

6 Faroe saithe

This section was updated in November 2020.

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 5.b) have varied cyclically between 10 000 tonnes and 68 000 tonnes since 1961. After a third high of about 60 000 tonnes 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 tonnes) landings increased by 20% in 2012 up to 35 000 tonnes. Since 2011, landings have remained below historical average (37 000 tonnes.) The total tonnage has decreased from 30 853 tonnes in 2017 to 21 303 tonnes in 2019.

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 pairtrawlers (>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 pairtrawlers (<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 just 1%. Historically the catch composition by the pairtrawler fleet has accounted for about 75% of the total tonnage for saithe but since 2007 it has increased gradually up to 97% in 2019 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 0.5% since 2000 and it now accounts for only 1% of the total domestic landings for saithe in 2019. 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 2.a, which lies immediately north of the Faroes, have also been included. Little or no discarding is thought to occur in this fishery. Effort (measured as the ratio of nominal to used fishing days by the pair-trawl fleet segment) has diminished considerably in recent years. In the 2013/2014 fishing year, only 58% and 41% of fishing days were utilized in the inner and outer areas respectively while in the 2014/2015 fishing year these ratios went up to 97% and 74%, i.e. 29% of fishing days were not used. In the 2015/2016 and 2016/2017 fishing seasons 20% and 31% of the allocated days for the trawl fleet were not used respectively. In the 2017/2018 fishing year 19% of allocated days were not used. Around 10% of total fishing days were not activated in 2019.

Cumulative landings of saithe for the domestic fleets are shown in Figure 6.2.1.2. The period from 2011 to 2019 is among the poorest in the time-series. The progression of landings from January to April of 2020 is below monthly averages.

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 pairtrawlers, 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 2014 due to revised final catch statistics (tables 6.2.2.1 and 6.2.2.2). Most of the age-disaggregated catch matrix is comprised of catches of the pair-trawl fleet (Figure 6.2.2.2). Since 2010, catch numbers is mostly comprised of age groups 4 to 6 whereas in the period from 2005 to 2009 it is mainly composed of age groups 4 to 8. The progression of the strong 2012 year class (age 3 in 2015) can be easily tracked in the catch matrix. Numbers of age 4 to 6 are lower in 2019 compared to 2018 whereas individuals aged 3 are the most numerous in the catch since 2008.

The sampling program and sampling intensity in 2019 as well as the approach used in compiling catch numbers is the same as in preceding years. A summary of sampling levels since 2011 is illustrated in table 6.2.2.3.

6.2.3 Weight at age

Mean weights at age have varied by a factor of about 2 during since 1961. 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 Figures 6.2.3.1.a and 6.2.3.1.b). Mean weights increased again in the period 1992–1996 but have shown a general decrease thereafter. With the exception of 3-years old saithe, all age groups were showing signs of increasing size since 2006. In 2011, age classes 4 to 6 were close or at long-term average. From 2012 to 2014, weight was below average for age groups 3 to 7. Age classes 7 and older are above historical average since 2014 whereas younger age groups (4–6) are lower than average. Mean weight of 3 years old saithe increased from 1.07 kg in 2016 to 1.57 kg in 2018 (50% increase) and it's now 1.42 kg in 2019. Weights for all age groups but age 7 have increased to above historical average from 2018 to 2019. For the short-term forecast, weights are predicted according to the following model:

$$\log(CW_{y,a}) = \beta_0 + \beta_1 \log(CW_{y-1,a-1}) + \beta_2 \log(SW_{y,a}) \quad (\text{Eq.1})$$

where $CW_{y,a}$ is catch-weight-at age a and year y and $SW_{y,a}$ is stock-weight-at age a and year y . 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 benchmark workshop (WKFAROE) in 2017, maturity ogives were smoothed via a 10-year running average. The time period for averaging was chosen as a compromise between retaining long-term trends and reducing noise in the data. For 1962–1982, the average maturity of estimated maturities of the 1983–1996 period was used. Maturity decreased from the mid-1990s to 2006 and it shows a increasing trend for all age groups since 2010 (Table 6.2.4.1 and Figure 6.2.4.1.).

Faroe saithe begins to mature at 3 years old, approximately 20% are mature at age 4, 50% at 5 years old and 100% are mature at age 9 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 surveys design is a classical random stratified design with fixed stations. The number of stations in the spring survey are 100 and the number of stations in the summer are 200. Both survey cover depths from 60 to 500 meters. The coverage of both surveys is however very poor for juvenile saithe, which is largely distributed in coastal areas very close to shore and therefore the surveys do not provide reliable measurements of incoming recruits. Moreover, as a result of the schooling nature of saithe variability in indices is higher than that for species like cod and haddock. The spring survey consists of time series data since 1994 while the summer series were initiated in 1996. Historical data dating back to early 1980s exist but are unfortunately not available for analysis although work is in progress to recover and compile these data in upcoming meetings. Both time series cover to a large degree the traditional fishing grounds of saithe in the Faroe shelf.

Standardized biomass and abundance indices from both surveys are shown figure 6.2.5.1.1.

In addition abundances of fish 50 cm and smaller as a proxy for recruitment is calculated from the surveys. Catch rates (kg/hour) is also presented in figure 6.2.5.1.2. There are seasonal effects in the series but both surveys suggest low abundances of saithe in the 1990s, followed by an increase in stock biomass until 2004 and a decline from 2005 to around 2010. Since 2010, both indices are in good agreement and indicate that stock abundance is quite stable. However, both stock indices disagree in 2019. The summer survey index decreased from 2016 to 2020. The spring survey suggests a drop in stock biomass from 2017 to 2018 with a substantial increase of the stock in 2019 to the second highest level since 2001. Both surveys indicate a drop in stock size from 2019 to 2020. The coefficient of variation (CV) of the summer index (CV = 18%, log-scale) is higher than the spring survey (CV = 13%, log-scale). The agreement between the survey indices measured by their correlation is estimated at $R^2 = 0.37$.

The progression of the 2012 year-class in the fishery is also confirmed in both age-disaggregated indices (figure 6.2.5.1.3 and table 6.2.5.1.1). There is conflicting signals regarding recruitment estimates in survey indices. The recruitment index for 2019 from the spring survey (numbers of aged 3 individuals) is estimated to be the largest since 1994 whereas the summer survey indicates that recruitment strength is very low. In general, both surveys suggest poor incoming recruitment and a general lack of year classes in the stock. Length compositions support the trends observed in the age-disaggregated indices (figures 6.2.5.1.4 and 6.2.5.1.5).

The internal consistency of the summer survey measured as the correlation between the indices for the same year class in two adjacent years is good with R^2 ranging from 0.5 to 0.7 for the best-defined age groups, and R^2 varying between 0.2 and 0.4 for other age classes (figures 6.2.5.1.6 and 6.2.5.1.7). The internal consistency of the summer index is overall inferior to the spring index. The spring survey shows a stronger internal consistency with R^2 ranging from 0.70 to 0.9 for the best-defined ages.

6.2.5.2 Commercial CPUE

The CPUE data from pair-trawlers have been used for tuning the assessment of saithe from 2000 to 2016. At the benchmark working group (WKFAROE, 2017), the series were replaced by fisheries-independent survey indices. A description of the commercial CPUE data can be found in the stock annex. The commercial CPUE data have not been compiled since 2016.

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

Faroe saithe was benchmarked in 2017 (WKFAROE). The SAM (state-space assessment model) framework was adopted as the basis for advice. Input data for the assessment was revised, e.g., maturity ogives (Section 6.2.4) and survey indices (Section 6.2.5.1). Configuration of the SAM model was slightly modified at the NWWG meeting in 2017. Some changes were incorporated into the SAM model in 2020. The modifications were carried out intersessionally and agreed to by external experts (see Annex 6). The changes caused improvements in the model performance and diagnostics. See stock annex http://www.ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2020/pok.27.5b_SA.pdf for detailed information on the configuration options for the adopted SAM model. Biological reference points were re-calculated but the adopted reference points from the benchmark in 2017 are still used.

6.4 Reference points

6.4.1 Biological reference points and MSY framework

At the NWWG in 2017, reference points were revised according to the ICES guidelines ([ICES fisheries management reference points for category 1 and 2 stocks](#), January 2017). The software used to implement the calculations was EqSim. The procedure was as follows:

$B_{pa} = B_{trigger}$ was set to 41 4000 t (lowest historical SSB).

B_{lim} was calculated according the equation: $B_{pa} = B_{lim} \times \exp(\sigma \times 1.645) = 29\,571$ t. where $\sigma = 0.20$ (as suggested by ACOM)

The F_{MSY} estimation process consisted of 3 simulations:

1. Simulation 1. Get F_{lim}

F_{lim} is derived from B_{lim} by simulating the stock with segmented regression S-R function with the point of inflection at B_{lim} .

F_{lim} is the F that, in equilibrium, gives a 50% probability of $SSB > B_{lim}$

The simulation was conducted with:

- fixed F (i.e. without inclusion of a $B_{trigger}$)
- without inclusion of assessment/advice errors.

2. Simulation 2. Get initial F_{MSY}

F_{MSY} should initially be calculated based on:

- a constant F evaluation
- with the inclusion of stochasticity in population and exploitation as well as assessment/advice error.
- SRRs (using all; Ricker, Beverton-Holt, Segmented)
- Uncertainty parameters used:
 - ## Assessment error

```

sigmaF    <- 0.18 # SAM value of uncertainty from 2016

sigmaSSB <- 0.2 # 0.23 SAM value of uncertainty from 2017 ,changed to de-
fault=0.2 (ACOM)

## Advice error

cvF    <- 0.39 ; phiF    <- 0.81
cvSSB <- 0.28 ; phiSSB <- 0.82

## Biological parameters and selectivity

numAvgYrsB <- 20 # Biological
numAvgYrsS <- 20 # Selection

```

To ensure consistency between the precautionary and MSY frameworks, F_{MSY} is not allowed to be above F_{pa} , i.e., F_{MSY} is set to F_{pa} if this initial F_{MSY} estimate is higher than F_{pa} .

3. Simulation 3. Get final F_{MSY}

$MSY B_{trigger}$ should be selected to safeguard against an undesirable or unexpected low SSB when fishing at F_{MSY} . The ICES MSY advice rule should be evaluated to check that the F_{MSY} and $MSY B_{trigger}$ combination adheres to precautionary considerations; in the long term, $P(SSB < B_{lim}) < 5\%$

The evaluation includes:

- realistic assessment/advice error (see above)
- stochasticity in population biology and fishery exploitation.
- SRRs (using all; Ricker, Beverton-Holt, Segmented)

The new reference points are illustrated in the table below:

Biological reference points	NWWG 2017	Basis
$B_{trigger}$	41 400 t.	B_{loss}
B_{lim}	29 571 t.	$B_{pa}/1.4$
B_{pa}	41 400 t.	B_{loss}
F_{lim}	0.7	Stochastic simulations (ICES, 2017) F50% F that gives a 50% probability of $SSB > B_{lim}$
F_{pa}	0.30	F_{p05} , $P(SSB < B_{lim}) < 5\%$
F_{MSY}	0.30	Stochastic simulations (ICES, 2017).

Graphical output of the simulations are presented in figures 6.4.1.1 and 6.4.1.2.

6.5 State of the stock

Recruitment of saithe (numbers of 3-years old individuals) oscillated between 9 to 38 million from 1961 to 2000 with higher numbers than the historical average (26 millions) from late 1960s to early 1970s and in late 1980s followed by a period of low recruitment from 1988 to 1997 (Figure 6.5.1). Estimated recruitment increased substantially to 66 million in 2001 as the strong 1998 year-

class entered the fishery. Recruitment has fluctuated with no clear trend around an average of 35 million since 2000. Average fishing mortality (F_{bar} = average F for ages 4–8) increased steadily from $F_{\text{bar}} = 0.29$ in 1973 to $F_{\text{bar}} = 0.64$ in 1991 causing a decrease in spawning stock biomass (SSB) from 161 kt to 81 kt. Although fishing mortality dropped substantially in the mid and late 1990s SSB continued to be low coupled with a period of poor incoming year classes. The spawning stock biomass (SSB) was estimated at its highest in the mid-1970s due to low fishing mortality ($\sim F_{\text{bar}} = 0.26$) and higher than average recruitment. Estimated F in 1991 ($F_{\text{bar}} = 0.64$) was the highest in the time series and although it went down to 0.35 in 2000 this did not prevent the SSB to decrease at around 49 kt in 1996. SSB increased substantially from 1997 to 2005 due to the maturation of the strongest observed 1998 year class (age 3 in 2001). F increased from $F_{\text{bar}} = 0.42$ in 2005 to $F_{\text{bar}} = 0.62$ in 2010 resulting in the largest landings of the whole time period (above 60 kt). SSB has not been below $MSY B_{\text{trigger}}$ (41 400 tonnes) since 1961. The 2016 year-class (age 3 in 2019) is estimated at around 4 million. SSB has increased since 2016 as a result of low catches and subsequently low F s. The saithe fishery is characterised with significant changes in the selection pattern (Figure 6.5.1.a).

Patterns in landings follow approximately a cycle of three distinctive peaks. Catches have remained below historical average (37 000 tonnes) since 2010. Nominal landings of saithe were 21 303 tonnes in 2019. Catches are assumed equal to landings.

Age-disaggregated fishing mortalities and stock numbers are presented in tables 6.5.1 and 6.5.2, respectively. The stock summary table is shown in Table 6.5.3 and a summary of the model parameter estimates is presented in Table 6.5.4. The residuals plots show a reasonably random distribution in all the series (Figure 6.5.2). The relation between SSB and recruitment of saithe is shown in Figure 6.5.3.

6.6 Short-term forecast

6.6.1 Input data

SAM provides a forecast module which can simulate the stock in the period following the assessment year under certain assumptions and taking into account the uncertainty estimated in the model fit. The input data for the short-term forecast are described in the stock annex. The main features of the input for prognosis is the estimation of catch-weights in the assessment year by the model described in Section 6.2.3 and assuming mean maturity ogives over the previous five years. Recruitment is taken randomly from the last five years and therefore the uncertainty in the recruitment pattern is captured in the forecast. The exploitation pattern used is a 3 year average.

Input data for the prediction are presented in Table 6.6.1.1 and the stock projection in Figure 6.6.2.1.

6.6.2 Projection of catch and biomass

Results from predictions with management option is presented in Table 6.6.2.1 and Figure 6.6.2.1. Catch options are presented for five different scenarios, F_{MSY} , F_{pa} , F_{lim} , $F_{\text{status-quo}}$ and $F = 0$.

According to the F_{MSY} advice ($F_{\text{MSY}} = 0.30$) catches are projected to 27 368 t in 2021 resulting in a SSB of 73 012 t. assuming a recruitment estimate of 33 mill. in 2020 and 23 mill. in 2021, respectively. In these conditions, SSB will go up to 89 455 t in 2022.

Landings in 2019 are predicted to rely on the 2012, 2013 and 2014 year classes (73%) while these year classes will contribute to around 71% of the spawning stock biomass in the same year (Figure 6.6.2.2.)

6.7 Yield-per-recruit

Input data to yield-per-recruit

For the yield-per-recruit calculations the average of last 15 years are assumed both in the selection pattern and in the biological parameters. F_{\max} and $F_{0.1}$ are estimated at $F_{\max}=0.35$ and $F_{0.1}=0.13$, respectively.

Results from the yield-per-recruit analysis are shown in Table 6.7.1 and Figure 6.7.1.

6.8 Uncertainties in assessment and forecast

Historically, the assessment of saithe was based on a XSA model calibrated with fisheries-dependent data (see Section 6.2.5.2). In 2017, the assessment framework adopted was SAM using fisheries-independent indices (see Section 6.2.5.1).

The assessment of Faroe saithe is relatively uncertain due to lack of good tuning data. Survey data for saithe are not as reliable of stock trends as for other gadoid species like cod and haddock. Saithe is a highly schooling, widely migrating and partly pelagic species. Moreover, saithe shows up in surveys with few year classes (usually one or two) dominating the entire haul composition making difficult to assess the true state of the stock. There are also indications of time-varying selectivity, so changes in the commercial catch at age may not reflect changes in the age distribution of the population

The retrospective pattern of the SAM model shows that F is underestimated and subsequently SSB is overestimated. (Figure 6.8.1) All of the retrospective runs but one are within the confidence intervals of the final assessment. The retrospective pattern in recruitment estimates has stabilised in comparison with the historical XSA model. Recruitment estimates for saithe stocks are notoriously unreliable as no measurements of juveniles are available until they reach age 3 or older and therefore forecasts are rather uncertain. Time-varying selectivity leads to high uncertainty in the estimates of current and future SSB and fishing mortality. Mohn's rho parameter (in percentage) are estimated at 32%, -13% and 52% for the spawning stock biomass, F and recruitment, respectively.

