

## 6 Faroe saithe

*This section was updated in November 2021.*

### 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 22 773 tonnes in 2020.

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 95% in 2020 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 2020. 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 August of 2021 is well 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 and 2016 year classes (age 3 in 2015 and 2019, respectively) can be easily tracked in the catch matrix. Numbers of aged 3, 5, 6 and 7 to 6 are lower in 2020 compared to 2019 whereas individuals aged 4 are the most numerous in the catch since 2016.

The sampling program and sampling intensity in 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 1.37 kg in 2020. Weights for all age groups but age 6 and 7 are estimated above historical average since 2019. For the short-term forecast, weights are predicted according to the following model:

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

where  $CWy, a$  is catch-weight-at age  $a$  and year  $y$  and  $SWy, a$  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 an 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. The summer survey index decreased from 2016 to 2021. 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 an increase in stock size from 2020 to 2021. 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. These modifications were carried out by correspondence in an intersessional process and agreed by external experts (see Annex 7 in the 2020 NWWG report). The changes caused improvements in the model performance and diagnostics. See stock annex ([https://www.ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2020/pok.27.5b\\_SA.pdf](https://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 default=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 ( $F_{\text{bar}}$  = average  $F$  for ages 4–8) increased steadily from  $F_{\text{bar}} = 0.28$  in 1973 to  $F_{\text{bar}} = 0.64$  in 1991 causing a decrease in spawning stock biomass (SSB) from 163 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 50 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  $F_{\text{bar}} = 0.63$  in 2010 resulting in the largest landings of the whole time period (above 60 kt). SSB has been below  $MSY B_{\text{trigger}}$  (41 400 tonnes) in 2015 and 2016. The 2016 year-class (age 3 in 2019) is estimated at around 4 million. SSB has increased since 2013 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 22 773 tonnes in 2020. 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,  $F_{\text{MSY}}$ ,  $F_{\text{pa}}$ ,  $F_{\text{lim}}$ ,  $F_{\text{status-quo}}$  and  $F = 0$ . All scenarios assume landings of 15 663 t. in 2021. These are estimated catches from January to September extrapolated to the entire year.

According to the  $F_{MSY}$  advice ( $F_{MSY} = 0.30$ ) catches are projected to 37 444 t in 2022 resulting in a SSB of 89 084 t. assuming a recruitment estimate of 81 mill. in 2021 and 15 mill. in 2022, respectively. In these conditions, SSB will go up to 110 756 t in 2023.

Landings in 2021 are predicted to rely on the 2013, 2016, 2017 and 2018 year classes (75%) while these year classes will contribute to around 70% 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  $F_{max} = 0.36$  and  $F_{0.1} = 0.14$ , 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 an 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). 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 33%, -13% and 98% for the spawning stock biomass,  $F$  and recruitment, respectively. The group investigated different settings regarding the bias calculation. Given that the assessment lacks catch-at-age data for 2021, a one-year lag was assumed in the Mohn's rho calculation. This change caused a reduction in the assessment bias. The incorporation of disaggregated catch-at-age in 2021 also resulted in lower bias (See table below)

rho	SPALY (lag=0)	NEW2 (lag=1)	Catch-at-age 2021 (lag=0)
R(age 3)	0.98	0.53	0.85
SSB	0.33	0.16	0.22
Fbar(4-8)	0.005	-0.14	-0.15

## 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 in an intersessional benchmark (IBP Faroese stocks) and agreed by external experts (see Stock Annex). The updated assessment suggests a downwards revision in SSB with respect to the 2020 assessment and subsequently higher estimates in  $F$  (Figure 6.9.1). The 2020 assessment estimated  $F_{4-8}=0.36$  while the 2021 assessment suggests that fishing mortality was higher ( $F_{4-8}=0.42$ ). Recruitment for the 2016 year class (age 3 in 2019) were 38% lower in last year assessment compared to the newest assessment estimate.

Predictions of the 2020 forecast were very closed to 2021 estimates in terms of  $F_{4-8}$  and landings but somehow they diverged in SSB (See table below)

Forecast comparison	Forecast NWWG2020	NWWG2021	Diff
Fages 4–8 (2020)	0.34	0.331	2.72%
Landings (2020)	23659	22773	3.89%
SSB2021	73012	60300	21.08%

## 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, the SAM model configuration was adjusted. The modifications were carried out by correspondence in an intersessional process and agreed by external experts (see Annex 7 in the 2020 NWWG report). 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. The Faroese authorities implemented in 2021 a management plan (Anon. 2019) that regulates the number of fishing days in the fishery for cod, haddock and saithe on the Faroe Plateau. The plan is supposed to be used for the years to come. Due to this management plan, this fishery was in September 2021 certified as sustainable by the Marine Stewardship Council. The management plan has not yet been evaluated by ICES and therefore ICES bases its advice on the MSY approach.



## 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. In 2021, areas closed to trawling activities were opened to trawlers.

## 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 1988–2020 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 <sup>3</sup>	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 <sup>2</sup>	-	-	30	-	12	-	-	-	18	28	-	-	-	-					
<b>Total</b>	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					
<b>Working Group estimate<sup>4,5</sup></b>	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	2020 <sup>1</sup>
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	22,698	24,217
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	35
Portugal	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Russia	10	32	71	210	104	160	38	44	3	-	-	1	-	-	-	-	-	0	-
UK (E/W/N)	58	89	85	32	88	4	-	-	-	-	-	-	-	-	-	-	-	-	-
UK (Scotland)	540	610	748	4,322	1,011	408	400	685	-	-	-	-	-	-	-	-	-	-	-
<b>United Kingdom</b>	-	-	-	-	-	-	-	-	706	19	-	1	340	304	601	292	214	73	337
<b>Total</b>	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	22,811	24,589
<b>Working Group estimate<sup>4,5,6,7</sup></b>	53,546	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	21,109	22,773

**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
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
2020	0.1	0.2	0.4	0	1.9	0.9	0.3	1.1	19.1	75.7	0	0	22805

Table 6.2.2.1. Faroe saithe (Division 5.b). Catch number-at-age by fleet categories in 2020.

Age	Jiggers	Single trawlers >1000 HP	Pair trawlers <1000 HP	Pair trawlers >1000HP	Others	Total Division Vb
0	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	0	1	0	1
3	0	0	75	316	0	392
4	0	0	1280	5171	0	6450
5	0	0	96	387	0	484
6	0	0	180	690	0	870
7	0	0	201	737	0	939
8	0	0	65	275	0	340
9	0	0	12	60	0	73
10	0	0	10	37	0	47
11	0	0	0	1	0	1
12	0	0	0	0	0	0
13	0	0	1	3	0	4
14	0	0	0	0	0	0
15	0	0	0	0	0	0
Total No.	0	0	1922	7680	0	9601
Catch, t.	0	0	4873	19480	0	24353

Table 6.2.2.2. Faroe saithe (Division 5.b). Catch number-at-age (thousands) from the commercial fleet (1961–2020)

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
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

Year-Age	3	4	5	6	7	8	9	10	11	12	13	14	15
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
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	3262	829	1178	2145	1316	179	117	47	6	4	3	0	0
2020	402	6625	497	894	964	350	75	49	1	0	4	0	0

**Table 6.2.2.3. Faroe saithe (Division 5.b). Sampling intensity in 2007–2020.**

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
2019	Lengths	616	0	7748	6062	264	14690
	Otoliths	180	0	1645	1257	124	3206
	Weights	616	0	5720	5261	264	11861
2020	Lengths	0	0	5314	2980	0	8294
	Otoliths	0	0	1555	896	0	2451
	Weights	0	0	5314	2980	0	8294



**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 2021 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

Year-Age	3	4	5	6	7	8	9	10	11	12	13	14	15
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
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	1.297	1.737	2.377	2.776	3.325	5.462	5.938	7.409	7.902	9.981	8.808	8.808	8.808
2020	1.369	1.814	2.411	2.846	3.751	4.687	7.553	7.336	8.821	8.821	8.88	8.88	8.88
2021	1.413	1.786	2.516	3.174	4.027	4.861	6.543	7.409	8.313	8.790	8.537	8.622	8.593

**Table 6.2.4.1. Faroe saithe (Division 5.b). Proportion mature at age (1983–2021). 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	0.9	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 1996–2021). Spring index (ages 3–10, years 1994–2021)**

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
2021	200	6314	519	977	136	172	224	92	31
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
2021	100	9587	588	910	130	184	230	52	24

**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	-7.605	0.233	0.000	0.000	0.001
logFpar_1	-7.043	0.189	0.001	0.001	0.001
logFpar_2	-6.721	0.179	0.001	0.001	0.002
logFpar_3	-6.779	0.117	0.001	0.001	0.001
logFpar_4	-6.954	0.126	0.001	0.001	0.001
logFpar_5	-7.022	0.127	0.001	0.001	0.001
logFpar_6	-7.027	0.141	0.001	0.001	0.001
logFpar_7	-8.265	0.252	0.000	0.000	0.000
logFpar_8	-7.444	0.199	0.001	0.000	0.001
logFpar_9	-7.191	0.129	0.001	0.001	0.001
logFpar_10	-7.080	0.091	0.001	0.001	0.001
logFpar_11	-7.246	0.091	0.001	0.001	0.001
logFpar_12	-7.129	0.099	0.001	0.001	0.001
logFpar_13	-7.068	0.120	0.001	0.001	0.001
logSdLogFsta_0	-1.385	0.114	0.250	0.199	0.314
logSdLogN_0	-0.493	0.139	0.611	0.463	0.806
logSdLogN_1	-1.368	0.108	0.255	0.205	0.316
logSdLogObs_0	-0.919	0.047	0.399	0.363	0.438
logSdLogObs_1	0.025	0.147	1.026	0.765	1.376
logSdLogObs_2	-0.211	0.150	0.810	0.600	1.093
logSdLogObs_3	-0.276	0.146	0.759	0.567	1.016
logSdLogObs_4	-0.856	0.158	0.425	0.309	0.583
logSdLogObs_5	-0.783	0.147	0.457	0.341	0.614
logSdLogObs_6	-0.846	0.153	0.429	0.316	0.583
logSdLogObs_7	-0.764	0.156	0.466	0.341	0.636
logSdLogObs_8	-0.465	0.171	0.628	0.447	0.884
logSdLogObs_9	0.216	0.138	1.242	0.942	1.636
logSdLogObs_10	-0.023	0.125	0.978	0.761	1.255
logSdLogObs_11	-0.523	0.127	0.593	0.460	0.765
logSdLogObs_12	-1.024	0.137	0.359	0.273	0.472
logSdLogObs_13	-1.016	0.136	0.362	0.276	0.476
logSdLogObs_14	-0.896	0.143	0.408	0.307	0.543
logSdLogObs_15	-0.654	0.156	0.520	0.380	0.711
logSdLogObs_16	-0.036	0.145	0.965	0.722	1.289
transfIRARdist_0	-1.512	0.274	0.221	0.127	0.382
transfIRARdist_1	-0.619	0.208	0.538	0.355	0.816
itrans_rho_0	1.350	0.153	3.858	2.842	5.236

**Table 6.5.1. Faroe saithe (Division 5.b). Estimated fishing mortality-at-age (1961–2021) from the SAM model (median F).**

