, 293., .229, .091, .40, 7, .229, .226

F shrinkage mean , 173., .50,,,, .150, .356

Weighted prediction :

Survivors, Int, Ext, N, Var, F
at end of year, s.e, s.e, , Ratio,
183., .14, .10, 15, .720, .340

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

Year class = 2005

Fleet, Estimated, Int, Ext, Var, N, Scaled, Estimated
, Survivors, s.e, s.e, Ratio, , Weights, F
SUMMER SURVEY , 150., .166, .139, .84, 8, .616, .445
SPRING SURVEY SHIFTE, 201., .221, .234, 1.06, 7, .212, .349

F shrinkage mean , 190., .50,,,, .172, .366

Weighted prediction :

Survivors, Int, Ext, N, Var, F
at end of year, s.e, s.e, , Ratio,
166., .14, .11, 16, .755, .409

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

Year class = 2004

Fleet, Estimated, Int, Ext, Var, N, Scaled, Estimated
, Survivors, s.e, s.e, Ratio, , Weights, F
SUMMER SURVEY , 169., .173, .165, .95, 8, .600, .337
SPRING SURVEY SHIFTE, 327., .225, .108, .48, 7, .184, .189

F shrinkage mean , 230., .50,,,, .216, .259

Weighted prediction :

Survivors, Int, Ext, N, Var, F
at end of year, s.e, s.e, , Ratio,
204., .16, .11, 16, .729, .287

Table 5.10 Faroe haddock. Fishing mortality (F) at age.

Run title : FAROE HADDOCK (ICES DIVISION Vb) HAD_IND

At 22/04/2014 15:30

Terminal Fs derived using XSA (With F shrinkage)

Table 8 Fishing mortality (F) at age

YEAR, 1957, 1958, 1959, 1960, 1961, 1962, 1963,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0010, .0024, .0132, .0150, .0219, .0149, .0106,

2, .1394, .1939, .1066, .2074, .1875, .3232, .3801,

3, .3707, .4378, .3860, .4599, .4162, .5866, .5639,

4, .6163, .5737, .4782, .6926, .4209, .5980, .7261,

5, .3909, .5386, .4195, .5260, .4387, .3480, .5591,

6, .4380, .6346, .6458, .6591, .5879, .6706, .4026,

7, .6340, .9504, .9184, 1.2130, .9483, 1.0499, 1.2493,

8, .5599, .7839, .8206, .9667, .8742, .9736, 1.1139,

9, .5321, .7028, .6625, .8198, .6600, .7351, .8185,

+gp, .5321, .7028, .6625, .8198, .6600, .7351, .8185,

FBAR 3- 7, .4900, .6270, .5696, .7101, .5624, .6506, .7002,

Table 8 Fishing mortality (F) at age

YEAR, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0018, .0017, .0032, .0012, .0014, .0024, .0033, .0015, .0016, .0114,

2, .0876, .0691, .0610, .0641, .1261, .0860, .0551, .0526, .0253, .1677,

3, .3723, .2354, .2370, .1873, .2647, .2363, .2528, .1936, .4226, .4320,

4, .5193, .4767, .4515, .2971, .3483, .5320, .3344, .4186, .2853, .2392,

5, .5369, .3678, .5006, .2997, .2847, .3330, .3639, .2754, .4517, .3143,

6, .6107, .5882, .5421, .5406, .4540, .4975, .5561, .5560, .1495, .2703,

7, .3375, .9618, .9128, .6906, .8367, .8277, .8740, .8385, .6720, .1951,

8, 1.2027, 2.3618, .7509, .6634, .5851, 1.0631, .5430, .4224, .4066, .2907,

9, .6472, .9619, .6373, .5022, .5057, .6566, .5386, .5061, .3957, .2633,

+gp, .6472, .9619, .6373, .5022, .5057, .6566, .5386, .5061, .3957, .2633,

FBAR 3- 7, .4753, .5260, .5288, .4031, .4377, .4853, .4762, .4564, .3962, .2902,

Table 8 Fishing mortality (F) at age

YEAR, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0033, .0015, .0014, .0000, .0000, .0002, .0000, .0000, .0000, .0000,

2, .1266, .1230, .0908, .0108, .0010, .0004, .0325, .0237, .0383, .0252,

3, .2172, .2650, .1878, .1128, .0547, .0458, .0285, .1373, .4617, .1916,

4, .3730, .2412, .3810, .1815, .1665, .1255, .2025, .1314, .3708, .3480,

5, .1279, .2116, .2216, .5273, .2115, .1913, .2749, .2112, .2917, .3498,

6, .1714, .0957, .2871, .7246, .3820, .1408, .2135, .2264, .2775, .1382,

7, .2134, .0859, .1601, .3904, .5760, .2721, .1702, .2004, .2523, .2990,

8, .1433, .1599, .2539, .3788, .4968, .3303, .3954, .0920, .2265, .3101,

9, .2068, .1595, .2621, .4437, .3689, .2130, .2526, .1730, .2854, .2906,

+gp, .2068, .1595, .2621, .4437, .3689, .2130, .2526, .1730, .2854, .2906,

FBAR 3- 7, .2206, .1799, .2475, .3873, .2781, .1551, .1779, .1813, .3308, .2653,

Table 8 Fishing mortality (F) at age

YEAR, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0006, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0060,

2, .0329, .0280, .0096, .0337, .0393, .0049, .0124, .0289, .0167, .0709,

3, .1167, .1694, .0940, .0925, .0679, .1205, .1307, .1646, .0743, .1659,

4, .3895, .2391, .2490, .1844, .1861, .1360, .2206, .2708, .1772, .1834,

5, .2171, .3473, .2596, .2621, .2365, .3322, .2329, .2179, .2743, .1852,

6, .3335, .4161, .3587, .3079, .3058, .3204, .3566, .3167, .2595, .2048,

7, .0853, .2083, .1572, .4744, .2080, .5166, .4228, .4030, .2668, .1971,

8, .2928, .1719, .5176, .5842, .2378, .3880, .4620, .2679, .2299, .1579,

9, .2650, .2781, .3102, .3649, .2360, .3408, .3411, .2970, .2428, .1865,

+gp, .2650, .2781, .3102, .3649, .2360, .3408, .3411, .2970, .2428, .1865,

FBAR 3- 7, .2284, .2760, .2237, .2642, .2009, .2851, .2727, .2746, .2104, .1872,

Table 8 Fishing mortality (F) at age

YEAR, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0000, .0000, .0001, .0000, .0000, .0004, .0006, .0003, .0000, .0000,

2, .0488, .0093, .0079, .0095, .0319, .0125, .0788, .0482, .0280, .0034,

3, .1644, .1049, .0768, .0909, .1734, .5553, .3149, .2412, .2150, .0818,

4, .2575, .3126, .3632, .2180, .2361, .2312, .1824, .4429, .3662, .3323,

5, .1476, .3066, .4177, .4662, .3268, .3406, .2614, .2249, .4111, .5400,

6, .2104, .1835, .3799, .5284, .6083, .3814, .3348, .2762, .2702, .6755,

7, .2488, .2225, .3567, .5551, 1.2934, .7302, .2795, .2335, .2305, .6244,

8, .2420, .2670, .3265, .3601, 1.0248, 1.8870, .6148, .2111, .2682, .5843,

9, .2223, .2598, .3590, .4850, .7784, .6964, .3053, .2526, .2595, .4819,

+gp, .2223, .2598, .3590, .4850, .7784, .6964, .3053, .2526, .2595, .4819,

FBAR 3- 7, .2057, .2260, .3189, .3717, .5276, .4477, .2746, .2837, .2986, .4508,

Table 8 Fishing mortality (F) at age

YEAR, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013,

AGE

0, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000, .0000,

1, .0003, .0000, .0000, .0000, .0021, .0000, .0000, .0000, .0000, .0000,

2, .0094, .0108, .0349, .0248, .0269, .0117, .0737, .0120, .0048, .0495,

3, .0656, .0824, .0724, .1895, .0860, .1812, .2712, .2053, .0866, .4990,

4, .1573, .1731, .1757, .1194, .2721, .2435, .3772, .3245, .2042, .1455,

5, .4628, .3462, .2701, .2874, .1279, .2625, .2661, .3013, .2554, .1331,

6, .6112, .5489, .5206, .3817, .2471, .2256, .3853, .2854, .2840, .2586,

7, .7093, .6531, .6499, .5521, .3463, .3062, .4043, .4037, .3103, .3405,

8, .8635, .6038, .3319, .4796, .5263, .2471, .3247, .4918, .2281, .4094,

9, .6574, .7486, .5692, .3778, .2425, .2135, .2303, .2738, .4714, .2872,

+gp, .6574, .7486, .5692, .3778, .2425, .2135, .2303, .2738, .4714, .2872,

FBAR 3- 7, .4012, .3608, .3377, .3060, .2159, .2438, .3408, .3040, .2281, .2753,

Table 5.11 Faroe haddock. Stock number (N) at age.