6.9 Comparison with previous assessment and forecast

The Faroe saithe assessment was benchmarked in 2017 (WKFAROE). Input data (new maturity ogives and adoption of survey indices) and assessment method were modified and therefore the historical stock perception of the stock has changed to some extent. Some changes were incorporated into the SAM model in 2020. The modifications were carried out intersessionally and agreed to by external experts (see Annex 6 and the Stock Annex). The updated assessment suggests a downwards revision in SSB with respect to the 2019 assessment and subsequently higher estimates in F (Figure 6.9.1). The 2019 assessment estimated $F_{4-8}=0.271$ while the 2020 assessment suggests that fishing mortality was higher ($F_{4-8}=0.362$). Recruitment of the 2016 year class (age 3 in 2019) were 20% lower in last year assessment compared to the newest assessment estimate.

6.10 Management plans and evaluations

Currently, no management plan exists for saithe in Division 5.b. An effort management system has been in place since 1996. Work on a new management system started in 2018 and will continue in 2019. A reform in the current management system establishes the fishing year to start on 1 January.

6.11 Management considerations

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

From 2019, advice for saithe will be issued in June and fall as a consequence of the availability of the summer index to the WG before the end of the assessment year.

Biological reference points were revised in 2017 (see Section 6.4). F_{MSY} was estimated at the current $F_{MSY} = 0.30$ while $F_{lim} = 0.7$ and $B_{lim} = 29\,571$ tonnes were defined (see Section 6.4.1.). Other biological reference points were estimated as follows; $F_{pa} = 0.52$, $B_{pa} = MSY$ $B_{trigger} = 41\,400$ t. In 2020, work was done intersessionally where the SAM model configuration was adjusted (see Annex 6). The changes caused improvements in the model performance. Reference points were re-calculated but there were negligible differences with the current estimates. The decision was to maintain reference points from the 2017 benchmark assessment.

6.12 Ecosystem considerations

No evidence is available to indicate that the fishery is impacting the marine environment.

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. Seasonal area restriction is an alternative to reduce fishing mortality and additional real-time closures are also implemented to protect small saithe in Faroese waters.

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 (Figures 6.15.1 and 6.15.2)

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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6.17 Tables

Table 6.2.1.1. Faroe saithe (Division 5.b). Nominal catches (tonnes round weight) by countries 1988–2019 as officially reported to ICES.

Country	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001				
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	-	49,676				
France ³	313	-	-	-	120	75	19	10	12	9	17	-	273	934				
Germany	-	-	-	32	5	2	1	41	3	5	-	100	230	667				
German Dem. Rep.	-	9	-	-	-	-	-	-	-	-	-	-	-	-				
German Fed. Rep.	74	20	15	-	-	-	-	-	-	-	-	-	-	5				
Greenland	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Ireland	-	-	-	-	-	-	-	-	-	-	-	0	0	0				
Netherlands	-	22	67	65	-	-	-	-	-	-	-	160	72	60				
Norway	52	51	46	103	85	32	156	10	16	67	53	-	-	-				
Portugal	-	-	-	-	-	-	-	-	-	-	-	-	-	20	1			
UK (Eng. & W.)	-	-	-	5	74	279	151	21	53	-	19	67	32	80				
UK (Scotland)	92	9	33	79	98	425	438	200	580	460	337	441	534	708				
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	52,131				
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	51,786				
Country	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019 ¹
Denmark	-	-	-	-	34	-	-	-	-	-	-	-	-	-	-	-	-	-
Estonia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Faroe Islands	55,165	47,933	48,222	71,496	72,169	66,319	63,424	63,339	48,279	32,357	38,278	28,655	25,655	27,496	30,849	32,966	25,692	22,908
France	607	370	147	123	315	108	97	68	46	135	40	31	28	122	336	40	-	-
Germany	422	281	186	1	49	3	3	0	-	-	-	-	-	-	-	-	-	-
Greenland	125	-	-	-	73	239	0	1	-	-	1	-	-	-	-	-	1	-
Ireland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iceland	-	-	-	-	-	-	-	148	-	-	-	-	-	-	-	-	-	2
Netherlands	0	0	0	0	0	3	0	0	-	-	-	-	-	-	1	-	-	-
Norway	77	62	82	82	35	81	38	23	28	-	-	-	4	40	198	27	40	38
Portugal	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Russia	10	32	71	210	104	160	38	44	3	-	-	1	-	-	-	-	-	0
UK (E/W/NI)	58	89	85	32	88	4	-	-	-	-	-	-	-	-	-	-	-	-
UK (Scotland)	540	610	748	4,322	1,011	408	400	685	-	-	-	-	-	-	-	-	-	-
United Kingdom	-	-	-	-	-	-	-	-	706	19	-	1	340	304	601	292	214	73
Total	57,004	49,377	49,546	76,266	73,878	67,325	64,000	64,308	49,062	32,511	38,319	28,688	26,027	27,962	31,985	33,325	25,947	23,021
Working Group estimate^{4,5,6,7}	53,346	46,555	46,355	67,967	68,465	62,351	59,243	59,558	45,441	30,084	35,448	26,539	24,103	25,900	29,671	30,853	24,019	21,303

Table 6.2.1.2. Faroe saithe (Division 5.b). Total Faroese landings (rightmost column) and the contribution (%) by each fleet category (1985–2019).

	Open boats	LL <100	LL >100	Gillnet	Jigger	ST <400	ST 400-1000	ST >1000	PT <1000	PT >1000	IT	Other	Total
1985	0.2	0.1	0.1	0	2.6	0.1	6.6	33.7	28.2	28.2	0.2	0.2	38377
1986	0.3	0.2	0.1	0.1	3.6	0.1	2.8	27.3	27.5	36.5	0.7	0.9	36130
1987	0.7	0.1	0.1	0.4	5.6	0.3	4.1	20.4	22.8	44.3	1.1	0	35671
1988	0.4	0.3	0.1	0.3	6.5	0.1	6.8	20.8	19.6	43.7	1.3	0.1	39486
1989	0.9	0.1	0.1	0.2	9.3	0.3	5.4	17.7	23.5	41.1	1.3	0	40132
1990	0.6	0.2	0.2	0.2	7.4	0.2	3.9	19.6	24	42.8	0.9	0	54722
1991	0.6	0.1	0.1	0.6	9.8	0.1	1.3	13.9	26.5	46.2	0.8	0	48911
1992	0.4	0.4	0.1	0	10.5	0	0.5	7.1	24.4	55.6	1	0	31473
1993	0.6	0.2	0.1	0	9.3	0.1	0.6	6.5	21.4	60.6	0.7	0	29110
1994	0.4	0.4	0.2	0	12.6	0.1	1.1	6.8	18.5	59.1	0.7	0	29194
1995	0.2	0.1	0.3	0	9.6	0.4	0.9	9.9	17.7	60.9	0	0	24246
1996	0	0	0.2	0	9.2	0.1	1.2	6.8	23.7	58.6	0	0	17353
1997	0	0.1	0.4	0	8.9	0.1	2.5	10.7	17.8	58.9	0.4	0	19561
1998	0.1	0.4	0.3	0	7.5	0.1	2.6	19.3	15.4	53.9	0.4	0	23417
1999	0	0.1	0.2	0	5.7	0.1	1.2	12.6	18.5	60	1.6	0	29781
2000	0.1	0.1	0.1	0	3.7	0.2	0.3	15	17.5	62.3	0.7	0	33736
2001	0.1	0.1	0.2	0	2.8	0.1	0.3	20.2	16.5	58.8	0.8	0.1	41896
2002	0.1	0.2	0.1	0	1.6	0.1	0.1	26.5	10.5	60.8	0	0	48377

	Open boats	LL <100	LL >100	Gillnet	Jigger	ST <400	ST 400- 1000	ST >1000	PT <1000	PT >1000	IT	Other	Total
2003	0	0	0.1	0	0.9	1.9	0.4	17.4	14.7	64.7	0	0	35778
2004	0.1	0.2	0.2	0	1.9	3.7	0.4	15.1	14.4	63.8	0	0	34622
2005	0.2	0.1	0.2	0	2.4	4.4	0.2	12.7	20.6	59.2	0	0	47349
2006	0.2	0.4	0.6	0	3.9	0.3	0.1	19.8	20.6	54.1	0	0	41997
2007	0.2	0.2	0.3	0	2	0.2	0.1	30.4	16	50.6	0	0	33553
2008	0.2	0.3	0.5	0	3.2	1.5	0.2	20.4	16	57.7	0	0	24752
2009	0.4	0.2	0.2	0	4.3	3.3	0.1	9.6	15.1	66.8	0	0	42452
2010	0.1	0.1	0.6	0	3.9	1.2	2.4	8.3	15.1	68.3	0	0	34498
2011	0.1	0.1	0.5	0	3.6	0.5	1.3	2.6	14.1	77.1	0	0	24193
2012	0.2	0.1	1	0	2.4	1.9	0.1	2.2	18.6	73.5	0	0	28498
2013	0.1	0.3	0.5	0	3.2	1	0.2	0.6	24.9	69	0	0.1	20125
2014	0.2	0.3	0.3	0	1.9	0.5	0.2	0.2	15.6	80.7	0	0.1	18732
2015	0.2	0.4	0.3	0	2.3	1.1	0	2	18	75.5	0	0	18879
2016	0.1	0.1	0.3	0	1.6	1.7	0.2	0.2	21.7	73.8	0	0.4	20282
2017	0.1	0	0.1	0.1	0.7	0.7	0.3	0.2	20.6	76.9	0	0.1	22682
2018	0.2	0	0.1	0	0.8	0.9	0.2	0.8	20.5	76.3	0	0	17780
2019	0.1	0.1	0.3	0	0.3	0.4	0.4	1.3	18.4	78.6	0	0	15294

Table 6.2.2.1. Faroe saithe (Division 5.b). Catch number-at-age by fleet categories in 2019 (calculated from gutted weights).

Age	Jiggers	Single trawlers >1000 HP	Pair trawlers <1000 HP	Pair trawlers >1000HP	Others	Total Division 5.b
0	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	1	0	0	1
3	2	16	319	2178	10	2526
4	1	10	98	527	5	642
5	2	11	186	662	9	870
6	6	22	314	1216	21	1579
7	7	16	148	681	22	874
8	1	3	24	99	2	129
9	1	2	18	58	2	81
10	0	0	9	24	1	34
11	0	0	2	2	0	4
12	0	0	2	0	0	2
13	0	0	2	0	0	2
14	0	0	0	0	0	0
15	0	0	0	0	0	0
Total No.	20	80	1124	5447	72	6743
Catch, t.	63	224	3106	13212	218	16823

Table 6.2.2.2. Faroe saithe (Division 5.b). Catch number-at-age (thousands) from the commercial fleet (1961–2019)

Year-Age	3	4	5	6	7	8	9	10	11	12	13	14	15
1961	183	379	483	403	216	129	116	82	45	27	6	1	48
1962	562	542	617	495	286	131	129	113	71	29	13	16	47
1963	614	340	340	415	406	202	174	158	94	169	61	8	36
1964	684	1908	1506	617	572	424	179	150	100	83	47	30	14
1965	996	850	1708	965	510	407	306	201	156	120	89	30	46
1966	488	1540	1201	1686	806	377	294	205	156	94	52	34	45
1967	595	796	1364	792	1192	473	217	190	97	75	38	11	16
1968	614	1689	1116	1095	548	655	254	128	89	59	40	29	59
1969	1191	2086	2294	1414	1118	589	580	239	115	100	36	30	24
1970	1445	6577	1558	1478	899	730	316	241	86	48	46	15	23
1971	2857	3316	5585	1005	828	469	326	164	100	54	13	18	15
1972	2714	1774	2588	2742	1529	1305	1017	743	330	133	28	28	21
1973	2515	6253	7075	3478	1634	693	550	403	215	103	25	21	37
1974	3504	4126	4011	2784	1401	640	368	340	197	124	45	44	52
1975	2062	3361	3801	1939	1045	714	302	192	193	126	64	41	67
1976	3178	3217	1720	1250	877	641	468	223	141	96	60	54	77
1977	1609	2937	2034	1288	767	708	498	338	272	129	80	57	64
1978	611	1743	1736	548	373	479	466	473	407	211	146	95	83
1979	287	933	1341	1033	584	414	247	473	368	206	136	98	251
1980	996	877	720	673	726	284	212	171	196	156	261	133	236
1981	411	1804	769	932	908	734	343	192	92	128	176	310	407
1982	387	4076	994	1114	380	417	296	105	88	56	49	110	687
1983	2483	1103	5052	1343	575	339	273	98	98	99	25	127	289
1984	368	11067	2359	4093	875	273	161	52	65	59	18	25	151
1985	1224	3990	5583	1182	1898	273	103	38	26	72	41	8	154
1986	1167	1997	4473	3730	953	1077	245	104	67	33	56	7	62
1987	1581	5793	3827	2785	990	532	333	81	43	5	11	15	66

Year-Age	3	4	5	6	7	8	9	10	11	12	13	14	15
1988	866	2950	9555	2784	1300	621	363	159	27	43	15	1	1
1989	451	5981	5300	7136	793	546	185	83	55	10	2	11	16
1990	294	3833	10120	9219	5070	477	123	61	60	18	19	9	33
1991	1030	5125	7452	5544	3487	1630	405	238	128	77	22	8	11
1992	521	4067	3667	2679	1373	894	613	123	63	37	52	8	11
1993	1316	2611	4689	1665	858	492	448	245	54	34	10	6	2
1994	690	3961	2663	2368	746	500	307	303	150	28	19	1	1
1995	398	1019	3468	1836	1177	345	241	192	104	73	25	14	5
1996	297	1087	1146	1449	1156	521	132	77	64	45	29	1	7
1997	344	832	2440	1767	1335	624	165	71	29	48	29	15	8
1998	163	1689	1934	3475	1379	683	368	77	32	28	24	14	7
1999	322	655	3096	2551	4113	915	380	147	24	27	5	23	14
2000	811	2830	1484	4369	2226	2725	348	186	56	18	2	3	2
2001	1125	2452	8437	2155	3680	1539	1334	293	90	24	19	13	0
2002	302	8399	5962	9786	862	1280	465	362	33	36	8	1	0
2003	330	2432	11152	3994	4287	417	419	304	91	40	3	0	0
2004	76	2011	8544	8762	2125	1807	265	293	146	100	10	2	0
2005	454	2948	9486	16606	7099	843	810	32	102	27	3	0	0
2006	1509	5163	7963	7892	10537	3848	655	289	33	12	12	5	0
2007	852	3406	11596	6640	3878	4405	1578	416	83	11	9	3	0
2008	4968	3228	3737	9731	3733	2309	2127	461	165	12	6	0	0
2009	472	7618	5116	1893	5310	2065	1743	1099	300	42	3	1	0
2010	2406	3019	5486	1165	1045	2172	1292	861	389	53	23	0	0
2011	1924	2783	1968	1830	484	538	714	529	446	140	34	4	0
2012	863	9870	4157	1257	905	305	308	401	230	137	91	21	0
2013	723	5186	4231	2249	512	210	122	97	146	85	39	33	3
2014	887	2344	3172	1696	873	333	100	93	71	55	16	1	0
2015	2201	2338	2656	1988	889	292	185	89	71	34	32	9	6

Year-Age	3	4	5	6	7	8	9	10	11	12	13	14	15
2016	889	10550	1984	1924	723	293	113	67	93	9	19	1	1
2017	487	3638	8927	1074	555	462	121	25	1	10	17	2	1
2018	329	1419	4067	3585	370	201	90	41	22	4	12	5	3
2019	3170	805	1091	1981	1096	162	101	43	6	3	3	0	0

Table 6.2.2.3. Faroe saithe (Division 5.b). Sampling intensity in 2007–2019.

Year		Jiggers	Single trawlers >1000 HP	Pair trawlers <1000 HP	Pair trawlers >1000 HP	Others	Total
2007	Lengths	683	10525	10593	18045	381	40227
	Otoliths	120	748	960	1977	0	3805
	Weights	120	697	5603	9884	120	16424
2008	Lengths	0	6892	3694	13995	234	24815
	Otoliths	0	690	600	1500	0	2790
	Weights	0	0	2517	12914	234	15665
2009	Lengths	511	5273	3695	23352	0	32831
	Otoliths	97	301	599	2519	0	3516
	Weights	511	0	3494	19060	0	23065
2010	Lengths	209	1442	3663	25793	151	31258
	Otoliths	5	119	480	2459	0	3063
	Weights	5	0	3060	18749	151	21965
2011	Lengths	583	18	1874	19990	753	23218
	Otoliths	60	0	300	2459	60	2879
	Weights	583	18	1458	14256	753	17068
2012	Lengths	6	0	1060	24924	211	26201
	Otoliths	6	0	120	2516	0	2642
	Weights	6	0	1060	17593	211	18870
2013	Lengths	0	0	1465	18015	920	20400
	Otoliths	0	0	360	1979	120	2459
	Weights	0	0	1465	13544	1325	16334
2014	Lengths	0	201	0	22131	920	23252
	Otoliths	0	0	0	2542	120	2662
	Weights	0	0	0	15448	920	16368
2015	Lengths	0	0	173	22455	753	23381
	Otoliths	0	0	20	2169	90	2279
	Weights	0	0	173	17199	753	18125
2016	Lengths	479	0	671	20282	2613	24045
	Otoliths	120	0	179	3118	776	4193
	Weights	479	0	671	15512	2613	19275
2017	Lengths	0	0	225	16874	1824	18923
	Otoliths	0	0	60	2253	538	2851
	Weights	0	0	225	11222	1824	13271
2018	Lengths	799	0	2284	14559	196	17838
	Otoliths	239	0	478	2931	60	3708
	Weights	799	0	2284	10922	196	14201

Year		Jiggers	Single trawlers >1000 HP	Pair trawlers <1000 HP	Pair trawlers >1000 HP	Others	Total
2019	Lengths	616	0	7748	6062	264	14690
	Otoliths	180	0	1645	1257	124	3206
	Weights	616	0	5720	5261	264	11861

Table 6.2.3.1. Faroe saithe (Division 5.b). Catch weights at age (kg) (equal to stock-weights) from the commercial fleet (1961–2020). Catch weights in 2020 used for short-term prediction.