Year Age	3	4	5	6	7	8	9	10	11	12	13	14	15
1961	0.029	0.063	0.099	0.117	0.127	0.120	0.133	0.160	0.198	0.198	0.198	0.198	0.198
1962	0.034	0.073	0.112	0.133	0.145	0.140	0.157	0.192	0.238	0.238	0.238	0.238	0.238
1963	0.033	0.072	0.114	0.139	0.159	0.162	0.187	0.234	0.295	0.295	0.295	0.295	0.295
1964	0.042	0.094	0.149	0.178	0.201	0.202	0.222	0.264	0.317	0.317	0.317	0.317	0.317
1965	0.044	0.103	0.164	0.199	0.233	0.244	0.274	0.330	0.398	0.398	0.398	0.398	0.398
1966	0.043	0.104	0.166	0.201	0.236	0.252	0.282	0.336	0.393	0.393	0.393	0.393	0.393
1967	0.039	0.095	0.146	0.171	0.197	0.211	0.232	0.267	0.297	0.297	0.297	0.297	0.297
1968	0.042	0.104	0.155	0.174	0.195	0.210	0.234	0.271	0.302	0.302	0.302	0.302	0.302
1969	0.053	0.134	0.193	0.207	0.221	0.234	0.255	0.288	0.308	0.308	0.308	0.308	0.308
1970	0.061	0.151	0.204	0.204	0.203	0.204	0.212	0.230	0.236	0.236	0.236	0.236	0.236
1971	0.068	0.162	0.213	0.200	0.186	0.177	0.176	0.182	0.178	0.178	0.178	0.178	0.178
1972	0.085	0.202	0.274	0.268	0.254	0.244	0.241	0.244	0.228	0.228	0.228	0.228	0.228
1973	0.107	0.262	0.341	0.311	0.268	0.240	0.222	0.213	0.194	0.194	0.194	0.194	0.194
1974	0.117	0.286	0.356	0.311	0.256	0.223	0.202	0.192	0.181	0.181	0.181	0.181	0.181
1975	0.113	0.285	0.345	0.293	0.234	0.202	0.179	0.168	0.162	0.162	0.162	0.162	0.162
1976	0.106	0.277	0.331	0.285	0.228	0.199	0.174	0.158	0.152	0.152	0.152	0.152	0.152
1977	0.094	0.265	0.330	0.301	0.252	0.229	0.201	0.179	0.169	0.169	0.169	0.169	0.169
1978	0.071	0.216	0.281	0.276	0.253	0.250	0.232	0.211	0.201	0.201	0.201	0.201	0.201
1979	0.057	0.192	0.268	0.289	0.284	0.292	0.280	0.252	0.240	0.240	0.240	0.240	0.240
1980	0.050	0.181	0.261	0.302	0.308	0.323	0.315	0.278	0.271	0.271	0.271	0.271	0.271
1981	0.045	0.187	0.296	0.379	0.404	0.437	0.431	0.367	0.369	0.369	0.369	0.369	0.369
1982	0.042	0.185	0.307	0.404	0.426	0.460	0.454	0.375	0.398	0.398	0.398	0.398	0.398
1983	0.045	0.210	0.371	0.492	0.517	0.551	0.548	0.448	0.500	0.500	0.500	0.500	0.500
1984	0.041	0.213	0.391	0.515	0.524	0.535	0.522	0.429	0.490	0.490	0.490	0.490	0.490
1985	0.040	0.207	0.395	0.517	0.517	0.521	0.509	0.437	0.525	0.525	0.525	0.525	0.525
1986	0.037	0.205	0.430	0.599	0.604	0.628	0.627	0.551	0.653	0.653	0.653	0.653	0.653
1987	0.034	0.193	0.417	0.584	0.577	0.581	0.567	0.492	0.554	0.554	0.554	0.554	0.554
1988	0.029	0.169	0.376	0.533	0.518	0.498	0.456	0.378	0.396	0.396	0.396	0.396	0.396
1989	0.027	0.165	0.366	0.508	0.482	0.447	0.401	0.344	0.384	0.384	0.384	0.384	0.384
1990	0.032	0.202	0.460	0.628	0.589	0.523	0.472	0.436	0.535	0.535	0.535	0.535	0.535
1991	0.043	0.270	0.612	0.825	0.784	0.712	0.675	0.657	0.825	0.825	0.825	0.825	0.825
1992	0.039	0.239	0.535	0.716	0.700	0.655	0.652	0.671	0.874	0.874	0.874	0.874	0.874
1993	0.037	0.211	0.458	0.601	0.595	0.556	0.542	0.545	0.666	0.666	0.666	0.666	0.666
1994	0.033	0.183	0.397	0.535	0.558	0.533	0.510	0.494	0.553	0.553	0.553	0.553	0.553
1995	0.027	0.151	0.356	0.515	0.591	0.604	0.602	0.598	0.681	0.681	0.681	0.681	0.681
1996	0.019	0.106	0.255	0.392	0.475	0.504	0.500	0.487	0.535	0.535	0.535	0.535	0.535
1997	0.016	0.091	0.225	0.363	0.463	0.518	0.537	0.546	0.618	0.618	0.618	0.618	0.618
1998	0.014	0.084	0.213	0.350	0.464	0.547	0.588	0.605	0.696	0.696	0.696	0.696	0.696
1999	0.014	0.083	0.216	0.360	0.481	0.582	0.636	0.668	0.783	0.783	0.783	0.783	0.783
2000	0.014	0.088	0.231	0.380	0.491	0.570	0.594	0.601	0.679	0.679	0.679	0.679	0.679
2001	0.015	0.103	0.292	0.510	0.690	0.823	0.894	0.938	1.135	1.135	1.135	1.135	1.135
2002	0.013	0.089	0.260	0.457	0.613	0.724	0.768	0.790	0.967	0.967	0.967	0.967	0.967
2003	0.011	0.076	0.228	0.410	0.562	0.681	0.755	0.757	0.959	0.959	0.959	0.959	0.959

Year Age	3	4	5	6	7	8	9	10	11	12	13	14	15
2004	0.011	0.079	0.229	0.407	0.572	0.727	0.860	0.868	1.164	1.164	1.164	1.164	1.164
2005	0.017	0.111	0.288	0.453	0.574	0.665	0.742	0.684	0.902	0.902	0.902	0.902	0.902
2006	0.028	0.169	0.392	0.558	0.654	0.734	0.823	0.762	0.993	0.993	0.993	0.993	0.993
2007	0.037	0.217	0.451	0.582	0.628	0.696	0.802	0.758	1.033	1.033	1.033	1.033	1.033
2008	0.051	0.288	0.551	0.644	0.632	0.654	0.746	0.712	0.979	0.979	0.979	0.979	0.979
2009	0.057	0.330	0.605	0.684	0.646	0.636	0.706	0.667	0.890	0.890	0.890	0.890	0.890
2010	0.065	0.372	0.660	0.746	0.684	0.663	0.716	0.681	0.895	0.895	0.895	0.895	0.895
2011	0.055	0.315	0.553	0.644	0.598	0.590	0.642	0.648	0.889	0.889	0.889	0.889	0.889
2012	0.057	0.329	0.561	0.666	0.645	0.648	0.711	0.753	1.088	1.088	1.088	1.088	1.088
2013	0.055	0.312	0.525	0.613	0.597	0.607	0.644	0.683	0.989	0.989	0.989	0.989	0.989
2014	0.054	0.301	0.508	0.611	0.594	0.604	0.594	0.576	0.716	0.716	0.716	0.716	0.716
2015	0.061	0.347	0.599	0.759	0.751	0.799	0.784	0.723	0.774	0.774	0.774	0.774	0.774
2016	0.057	0.322	0.556	0.698	0.678	0.696	0.665	0.553	0.452	0.452	0.452	0.452	0.452
2017	0.052	0.282	0.473	0.576	0.546	0.534	0.488	0.370	0.251	0.251	0.251	0.251	0.251
2018	0.054	0.281	0.449	0.545	0.528	0.514	0.490	0.385	0.241	0.241	0.241	0.241	0.241
2019	0.055	0.280	0.416	0.491	0.471	0.439	0.399	0.305	0.171	0.171	0.171	0.171	0.171
2020	0.046	0.237	0.339	0.386	0.362	0.333	0.285	0.211	0.111	0.111	0.111	0.111	0.111
2021	0.048	0.250	0.356	0.404	0.375	0.341	0.289	0.214	0.112	0.112	0.112	0.112	0.112



**Table 6.5.2. Faroe saithe (Division 5.b). Stock number-at-age (start of year) (Thousands) (1961–2021).**

Year Age	3	4	5	6	7	8	9	10	11	12	13	14	15
1961	8643	7267	5762	3506	1929	1349	1018	679	314	120	59	6	291
1962	13775	6918	5737	4305	2416	1371	1008	728	495	222	71	49	199
1963	20527	9752	4872	4128	3085	1643	1050	735	496	377	178	41	143
1964	16837	17964	8459	3777	3084	2167	1144	747	472	330	207	114	94
1965	20715	11869	13294	5900	2640	2068	1366	796	502	297	214	116	131
1966	15505	16272	8588	9435	3922	1731	1329	792	499	291	152	112	133
1967	19788	11995	11788	5819	6258	2442	1081	826	433	288	163	74	119
1968	20388	17101	9601	8406	4003	3909	1488	671	505	251	175	101	138
1969	33304	16122	13328	7581	6093	2872	2439	926	421	337	145	108	125
1970	30123	31950	11035	9215	5473	4187	1921	1370	518	243	206	82	128
1971	33503	23444	22838	7555	6416	3994	2880	1341	808	323	148	127	122
1972	34041	22554	16227	13369	5667	4892	3282	2263	1053	541	204	119	160
1973	26788	25919	18027	11408	7536	3595	3113	2096	1349	637	307	138	208
1974	24011	19120	15612	10663	7055	4226	2319	2046	1323	848	398	238	273
1975	19773	15222	11640	8775	6315	4672	2671	1583	1360	867	547	283	392
1976	21990	13323	8231	6147	5350	4271	3379	1973	1187	917	563	382	487
1977	15070	14617	7340	4624	3596	3661	3102	2561	1590	933	677	398	560
1978	9219	10266	8472	3715	2503	2129	2465	2278	2030	1173	726	528	660
1979	7886	6456	6293	5005	2335	1614	1208	1652	1537	1455	810	506	968
1980	14817	6070	4163	3669	3059	1395	958	688	944	925	1140	570	1068
1981	17848	10486	4194	2708	2297	1847	874	581	374	537	597	847	1209
1982	14064	18841	6200	2848	1456	1165	901	452	312	196	297	343	1366
1983	38943	10027	15047	3837	1565	807	546	435	268	167	102	203	882
1984	20487	33513	7254	9305	1984	769	382	211	246	140	66	56	523
1985	26063	18471	18793	4211	4631	928	381	177	101	151	68	29	308
1986	40912	17575	12800	8789	2408	2205	479	219	106	52	81	27	152
1987	41413	37087	11796	6837	3315	1288	889	206	111	44	20	32	73
1988	37757	30487	29030	6299	3122	1441	698	390	98	56	33	7	28