Table 10 Stock number at age (start of year) Numbers*10**-3

YEAR, 1957, 1958, 1959, 1960, 1961, 1962, 1963,

AGE

0, 64927, 54061, 77651, 58761, 71715, 45400, 33843,

1, 47944, 53158, 44261, 63576, 48109, 58715, 37170,

2, 35106, 39212, 43417, 35763, 51279, 38537, 47362,

3, 25440, 25003, 26445, 31954, 23796, 34806, 22837,

4, 20280, 14377, 13213, 14717, 16517, 12850, 15850,

5, 5517, 8965, 6632, 6706, 6028, 8877, 5786,

6, 2786, 3055, 4284, 3570, 3245, 3182, 5132,

7, 1377, 1472, 1326, 1839, 1512, 1476, 1332,

8, 585, 598, 466, 433, 448, 480, 423,

9, 252, 274, 224, 168, 135, 153, 148,

+gp, 154, 227, 106, 54, 29, 46, 45,

TOTAL, 204367, 200401, 218024, 217540, 222811, 204522, 169929,

Table 10 Stock number at age (start of year) Numbers*10**-3

YEAR, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973,

AGE

0, 30192, 37948, 81924, 47768, 53237, 23136, 49622, 35418, 78971, 104854,

1, 27709, 24719, 31069, 67073, 39109, 43587, 18942, 40627, 28998, 64656,

2, 30110, 22644, 20203, 25356, 54852, 31975, 35600, 15457, 33213, 23703,

3, 26515, 22585, 17302, 15563, 19470, 39587, 24022, 27583, 12006, 26514,

4, 10638, 14961, 14613, 11176, 10566, 12234, 25590, 15275, 18608, 6442,

5, 6278, 5182, 7604, 7617, 6798, 6106, 5884, 14996, 8229, 11454,

6, 2708, 3005, 2937, 3774, 4622, 4187, 3583, 3348, 9322, 4289,

7, 2809, 1204, 1366, 1398, 1800, 2403, 2084, 1682, 1572, 6573,

8, 313, 1641, 377, 449, 574, 638, 860, 712, 595, 657,

9, 114, 77, 127, 146, 189, 262, 180, 409, 382, 325,

+gp, 16, 14, 21, 36, 33, 45, 26, 281, 319, 52,

TOTAL, 137402, 133981, 177543, 180356, 191250, 164161, 166394, 155789, 192215, 249517,

Table 10 Stock number at age (start of year) Numbers*10**-3

YEAR, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983,

AGE

0, 83631, 39130, 52366, 4154, 7377, 5208, 23625, 29269, 60819, 58866,

1, 85847, 68471, 32037, 42873, 3401, 6040, 4264, 19343, 23963, 49794,

2, 52334, 70057, 55974, 26194, 35102, 2784, 4944, 3491, 15836, 19619,

3, 16410, 37751, 50719, 41850, 21215, 28710, 2279, 3919, 2791, 12478,

4, 14093, 10812, 23712, 34415, 30609, 16445, 22454, 1813, 2797, 1440,

5, 4152, 7946, 6955, 13263, 23500, 21217, 11876, 15014, 1302, 1580,

6, 6849, 2992, 5265, 4562, 6409, 15572, 14346, 7386, 9953, 796,

7, 2680, 4724, 2226, 3235, 1810, 3581, 11075, 9487, 4822, 6174,

8, 4427, 1772, 3549, 1553, 1792, 833, 2234, 7648, 6357, 3067,

9, 402, 3141, 1237, 2254, 870, 893, 490, 1231, 5712, 4150,

+gp, 865, 1396, 1515, 2613, 1109, 424, 423, 249, 947, 3461,

TOTAL, 271690, 248191, 235555, 176966, 133194, 101707, 98010, 98851, 135298, 161427,

Table 10 Stock number at age (start of year) Numbers*10**-3

YEAR, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993,

AGE

0, 39519, 14086, 28007, 21061, 14028, 4460, 3992, 2724, 9655, 143943,

1, 48196, 32355, 11532, 22930, 17244, 11485, 3651, 3269, 2230, 7905,

2, 40768, 39437, 26490, 9442, 18773, 14118, 9403, 2990, 2676, 1826,

3, 15664, 32297, 31397, 21480, 7474, 14778, 11502, 7604, 2378, 2155,

4, 8435, 11412, 22323, 23399, 16032, 5718, 10725, 8263, 5281, 1808,

5, 833, 4678, 7356, 14248, 15932, 10897, 4086, 7043, 5160, 3621,

6, 912, 549, 2706, 4646, 8976, 10297, 6400, 2650, 4637, 3211,

7, 568, 535, 296, 1548, 2796, 5413, 6119, 3668, 1581, 2929,

8, 3749, 427, 356, 207, 789, 1859, 2644, 3283, 2007, 991,

9, 1842, 2290, 294, 174, 95, 509, 1033, 1364, 2056, 1306,

+gp, 4567, 4402, 2930, 1198, 669, 308, 410, 137, 826, 1196,

TOTAL, 165051, 142467, 133688, 120333, 102807, 79841, 59966, 42994, 38487, 170891,

Table 10 Stock number at age (start of year) Numbers*10**-3

YEAR, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003,

AGE

0, 68039, 13476, 5572, 23106, 31815, 153465, 90575, 63864, 42934, 13000,

1, 117851, 55706, 11034, 4562, 18918, 26048, 125647, 74157, 52287, 35151,

2, 6433, 96487, 45608, 9033, 3735, 15488, 21318, 102805, 60697, 42809,

3, 1393, 5016, 78269, 37046, 7326, 2962, 12523, 16132, 80206, 48324,

4, 1495, 967, 3698, 59346, 27695, 5043, 1392, 7484, 10377, 52964,

5, 1232, 946, 579, 2106, 39072, 17907, 3277, 949, 3935, 5891,

6, 2464, 870, 570, 312, 1082, 23071, 10429, 2066, 621, 2136,

7, 2142, 1634, 593, 319, 151, 482, 12900, 6109, 1283, 388,

8, 1969, 1368, 1071, 340, 150, 34, 190, 7986, 3960, 834,

9, 693, 1266, 857, 633, 194, 44, 4, 84, 5295, 2480,

+gp, 1660, 1416, 1433, 1470, 1011, 417, 296, 89, 159, 2645,

TOTAL, 205370, 179153, 149284, 138271, 131147, 244962, 278551, 281724, 261753, 206621,

Table 10 Stock number at age (start of year) Numbers*10**-3

YEAR, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014,

AGE

0, 11864, 5112, 4106, 3825, 9030, 23592, 2766, 2972, 11910, 17520, 0,

1, 10644, 9713, 4185, 3361, 3131, 7393, 19315, 2264, 2433, 9751, 14345,

2, 28779, 8711, 7953, 3427, 2752, 2558, 6053, 15814, 1854, 1992, 7984,

3, 34929, 23343, 7055, 6288, 2737, 2194, 2070, 4604, 12793, 1511, 1552,

4, 36455, 26781, 17599, 5373, 4259, 2056, 1498, 1292, 3070, 9606, 751,

5, 31102, 25502, 18441, 12087, 3904, 2657, 1320, 841, 765, 2049, 6800,

6, 2811, 16030, 14769, 11525, 7424, 2813, 1673, 828, 510, 485, 1469,

7, 890, 1249, 7581, 7185, 6442, 4747, 1838, 932, 510, 314, 307,

8, 170, 358, 532, 3240, 3387, 3731, 2862, 1004, 509, 306, 183,

9, 381, 59, 160, 313, 1642, 1638, 2386, 1693, 503, 332, 166,

+gp, 1837, 318, 176, 31, 199, 274, 850, 857, 332, 550, 542,

TOTAL, 159861, 117178, 82558, 56655, 44908, 53652, 42629, 33102, 35189, 44416, 34098,

Table 5.12. Faroe haddock. Stock summary of the 2014 VPA.

Run title : FAROE HADDOCK (ICES DIVISION Vb) HAD_IND

At 15/04/2014 20:12

Table 16 Summary (without SOP correction)

Terminal Fs derived using XSA (With F shrinkage)

	RECRUITS	RECRUITS	TOTALBIO	TOTSPBIO	LANDINGS	YIELD/SSB	FBAR 3- 7
	Age 0	Age 2					
1957	64927	35106	90264	51049	20995	0.4113	0.49
1958	54061	39212	92975	51409	23871	0.4643	0.627
1959	77651	43417	89969	48340	20239	0.4187	0.5696
1960	58761	35763	96422	51101	25727	0.5035	0.7101
1961	71715	51279	93296	47901	20831	0.4349	0.5624
1962	45400	38537	98262	52039	27151	0.5217	0.6506
1963	33843	47362	90204	49706	27571	0.5547	0.7002
1964	30192	30110	75561	44185	19490	0.4411	0.4753
1965	37948	22644	71884	45605	18479	0.4052	0.526
1966	81924	20203	68774	44027	18766	0.4262	0.5288
1967	47768	25356	77101	42086	13381	0.3179	0.4031
1968	53237	54852	87971	45495	17852	0.3924	0.4377
1969	23136	31975	94878	53583	23272	0.4343	0.4853
1970	49622	35600	92143	59958	21361	0.3563	0.4762
1971	35418	15457	92930	63921	19393	0.3034	0.4564
1972	78971	33213	91507	63134	16485	0.2611	0.3962
1973	104854	23703	98977	61621	18035	0.2927	0.2902
1974	83631	52334	116876	64631	14773	0.2286	0.2206
1975	39130	70057	138903	75405	20715	0.2747	0.1799
1976	52366	55974	143623	89220	26211	0.2938	0.2475
1977	4154	26194	121043	96376	25555	0.2652	0.3873
1978	7377	35102	120579	97233	19200	0.1975	0.2781
1979	5208	2784	99503	85401	12424	0.1455	0.1551
1980	23625	4944	87640	81905	15016	0.1833	0.1779
1981	29269	3491	78966	75849	12233	0.1613	0.1813
1982	60819	15836	68310	56807	11937	0.2101	0.3308
1983	58866	19619	63968	51815	12894	0.2488	0.2653
1984	39519	40768	100683	53826	12378	0.23	0.2284
1985	14086	39437	93980	62605	15143	0.2419	0.276
1986	28007	26490	98535	65606	14477	0.2207	0.2237
1987	21061	9442	87662	67310	14882	0.2211	0.2642