Year-Age	3	4	5	6	7	8	9	10	11	12	13	14	15
1961	1.43	2.302	3.348	4.287	5.128	6.155	7.06	7.265	7.497	8.198	9.154	9.6	10
1962	1.273	2.045	3.293	4.191	5.146	5.655	6.469	6.706	7.15	7.903	8.449	8.654	10
1963	1.28	2.197	3.212	4.568	5.056	5.932	6.259	8	7.265	8.551	9.02	9	10
1964	1.175	2.055	3.266	4.255	5.038	5.694	6.662	6.837	7.686	8.348	8.123	9.154	10
1965	1.181	2.125	2.941	4.096	4.878	5.932	6.321	7.288	8.074	7.878	9.479	9.617	10
1966	1.361	2.026	3.055	3.658	4.585	5.52	6.837	7.265	7.662	8.123	10.21	9.728	10
1967	1.273	1.78	2.534	3.572	4.368	5.313	5.812	6.554	7.806	7.591	8.551	7.878	10
1968	1.302	1.737	2.036	3.12	4.049	5.183	6.238	7.52	8.049	8.654	8.298	9.234	10
1969	1.188	1.667	2.302	2.853	3.673	5.002	5.714	6.405	6.554	7.591	7.951	8.373	10
1970	1.244	1.445	2.249	2.853	3.515	4.418	5.444	5.733	6.662	7.31	9.047	9.073	10
1971	1.101	1.316	1.818	2.978	3.702	4.271	5.388	5.972	6.49	7.173	7.38	9.288	10
1972	1.043	1.485	2.055	2.829	3.791	4.175	4.808	5.294	6.948	6.727	7.591	9.315	10
1973	1.306	1.754	1.899	2.7	4.426	5.264	6.156	6.334	8.076	8.777	9.782	9.546	12.006
1974	1.615	1.723	2.493	2.824	3.524	5.197	6.279	6.454	7.07	7.773	8.763	10.279	11.296
1975	1.293	1.924	2.623	3.621	4.128	4.754	5.952	7.073	8.352	9.032	9.984	10.225	11.607
1976	1.162	1.79	3.074	3.291	4.579	4.648	5.116	6.314	7.069	7.069	7.808	8.337	10.68
1977	1.223	1.641	2.66	3.79	4.239	5.597	5.35	5.912	6.837	6.727	6.948	8.424	10
1978	1.493	2.324	3.068	3.746	4.913	4.368	5.276	5.832	6.053	6.706	7.686	7.219	10
1979	1.22	1.88	2.62	3.4	4.18	4.95	5.69	6.38	7.02	7.26	8.15	8.64	10
1980	1.23	2.12	3.32	4.28	5.16	6.42	6.87	7.09	7.93	8.07	8.59	9.79	10.34
1981	1.31	2.13	3	3.81	4.75	5.25	5.95	6.43	7	7.47	8.14	8.55	10.1
1982	1.337	1.851	2.951	3.577	4.927	6.243	7.232	7.239	8.346	8.345	8.956	9.584	10.33
1983	1.208	2.029	2.965	4.143	4.724	5.901	6.811	7.051	7.248	8.292	9.478	10.893	10.34
1984	1.431	1.953	2.47	3.85	5.177	6.347	7.825	6.746	8.636	8.467	8.556	11.127	10.748
1985	1.401	2.032	2.965	3.596	5.336	7.202	6.966	9.862	10.67	10.46	10.202	9.644	13.232
1986	1.718	1.986	2.618	3.277	4.186	5.589	6.05	6.15	9.536	9.823	7.303	11.869	12.875
1987	1.609	1.835	2.395	3.182	4.067	5.149	5.501	6.626	6.343	10.245	8.491	11.634	10.22
1988	1.5	1.975	1.978	2.937	3.798	4.419	5.115	6.712	9.04	9.364	9.142	10.346	10.086
1989	1.309	1.735	1.907	2.373	3.81	4.667	5.509	5.972	6.939	8.543	9.514	11.73	9.627

Year-Age	3	4	5	6	7	8	9	10	11	12	13	14	15
1990	1.223	1.633	1.83	2.052	2.866	4.474	5.424	6.469	6.343	8.418	7.383	5.822	9.408
1991	1.24	1.568	1.864	2.211	2.648	3.38	4.816	5.516	6.407	7.395	8.079	7.187	9.756
1992	1.264	1.602	2.069	2.554	3.057	4.078	5.012	6.768	7.754	8.303	7.786	9.575	9.102
1993	1.408	1.86	2.323	3.131	3.73	4.394	5.209	6.54	8.403	7.275	9.414	9.281	10.715
1994	1.503	1.951	2.267	2.936	4.214	4.971	5.657	5.95	6.891	8.752	9.752	8.629	7.349
1995	1.456	2.177	2.42	2.895	3.651	5.064	5.44	6.167	7.08	7.736	7.295	5.885	10.518
1996	1.432	1.875	2.496	3.229	3.744	4.964	6.375	6.745	7.466	7.284	8.47	10.001	10.143
1997	1.476	1.783	2.032	2.778	3.598	4.766	5.982	7.658	7.882	8.539	9.488	10.355	10.523
1998	1.388	1.711	1.954	2.405	3.3	4.22	4.999	6.391	6.665	8.214	8.485	8.668	9.2
1999	1.374	1.712	1.905	2.396	2.845	4.124	5.256	5.526	6.956	8.03	8.349	8.083	10.262
2000	1.477	1.606	2.077	2.36	2.977	3.48	4.851	5.268	6.523	4.727	8.807	8.002	10.427
2001	1.33	1.59	1.785	2.586	3.059	3.871	4.374	5.565	6.703	5.776	7.745	7.773	10
2002	1.142	1.46	1.652	1.969	3.13	3.589	4.513	5.138	6.422	8.026	4.759	11.357	10
2003	1.123	1.304	1.614	1.977	2.532	3.97	4.834	5.499	6.099	6.987	5.961	9.044	10
2004	1.143	1.333	1.45	1.789	2.56	3.159	4.154	5.167	6.015	6.186	7.056	9.391	10
2005	1.148	1.325	1.516	1.672	2.087	2.975	3.79	6.087	6.134	6.651	7.424	9.113	10
2006	1.126	1.218	1.462	1.79	2.035	2.436	3.861	4.222	5.149	6.437	6.905	5.365	10
2007	1.058	1.391	1.413	1.824	2.361	2.682	3.278	4.104	4.998	6.331	7.844	7.971	10
2008	1.146	1.312	1.672	1.816	2.395	2.902	3.1	3.728	4.769	6.072	6.451	7.96	10
2009	0.938	1.485	1.893	2.411	2.601	3.147	3.634	4.024	5.014	5.828	6.308	9.011	10
2010	1.429	1.706	2.166	2.551	3.172	3.411	3.972	4.352	5.083	4.941	5.305	9.011	10
2011	1.111	1.693	2.253	2.918	3.609	4.204	4.531	5.087	5.416	6.087	6.763	7.916	10
2012	1.029	1.334	1.626	2.709	3.785	4.448	4.799	5.207	5.562	6.018	7.143	6.247	10
2013	1.208	1.466	1.778	2.069	3.553	4.292	5.191	5.742	5.919	6.417	7.941	7.154	6.963
2014	1.369	1.724	2.163	2.868	3.325	5.903	5.899	6.877	6.784	7.467	7.121	11.31	10
2015	0.932	1.555	2.091	3.17	4.208	5.032	6.715	7.858	7.428	7.565	7.629	9.87	8.613
2016	1.07	1.246	2.091	2.613	3.98	4.927	5.876	7.426	6.967	8.153	7.89	7.36	8.233
2017	1.472	1.534	1.689	3.083	3.977	5.92	6.415	6.833	8.192	9.013	8.314	9.036	8.545

Year-Age	3	4	5	6	7	8	9	10	11	12	13	14	15
2018	1.574	1.849	2.055	2.452	3.95	4.879	6.138	7.481	8.217	7.567	7.924	8.179	8.09
2019	1.417	1.919	2.582	3.078	3.704	6.081	6.474	8.167	8.724	11.051	9.763	8.179	8.09
2020	1.488	1.785	2.020	2.588	3.439	4.619	6.342	7.494	8.378	9.210	8.667	8.465	8.242

Table 6.2.4.1. Faroe saithe (Division 5.b). Proportion mature at age (1983–2020). Maturities for ages 11 to 15 are set to 1.00

Year-Age	3	4	5	6	7	8	9	10
1983	0.04	0.25	0.55	0.84	0.92	0.98	1	1
1984	0.03	0.26	0.58	0.85	0.93	0.98	1	1
1985	0.04	0.26	0.57	0.86	0.93	0.99	1	1
1986	0.04	0.28	0.6	0.87	0.94	0.99	1	1
1987	0.05	0.28	0.58	0.86	0.95	0.99	1	1
1988	0.06	0.28	0.57	0.86	0.95	0.98	1	1
1989	0.06	0.27	0.58	0.85	0.94	0.97	1	1
1990	0.05	0.26	0.58	0.82	0.92	0.97	1	1
1991	0.05	0.26	0.57	0.82	0.91	0.97	1	1
1992	0.04	0.24	0.54	0.81	0.91	0.98	1	1
1993	0.04	0.25	0.56	0.79	0.91	0.98	1	1
1994	0.05	0.22	0.54	0.78	0.9	0.97	1	1
1995	0.05	0.22	0.57	0.79	0.91	0.97	1	1
1996	0.04	0.18	0.54	0.77	0.9	0.97	1	1
1997	0.02	0.17	0.55	0.77	0.89	0.97	1	1
1998	0.01	0.16	0.53	0.73	0.88	0.98	1	1
1999	0.01	0.16	0.5	0.71	0.86	0.99	0.99	1
2000	0.02	0.17	0.48	0.72	0.87	0.98	0.99	1
2001	0.02	0.16	0.47	0.72	0.87	0.98	0.99	1
2002	0.02	0.18	0.48	0.68	0.84	0.96	0.98	1
2003	0.02	0.17	0.47	0.67	0.82	0.96	0.98	1
2004	0.02	0.16	0.42	0.62	0.79	0.94	0.98	1
2005	0.01	0.16	0.39	0.59	0.77	0.92	0.98	1
2006	0.01	0.18	0.38	0.58	0.75	0.91	0.97	1
2007	0.01	0.19	0.37	0.57	0.74	0.9	0.97	1
2008	0.01	0.2	0.39	0.59	0.75	0.9	0.97	1
2009	0.01	0.19	0.38	0.61	0.77	0.9	0.98	1
2010	0.01	0.18	0.41	0.63	0.79	0.91	0.98	1
2011	0.01	0.19	0.44	0.64	0.8	0.91	0.98	1
2012	0.01	0.2	0.43	0.65	0.81	0.91	0.98	1
2013	0.01	0.19	0.42	0.64	0.83	0.91	0.97	1
2014	0.02	0.25	0.48	0.69	0.86	0.94	0.97	1
2015	0.03	0.24	0.47	0.7	0.88	0.94	0.98	1
2016	0.04	0.26	0.5	0.73	0.91	0.96	0.98	1
2017	0.05	0.26	0.53	0.75	0.91	0.97	0.99	1
2018	0.07	0.25	0.5	0.74	0.89	0.97	0.99	1
2019	0.07	0.28	0.53	0.76	0.91	0.98	0.99	1
2020	0.07	0.28	0.52	0.75	0.90	0.98	0.99	1

Table 6.2.5.1. Faroe saithe (Division 5.b). Effort (hours) and catch in number-at-age for the survey indices used in the SAM model. Summer index (ages 3–10, years 1996–2020). Spring index (ages 3–10, years 1994–2020)

Summer Survey									
Year/age	Effort	3	4	5	6	7	8	9	10
1996	200	293	818	403	334	166	84	31	26
1997	200	1266	981	1614	644	459	236	77	19
1998	200	223	843	798	1101	220	110	56	19
1999	200	302	418	1298	918	1235	206	80	39
2000	200	1621	5005	1338	2958	1198	1325	171	95
2001	200	27060	14830	28221	1878	2494	783	799	192
2002	200	4640	13148	4691	5021	334	419	208	144
2003	200	15749	21047	14624	2277	1986	162	105	93
2004	200	1372	14471	32436	11964	1619	711	51	49
2005	200	4693	5808	6037	6801	1787	262	168	32
2006	200	8986	20294	8842	3767	3057	791	72	57
2007	200	1647	2081	5559	2046	1007	722	252	69
2008	200	6864	2415	965	2373	690	378	233	72
2009	200	2350	2339	6939	938	1690	669	431	359
2010	200	2790	1240	1461	213	134	245	126	98
2011	200	5895	1713	519	388	107	88	163	94
2012	200	6457	6018	3012	393	193	86	58	86
2013	200	1086	3777	3931	1853	202	86	30	31
2014	200	2481	1484	1251	550	235	39	26	20
2015	200	5882	2177	2122	847	333	88	38	23
2016	200	4357	11484	1620	669	205	110	39	44
2017	200	2435	4588	3680	423	315	170	58	22
2018	200	264	699	1549	1352	77	54	17	7
2019	200	4343	813	874	1113	622	107	59	41
2020	200	378	1140	151	287	252	74	34	23
Spring Survey									
Year/age	Effort	3	4	5	6	7	8	9	10
1994	100	127	847	470	423	108	68	51	54
1995	100	157	527	914	916	357	85	58	24
1996	100	63	270	115	131	105	57	34	16
1997	100	79	107	252	131	94	63	23	26
1998	100	335	941	805	1358	323	145	104	23
1999	100	218	208	699	557	662	89	39	19
2000	100	215	381	310	1256	503	568	28	12
2001	100	797	363	1112	291	427	163	130	23
2002	100	419	6989	2717	2574	206	211	79	39
2003	100	838	927	3306	964	585	76	49	46
2004	100	531	5326	7993	4765	297	120	13	28
2005	100	1417	1208	2774	4592	1497	218	83	26
2006	100	2726	1145	1991	1470	1480	457	41	25
2007	100	254	410	1401	536	226	242	111	13
2008	100	5922	648	481	1333	334	343	223	27
2009	100	1292	7699	978	274	466	217	206	16
2010	100	146	401	674	180	200	297	194	14
2011	100	3723	647	210	235	65	46	92	60
2012	100	255	2305	602	140	73	43	58	64
2013	100	281	2203	1130	524	89	82	32	31
2014	100	488	1215	1434	447	238	65	55	26
2015	100	2343	988	1067	538	139	88	20	6
2016	100	1001	6118	176	189	59	47	19	12
2017	100	1126	4372	5213	190	83	72	27	21
2018	100	216	517	1228	803	56	32	33	5
2019	100	13608	1772	828	771	442	90	74	46
2020	100	733	2724	247	224	191	113	29	14

Table 6.3.2. Faroe saithe (Division 5.b). Parameter estimates of the SAM model.