Year Age	3	4	5	6	7	8	9	10	11	12	13	14	15
1989	24080	33559	22885	17868	2809	1451	629	358	179	52	23	25	30
1990	17874	20796	23484	15227	9282	1438	686	306	217	80	34	15	40
1991	24166	15975	14466	11069	6762	3948	740	412	175	123	38	16	25
1992	19128	19818	9570	6141	3666	2537	1561	302	185	59	49	13	14
1993	25634	15195	13040	4380	2419	1499	1185	685	129	80	18	14	7
1994	15852	19277	10197	6704	1942	1142	759	623	345	57	43	6	7
1995	17972	10338	10100	6679	3217	863	579	397	292	164	25	25	7
1996	15484	16759	6548	4439	2974	1234	399	246	193	125	69	7	16
1997	22729	12434	14357	4436	3100	1653	537	185	103	105	63	33	13
1998	14021	20402	11340	13258	3355	1580	809	227	87	45	51	29	18
1999	29761	10214	17881	8709	11763	1852	766	348	87	38	16	23	19
2000	38328	34133	7175	14935	6300	7069	796	364	131	35	13	6	11
2001	78929	27770	33433	5097	8157	3133	2719	426	154	50	15	8	7
2002	46907	76633	21226	24917	2346	2820	1277	772	122	39	13	3	4
2003	44712	50055	55340	12135	10739	1103	858	588	245	46	10	4	2
2004	19715	41566	54881	39625	6014	3730	387	393	222	78	15	3	2
2005	38919	25312	31973	45528	17485	2444	1268	149	132	55	15	4	1
2006	32742	40607	24273	19656	23256	7960	944	505	64	38	19	6	2
2007	25217	18925	36820	14872	9344	8325	2936	553	142	21	12	5	2
2008	43191	17574	9674	22090	7767	5444	3803	1075	242	30	7	4	2
2009	16460	22332	11804	4355	9551	4245	3109	1744	455	79	8	2	2
2010	25965	10993	12710	2908	2424	4132	2322	1367	802	149	29	3	1
2011	40754	16664	5336	4159	1326	1045	1802	1023	576	308	58	9	1
2012	23475	28166	11898	2540	1584	712	588	785	426	171	127	22	3
2013	13905	19659	12459	6919	1162	728	312	283	287	120	37	41	6
2014	16480	11314	10622	4772	2577	557	350	203	142	87	34	7	14
2015	40185	9813	7748	4818	2033	822	310	195	115	67	31	13	9
2016	21912	39789	4686	3673	1469	770	241	117	115	49	30	8	6
2017	11286	19466	22511	2162	1401	812	286	107	30	62	37	14	6

Year Age	3	4	5	6	7	8	9	10	11	12	13	14	15
2018	7446	8021	12981	10842	980	656	305	121	69	21	45	24	14
2019	32492	4759	4790	6465	3813	628	344	134	59	42	15	29	24
2020	14498	24596	2519	3057	3410	1271	387	225	45	41	32	11	37
2021	78889	8637	13375	1397	1943	2233	735	244	149	33	30	24	35

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	8643	4661	16030	64278	48613	84991	0.105	0.07	0.158	100581	75571	133867
1962	13775	7762	24447	68566	52477	89588	0.12	0.083	0.174	108514	82552	142642
1963	20527	11655	36150	77425	60158	99647	0.129	0.091	0.184	130225	99561	170333
1964	16837	9635	29423	88327	69061	112968	0.165	0.117	0.232	151054	115250	197981
1965	20715	11860	36181	98654	76662	126956	0.189	0.134	0.265	163371	124993	213531
1966	15505	8846	27176	103409	79495	134517	0.192	0.136	0.271	167366	127645	219449
1967	19788	11341	34527	98651	75114	129565	0.164	0.116	0.232	157938	120145	207620
1968	20388	11774	35304	100367	76717	131308	0.168	0.119	0.237	162822	124425	213067
1969	33304	19367	57270	106736	81779	139310	0.198	0.14	0.278	183995	140744	240537
1970	30123	17687	51304	112261	85974	146586	0.193	0.137	0.271	199905	153134	260961
1971	33503	19828	56610	124526	95616	162177	0.188	0.134	0.263	207149	160641	267123
1972	34041	20264	57182	142683	110784	183766	0.248	0.179	0.344	225039	177098	285959
1973	26788	15980	44904	162637	126713	208747	0.284	0.206	0.392	253508	200966	319788
1974	24011	14223	40534	153868	120025	197254	0.286	0.208	0.395	240306	191043	302273
1975	19773	11697	33423	156771	122383	200821	0.272	0.197	0.376	224624	179263	281464
1976	21990	12937	37379	137380	108083	174618	0.264	0.191	0.365	196681	157900	244987
1977	15070	8885	25559	128961	102729	161892	0.275	0.199	0.381	177736	143914	219506
1978	9219	5444	15612	115725	93538	143175	0.255	0.186	0.35	161569	131418	198637
1979	7886	4646	13386	103021	83763	126707	0.265	0.195	0.36	132429	108919	161015
1980	14817	8767	25043	100796	82710	122837	0.275	0.205	0.369	138183	114289	167072
1981	17848	10516	30294	81676	67584	98705	0.34	0.256	0.452	129092	105821	157481
1982	14064	8284	23875	76353	63336	92045	0.356	0.27	0.47	130703	105583	161800
1983	38943	22824	66445	78741	63895	97037	0.428	0.328	0.559	162466	127112	207654
1984	20487	12111	34655	87601	69720	110067	0.436	0.334	0.567	178187	137901	230241
1985	26063	15497	43833	97713	77760	122785	0.432	0.332	0.561	188417	148158	239617
1986	40912	24188	69202	88049	70696	109663	0.493	0.38	0.64	198533	152853	257864
1987	41413	24526	69925	85551	68690	106550	0.471	0.361	0.613	213504	162039	281314
1988	37757	22334	63828	94659	74678	119986	0.419	0.318	0.551	219249	167617	286786
1989	24080	14291	40574	103672	81406	132029	0.394	0.3	0.517	201340	156880	258402
1990	17874	10634	30043	99641	79214	125335	0.48	0.372	0.621	171533	136897	214933
1991	24166	14472	40355	81219	65801	100250	0.641	0.499	0.823	146235	118111	181055
1992	19128	11468	31906	64738	53117	78902	0.569	0.443	0.731	125381	100722	156078
1993	25634	15323	42882	63658	52182	77659	0.484	0.376	0.624	136655	108172	172639
1994	15852	9593	26194	61567	50952	74393	0.441	0.341	0.571	129488	102958	162855
1995	17972	10805	29891	59737	49254	72452	0.444	0.34	0.579	117909	94183	147613
1996	15484	9439	25399	49742	40918	60471	0.346	0.264	0.454	108907	85015	139514
1997	22729	13944	37048	54950	44865	67303	0.332	0.256	0.431	123654	96047	159196
1998	14021	8582	22908	64367	52743	78552	0.332	0.256	0.429	133441	106128	167782
1999	29761	17865	49576	78723	64500	96083	0.345	0.267	0.445	161779	128785	203224
2000	38328	23570	62327	90452	74865	109286	0.352	0.271	0.457	212017	167274	268728
2001	78929	48609	128159	96009	79197	116392	0.483	0.375	0.624	274900	211240	357746
2002	46907	28306	77732	98139	80342	119878	0.428	0.329	0.557	278009	214641	360085
2003	44712	27304	73217	105892	85154	131679	0.391	0.299	0.512	269684	209469	347208
2004	19715	11634	33410	115508	93232	143106	0.403	0.31	0.522	261198	207158	329335
2005	38919	24164	62683	111374	90846	136540	0.418	0.323	0.541	253626	205161	313541
2006	32742	20517	52251	102718	84841	124362	0.501	0.393	0.64	230238	188227	281626
2007	25217	15973	39810	89012	73980	107099	0.515	0.406	0.652	189447	155936	230160
2008	43191	26369	70744	80132	67041	95778	0.554	0.438	0.7	180477	146918	221701
2009	16460	10385	26089	73427	61619	87497	0.58	0.458	0.735	140799	116729	169833
2010	25965	16503	40852	58594	49296	69646	0.625	0.49	0.797	132760	108154	162965
2011	40754	25543	65023	45371	38516	53447	0.54	0.424	0.688	125666	99445	158801
2012	23475	14885	37020	39614	33386	47003	0.57	0.45	0.722	108503	86377	136296
2013	13905	8828	21902	36675	30445	44180	0.531	0.415	0.678	95683	76643	119452
2014	16480	10422	26058	41739	34484	50520	0.524	0.406	0.675	96125	77233	119639
2015	40185	25269	63907	39882	33022	48168	0.651	0.507	0.836	102293	80614	129803
2016	21912	13797	34800	38492	31226	47449	0.59	0.457	0.762	105883	81394	137741

Year	R (age 3)	Low	High	SSB	Low	High	Fbar (4–8)	Low	High	TSB	Low	High
2017	11286	6977	18254	47312	37408	59839	0.482	0.365	0.636	105391	81753	135865
2018	7446	4457	12440	48242	38107	61072	0.463	0.344	0.624	91056	71192	116463
2019	32492	17469	60435	44350	34269	57396	0.419	0.297	0.592	100381	70605	142715
2020	14498	6814	30851	46920	33374	65964	0.331	0.217	0.506	104021	67152	161132
2021	78889	23213	268097	60300	36056	100848	0.345	0.187	0.639	192554	81361	455715

**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	78889	0.2	0.066	0	0	1.413	0.187	1.413
4	8637	0.2	0.272	0	0	1.786	0.974	1.786
5	13375	0.2	0.524	0	0	2.516	1.468	2.516
6	1397	0.2	0.75	0	0	3.174	1.724	3.174
7	1943	0.2	0.902	0	0	4.027	1.633	4.027
8	2233	0.2	0.976	0	0	4.861	1.538	4.861
9	735	0.2	0.99	0	0	6.543	1.377	6.543
10	244	0.2	1	0	0	7.409	1.044	7.409
11	149	0.2	1	0	0	8.313	0.611	8.313
12	33	0.2	1	0	0	8.79	0.611	8.79
13	30	0.2	1	0	0	8.537	0.611	8.537
14	24	0.2	1	0	0	8.622	0.611	8.622
15	35	0.2	1	0	0	8.593	0.611	8.593

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
2021	0.200	0.112	0.354	81151	23230	287493	62409	38575	107106	15663	9047	28277	199263	90635	514630
2022	0.300	0.169	0.532	14498	7446	32492	89084	44494	196649	37444	18079	91592	210860	100568	545248
2023	0.300	0.169	0.532	14498	7446	32492	110756	48073	297456	43405	19459	119655	203480	97527	543985

**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	0.033	0	0	1.228	0.119	1.228
4	0.2	0.23	0	0	1.575	0.644	1.575
5	0.2	0.461	0	0	2.013	1.056	2.013
6	0.2	0.68	0	0	2.619	1.252	2.619
7	0.2	0.843	0	0	3.468	1.202	3.468
8	0.2	0.937	0	0	4.45	1.185	4.45
9	0.2	0.981	0	0	5.305	1.169	5.305
10	0.2	1	0	0	6.058	1.029	6.058
11	0.2	1	0	0	6.626	1.069	6.626
12	0.2	1	0	0	7.27	1.069	7.27
13	0.2	1	0	0	7.524	1.069	7.524
14	0.2	1	0	0	8.489	1.069	8.489
15	0.2	1	0	0	9.115	1.069	9.115