1988	14028	18773	77440	61917	12178	0.1967	0.2009
1989	4460	14118	69571	51749	14325	0.2768	0.2851
1990	3992	9403	53579	43718	11726	0.2682	0.2727
1991	2724	2990	38751	34653	8429	0.2432	0.2746
1992	9655	2676	29102	26959	5476	0.2031	0.2104
1993	143943	1826	28784	23201	4026	0.1735	0.1872
1994	68039	6433	27453	21580	4252	0.197	0.2057
1995	13476	96487	88093	22744	4948	0.2175	0.226
1996	5572	45608	113479	49890	9642	0.1933	0.3189
1997	23106	9033	108113	82640	17924	0.2169	0.3717
1998	31815	3735	93068	82642	22210	0.2687	0.5276
1999	153465	15488	80651	63575	18482	0.2907	0.4477
2000	90575	21318	110248	53496	15821	0.2957	0.2746
2001	63864	102805	146955	61617	15890	0.2579	0.2837
2002	42934	60697	153806	85701	24933	0.2909	0.2986
2003	13000	42809	140920	97491	27072	0.2777	0.4508
2004	11864	28779	127724	87516	23101	0.264	0.4012
2005	5112	8711	91145	74326	20455	0.2752	0.3608
2006	4106	7953	67336	59920	17154	0.2863	0.3377
2007	3825	3427	49407	44863	12631	0.2815	0.306
2008	9030	2752	36322	32126	7388	0.23	0.2159
2009	23592	2558	27159	25168	5197	0.2065	0.2438
2010	2766	6053	24584	19822	5202	0.2624	0.3408
2011	2972	15814	23537	14561	3540	0.2431	0.304
2012	11910	1854	19581	16886	2634	0.156	0.2281
2013	17520	1992	20183	19017	3105	0.1633	0.2753
Arith. Mean	38489	26673	83691	55385	15763	0.2859	0.3518
0 Units	(Thousands)	(Thousands)	(Tonnes)	(Tonnes)	(Tonnes)		

Table 5.13. Management options table - INPUT DATA descriptions.

Stock size

The stock in numbers 2014 is taken directly from the 2014 XSA. The yearclass 2013 at age 2 (in 2015) is estimated from the 2014 XSA age 1 applying a natural mortality of 0.2 in foreward calculation of the number using the standard VPA equation. The yearclass 2014 at age 2 (in 2016) is estimated as the geomean of the numbers at age 2 since 2005.

Age	2014	2015	2016
2	7984	11745	4334
3	1552		
4	751		
5	6800		
6	1469		
7	307		
8	183		
9	166		
10+	542		

Numbers in thousands (predicted values rounded).

Proportion mature at age

The proportion mature at age in 2014 is estimated as the average of the observed data in 2013 and 2014. For 2015 and 2016, the average of 2012 to 2014 is used.

Age	2014	2015	2016
2	0.17	0.16	0.16
3	0.83	0.82	0.82
4	1.00	0.99	0.99
5	1.00	1.00	1.00
6	1.00	1.00	1.00
7	1.00	1.00	1.00
8	1.00	1.00	1.00
9	1.00	1.00	1.00
10+	1.00	1.00	1.00

Table 5.13. Management options table - INPUT DATA descriptions (cont.).

Catch&Stock weights at age

Catch and stock weights at age for all ages and for each of the years 2014-2016 are simply the average of the estimated point-values for 2011-2013 not re-scaled to 2013 since weights have been fluctuating without any trend during the last 3 years (no model was available to predict future mean weights at age).

Age	2014	2015	2016
2	0.583	0.583	0.583
3	0.810	0.810	0.810
4	1.101	1.101	1.101
5	1.391	1.391	1.391
6	1.571	1.571	1.571
7	1.651	1.651	1.651
8	1.700	1.700	1.700
9	1.762	1.762	1.762
10+	1.951	1.951	1.951

Exploitation pattern

The exploitation pattern 2014 is estimated like last year as the average fishing mortality matrix in the 3 preceding years (2011-2013) from the final VPA in 2014, without re-scaling to the terminal year (2013) since fishing mortalities have been fluctuating without any general trend during the last 3 years; the same exploitation pattern was used for all 3 years.

Age	2014	2015	2016
2	0.0221	0.0221	0.0221
3	0.2636	0.2636	0.2636
4	0.2247	0.2247	0.2247
5	0.2299	0.2299	0.2299
6	0.2760	0.2760	0.2760
7	0.3515	0.3515	0.3515
8	0.3764	0.3764	0.3764
9	0.3441	0.3441	0.3441
10+	0.3441	0.3441	0.3441

Table 5.14 Faroe haddock. Management option table - Input

MFDP version 1
Run: jr1
Time and date: 15:21 19/04/2014
Fbar age range: 3-7

2014

Age	N	M	Mat	PF	PM	SWt
2	7984	0.2	0.17	0	0	0.58
3	1552	0.2	0.83	0	0	0.81
4	751	0.2	1	0	0	1.10
5	6800	0.2	1	0	0	1.39
6	1469	0.2	1	0	0	1.57
7	307	0.2	1	0	0	1.65
8	183	0.2	1	0	0	1.70
9	166	0.2	1	0	0	1.76
10	542	0.2	1	0	0	1.95

2015

Age	N	M	Mat	PF	PM	SWt
2	11745	0.2	0.16	0	0	0.58
3	.	0.2	0.82	0	0	0.81
4	.	0.2	0.99	0	0	1.10
5	.	0.2	1	0	0	1.39
6	.	0.2	1	0	0	1.57
7	.	0.2	1	0	0	1.65
8	.	0.2	1	0	0	1.70
9	.	0.2	1	0	0	1.76
10	.	0.2	1	0	0	1.95

2016

Age	N	M	Mat	PF	PM	SWt
2	4334	0.2	0.16	0	0	0.58
3	.	0.2	0.82	0	0	0.81
4	.	0.2	0.99	0	0	1.10
5	.	0.2	1	0	0	1.39
6	.	0.2	1	0	0	1.57
7	.	0.2	1	0	0	1.65
8	.	0.2	1	0	0	1.70
9	.	0.2	1	0	0	1.76
10	.	0.2	1	0	0	1.95

Input units are thousands and kg - output in tonnes

Table 5.15 Faroe haddock. Management option table - Results

MFDP version 1
Run: jr1
Index file 18/04/2014
Time and date: 15:21 19/04/2014
Fbar age range: 3-7

2014				
Biomass	SSB	FMult	FBar	Landings
20671	16596	1	0.2691	3367

2015					2016	
Biomass	SSB	FMult	FBar	Landings	Biomass	SSB
23523	16831	0	0	0	26150	22569
.	16831	0.1	0.0269	431	25700	22124
.	16831	0.2	0.0538	850	25262	21690
.	16831	0.3	0.0807	1258	24836	21268
.	16831	0.4	0.1077	1656	24421	20858
.	16831	0.5	0.1346	2043	24017	20458
.	16831	0.6	0.1615	2420	23624	20070
.	16831	0.7	0.1884	2787	23242	19691
.	16831	0.8	0.2153	3145	22869	19323
.	16831	0.9	0.2422	3494	22507	18965
.	16831	1	0.2691	3833	22153	18616
.	16831	1.1	0.2961	4164	21810	18277
.	16831	1.2	0.323	4486	21475	17946
.	16831	1.3	0.3499	4800	21149	17624
.	16831	1.4	0.3768	5105	20832	17311
.	16831	1.5	0.4037	5403	20523	17006
.	16831	1.6	0.4306	5694	20222	16709
.	16831	1.7	0.4575	5977	19929	16420
.	16831	1.8	0.4845	6252	19644	16139
.	16831	1.9	0.5114	6521	19366	15865
.	16831	2	0.5383	6783	19095	15598

Input units are thousands and kg - output in tonnes

Table 5.16 Faroe haddock. Long-term Prediction - Input data

MFYPR version 1
Run: jr2
Index file 18/04/2014
Time and date: 15:48 19/04/2014
Fbar age range: 3-7

Age	M	Mat	PF	PM	SWt	Sel	CWt
2	0.2	0.06	0	0	0.564	0.0223	0.564
3	0.2	0.51	0	0	0.800	0.2637	0.800
4	0.2	0.92	0	0	1.064	0.2250	1.064
5	0.2	0.99	0	0	1.370	0.2297	1.370
6	0.2	1.00	0	0	1.652	0.2760	1.652
7	0.2	1.00	0	0	1.910	0.3517	1.910
8	0.2	1.00	0	0	2.130	0.3763	2.130
9	0.2	1.00	0	0	2.355	0.3440	2.355
10	0.2	1.00	0	0	2.659	0.3440	2.659

Weights in kilograms

Table 5.17 **Faroe haddock. Long-term Prediction - Results**

MFYPR version 1
Run: jak2
Time and date: 15:48 19/04/2014
Yield per results

FMult	Fbar	CatchNos	Yield	StockNos	Biomass	SpwnNosJan	SSBJan	SpwnNosSpwn	SSBSpwn
0	0	0	0	5.5167	8.3121	4.1119	7.3944	4.1119	7.3944
0.1	0.0269	0.1051	0.1798	4.9933	7.0806	3.5911	6.1655	3.5911	6.1655
0.2	0.0538	0.1844	0.301	4.5984	6.1789	3.1989	5.2664	3.1989	5.2664
0.3	0.0808	0.2468	0.3855	4.2887	5.4925	2.8917	4.5826	2.8917	4.5826
0.4	0.1077	0.2972	0.446	4.0383	4.9542	2.6437	4.0467	2.6437	4.0467
0.5	0.1346	0.339	0.4901	3.831	4.5216	2.4389	3.6165	2.4389	3.6165
0.6	0.1615	0.3744	0.5228	3.6561	4.1669	2.2664	3.2642	2.2664	3.2642
0.7	0.1884	0.4047	0.5473	3.5062	3.8713	2.1187	2.9708	2.1187	2.9708
0.8	0.2154	0.4311	0.5659	3.3759	3.6213	1.9908	2.7231	1.9908	2.7231
0.9	0.2423	0.4543	0.58	3.2616	3.4074	1.8786	2.5114	1.8786	2.5114
1	0.2692	0.4749	0.5909	3.1601	3.2223	1.7794	2.3285	1.7794	2.3285
1.1	0.2961	0.4934	0.5993	3.0695	3.0607	1.6909	2.169	1.6909	2.169
1.2	0.323	0.51	0.6058	2.9879	2.9185	1.6114	2.0288	1.6114	2.0288
1.3	0.35	0.5251	0.6108	2.914	2.7923	1.5396	1.9046	1.5396	1.9046
1.4	0.3769	0.5389	0.6146	2.8467	2.6797	1.4743	1.794	1.4743	1.794
1.5	0.4038	0.5515	0.6176	2.7851	2.5786	1.4147	1.6948	1.4147	1.6948
1.6	0.4307	0.5632	0.6198	2.7285	2.4873	1.3601	1.6055	1.3601	1.6055
1.7	0.4576	0.5739	0.6214	2.6763	2.4046	1.3098	1.5246	1.3098	1.5246
1.8	0.4846	0.5839	0.6226	2.628	2.3292	1.2634	1.451	1.2634	1.451
1.9	0.5115	0.5932	0.6234	2.5832	2.2603	1.2204	1.3838	1.2204	1.3838
2	0.5384	0.6018	0.6239	2.5414	2.1971	1.1804	1.3223	1.1804	1.3223