Parameter name	par	sd(par)	exp(par)	Low	High
logFpar_0	-7.655	0.251	0.000	0.000	0.001
logFpar_1	-7.031	0.197	0.001	0.001	0.001
logFpar_2	-6.683	0.189	0.001	0.001	0.002
logFpar_3	-6.743	0.122	0.001	0.001	0.002
logFpar_4	-6.921	0.132	0.001	0.001	0.001
logFpar_5	-6.999	0.134	0.001	0.001	0.001
logFpar_6	-7.008	0.155	0.001	0.001	0.001
logFpar_7	-8.388	0.247	0.000	0.000	0.000
logFpar_8	-7.481	0.202	0.001	0.000	0.001
logFpar_9	-7.205	0.131	0.001	0.001	0.001
logFpar_10	-7.085	0.092	0.001	0.001	0.001
logFpar_11	-7.258	0.092	0.001	0.001	0.001
logFpar_12	-7.146	0.099	0.001	0.001	0.001
logFpar_13	-7.066	0.117	0.001	0.001	0.001
logSdLogFsta_0	-1.438	0.120	0.237	0.187	0.302
logSdLogN_0	-0.626	0.141	0.535	0.403	0.709
logSdLogN_1	-1.373	0.106	0.253	0.205	0.313
logSdLogObs_0	-0.920	0.046	0.399	0.364	0.437
logSdLogObs_1	0.082	0.147	1.085	0.809	1.457
logSdLogObs_2	-0.198	0.150	0.820	0.607	1.108
logSdLogObs_3	-0.251	0.148	0.778	0.579	1.047
logSdLogObs_4	-0.845	0.160	0.430	0.312	0.592
logSdLogObs_5	-0.769	0.149	0.463	0.344	0.624
logSdLogObs_6	-0.825	0.159	0.438	0.319	0.602
logSdLogObs_7	-0.699	0.158	0.497	0.362	0.682
logSdLogObs_8	-0.469	0.181	0.626	0.436	0.898
logSdLogObs_9	0.178	0.137	1.195	0.909	1.570
logSdLogObs_10	-0.021	0.128	0.979	0.757	1.265
logSdLogObs_11	-0.522	0.130	0.593	0.458	0.769
logSdLogObs_12	-1.019	0.138	0.361	0.274	0.476
logSdLogObs_13	-1.026	0.137	0.359	0.273	0.471
logSdLogObs_14	-0.906	0.142	0.404	0.304	0.537
logSdLogObs_15	-0.677	0.160	0.508	0.369	0.699
logSdLogObs_16	-0.042	0.147	0.958	0.715	1.285
transfIRARdist_0	-1.560	0.279	0.210	0.120	0.367
transfIRARdist_1	-0.599	0.207	0.550	0.363	0.832
itrans_rho_0	1.406	0.156	4.081	2.987	5.576

Table 6.5.1. Faroe saithe (Division 5.b). Estimated fishing mortality-at-age (1961–2019) from the SAM model (median F).

Year Age	3	4	5	6	7	8	9	10	11	12	13	14	15
1961	0.029	0.064	0.098	0.116	0.126	0.121	0.134	0.161	0.199	0.199	0.199	0.199	0.199
1962	0.033	0.073	0.112	0.132	0.144	0.141	0.158	0.192	0.238	0.238	0.238	0.238	0.238
1963	0.034	0.074	0.116	0.14	0.16	0.163	0.188	0.233	0.291	0.291	0.291	0.291	0.291
1964	0.042	0.096	0.15	0.177	0.2	0.202	0.222	0.265	0.317	0.317	0.317	0.317	0.317
1965	0.045	0.105	0.166	0.2	0.232	0.243	0.273	0.328	0.393	0.393	0.393	0.393	0.393
1966	0.044	0.107	0.168	0.203	0.235	0.251	0.281	0.333	0.389	0.389	0.389	0.389	0.389
1967	0.04	0.097	0.149	0.174	0.198	0.211	0.232	0.267	0.297	0.297	0.297	0.297	0.297
1968	0.043	0.107	0.158	0.178	0.197	0.212	0.234	0.27	0.301	0.301	0.301	0.301	0.301
1969	0.054	0.136	0.196	0.211	0.224	0.235	0.255	0.286	0.307	0.307	0.307	0.307	0.307
1970	0.061	0.152	0.207	0.208	0.207	0.207	0.215	0.232	0.239	0.239	0.239	0.239	0.239
1971	0.068	0.162	0.215	0.204	0.191	0.181	0.18	0.186	0.183	0.183	0.183	0.183	0.183
1972	0.084	0.205	0.278	0.272	0.257	0.246	0.243	0.244	0.232	0.232	0.232	0.232	0.232
1973	0.104	0.26	0.339	0.312	0.271	0.244	0.226	0.217	0.2	0.2	0.2	0.2	0.2
1974	0.112	0.282	0.353	0.313	0.26	0.228	0.207	0.196	0.186	0.186	0.186	0.186	0.186
1975	0.108	0.278	0.34	0.295	0.238	0.207	0.184	0.172	0.167	0.167	0.167	0.167	0.167
1976	0.101	0.269	0.326	0.285	0.232	0.203	0.179	0.163	0.157	0.157	0.157	0.157	0.157
1977	0.09	0.258	0.325	0.3	0.254	0.23	0.205	0.182	0.174	0.174	0.174	0.174	0.174
1978	0.069	0.212	0.281	0.278	0.255	0.25	0.233	0.212	0.204	0.204	0.204	0.204	0.204
1979	0.056	0.19	0.269	0.29	0.284	0.289	0.278	0.251	0.242	0.242	0.242	0.242	0.242
1980	0.049	0.18	0.264	0.304	0.308	0.321	0.313	0.278	0.274	0.274	0.274	0.274	0.274
1981	0.046	0.188	0.3	0.379	0.401	0.429	0.422	0.364	0.369	0.369	0.369	0.369	0.369
1982	0.043	0.186	0.31	0.404	0.424	0.454	0.447	0.376	0.399	0.399	0.399	0.399	0.399
1983	0.046	0.211	0.374	0.492	0.515	0.546	0.541	0.45	0.499	0.499	0.499	0.499	0.499
1984	0.042	0.212	0.39	0.512	0.522	0.533	0.519	0.433	0.491	0.491	0.491	0.491	0.491
1985	0.04	0.206	0.395	0.517	0.519	0.524	0.512	0.443	0.524	0.524	0.524	0.524	0.524
1986	0.039	0.208	0.432	0.598	0.606	0.627	0.623	0.55	0.645	0.645	0.645	0.645	0.645
1987	0.035	0.195	0.418	0.582	0.578	0.581	0.564	0.492	0.554	0.554	0.554	0.554	0.554
1988	0.03	0.171	0.375	0.526	0.514	0.494	0.454	0.38	0.404	0.404	0.404	0.404	0.404
1989	0.028	0.166	0.364	0.502	0.48	0.447	0.404	0.349	0.391	0.391	0.391	0.391	0.391
1990	0.032	0.201	0.454	0.619	0.585	0.527	0.479	0.441	0.537	0.537	0.537	0.537	0.537
1991	0.043	0.267	0.603	0.815	0.781	0.718	0.682	0.658	0.818	0.818	0.818	0.818	0.818
1992	0.039	0.238	0.533	0.717	0.705	0.666	0.66	0.67	0.86	0.86	0.86	0.86	0.86
1993	0.036	0.209	0.455	0.603	0.599	0.565	0.551	0.546	0.666	0.666	0.666	0.666	0.666
1994	0.032	0.18	0.395	0.535	0.557	0.536	0.515	0.494	0.561	0.561	0.561	0.561	0.561
1995	0.026	0.152	0.358	0.518	0.588	0.603	0.601	0.591	0.68	0.68	0.68	0.68	0.68
1996	0.019	0.107	0.258	0.395	0.472	0.502	0.5	0.484	0.542	0.542	0.542	0.542	0.542
1997	0.016	0.092	0.23	0.368	0.462	0.518	0.538	0.54	0.621	0.621	0.621	0.621	0.621
1998	0.014	0.085	0.217	0.355	0.464	0.545	0.586	0.595	0.696	0.696	0.696	0.696	0.696
1999	0.014	0.084	0.22	0.366	0.483	0.584	0.637	0.656	0.782	0.782	0.782	0.782	0.782

Year Age	3	4	5	6	7	8	9	10	11	12	13	14	15
2000	0.014	0.088	0.233	0.383	0.492	0.574	0.603	0.599	0.693	0.693	0.693	0.693	0.693
2001	0.016	0.104	0.296	0.513	0.687	0.824	0.899	0.919	1.127	1.127	1.127	1.127	1.127
2002	0.013	0.09	0.264	0.457	0.608	0.725	0.777	0.78	0.971	0.971	0.971	0.971	0.971
2003	0.011	0.079	0.233	0.412	0.558	0.68	0.757	0.747	0.961	0.961	0.961	0.961	0.961
2004	0.012	0.081	0.236	0.412	0.568	0.721	0.848	0.845	1.144	1.144	1.144	1.144	1.144
2005	0.017	0.111	0.292	0.454	0.567	0.662	0.738	0.681	0.911	0.911	0.911	0.911	0.911
2006	0.028	0.167	0.394	0.559	0.647	0.73	0.813	0.751	0.999	0.999	0.999	0.999	0.999
2007	0.036	0.212	0.455	0.587	0.629	0.697	0.793	0.746	1.034	1.034	1.034	1.034	1.034
2008	0.049	0.279	0.553	0.65	0.636	0.661	0.743	0.702	0.985	0.985	0.985	0.985	0.985
2009	0.055	0.317	0.605	0.686	0.645	0.641	0.701	0.655	0.902	0.902	0.902	0.902	0.902
2010	0.063	0.356	0.662	0.747	0.682	0.667	0.711	0.666	0.912	0.912	0.912	0.912	0.912
2011	0.055	0.306	0.564	0.652	0.601	0.597	0.641	0.63	0.906	0.906	0.906	0.906	0.906
2012	0.056	0.318	0.576	0.677	0.647	0.656	0.71	0.726	1.105	1.105	1.105	1.105	1.105
2013	0.054	0.3	0.541	0.628	0.604	0.619	0.653	0.666	1.034	1.034	1.034	1.034	1.034
2014	0.053	0.287	0.525	0.625	0.6	0.616	0.607	0.572	0.8	0.8	0.8	0.8	0.8
2015	0.061	0.331	0.625	0.779	0.76	0.813	0.802	0.723	0.922	0.922	0.922	0.922	0.922
2016	0.056	0.299	0.571	0.706	0.675	0.701	0.675	0.56	0.598	0.598	0.598	0.598	0.598
2017	0.049	0.249	0.47	0.567	0.526	0.522	0.483	0.375	0.366	0.366	0.366	0.366	0.366
2018	0.047	0.231	0.428	0.517	0.485	0.477	0.454	0.365	0.363	0.363	0.363	0.363	0.363
2019	0.045	0.209	0.371	0.437	0.405	0.386	0.353	0.276	0.268	0.268	0.268	0.268	0.268
2020	0.046	0.215	0.382	0.449	0.42	0.407	0.365	0.283	0.274	0.274	0.274	0.274	0.274

Table 6.5.2. Faroe saithe (Division 5.b). Stock number-at-age (start of year) (Thousands)(1961–2020).

Year Age	3	4	5	6	7	8	9	10	11	12	13	14	15
1961	8835	7250	5775	3517	1931	1344	1016	679	314	120	59	6	291
1962	13699	6983	5729	4314	2422	1371	1004	727	495	223	71	49	199
1963	19920	9680	4887	4124	3089	1644	1049	734	496	377	178	41	144
1964	16844	17597	8405	3782	3084	2169	1144	746	472	332	208	115	94
1965	20120	11798	13100	5874	2644	2071	1367	796	502	297	215	116	132
1966	15521	15889	8511	9330	3910	1733	1331	793	500	291	153	113	134
1967	19396	11899	11551	5760	6203	2436	1081	826	434	289	164	75	120
1968	20374	16778	9482	8254	3961	3879	1484	670	505	250	175	101	138
1969	32318	16015	13095	7470	5992	2841	2420	921	420	336	144	108	125
1970	30150	31288	10932	9057	5385	4118	1897	1356	514	241	204	82	128
1971	33405	23402	22474	7466	6304	3926	2831	1321	797	319	146	125	121
1972	33840	22488	16155	13181	5588	4809	3226	2224	1034	531	200	116	157
1973	27203	25860	17935	11314	7423	3539	3059	2059	1323	624	300	135	203
1974	24406	19355	15608	10609	6977	4154	2275	2005	1295	828	388	231	266
1975	20371	15456	11754	8770	6261	4600	2617	1549	1330	845	532	275	380
1976	22069	13634	8347	6191	5330	4221	3319	1930	1160	895	548	370	472
1977	15284	14746	7477	4671	3606	3641	3065	2518	1556	912	661	387	544
1978	9502	10392	8552	3765	2520	2132	2454	2254	1999	1151	711	516	644
1979	8189	6576	6346	5033	2352	1620	1210	1647	1524	1437	797	497	948
1980	14598	6196	4205	3684	3069	1403	963	689	941	918	1128	562	1051
1981	17521	10390	4237	2719	2301	1853	878	583	375	536	593	839	1194
1982	14501	18614	6162	2856	1460	1169	908	455	313	196	297	341	1355
1983	36575	10190	14924	3816	1567	809	548	438	269	167	102	203	878
1984	20904	32379	7313	9243	1977	770	384	212	247	140	66	56	522

Year Age	3	4	5	6	7	8	9	10	11	12	13	14	15
1985	26083	18660	18462	4232	4619	927	382	178	102	151	69	29	307
1986	39692	17556	12868	8708	2414	2197	477	218	106	52	81	27	152
1987	40480	36406	11771	6848	3301	1287	887	206	111	44	20	32	73
1988	36785	30083	28709	6289	3129	1437	697	389	97	56	33	7	28
1989	24065	33053	22711	17773	2818	1456	629	357	178	52	22	24	29
1990	18199	20803	23288	15169	9284	1442	687	305	216	79	34	15	39
1991	23775	16145	14484	11047	6782	3957	740	411	174	123	38	16	24
1992	19402	19660	9649	6182	3682	2544	1557	301	184	59	49	13	15
1993	25158	15307	12997	4409	2433	1496	1179	681	129	80	18	14	7
1994	16229	19119	10213	6702	1951	1147	753	618	343	57	43	6	7
1995	17919	10431	10069	6633	3225	870	579	394	291	163	25	25	7
1996	15880	16576	6551	4412	2955	1234	404	247	193	125	69	7	16
1997	22480	12397	14219	4406	3084	1656	532	185	103	105	63	32	13
1998	14746	20117	11242	13061	3328	1579	818	226	87	44	51	28	18
1999	30330	10240	17711	8585	11636	1842	765	350	87	38	16	23	19
2000	39256	34175	7133	14740	6235	7011	780	366	132	36	13	6	11
2001	75782	27800	33107	5056	8092	3120	2631	424	154	50	15	8	7
2002	46810	74700	20956	24622	2327	2815	1257	762	124	39	13	3	4
2003	43422	49512	54254	11957	10655	1099	852	583	245	46	10	4	2
2004	20545	40865	53861	39016	5973	3722	383	391	222	78	15	3	2
2005	38781	25498	31618	44860	17327	2447	1259	150	134	56	15	4	1
2006	33201	40744	24169	19508	23123	7967	950	506	64	38	19	6	2
2007	26211	19029	36779	14827	9333	8377	2942	558	143	21	12	5	2
2008	42656	17738	9706	21983	7761	5463	3853	1077	245	30	7	4	2
2009	17425	22248	11806	4345	9539	4273	3092	1769	459	80	8	2	2
2010	26465	11213	12776	2895	2416	4148	2355	1362	815	149	29	3	1

Year Age	3	4	5	6	7	8	9	10	11	12	13	14	15
2011	40208	16726	5408	4148	1324	1050	1806	1026	579	308	57	9	1
2012	23629	27975	11934	2533	1576	714	588	782	430	169	126	21	3
2013	14525	19683	12431	6885	1152	727	312	280	289	119	36	40	6
2014	17089	11499	10661	4721	2538	549	346	198	141	84	33	7	14
2015	39611	9914	7824	4777	2001	804	298	185	110	62	28	12	8
2016	22766	39803	4742	3659	1450	753	227	109	103	41	24	6	5
2017	12494	20190	22881	2173	1415	824	274	95	25	47	27	10	4
2018	9500	8745	13555	10992	1003	690	341	118	51	16	31	16	9
2019	44243	5935	5260	6618	3905	663	380	199	52	24	10	18	14
2020	31734	36181	3520	3352	3557	1363	426	239	124	33	15	6	20

Table 6.5.3. Faroe saithe (Division 5.b). Summary table (1961–2020).