6.18 Figures

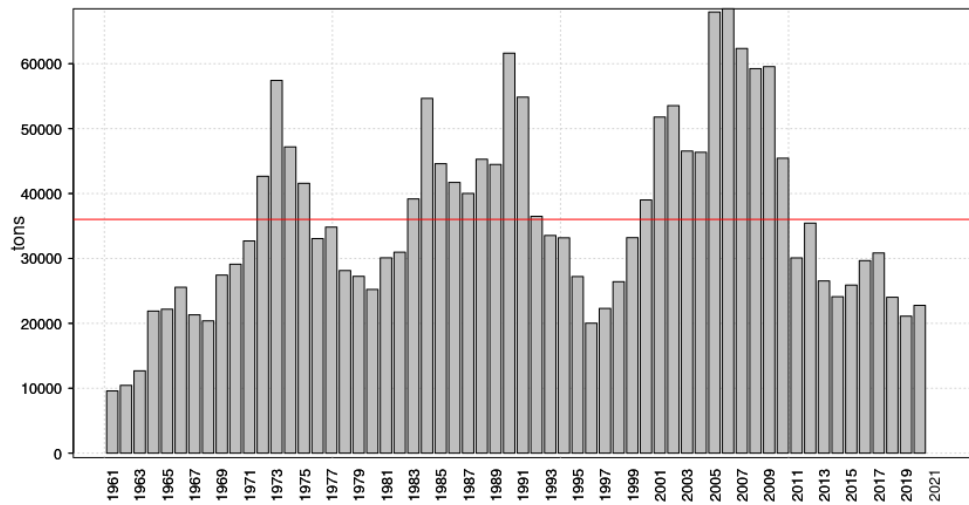


Figure 6.2.1.1. Faroe saithe (Division 5.b). Landings (tonnes) (1961–2020). Horizontal red line represents average landings.

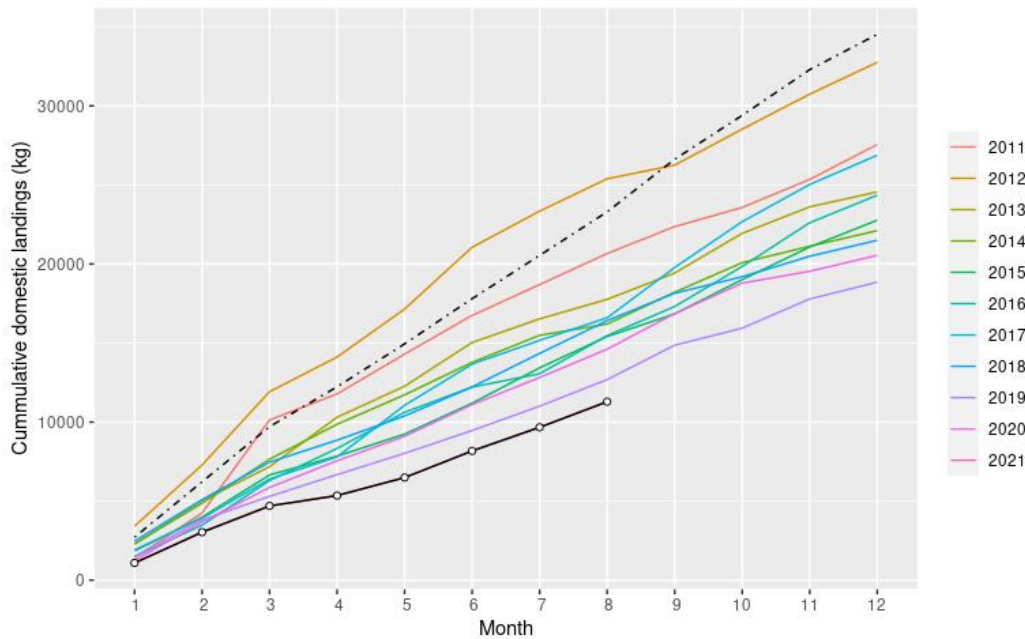


Figure 6.2.1.2. Saithe in the Faroes (Division 5.b). Cumulative domestic landings (2011–2021). Black line shows the first quarter of 2020.



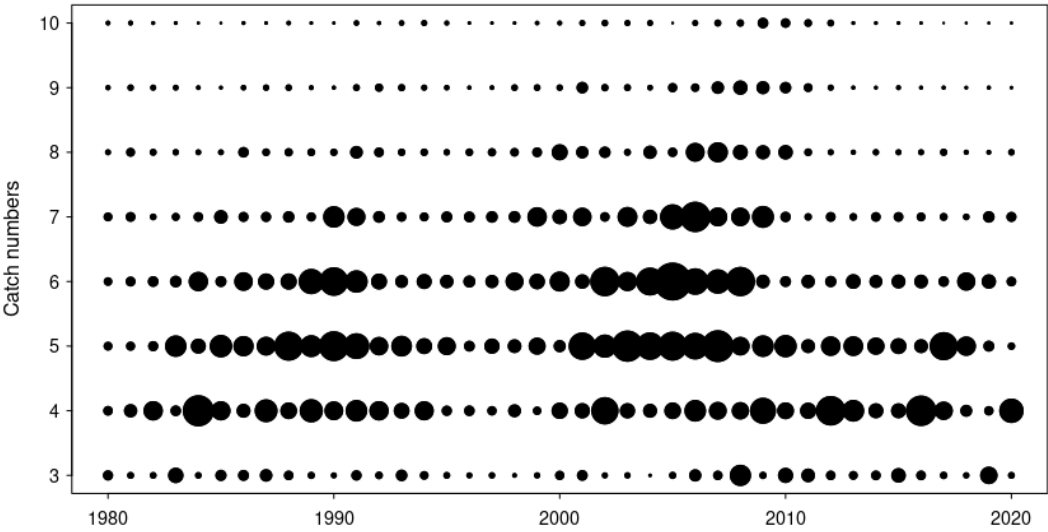


Figure 6.2.2.2. Faroe saithe (Division 5.b). Cath-at-age numbers in the commercial catches (ages 3–10) (1961–2020).

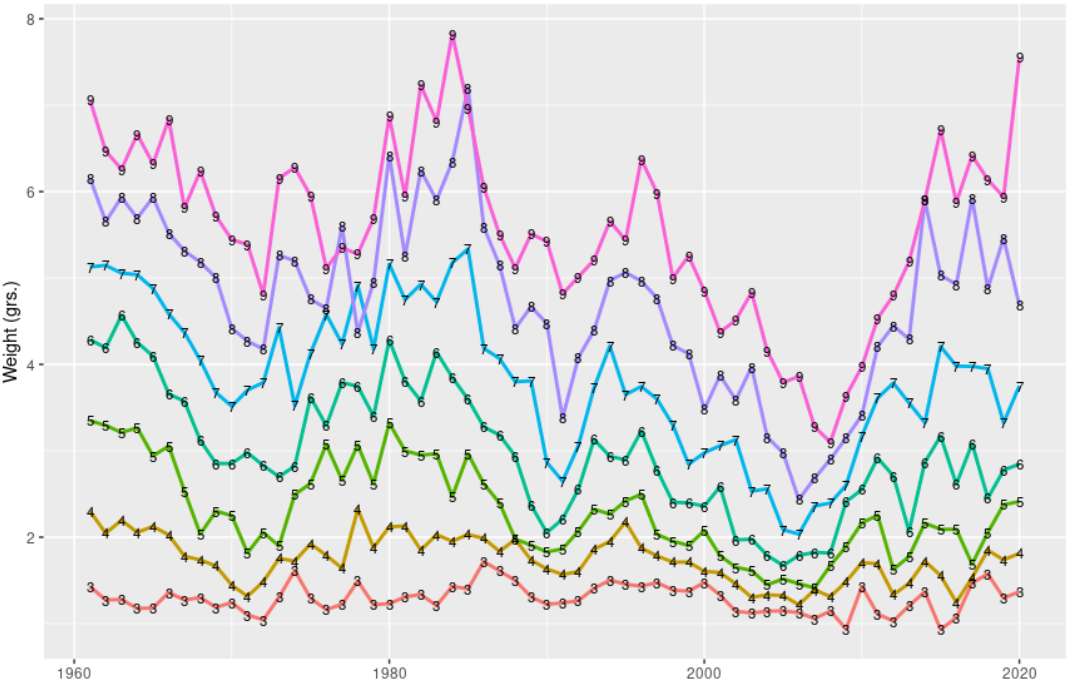


Figure 6.2.3.1.a Faroe saithe (Division 5.b). Mean weight at age (kg) in commercial catches (ages 3–9) (1961–2020).

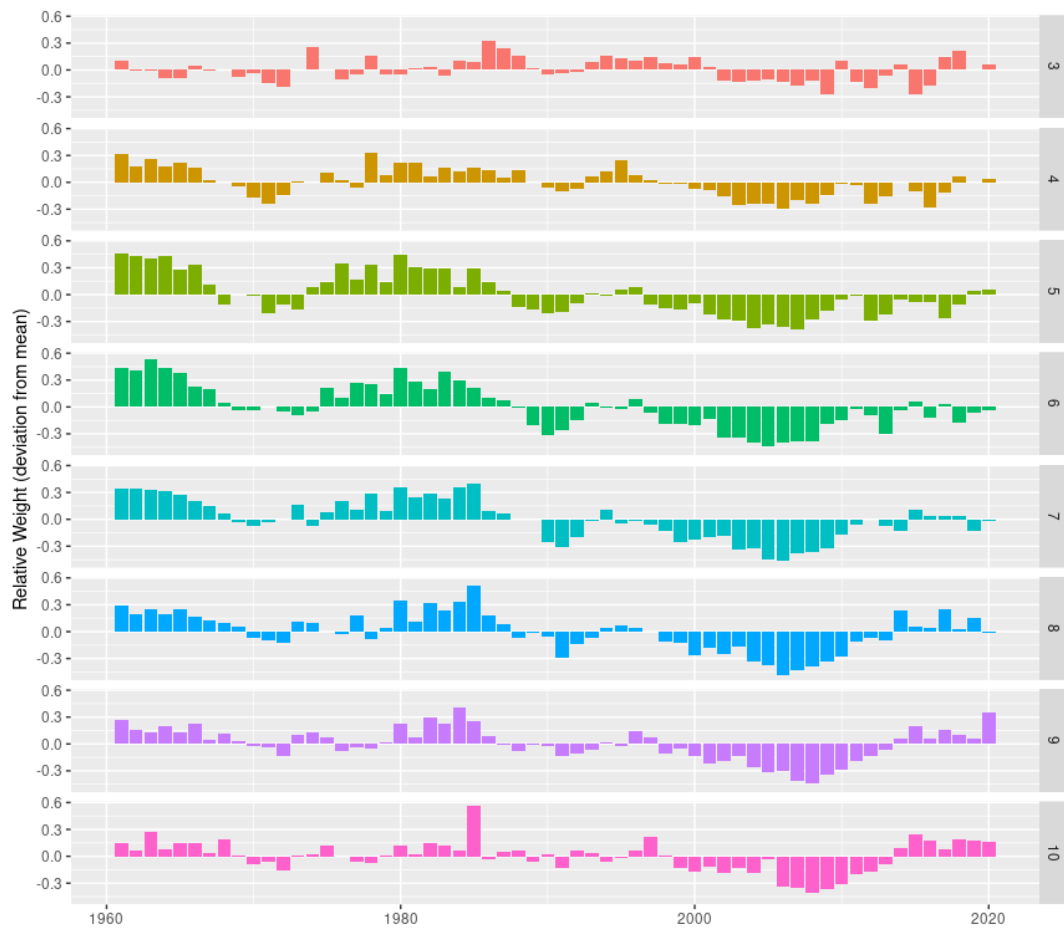


Figure 6.2.3.1.b Faroe saithe (Division 5.b). Deviations of mean weight at age (kg) from historical average in commercial catches (ages 3–10) (1961–2021). Weights in 2021 are estimated.