Reference point	F multiplier	Absolute F
Fbar(3-7)	1	0.2692
FMax	2.2137	0.5959
F0.1	0.687	0.1849
F35%SPR	0.862	0.2321
Flow	-99	
Fmed	0.8847	0.2382
Fhigh	2.9773	0.8015

Weights in kilograms

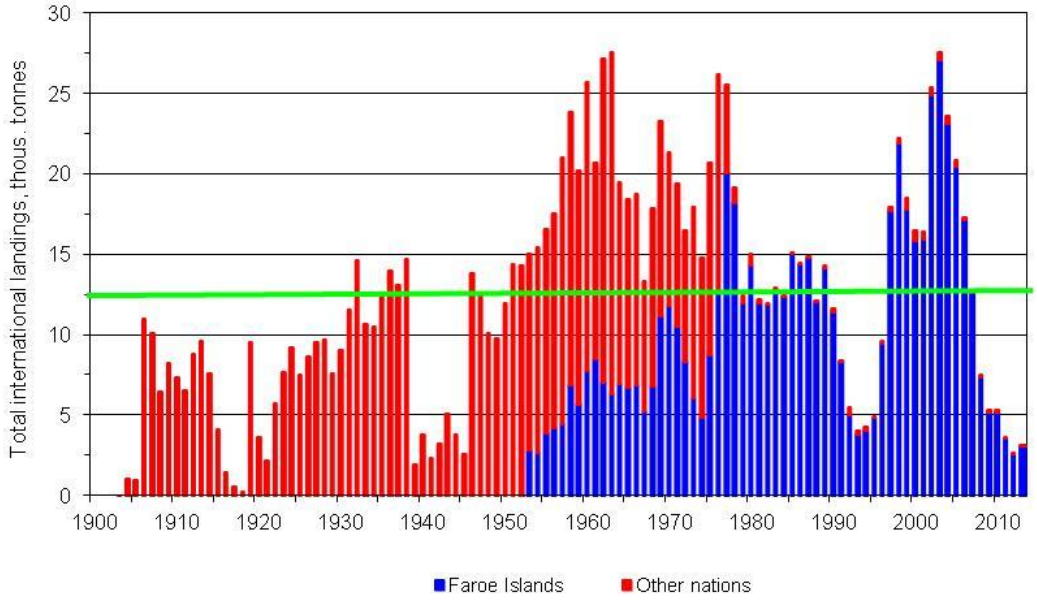


Figure 5.1. Haddock in ICES Division Vb. Landings by all nations 1904-2013. Horisontal line average for the whole period.

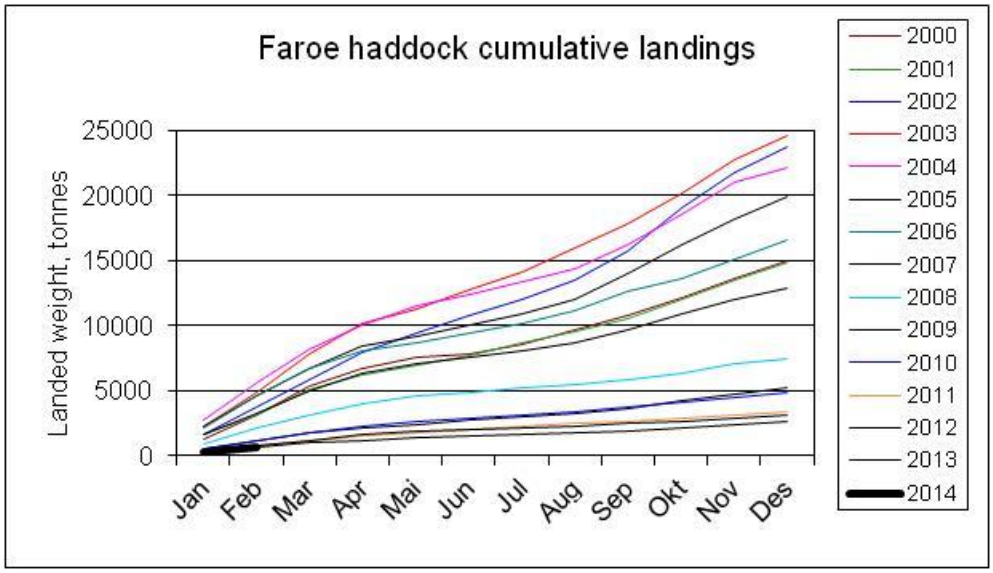


Figure 5.2. Faroe haddock. Cumulative Faroese landings from Vb.

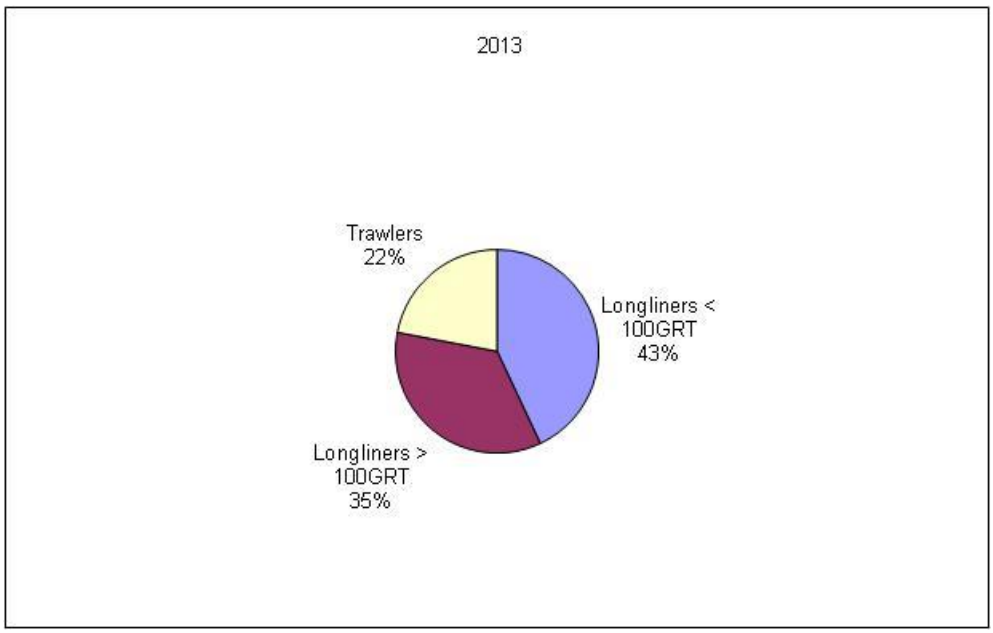


Figure 5.3. Faroe haddock. Contribution (%) by fleet to the total Faroese landings 2013.

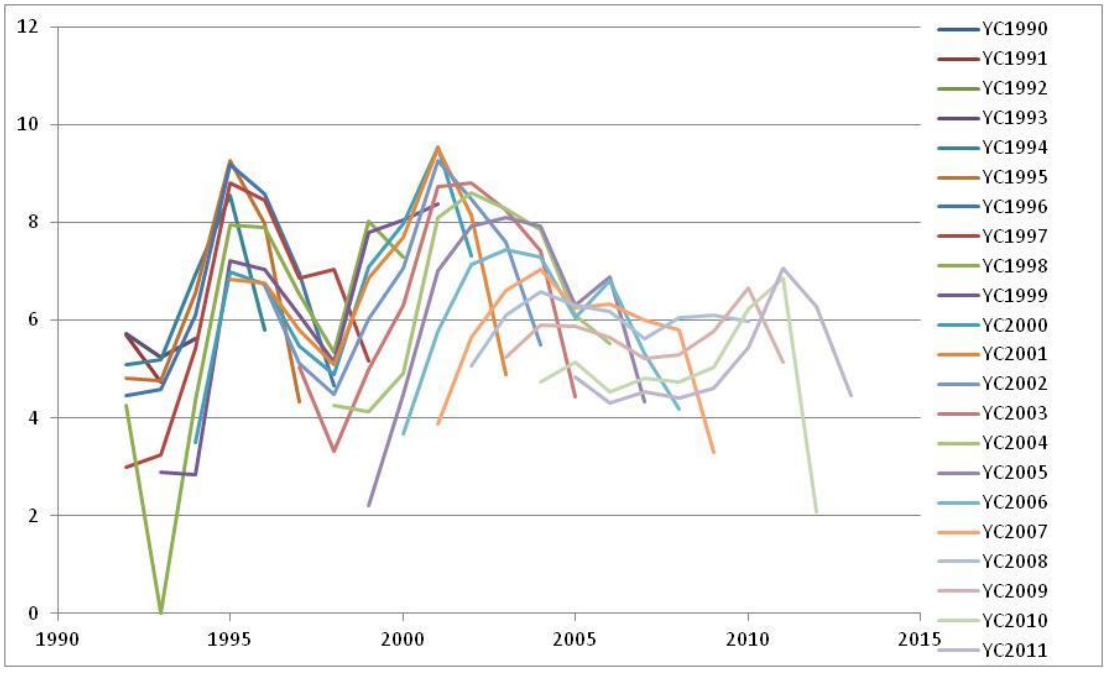


Figure 5.4. Catch curves for YC's 1990 onwards.