Year	R (age 3)	Low	High	SSB	Low	High	Fbar (4-8)	Low	High	TSB	Low	High
1961	8835	4834	16148	64301	48739	84831	0.105	0.071	0.156	100866	76011	133849
1962	13699	7864	23864	68616	52644	89433	0.121	0.084	0.173	108567	82874	142226
1963	19920	11522	34436	77390	60275	99365	0.13	0.092	0.184	129345	99344	168406
1964	16844	9827	28871	88083	69064	112339	0.165	0.118	0.23	150190	115134	195919
1965	20120	11744	34468	98242	76614	125977	0.189	0.136	0.264	161909	124495	210568
1966	15521	9029	26680	102777	79338	133142	0.193	0.138	0.27	166006	127270	216532
1967	19396	11336	33186	97862	74864	127925	0.166	0.118	0.233	156225	119483	204264
1968	20374	11994	34608	99365	76312	129383	0.171	0.122	0.239	161179	123810	209827
1969	32318	19147	54549	105424	81159	136945	0.201	0.144	0.28	181101	139311	235429
1970	30150	18039	50390	110665	85159	143811	0.196	0.141	0.273	197417	152010	256389
1971	33405	20129	55438	122720	94676	159072	0.191	0.137	0.264	204825	159571	262914
1972	33840	20489	55891	140769	109787	180495	0.252	0.183	0.346	222661	175931	281803
1973	27203	16483	44894	160538	125646	205119	0.285	0.209	0.39	251683	200210	316390
1974	24406	14670	40603	152133	119192	194177	0.287	0.21	0.393	239418	190895	300275
1975	20371	12217	33966	155171	121635	197953	0.272	0.198	0.373	224199	179420	280153
1976	22069	13162	37002	136245	107575	172556	0.263	0.192	0.361	196214	157863	243881
1977	15284	9149	25535	128119	102363	160356	0.273	0.199	0.375	177494	143970	218825
1978	9502	5700	15839	115300	93413	142315	0.255	0.187	0.347	161912	131881	198782
1979	8189	4903	13677	102726	83704	126070	0.264	0.196	0.357	132740	109347	161138
1980	14598	8798	24220	100700	82769	122515	0.275	0.206	0.367	138104	114434	166669
1981	17521	10524	29169	81549	67560	98434	0.339	0.257	0.448	128467	105634	156236
1982	14501	8695	24184	76219	63308	91764	0.356	0.271	0.466	130780	105947	161433
1983	36575	21796	61375	78468	63787	96527	0.428	0.33	0.555	159520	125638	202539
1984	20904	12586	34718	86928	69336	108983	0.434	0.335	0.562	176477	137267	226889
1985	26083	15796	43069	97256	77592	121903	0.432	0.335	0.559	187855	148242	238055
1986	39692	23888	65953	87798	70621	109154	0.494	0.383	0.638	196280	152165	253186
1987	40480	24408	67134	85056	68442	105702	0.471	0.364	0.609	210659	160848	275895
1988	36785	22156	61072	93952	74293	118814	0.416	0.318	0.544	216322	166171	281608
1989	24065	14545	39817	103090	81108	131031	0.392	0.3	0.511	199930	156316	255713
1990	18199	11018	30058	99365	79121	124789	0.477	0.372	0.613	171472	137159	214368
1991	23775	14489	39013	81293	65951	100203	0.637	0.499	0.814	146057	118301	180326
1992	19402	11836	31807	64907	53319	79014	0.572	0.448	0.73	125791	101334	156150
1993	25158	15288	41402	63679	52263	77588	0.486	0.38	0.622	136170	108217	171344
1994	16229	9979	26394	61523	50969	74262	0.44	0.342	0.566	129764	103458	162760
1995	17919	10970	29270	59656	49250	72261	0.443	0.342	0.575	117857	94461	147049
1996	15880	9832	25648	49601	40849	60229	0.347	0.266	0.452	109007	85442	139071
1997	22480	13966	36185	54640	44672	66832	0.334	0.259	0.431	122777	95802	157347
1998	14746	9147	23770	63804	52360	77751	0.333	0.259	0.429	133238	106265	167056
1999	30330	18565	49550	78026	64025	95089	0.348	0.271	0.446	161594	129081	202296
2000	39256	24492	62918	89687	74339	108203	0.354	0.275	0.456	212446	168151	268409
2001	75782	47029	122112	94969	78447	114971	0.485	0.378	0.622	269429	208043	348928
2002	46810	28573	76686	96825	79395	118081	0.429	0.332	0.554	273843	212127	353516
2003	43422	26749	70487	104437	84109	129677	0.392	0.302	0.51	265137	206376	340628
2004	20545	12286	34355	113943	92074	141007	0.404	0.313	0.52	258483	205280	325475
2005	38781	24327	61824	110285	90030	135097	0.417	0.324	0.537	251727	203874	310811
2006	33201	21022	52436	102379	84631	123848	0.499	0.393	0.634	230276	188486	281331
2007	26211	16742	41035	89128	74108	107193	0.516	0.41	0.65	190656	157100	231380
2008	42656	26254	69304	80286	67200	95919	0.556	0.442	0.699	180156	147049	220717
2009	17425	11060	27455	73512	61724	87551	0.579	0.459	0.729	141672	117530	170773
2010	26465	16960	41297	58912	49589	69986	0.623	0.491	0.79	134168	109426	164504
2011	40208	25418	63602	45490	38634	53562	0.544	0.429	0.689	125347	99563	157809
2012	23629	15133	36895	39546	33357	46884	0.574	0.456	0.723	108410	86465	135925
2013	14525	9292	22704	36567	30374	44023	0.538	0.424	0.684	96284	77142	120175
2014	17089	10884	26830	41505	34314	50203	0.53	0.414	0.679	96925	77826	120711
2015	39611	24984	62802	39406	32648	47563	0.662	0.519	0.844	101440	79975	128666
2016	22766	14325	36179	38055	30829	46975	0.59	0.459	0.759	106374	81354	139087

Year	R (age 3)	Low	High	SSB	Low	High	Fbar (4-8)	Low	High	TSB	Low	High
2017	12494	7586	20577	47709	37476	60735	0.467	0.351	0.62	108609	83115	141922
2018	9500	5330	16932	49701	38625	63954	0.428	0.309	0.592	97228	73600	128440
2019	44243	21047	93005	52506	38671	71290	0.362	0.241	0.543	131690	82949	209071
2020	31734	10902	92374	54921	33781	89291	0.374	0.208	0.675	152293	77233	300298

Table 6.6.1.1. Faroe saithe (Division 5.b). Input data for short-term forecast for the SAM assessment. Natural mortality (nm), maturity (mat), catch weights (cw), selection pattern (sel), stock weights (sw). Units for catch and stock weights are kg.

"age"	"N"	"nm"	"mat"	"pf"	"pm"	"sw"	"sel"	"cw"
3	31734	0.2	0.06	0	0	1.488	0.131	1.488
4	36181	0.2	0.266	0	0	1.785	0.645	1.785
5	3520	0.2	0.516	0	0	2.02	1.182	2.02
6	3352	0.2	0.746	0	0	2.588	1.417	2.588
7	3557	0.2	0.904	0	0	3.439	1.327	3.439
8	1363	0.2	0.972	0	0	4.619	1.309	4.619
9	426	0.2	0.988	0	0	6.342	1.217	6.342
10	239	0.2	1	0	0	7.494	0.966	7.494
11	124	0.2	1	0	0	8.378	0.961	8.378
12	33	0.2	1	0	0	9.21	0.961	9.21
13	15	0.2	1	0	0	8.667	0.961	8.667
14	6	0.2	1	0	0	8.465	0.961	8.465
15	20	0.2	1	0	0	8.242	0.961	8.242

Table 6.6.2.1. Faroe saithe (Division 5.b). Output of the SAM short-term-forecast including confidence intervals (low and high columns). Units for ssb and catch are tonnes, thousands for recruitment. F_{MSY} advice.

Year	fbar:median	fbar:low	fbar:high	rec:median	rec:low	rec:high	ssb:median	ssb:low	ssb:high	catch:median	catch:low	catch:high	tsb:median	tsb:low	tsb:high
2020	0.343	0.196	0.602	32527	10909	98185	56308	35345	92246	23659	13795	41445	156289	81836	325688
2021	0.300	0.171	0.526	22766	9500	44243	73012	37367	143337	27368	14383	56238	169111	86684	338626
2022	0.300	0.171	0.526	22766	9500	44243	89455	41383	189390	32070	16517	65349	180509	88883	341110

Table 6.7.1. Faroe saithe (Division 5.b). Input data for the yield-per-recruit calculations of the SAM assessment. Natural mortality (nm), maturity (mat), catch weights (cw), selection pattern (sel), stock weights (sw). Units for catch and stock weights are kg.

"age"	"nm"	"mat"	"pf"	"pm"	"sw"	"sel"	"cw"
3	0.2	0.029	0	0	1.224	0.093	1.224
4	0.2	0.223	0	0	1.548	0.491	1.548
5	0.2	0.45	0	0	1.93	0.921	1.93
6	0.2	0.669	0	0	2.529	1.104	2.529
7	0.2	0.833	0	0	3.34	1.06	3.34
8	0.2	0.933	0	0	4.326	1.077	4.326
9	0.2	0.979	0	0	5.082	1.092	5.082
10	0.2	1	0	0	5.907	0.976	5.907
11	0.2	1	0	0	6.44	1.237	6.44
12	0.2	1	0	0	7.21	1.237	7.21
13	0.2	1	0	0	7.465	1.237	7.465
14	0.2	1	0	0	8.202	1.237	8.202
15	0.2	1	0	0	9.118	1.237	9.118

6.18 Figures

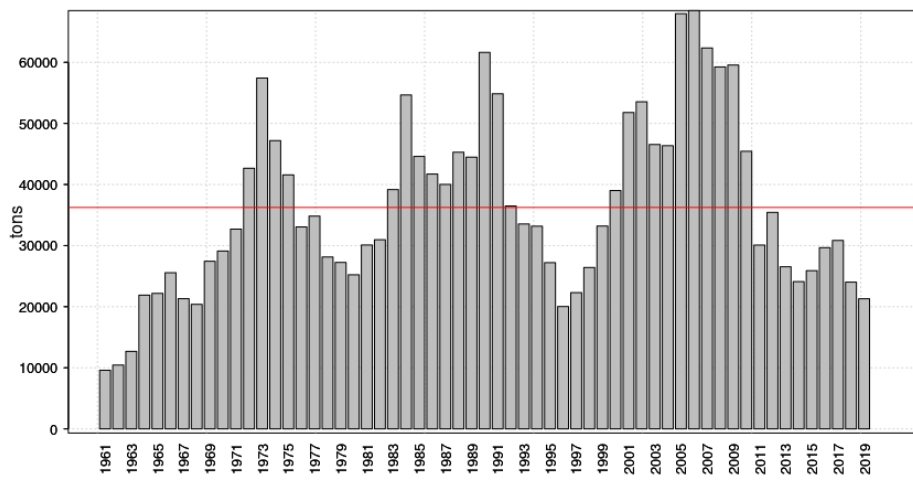


Figure 6.2.1.1. Faroe saithe (Division 5.b). Landings (tonnes)(1961–2019). Horizontal red line represents average landings.

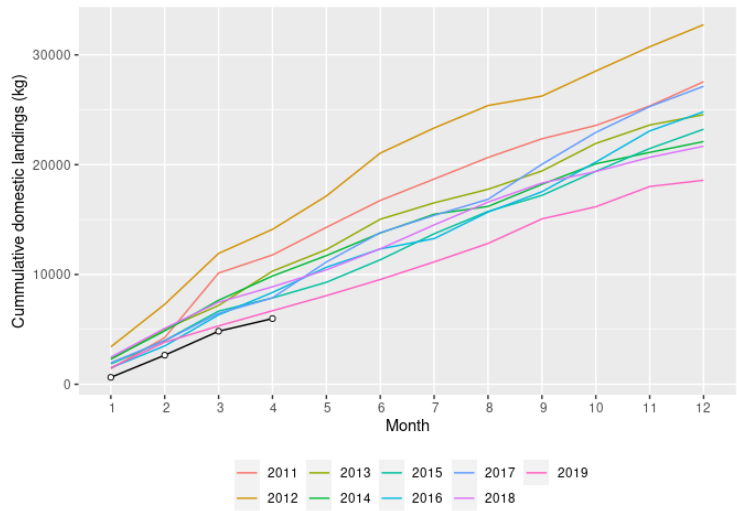


Figure 6.2.1.2. Saithe in the Faroes (Division 5.b). Cumulative domestic landings (2011–2020). Black line shows the first quarter of 2020.

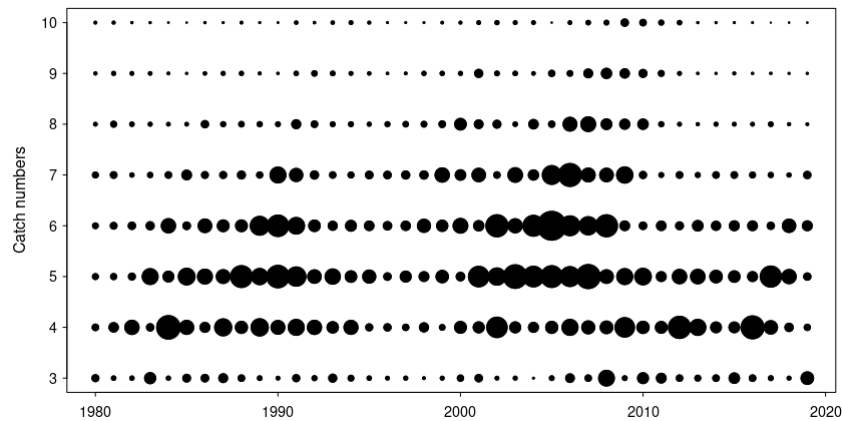


Figure 6.2.2.2. Faroe saithe (Division 5.b). Cath-at-age numbers in the commercial catches (ages 3–10) (1961–2019).

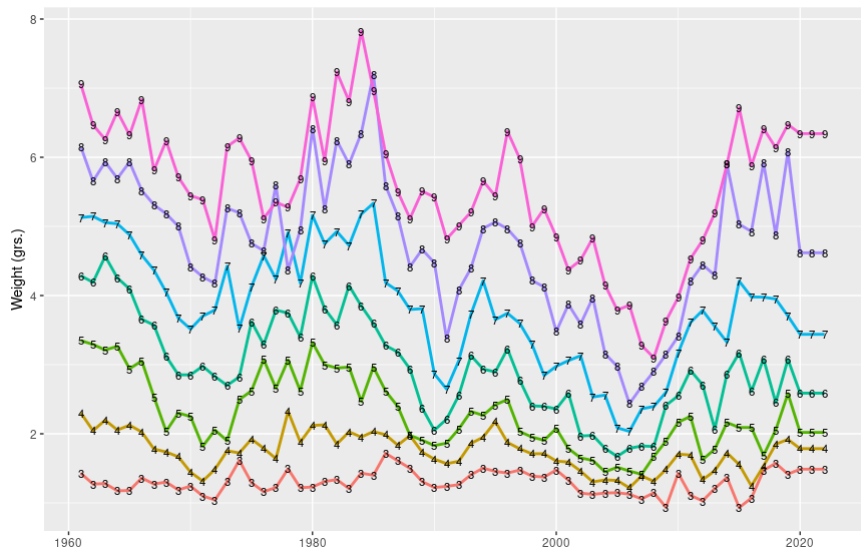


Figure 6.2.3.1.a Faroe saithe (Division 5.b). Mean weight at age (kg) in commercial catches (ages 3–9) (1961–2022). Estimated weights in 2020–2022 are used in projections.

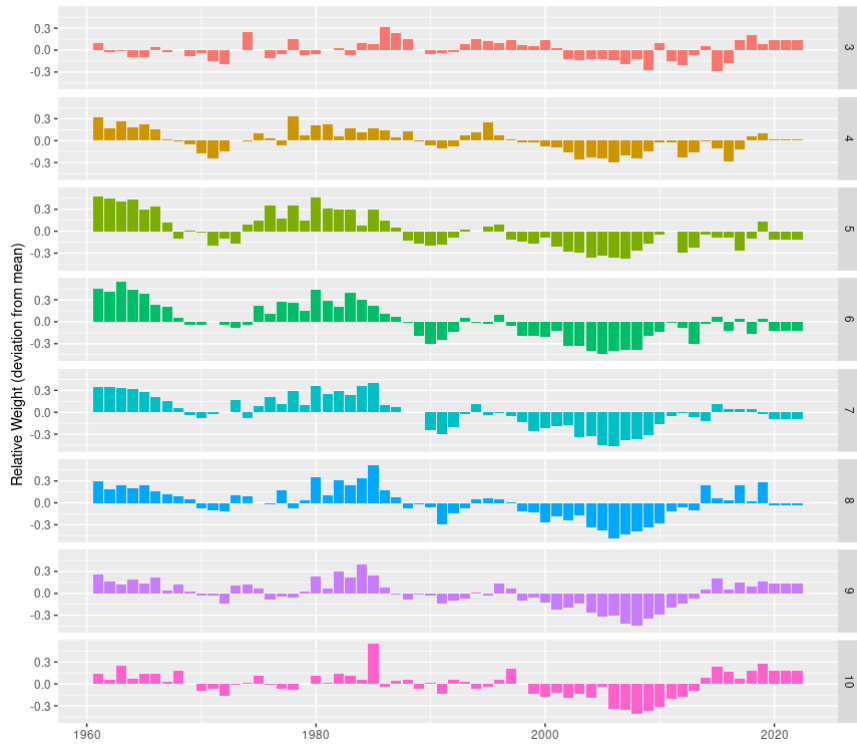


Figure 6.2.3.1.b Faroe saithe (Division 5.b). Deviations of mean weight at age (kg) from historical average in commercial catches (ages 3–10) (1961–2022). Weights in 2020–2022 are estimated.