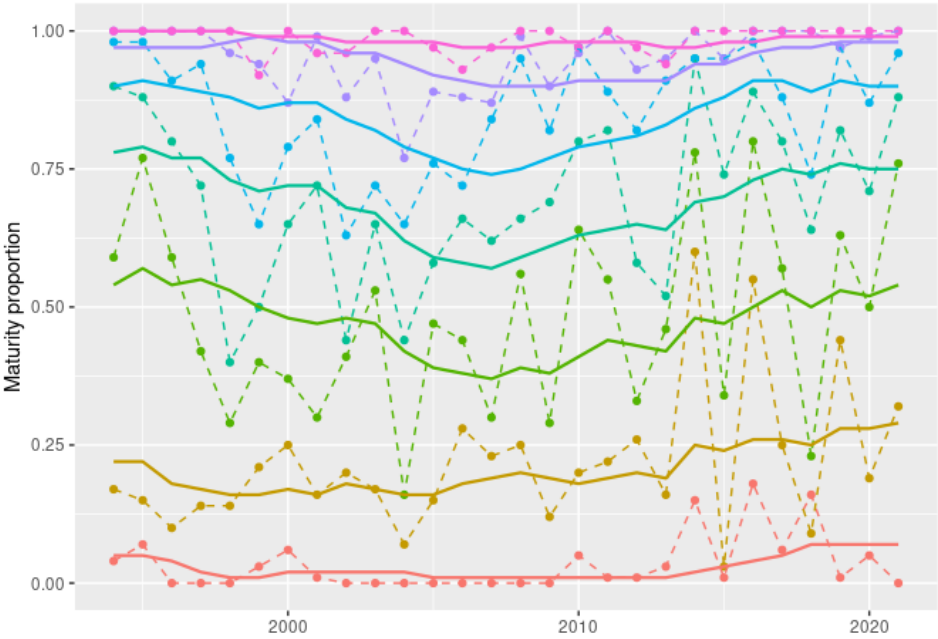
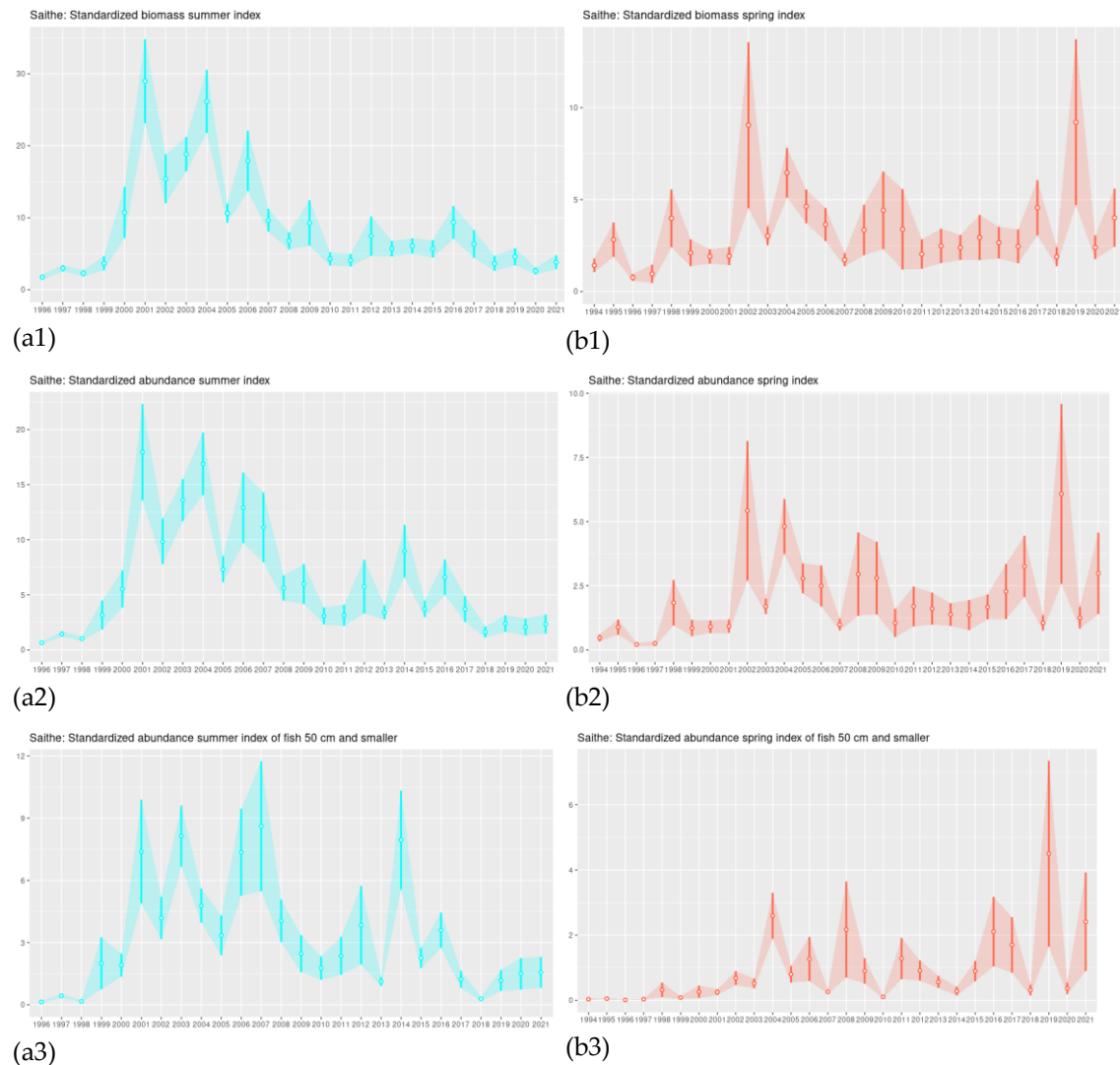


Figure 6.2.4.1. Faroe saithe (Division 5.b). Observed and smoothed maturity ogives (ages 3–9) (1994–2021) from FGFS1 (spring survey).



**Figure 6.2.5.1.1. Faroe saithe (Division 5.b). Standardised biomass (a1) (b1) and abundance (a2) (b2) indices from the Faroese bottom-trawl summer FGFS1 (1996–2021) and spring surveys FGFS2 (1994–2021). 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.**

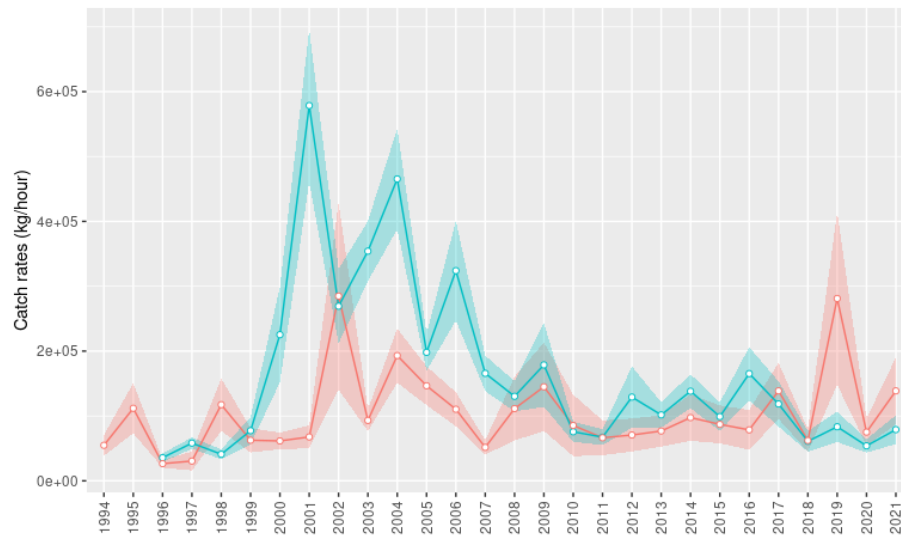


Figure 6.2.5.1.2. Faroe saithe (Division 5.b). Catch rates (kg/hour) from the Faroese bottom-trawl spring FGFS1 (1994–2021) (red line) and summer survey FGFS2 (1996–2021) (cyan line). Shade areas show standard errors in the estimation of indices.



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.