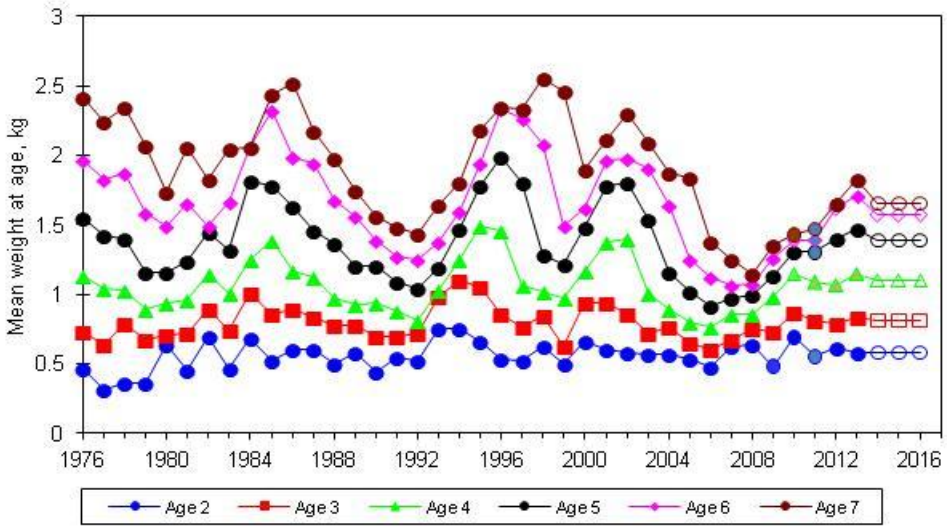


Figure 5.5. Faroe haddock. Mean weight at age (2-7). 2014-2016 are predicted values used in the short term prediction (open symbols).

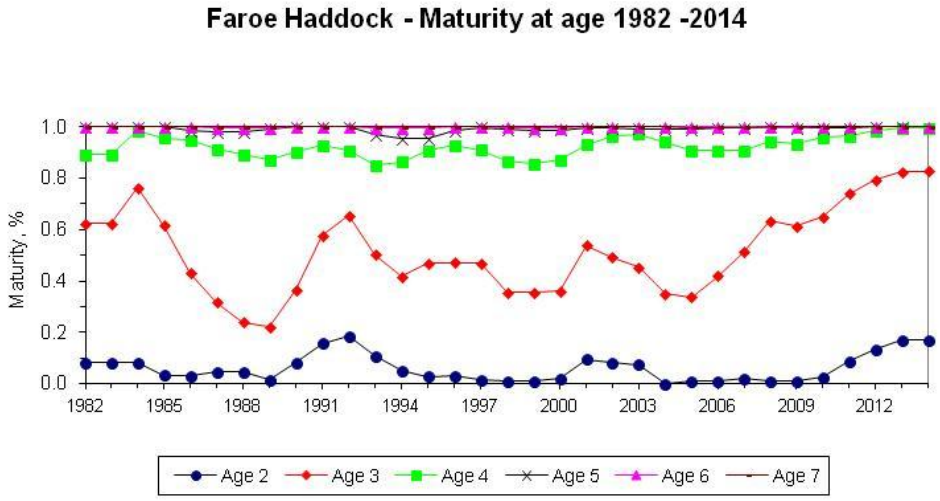


Figure 5.6. Faroe haddock. Maturity at age since 1982. Running 3-years average of survey observations.

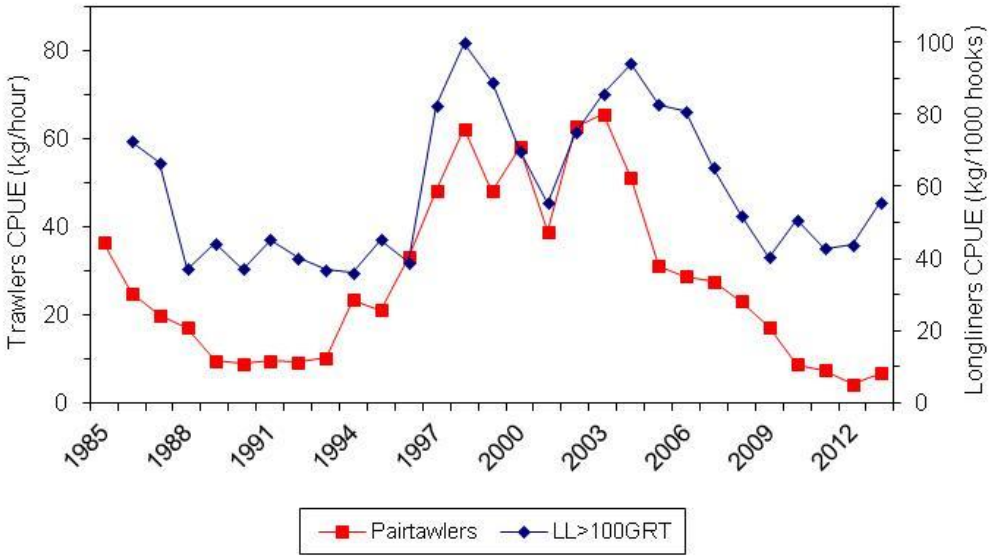


Figure 5.7. Commercial CPUE's for Pairtrawlers > 1000 HP and longliners > 100 HP.

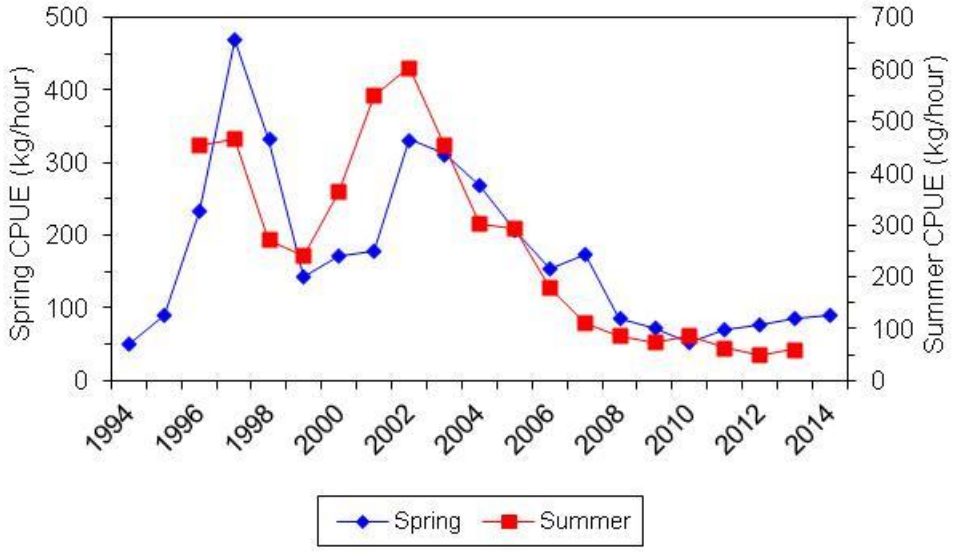


Figure 5.8. Faroe haddock. CPUE (kg/trawlhour) in the spring and summer surveys.

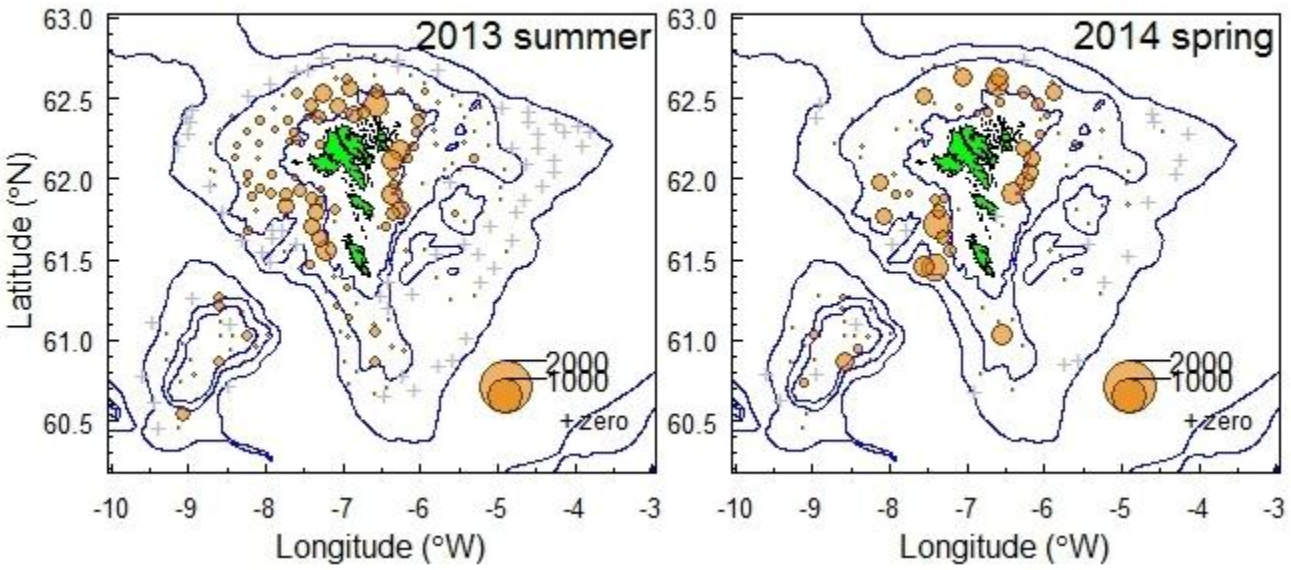


Figure 5.9. Distribution of Faroe haddock catches in the summer survey 2013 and in the spring survey 2014. In the annex, the catch distributions for all years are given.