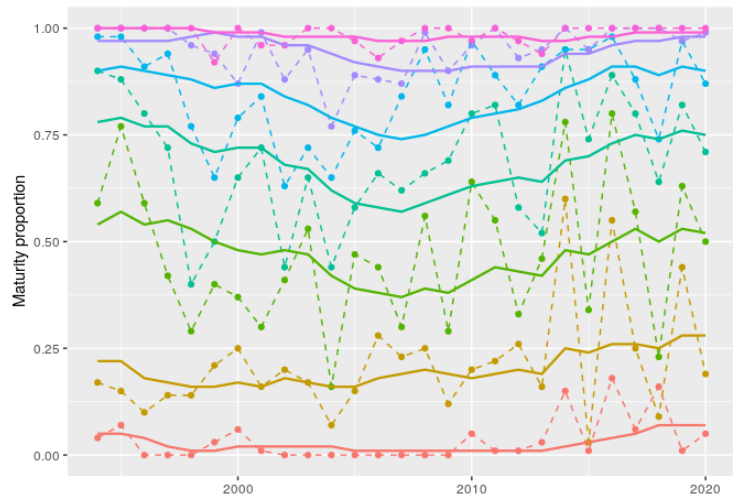


Figure 6.2.4.1. Faroe saithe (Division 5.b). Observed and smoothed maturity ogives (ages 3–9) (1994–2020) from FGFS1 (spring survey).

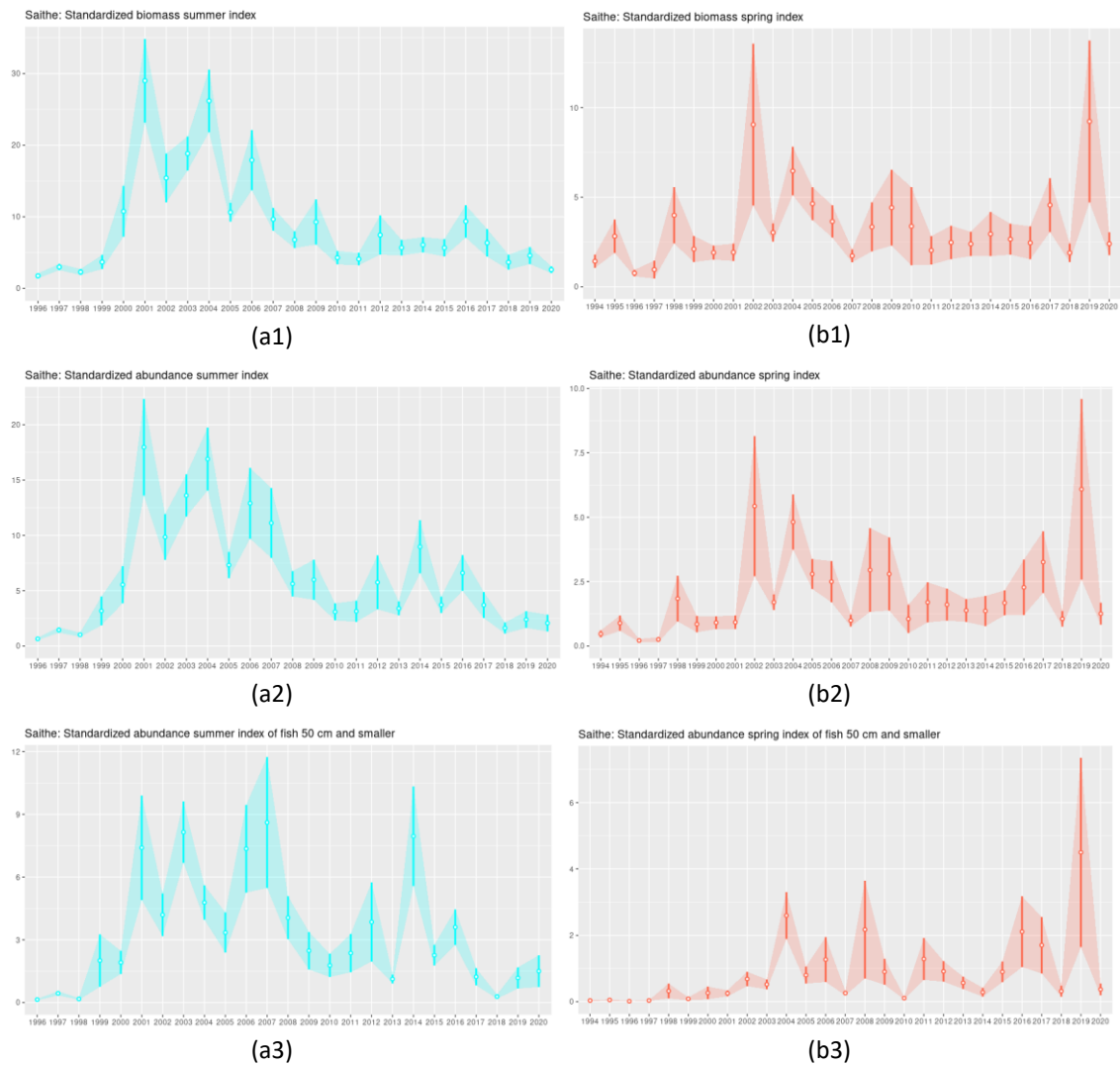


Figure 6.2.5.1.1. Faroe saithe (Division 5.b). Standardised biomass (a1)(b1) and abundance (a2)(b2) indices from the Faroe bottom-trawl summer FGF51 (1996–2020) and spring surveys FGF52 (1994–2020). Abundance indices of fish 50 cm and smaller are proxies for recruitment strength (a3)(b3). Shade areas show standard errors in the estimation of indices.

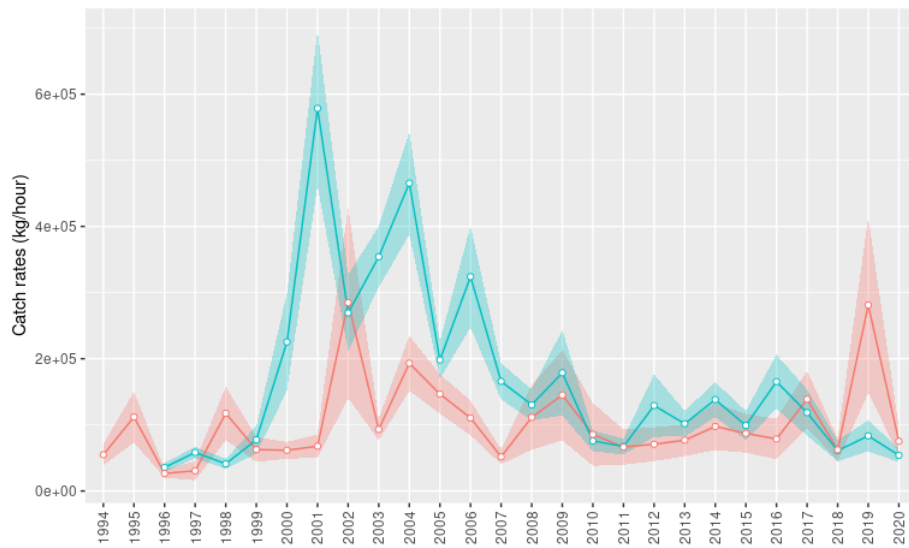


Figure 6.2.5.1.2. Faroe saithe (Division 5.b). Catch rates (kg/hour) from the Faroese bottom-trawl spring FGFS1 (1994–2020)(red line) and summer survey FGFS2 (1996–2020) (cyan line). Shade areas show standard errors in the estimation of indices.



Figure 6.2.5.1.3. Faroe saithe (Division 5.b). Age-disaggregated (ages 3–10) numbers from the commercial fleet (left panel), the Faroese bottom-trawl spring FGFS1 (middle panel) and summer survey FGFS2 (right panel) since 1995.

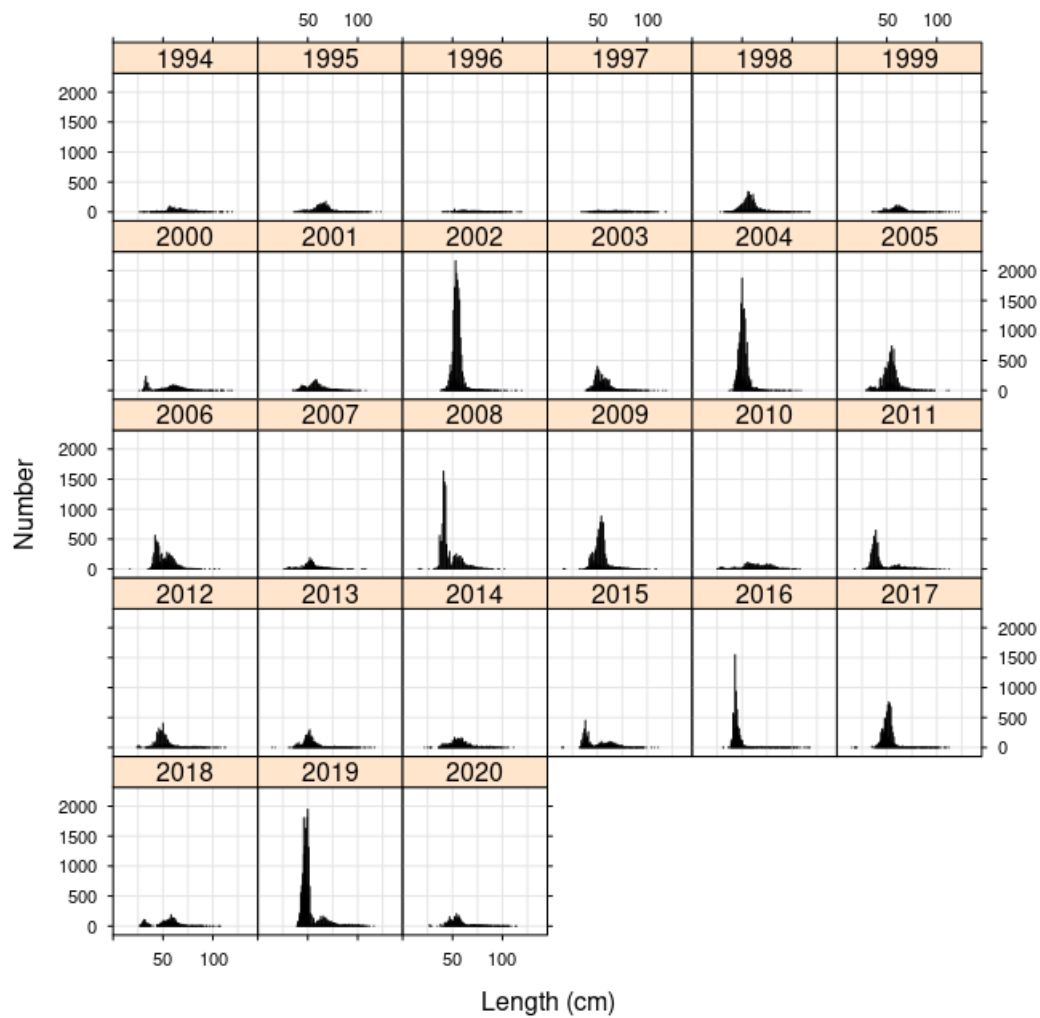


Figure 6.2.5.1.4. Faroe saithe (Division 5.b). Length composition from the Faroese bottom-trawl spring survey FGFS1 (1994–2020).

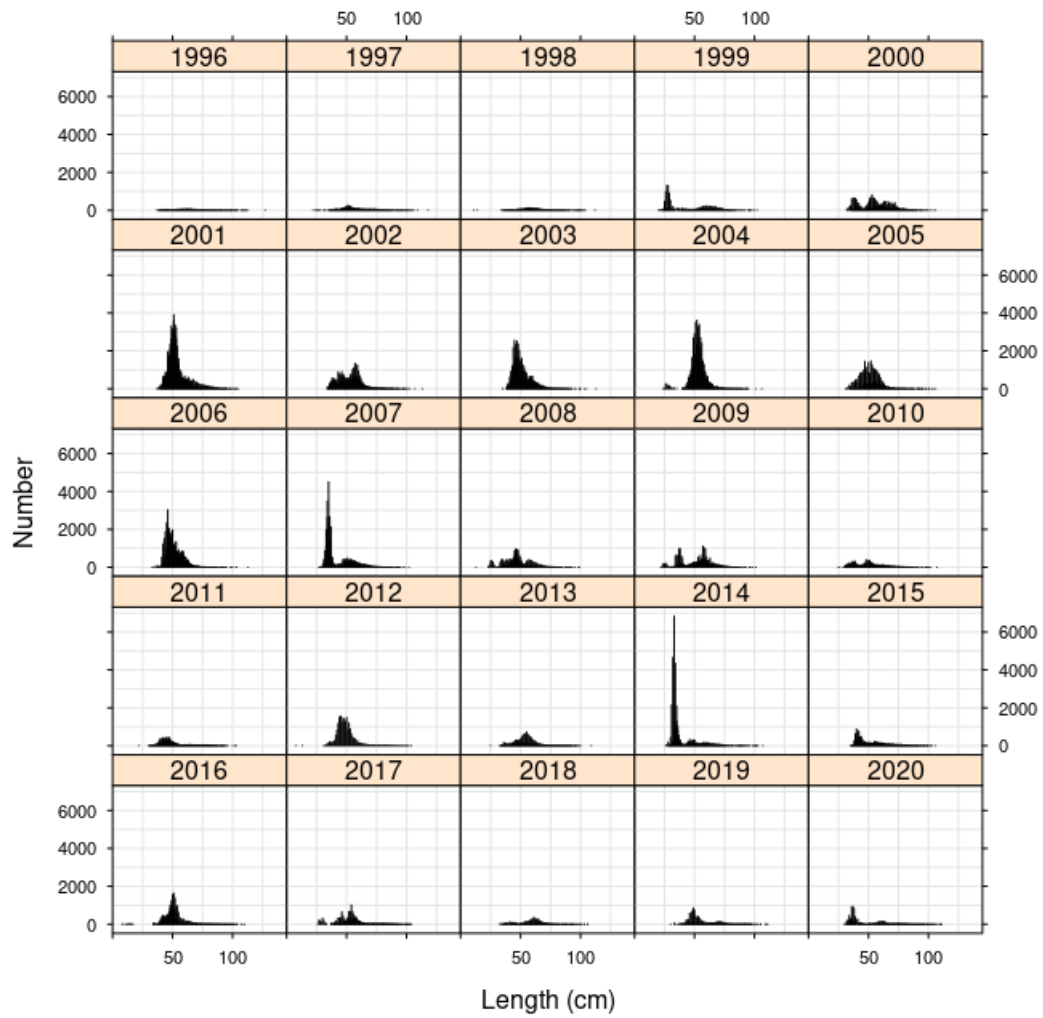


Figure 6.2.5.1.5. Faroe saithe (Division 5.b). Length composition from the Faroese bottom-trawl summer survey FGFS2 (1996–2020).

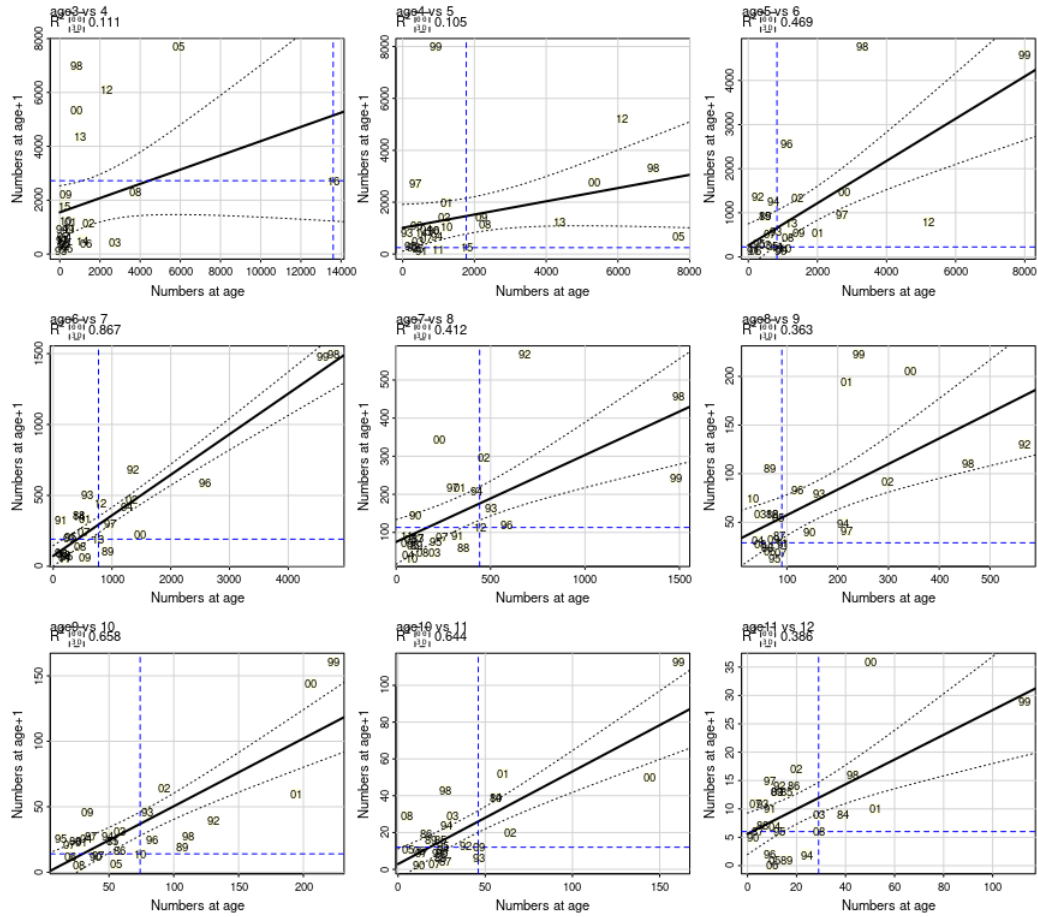


Figure 6.2.5.1.6. Faroe saithe (Division 5.b). Numbers from spring survey (FGFS1) plotted against numbers of the same year class one year later. Letters in the figures represent year classes. Horizontal and vertical lines crossing is the most recent pair.