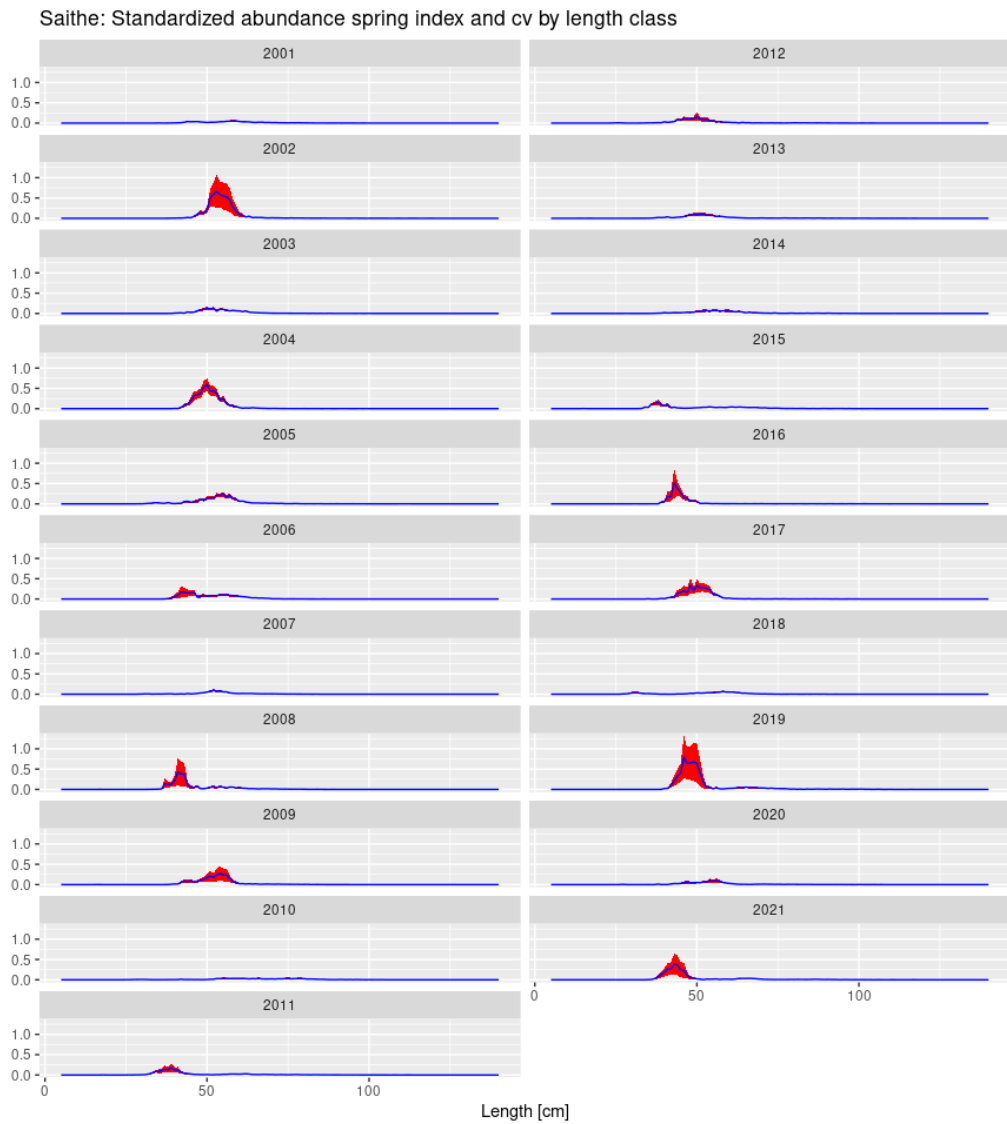
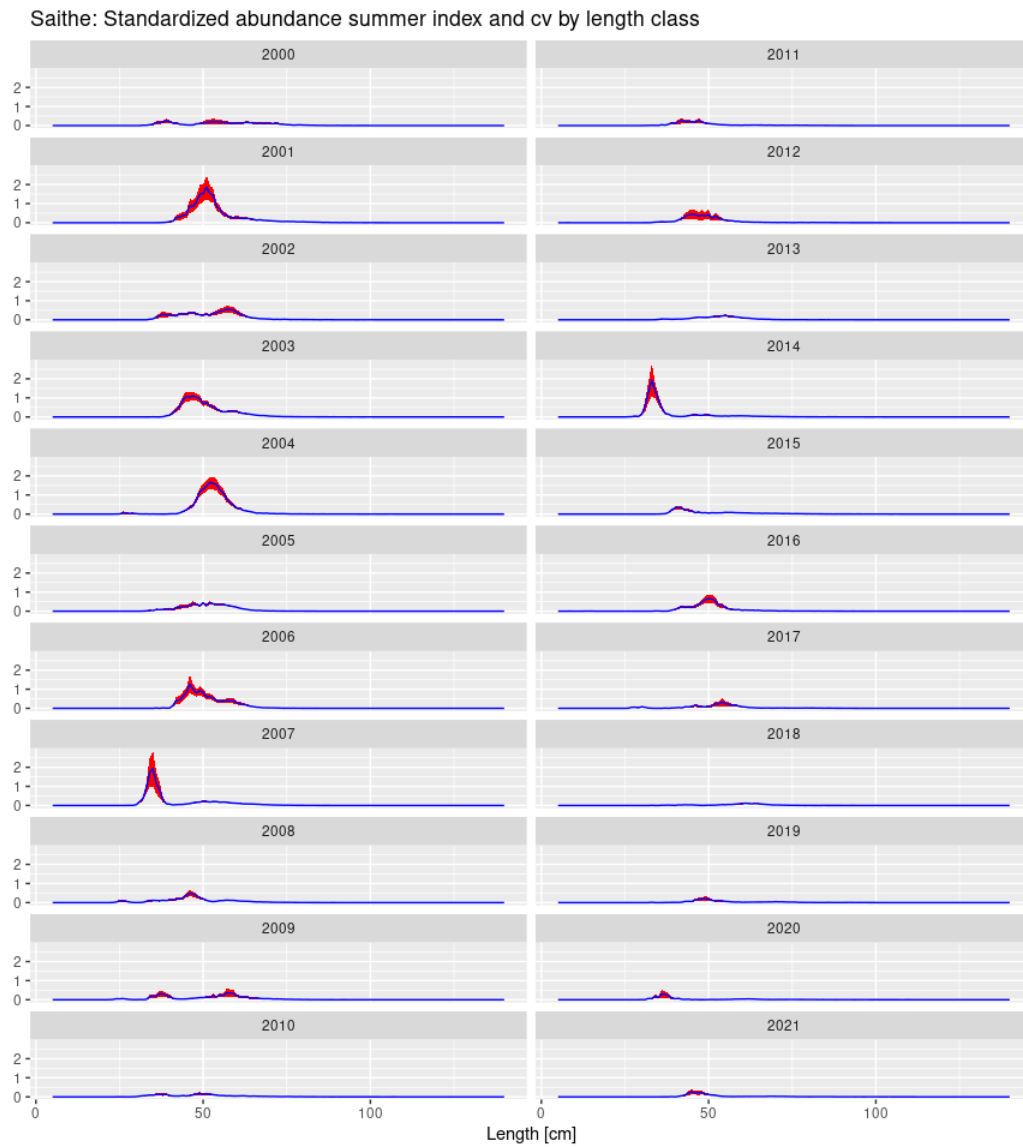


Figure 6.2.5.1.4. Faroe saithe (Division 5.b). Length composition from the Faroese bottom-trawl spring survey FGFS1 (2001–2021).



**Figure 6.2.5.1.5. Faroe saithe (Division 5.b). Length composition from the Faroese bottom-trawl summer survey FGFS2 (2000–2021).**

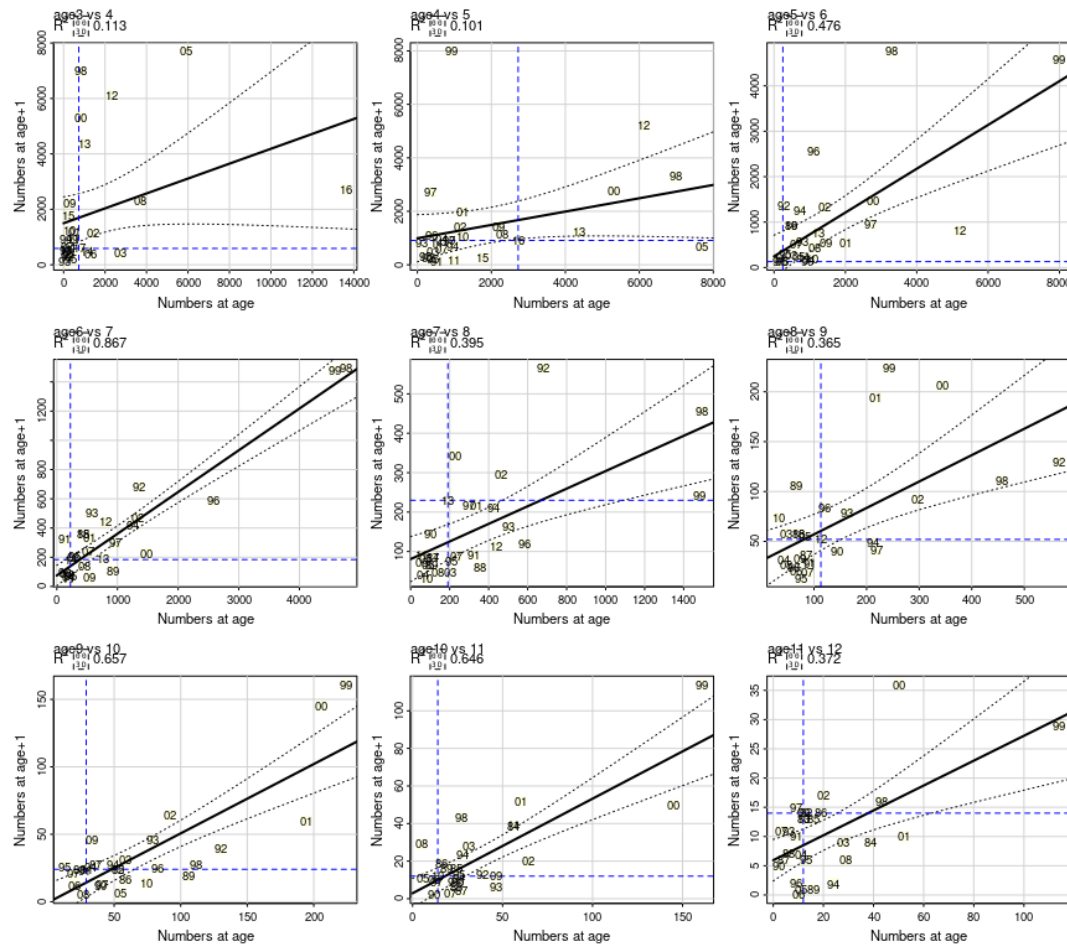


Figure 6.2.5.1.6. Faroe saithe (Division 5.b). Numbers from spring survey (FGFS1) plotted against numbers of the same year class one year later. Letters in the figures represent year classes. Horizontal and vertical lines crossing is the most recent pair.