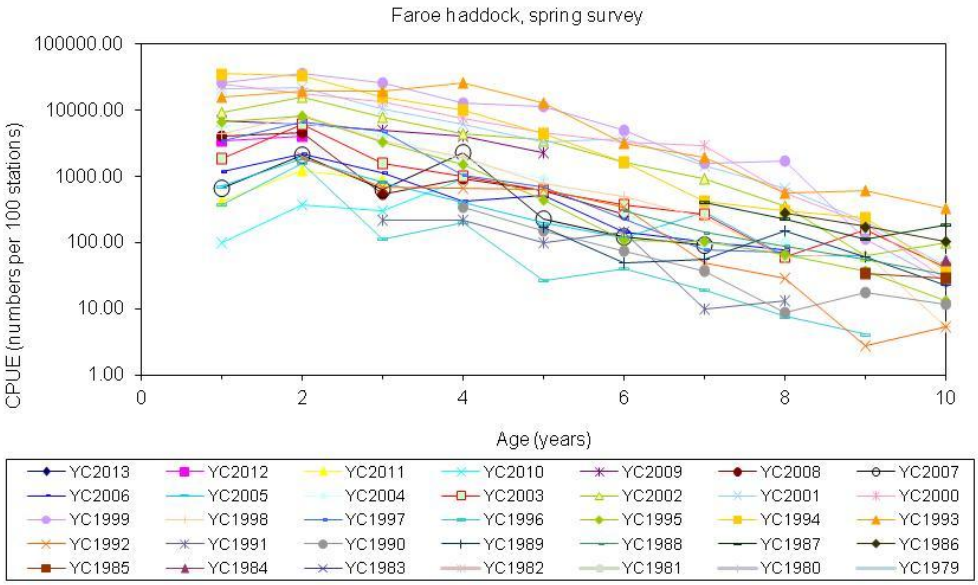


Figure 5.10. Faroe haddock. LN (c@age in numbers) in the spring survey.

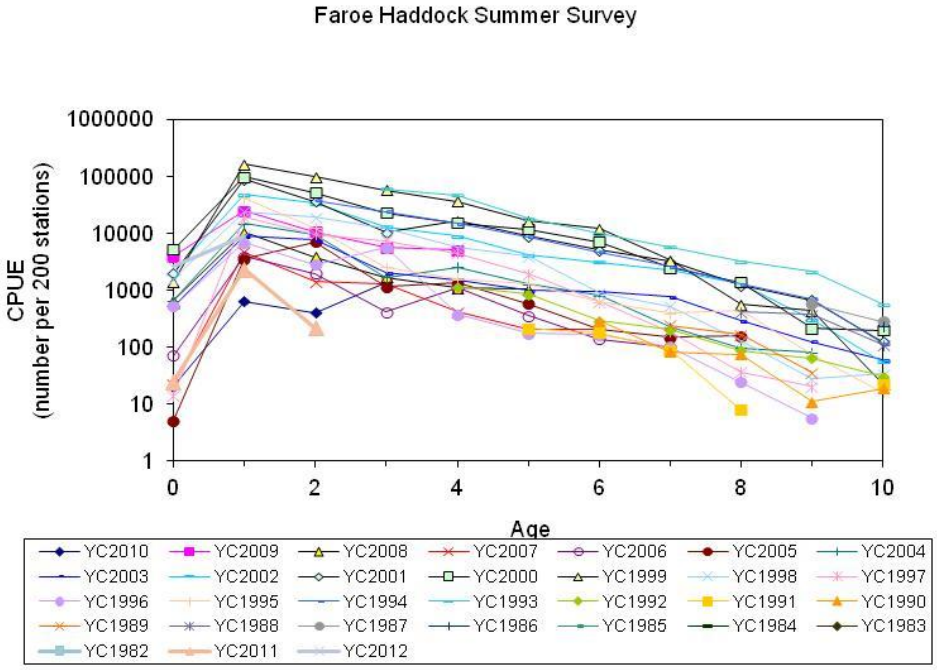


Figure 5.11. Faroe haddock. LN (c@age in numbers) in the summer survey.

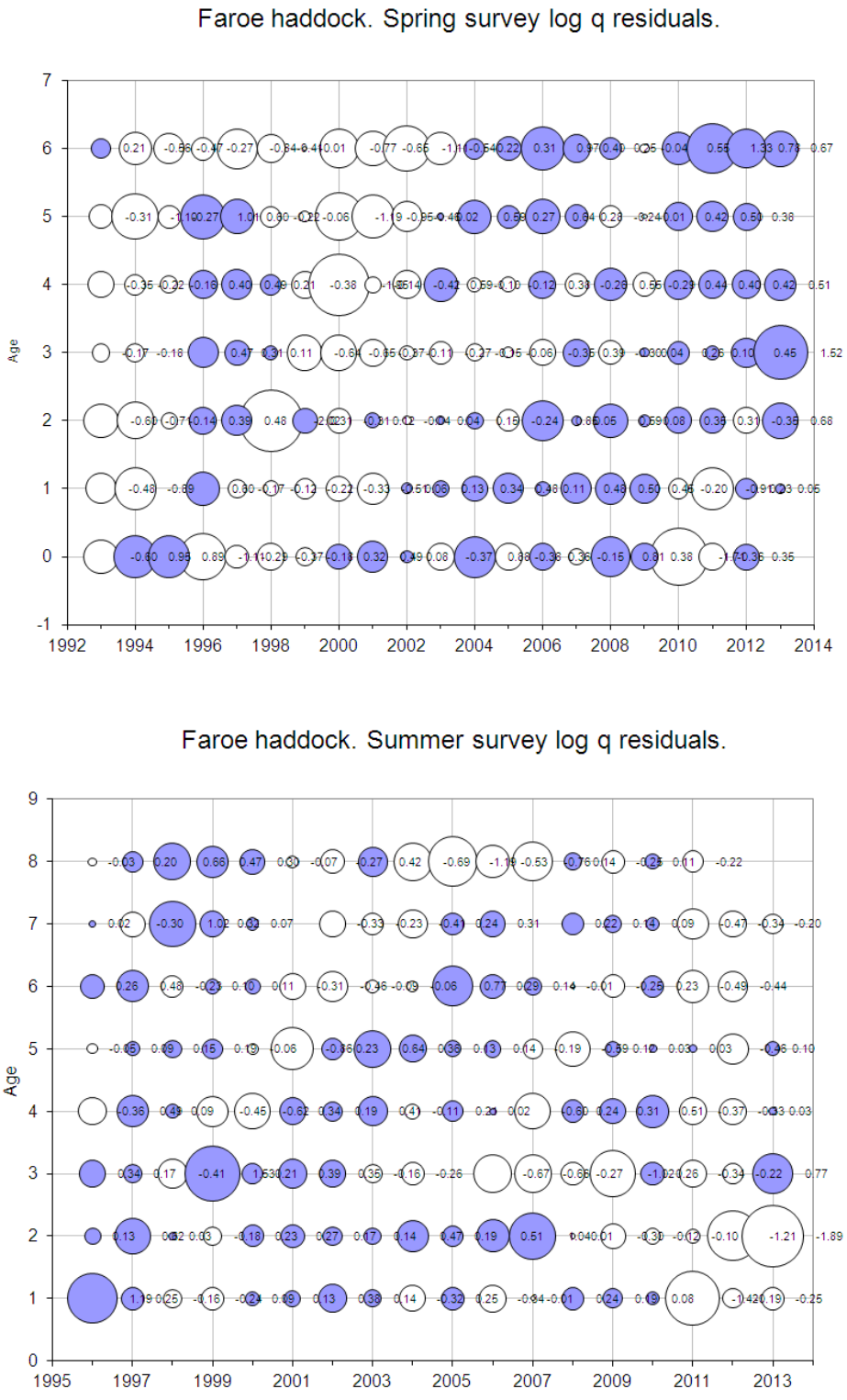

Faroe haddock. Spring survey log q residuals.
Age
7
6
5
4
3
2
1
0
-1
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
Faroe haddock. Summer survey log q residuals.
Age
9
8
7
6
5
4
3
2
1
0
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013

Figure 5.12.