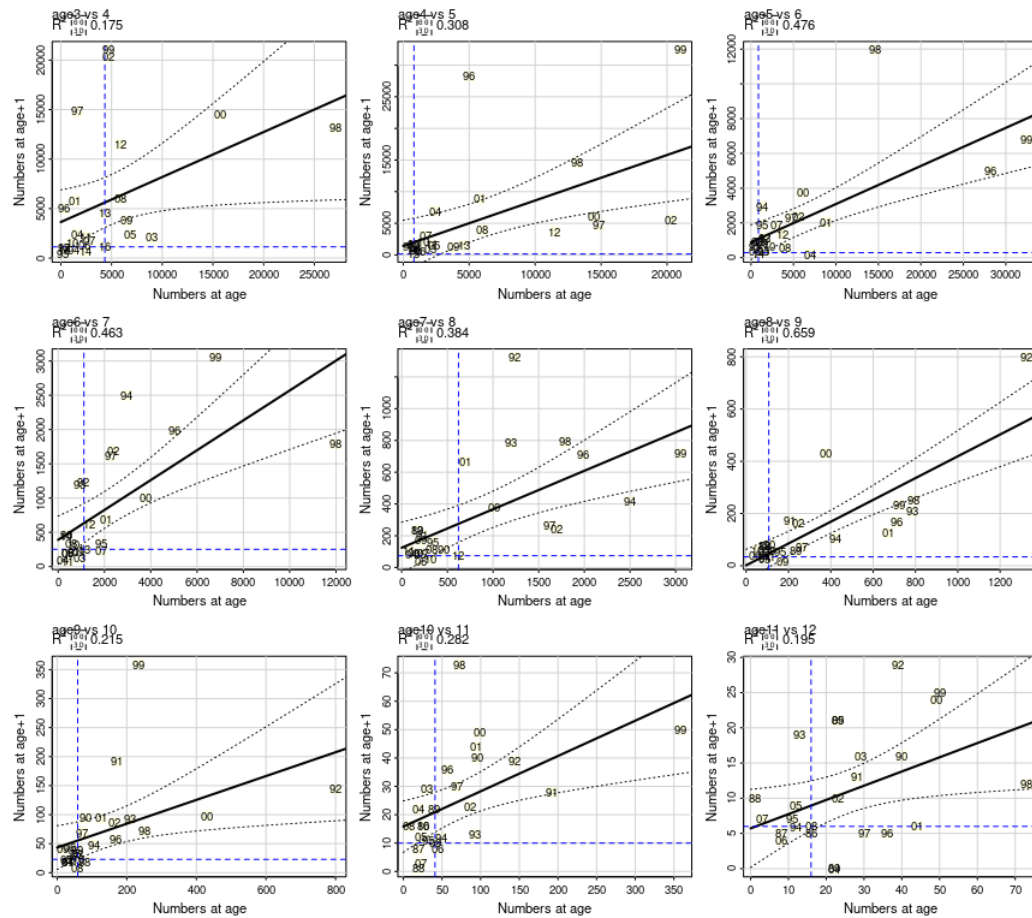


Figure 6.2.5.1.7. Faroe saithe (Division 5.b). Numbers from summer survey (FGF52) plotted against numbers of the same year class one year later. Letters in the figures represent year classes. Horizontal and vertical lines crossing is the most recent pair.

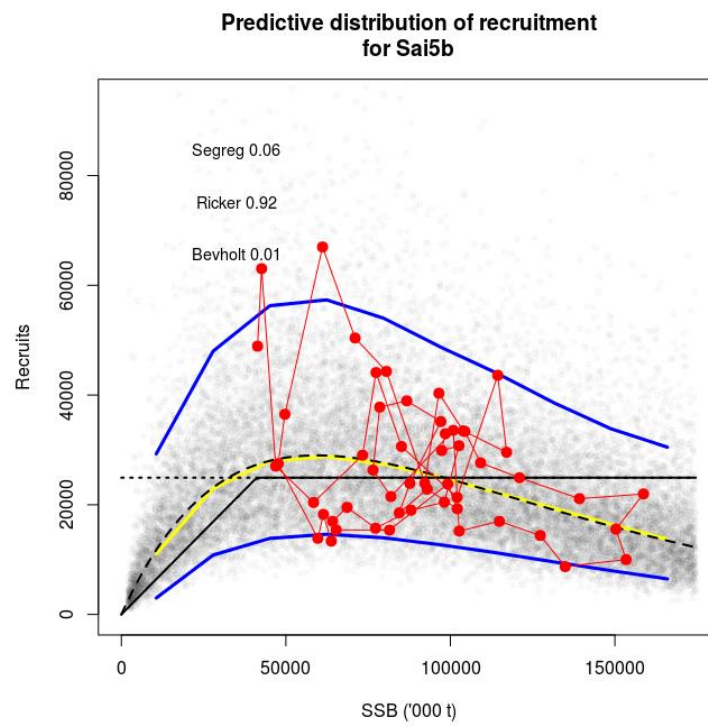


Figure 6.4.1.1. Faroe saithe (Division 5.b). EqSim simulations. Stock–recruitment functions used in the simulations (Ricker, Bevton-Holt and Segmented).

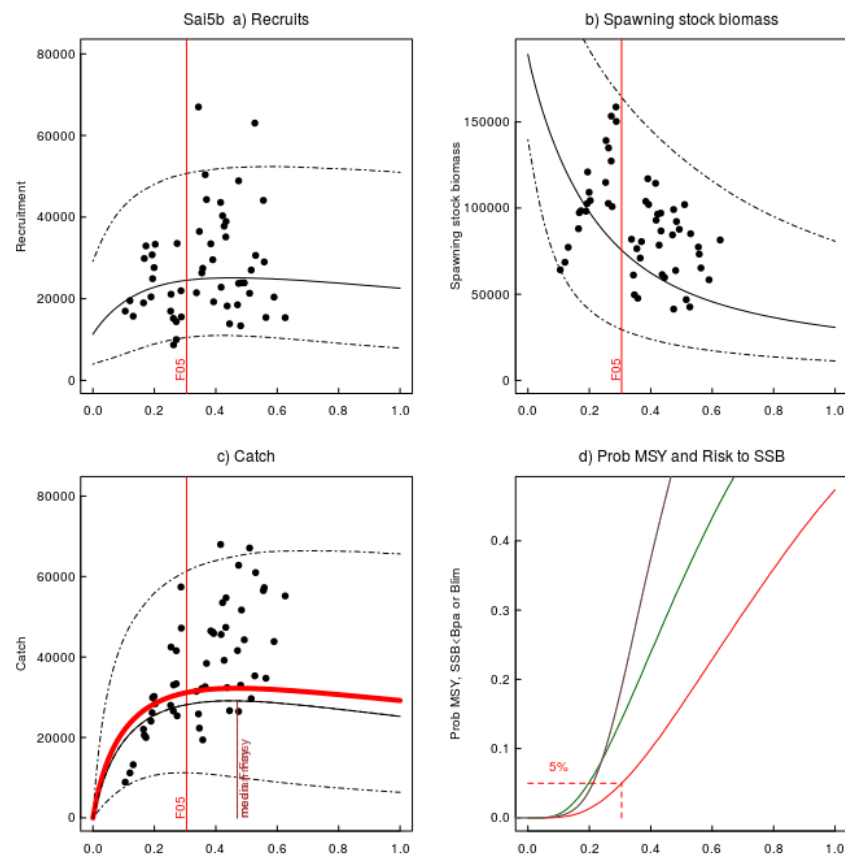


Figure 6.4.1.2. Faroe saithe (Division 5.b). EqsSim simulation results. $F_{MSY} = 0.30$ is the vertical red line in the bottom-left graph.

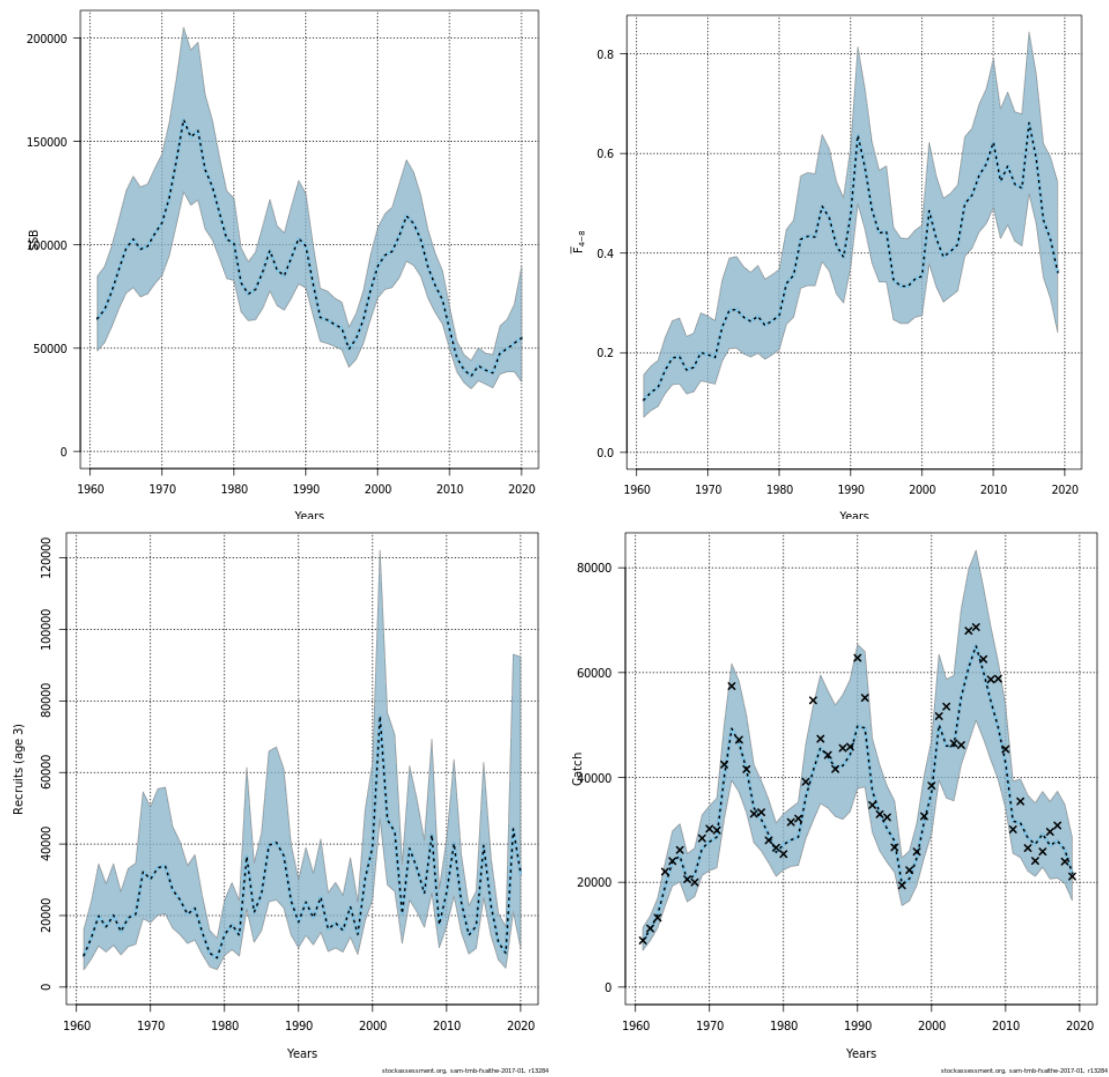


Figure 6.5.1. Faroe saithe (Division 5.b). Spawning-stock biomass (tonnes) (top-left), recruitment (age 3) in millions (bottom-left), \bar{F}_{bar} (ages 4 to 8)(top-right) and landings (tonnes)(bottom-right) from the SAM assessment. Reference points ($B_{trigger} = B_{pa} = 41\,400$ t and $F_{MSY} = 0.30$ respectively).

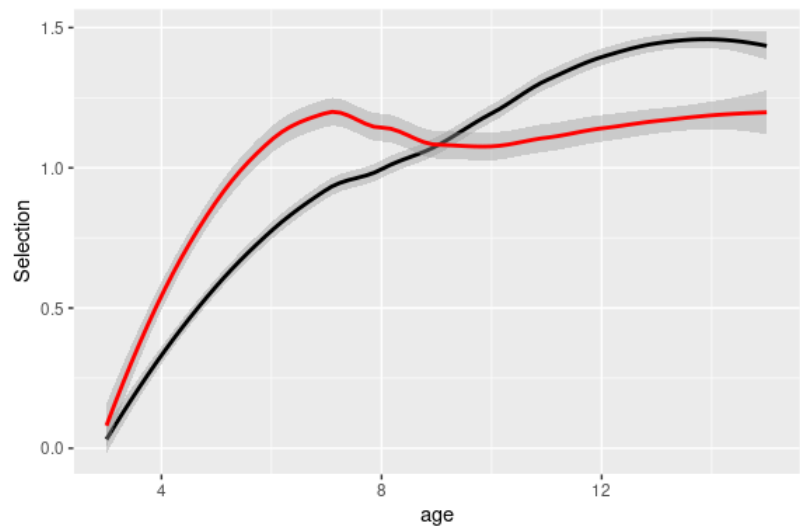


Figure 6.5.1.a Faroe saithe (Division 5.b). Selection pattern by periods in the fishery. Average selection from 2000 to 2014 (black line) and from 2015 to 2019 (red line).

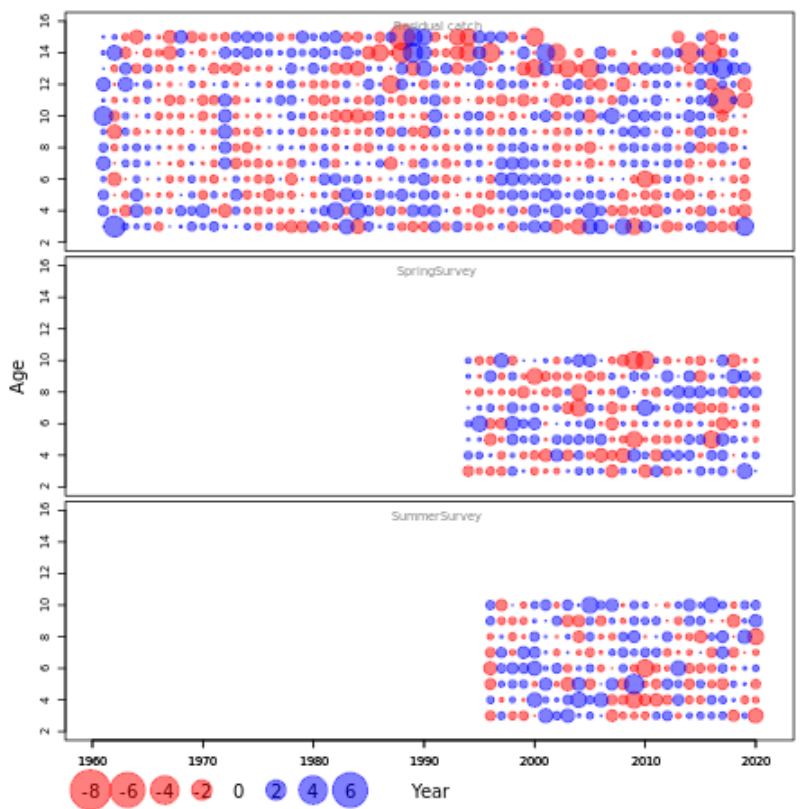


Figure 6.5.2. Faroe saithe (Division 5.b). Residuals of the SAM assessment calibrated with both survey indices. Blue and red bubbles represent positive and negative residuals respectively.