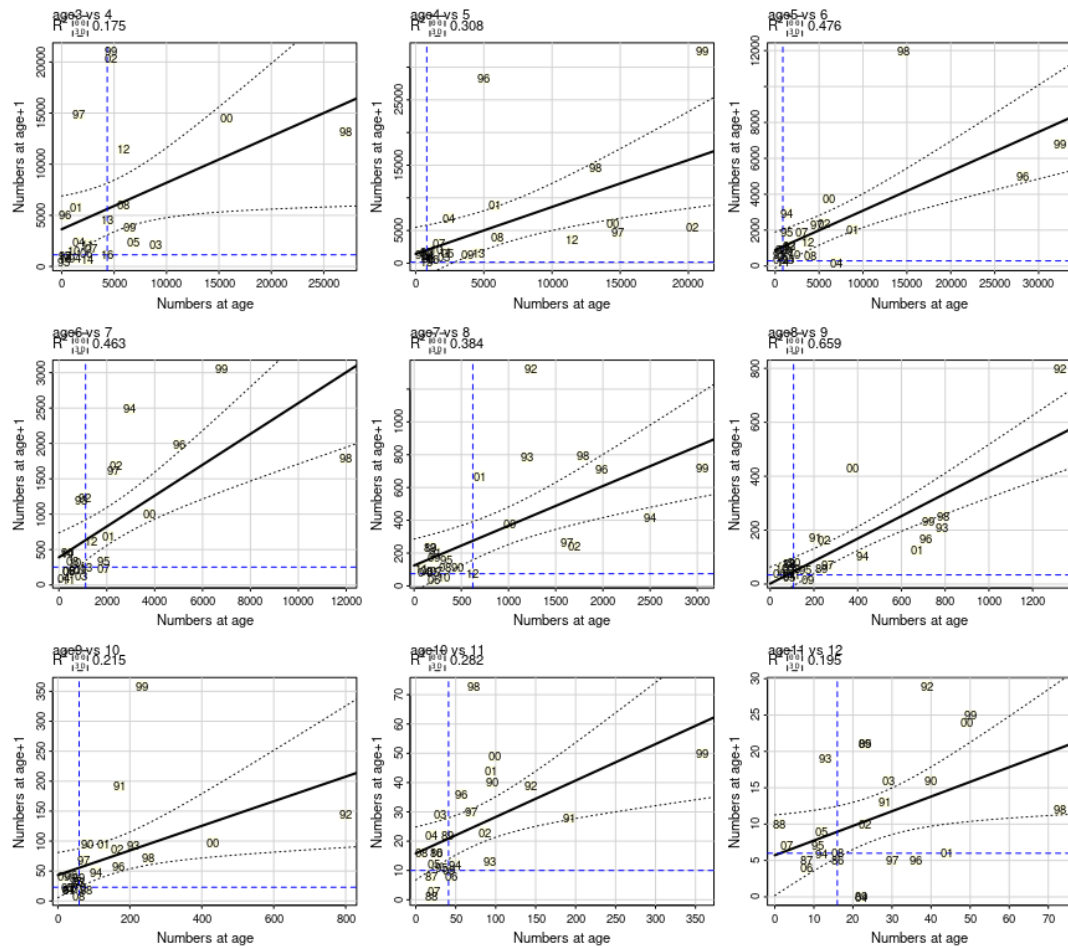
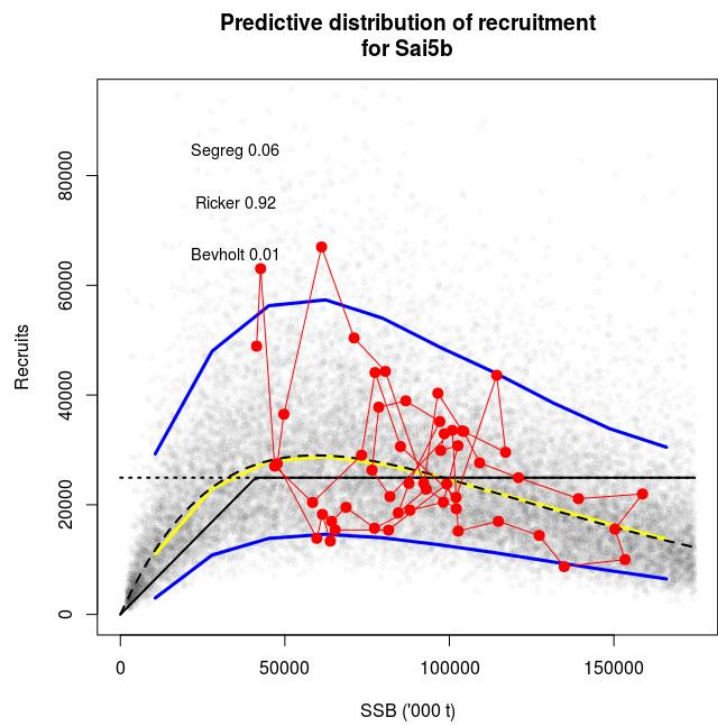


Figure 6.2.5.1.7. Faroe saithe (Division 5.b). Numbers from summer survey (FGF52) plotted against numbers of the same year class one year later. Letters in the figures represent year classes. Horizontal and vertical lines crossing is the most recent pair.



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

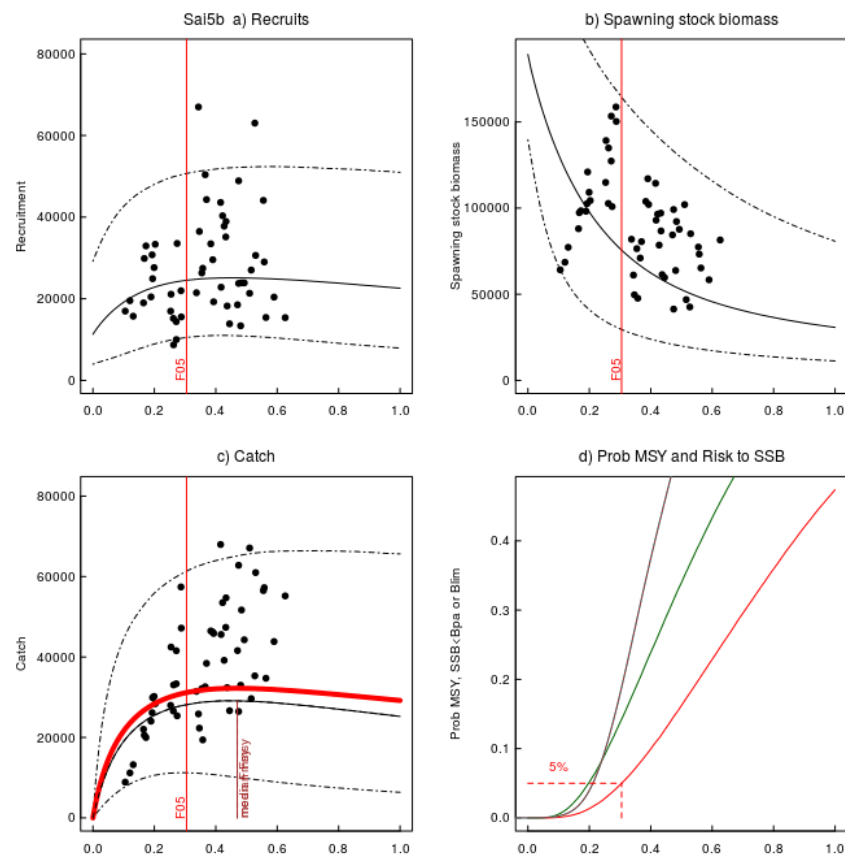
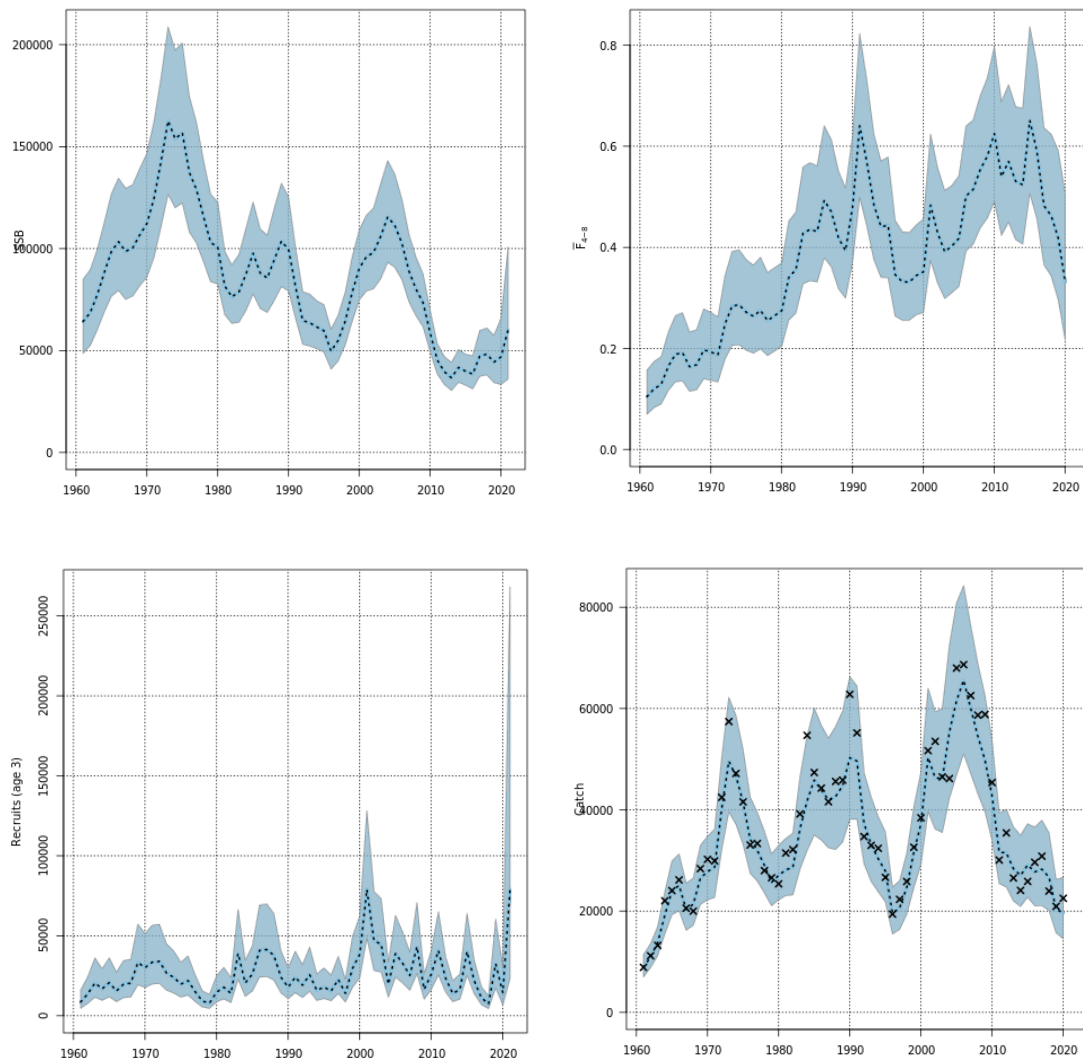


Figure 6.4.1.2. Faroe saithe (Division 5.b). EqsSim simulation results.  $F_{MSY} = 0.30$  is the vertical red line in the bottom-left graph.



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

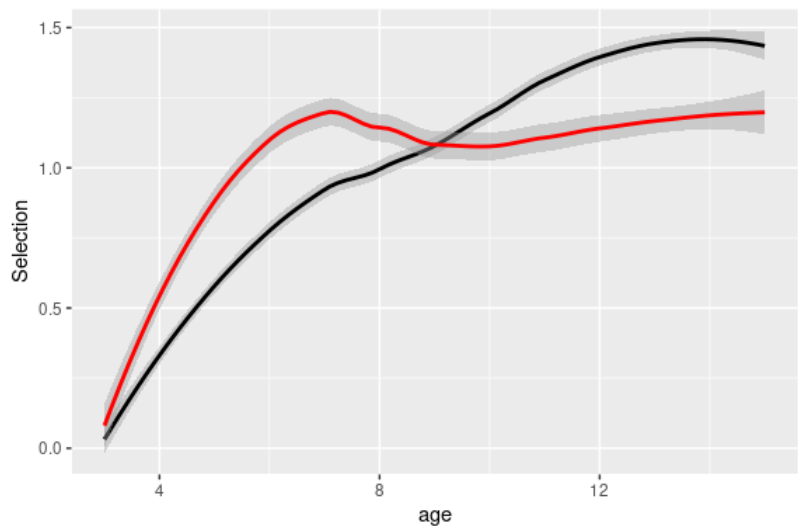


Figure 6.5.1.a Faroe saithe (Division 5.b). Selection pattern by periods in the fishery. Average selection from 2000 to 2014 (black line) and from 2015 to 2019 (red line).