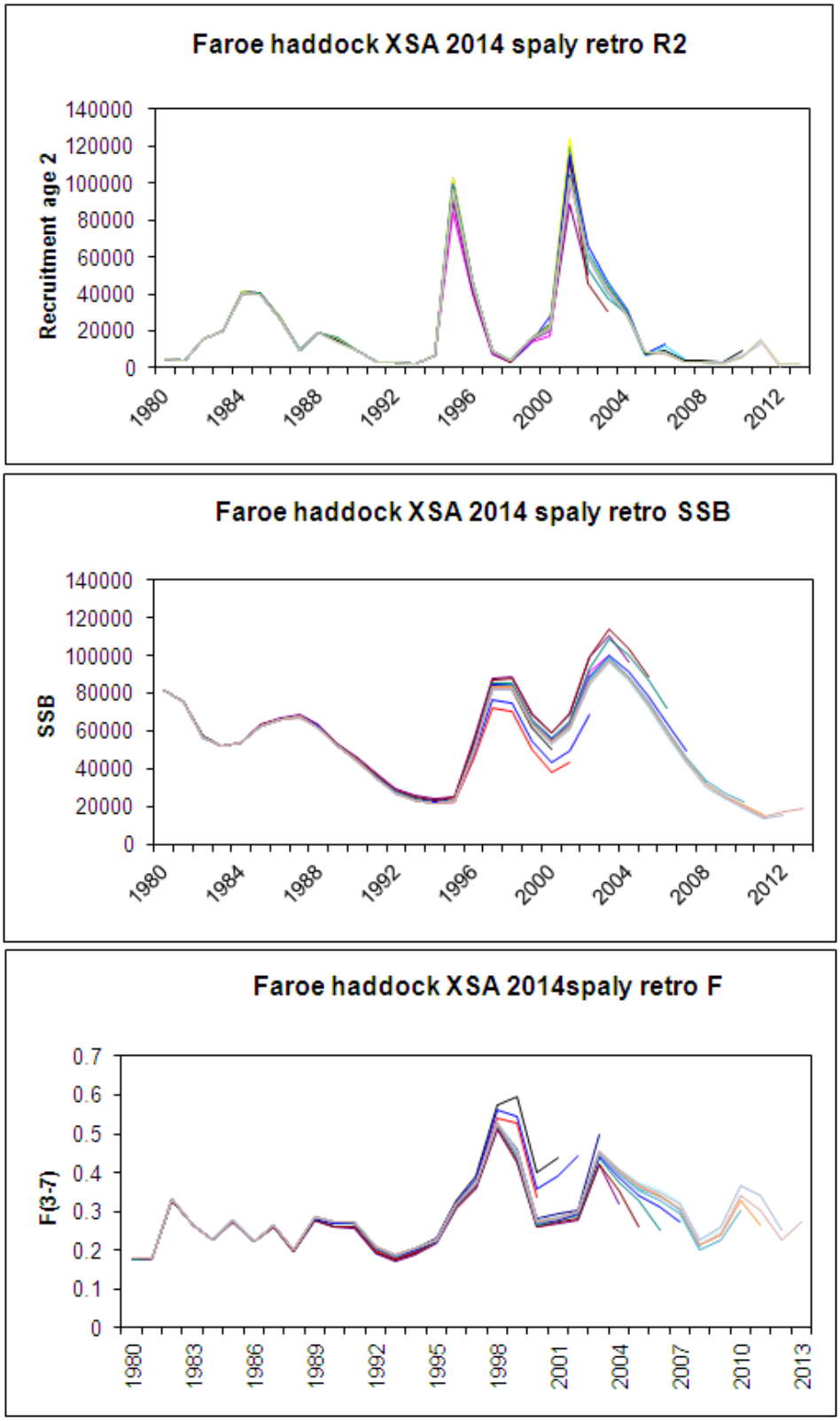


Figure 5.13. Faroe haddock. Retrospective analysis on the 2014 XSA.

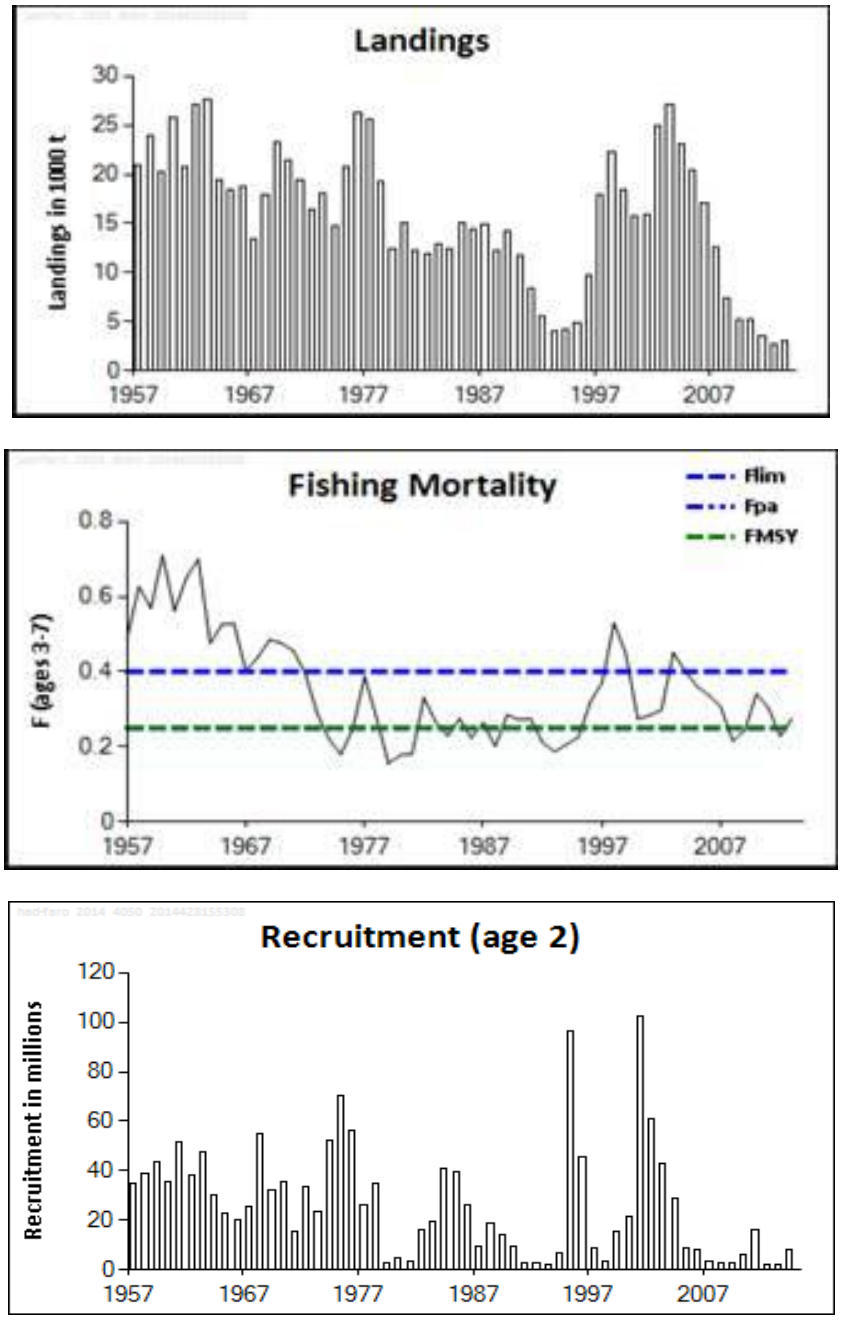


Figure 5.14. Faroe haddock (Division Vb) standard graphs from the 2014 assessment.

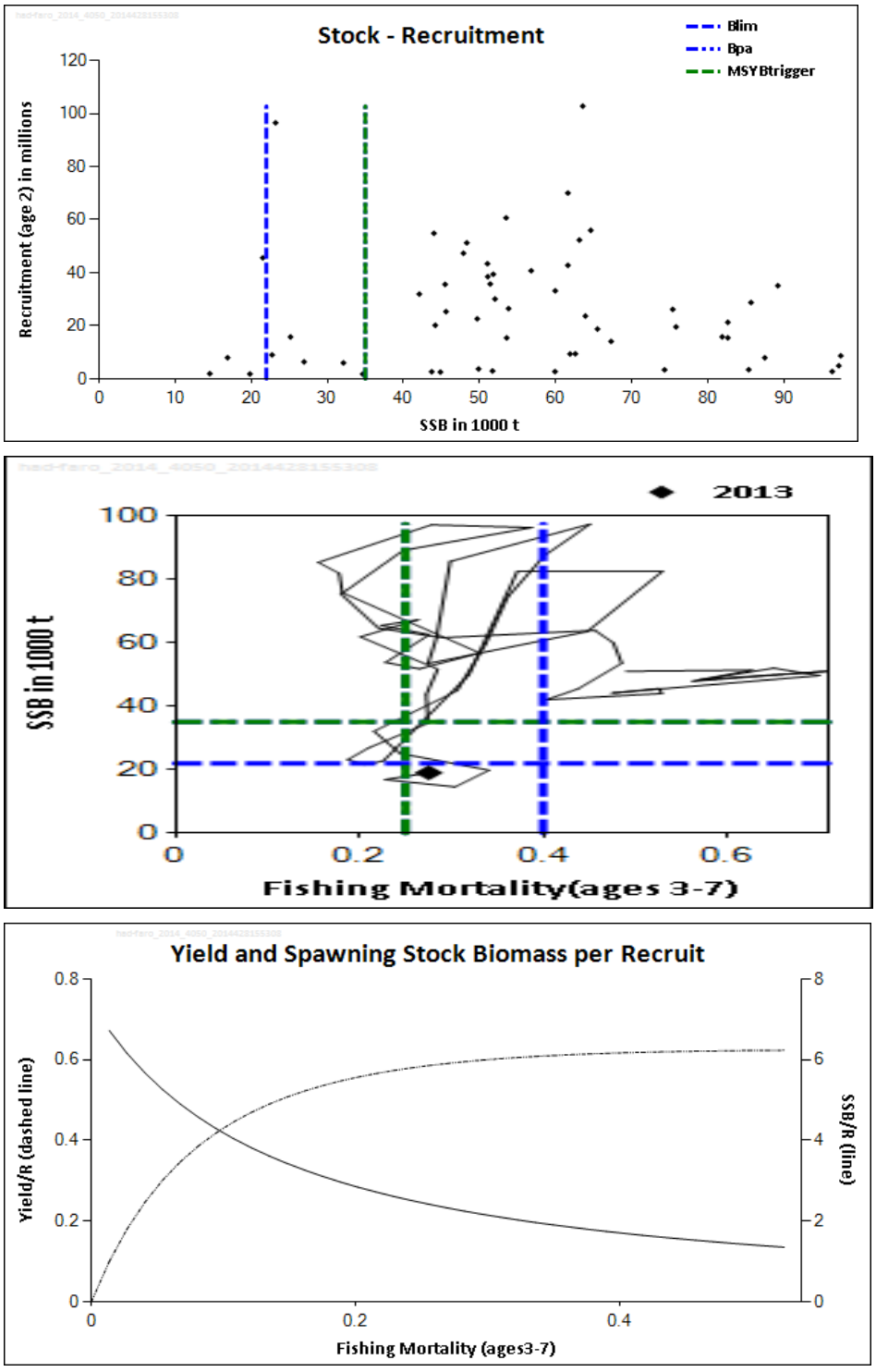


Figure 5.14 (cont.). Faroe haddock (Division Vb) standard graphs from the 2014 assessment.