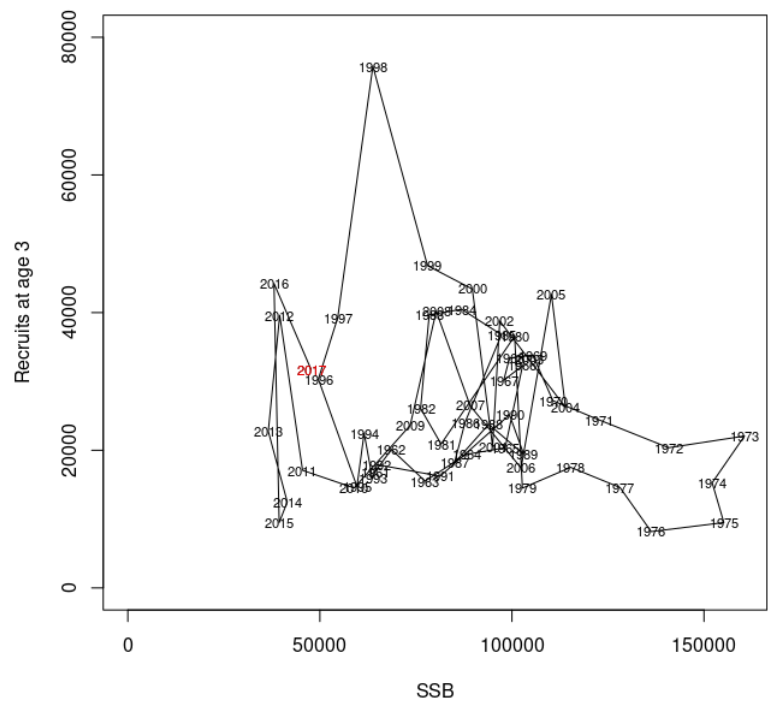


Figure 6.5.3. Faroe saithe (Division 5.b). Relation between SSB and recruitment (age 3). Numbers represent year-classes. The most recent year-class (2017) is highlighted in red.

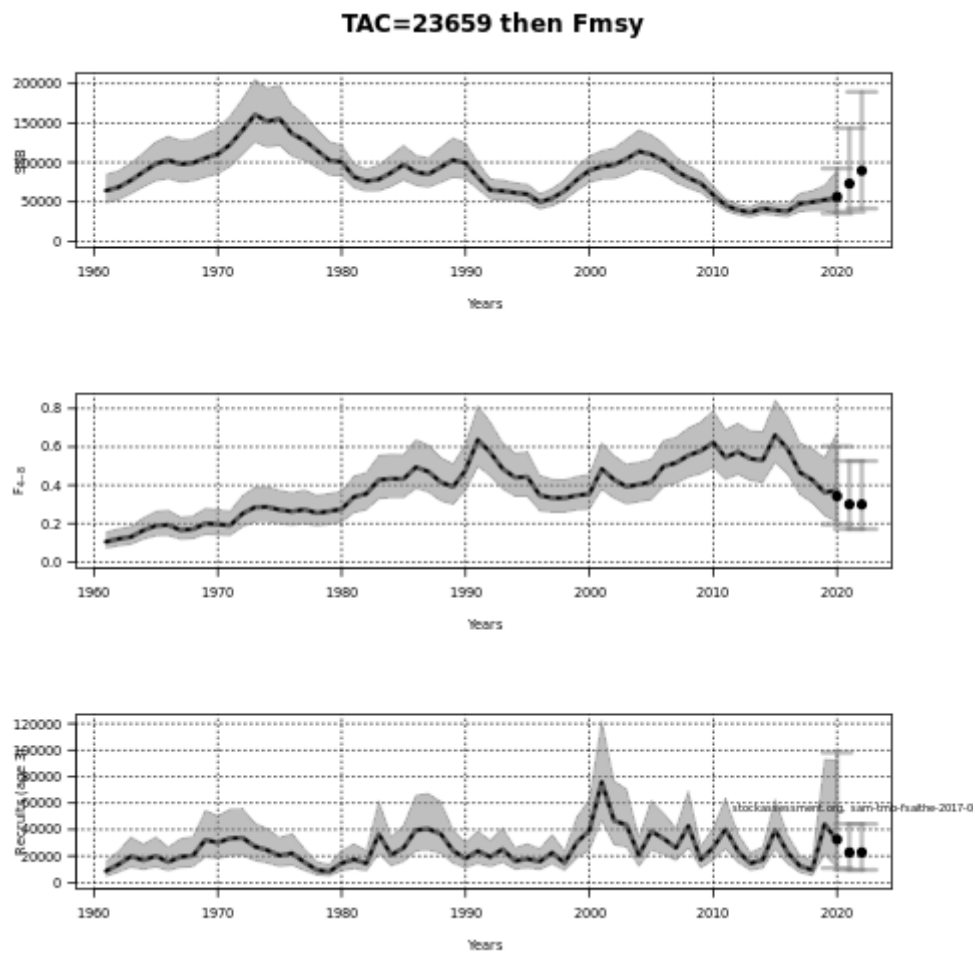


Figure 6.6.2.1. Faroe saithe (Division 5.b). Short-term forecast based on the F_{MSY} advice including historical assessment. Spawning stock biomass (top, red line represents $B_{trigger}$), average fishing mortality (F_{4-8}) (middle) and recruitment (numbers age 3, bottom).

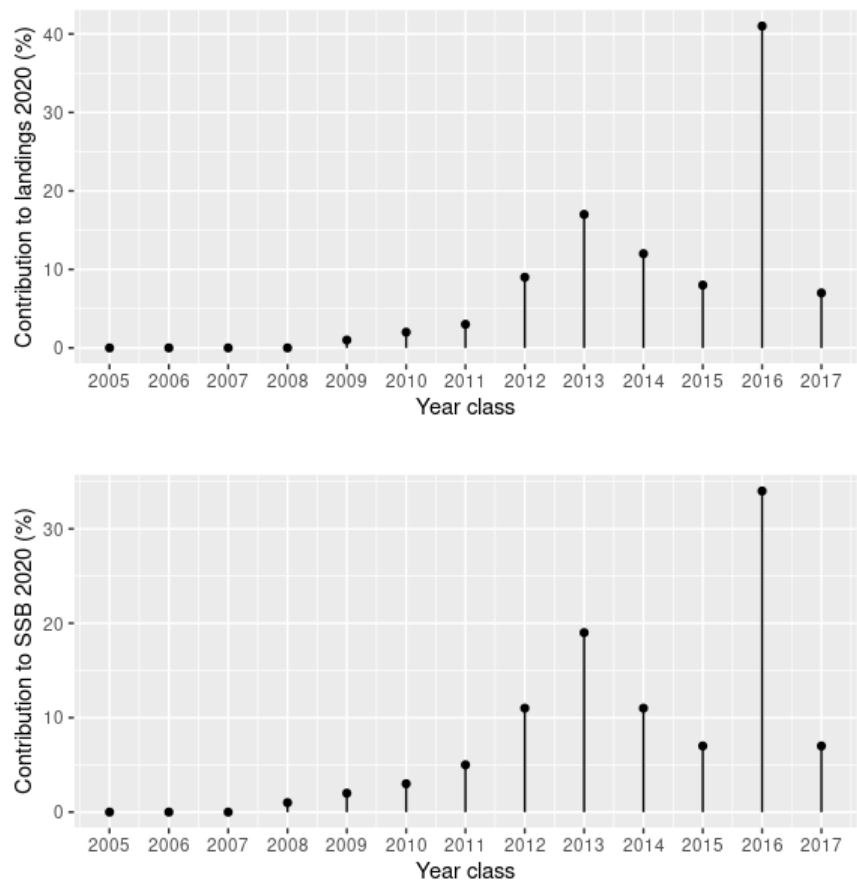


Figure 6.6.2.2. Faroe saithe (Division 5.b). Contribution of year classes to landings (top) and spawning stock biomass (bottom) in 2020.

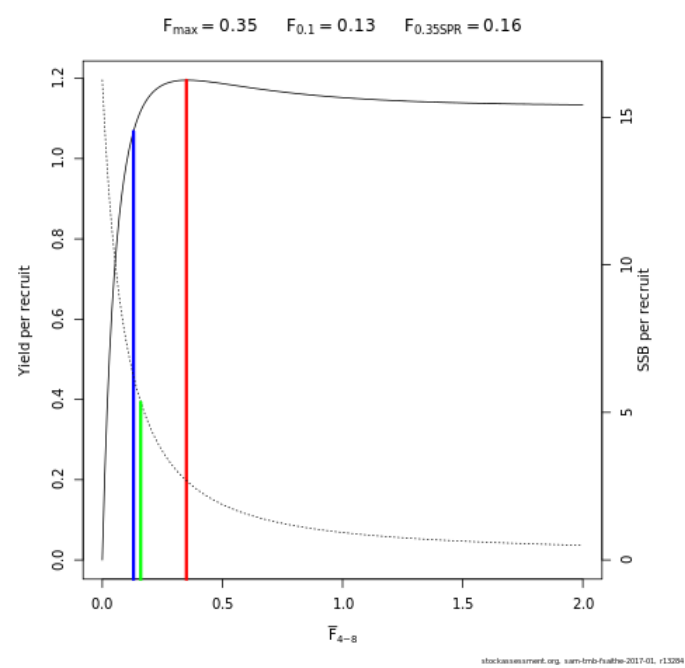


Figure 6.7.1. Faroe saithe (Division 5.b). Yield-per-recruit analysis.

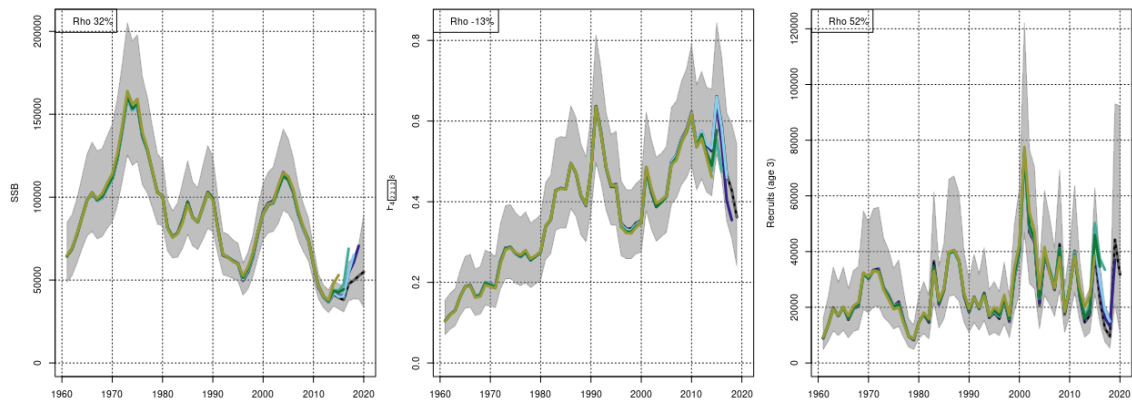


Figure 6.8.1. Faroe saithe (Division 5.b). Retrospective analysis of spawning-stock biomass (tonnes)(left), average fishing mortality over age groups 4–8 (middle) and recruitment-at-age 3 ('000)(right) from the SAM assessment.

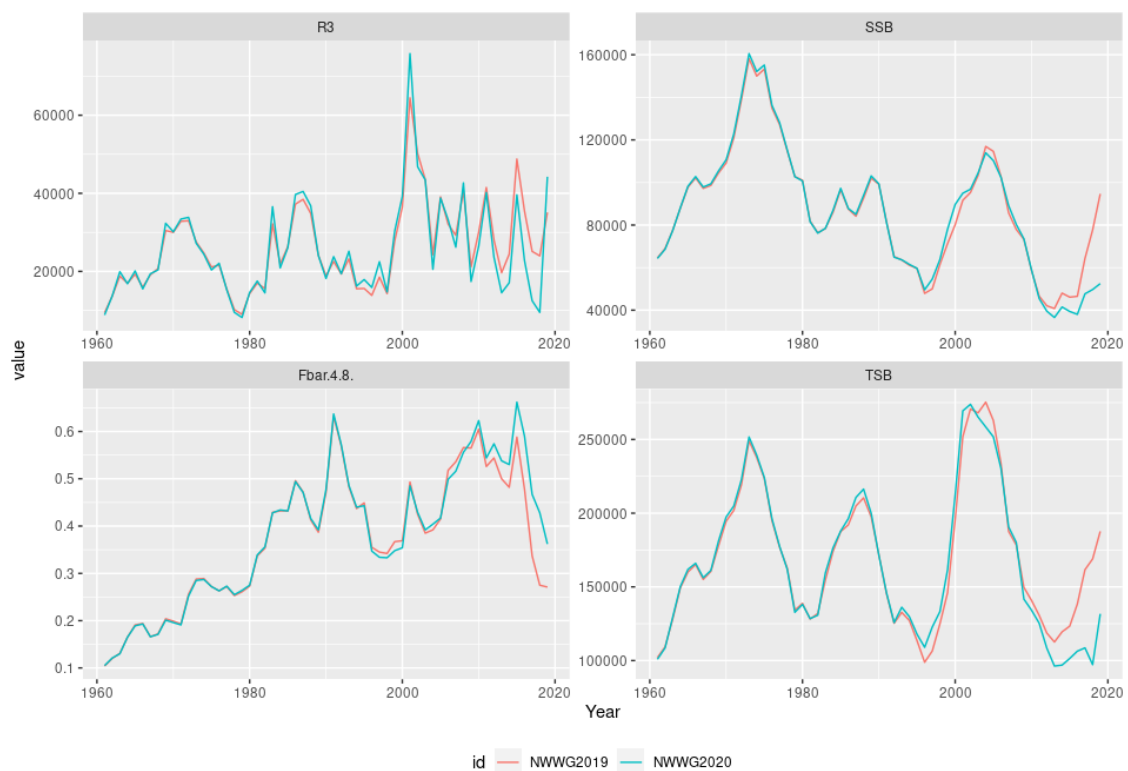


Figure 6.9.1. Faroe saithe (Division 5.b). Comparison with previous assessment. Recruitment-at-age 3 ('000)(top-left), spawning-stock biomass (tonnes)(top-right), average fishing mortality over age groups 4–8 (bottom-left) and total biomass (tonnes)(bottom-right) from the 2019 (red) and 2020 (cyan) assessments

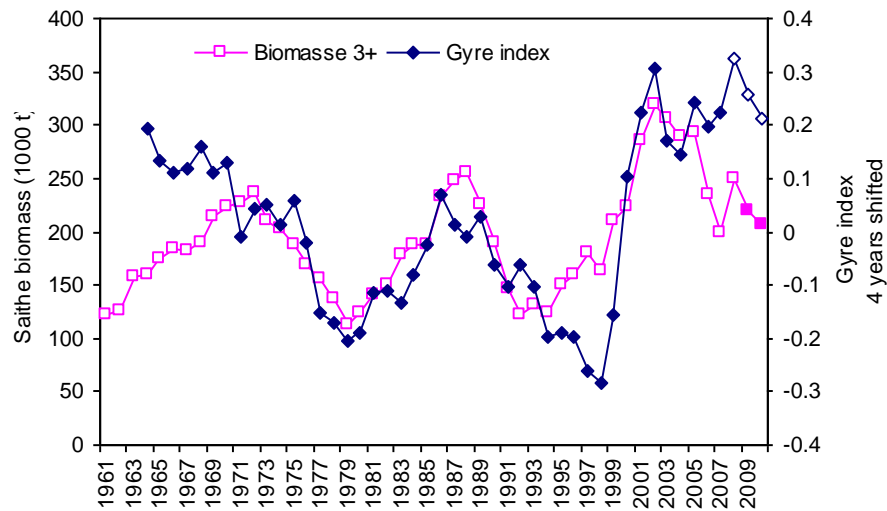


Figure 6.15.1. Faroe saithe (Division 5.b). Relationship between the Gyre index (4 years shifted) and saithe biomass (age 3+) in Faroese waters.

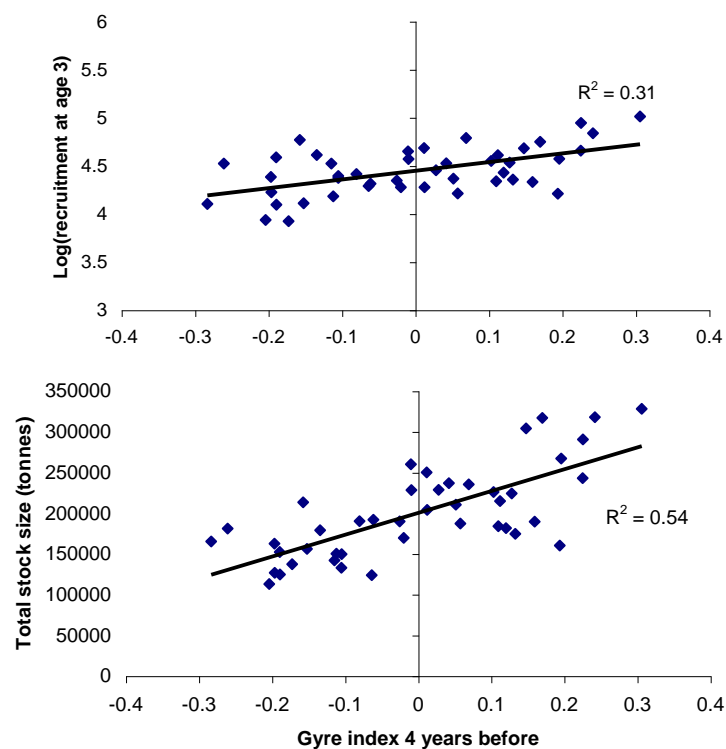


Figure 6.15.2. Relationship between the gyre index and both recruitment (top figure) and total stock biomass estimates (bottom figure.) Note that a large gyre index indicates a small subpolar gyre, and, consequently, a large influx of plankton-rich warmer-than-average water to the outer areas (bottom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