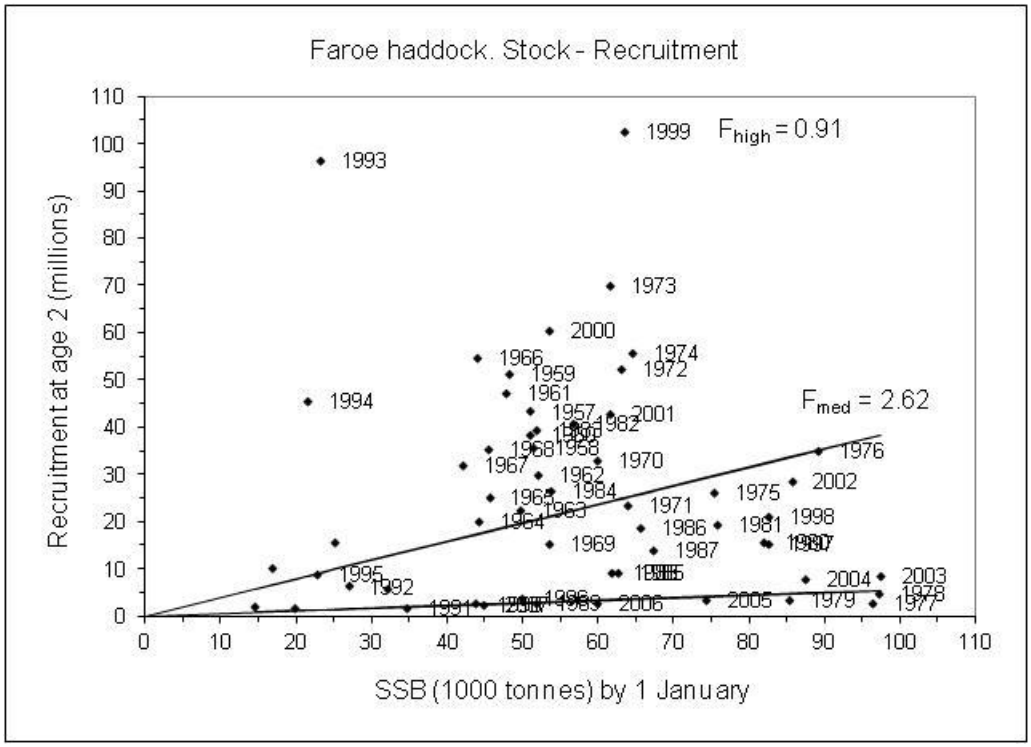
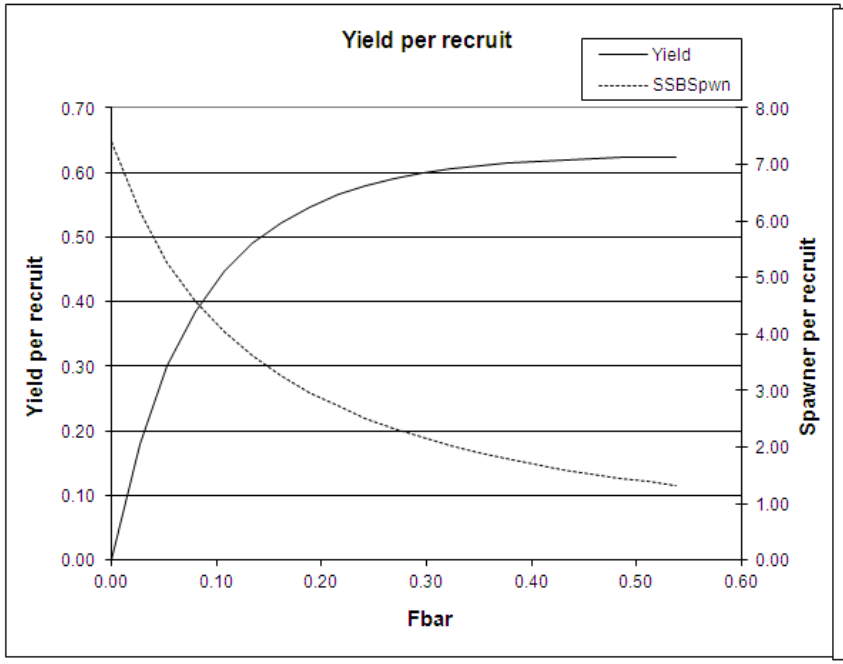


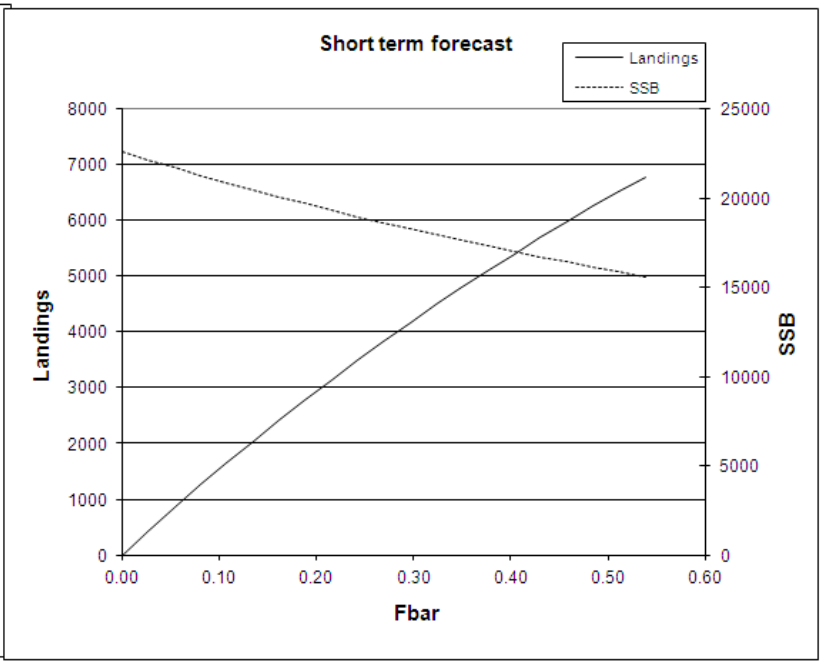
Figure 5.15. Faroe haddock. SSB-R plot.



MFYPR version 1
Run: jr2
Time and date: 15:48 19/04/2014

Reference point	F multiplier	Absolute F
Fbar(3-7)	1	0.2692
FMax	2.2137	0.5959
F0.1	0.687	0.1849
F35%SPR	0.862	0.2321
Fhigh	2.9773	0.8015
Fmed	0.8847	0.2382
Flow	-99	

Weights in kilograms



MFDP version 1
Run: jr1
Index file 18/04/2014
Time and date: 15:21 19/04/2014
Fbar age range: 3-7

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Figure 5.16. Faroe haddock. Prediction output.

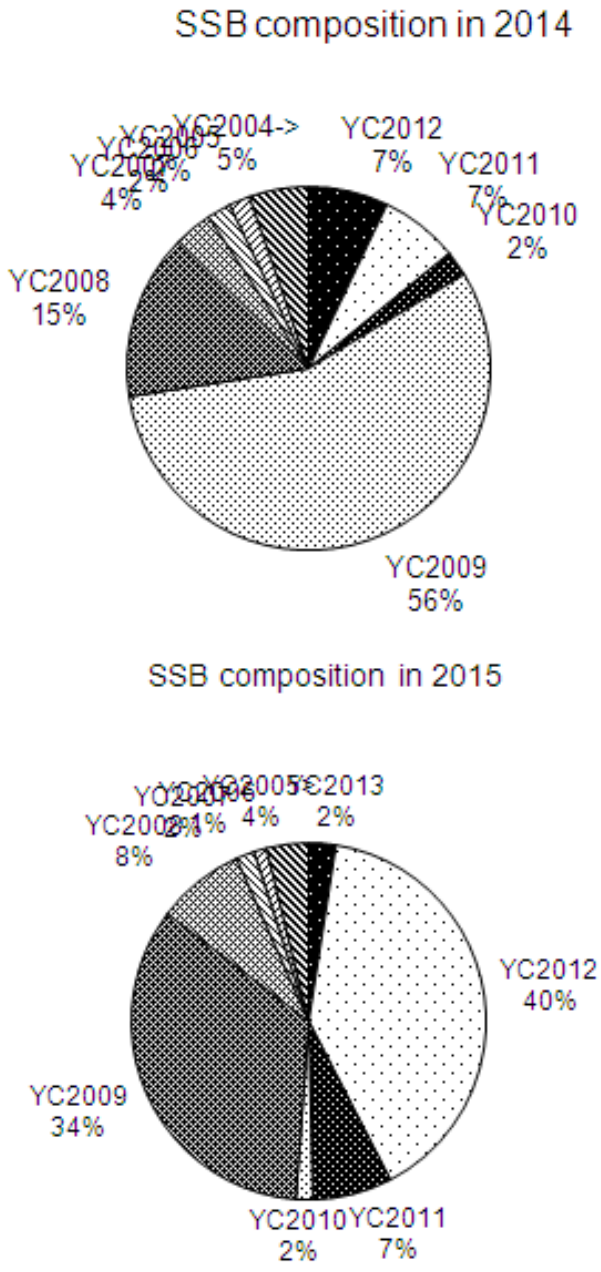

Figure 5.17. Faroe haddock. Projected composition of the number by year-classes in the SSB's in 2014 and 2015.