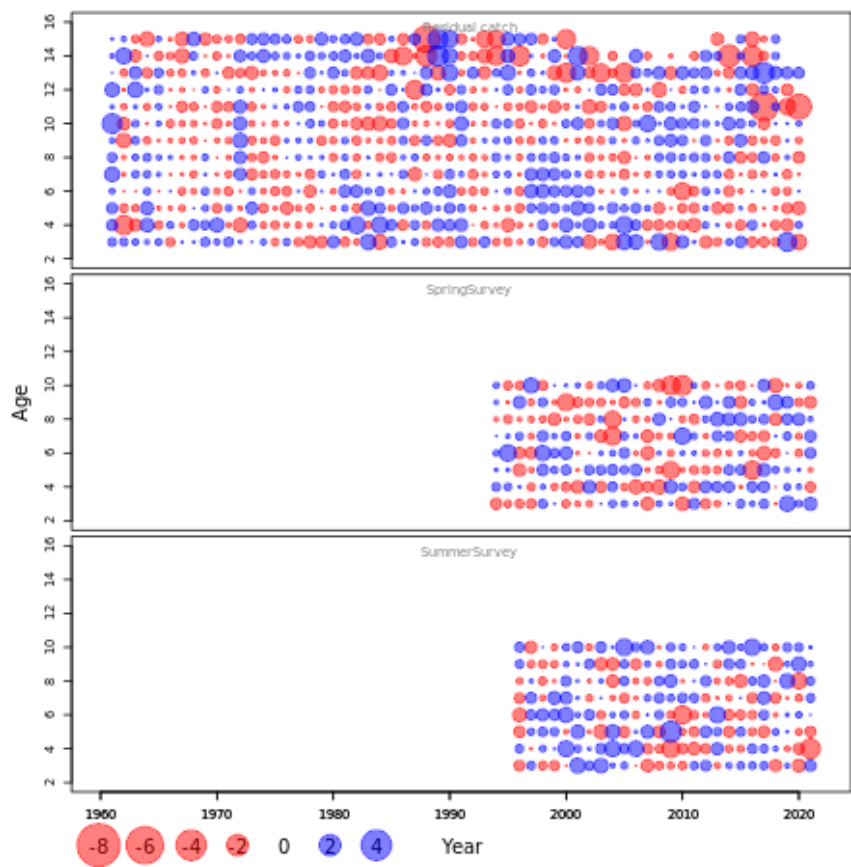


Figure 6.5.2. Faroe saithe (Division 5.b). Residuals of the SAM assessment calibrated with both survey indices. Blue and red bubbles represent positive and negative residuals respectively.

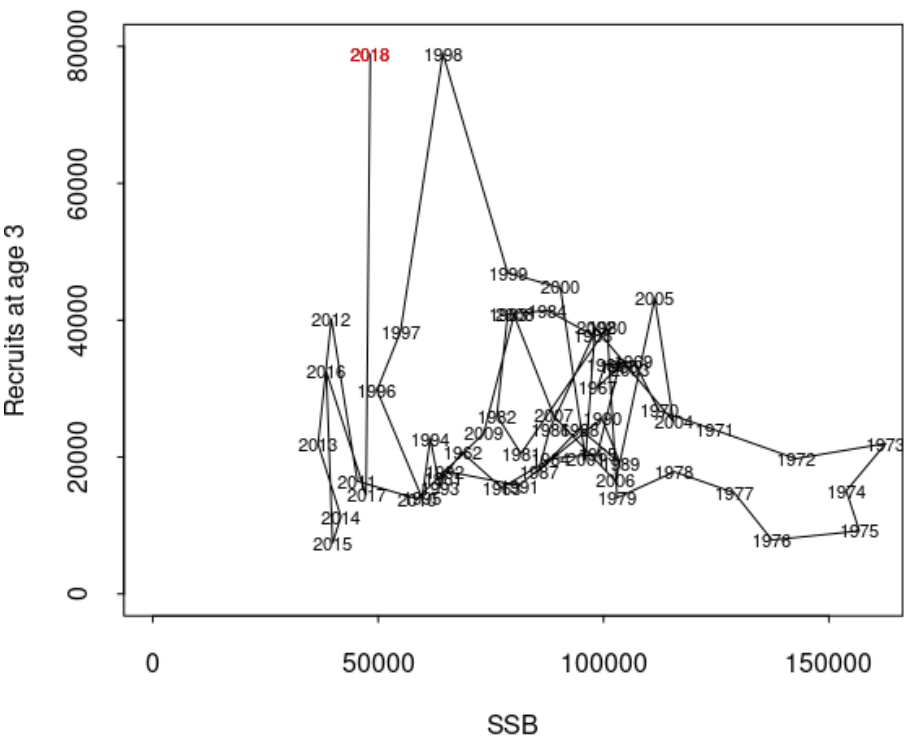


Figure 6.5.3. Faroe saithe (Division 5.b). Relation between SSB and recruitment (age 3). Numbers represent year-classes. The most recent year-class (2018) is highlighted in red.

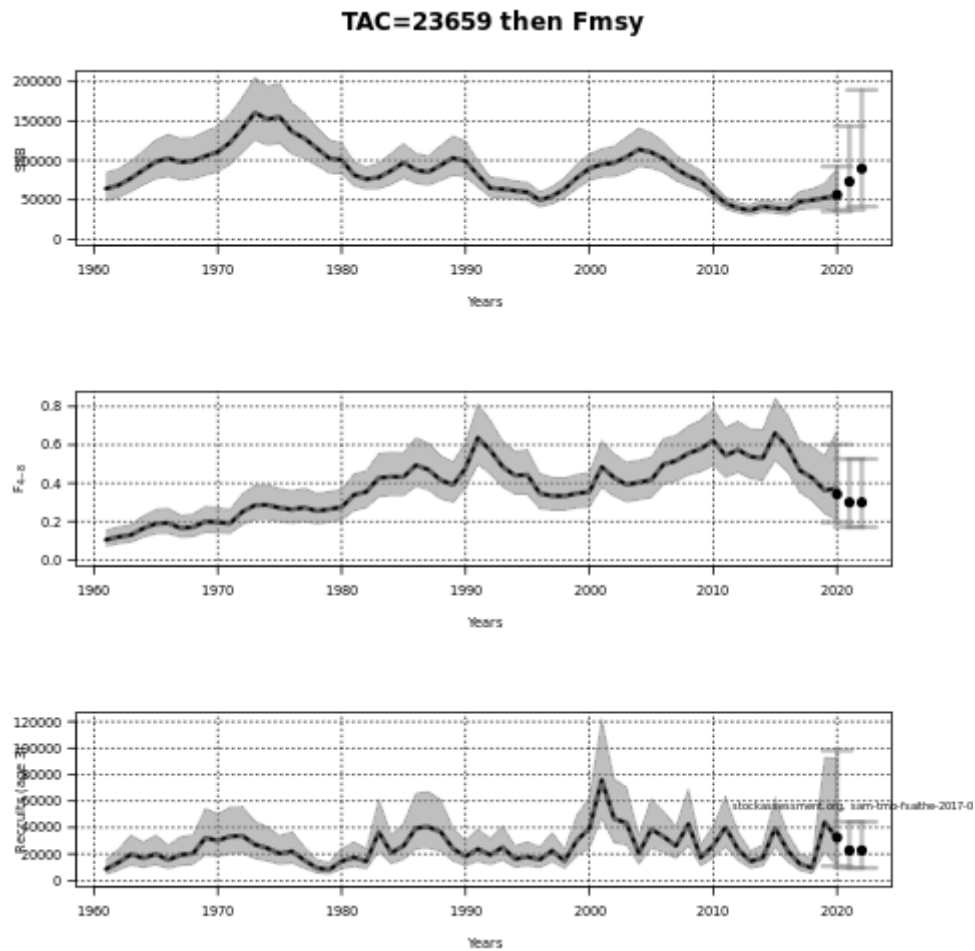


Figure 6.6.2.1. Faroe saithe (Division 5.b). Short-term forecast based on the  $F_{MSY}$  advice including historical assessment. Spawning stock biomass (top, red line represents  $B_{trigger}$ ), average fishing mortality ( $F_{4-8}$ ) (middle) and recruitment (numbers age 3, bottom).

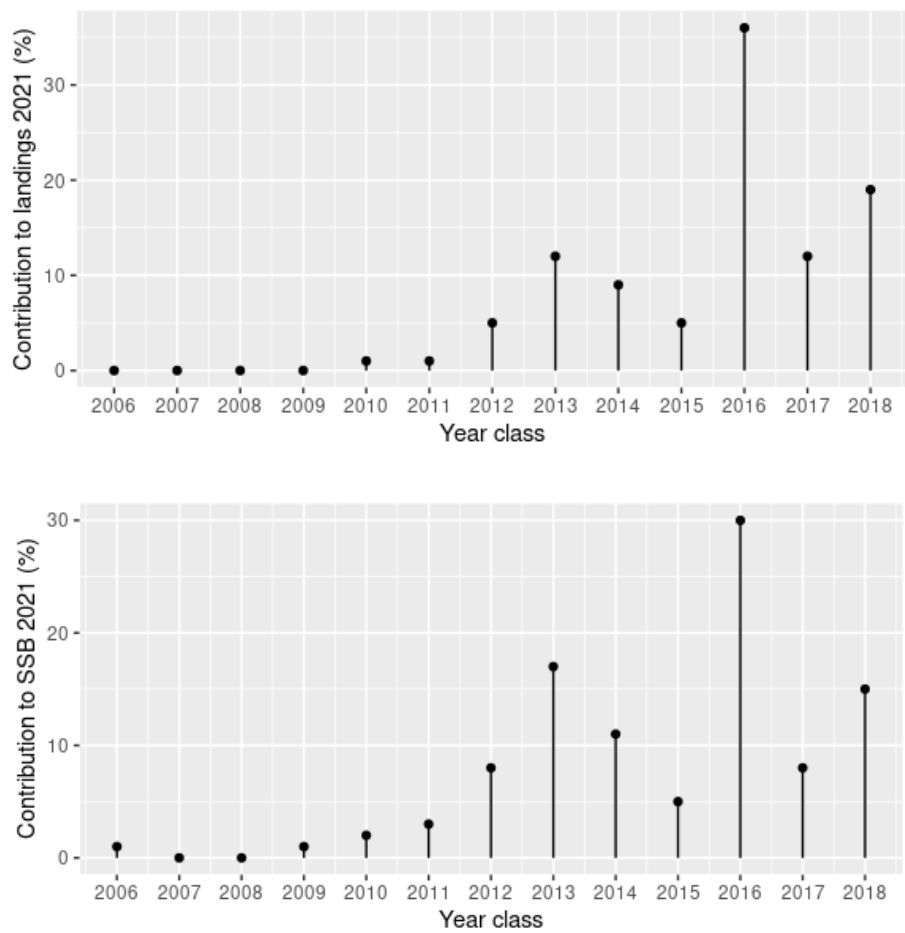


Figure 6.6.2.2. Faroe saithe (Division 5.b). Contribution of year classes to landings (top) and spawning stock biomass (bottom) in 2021.



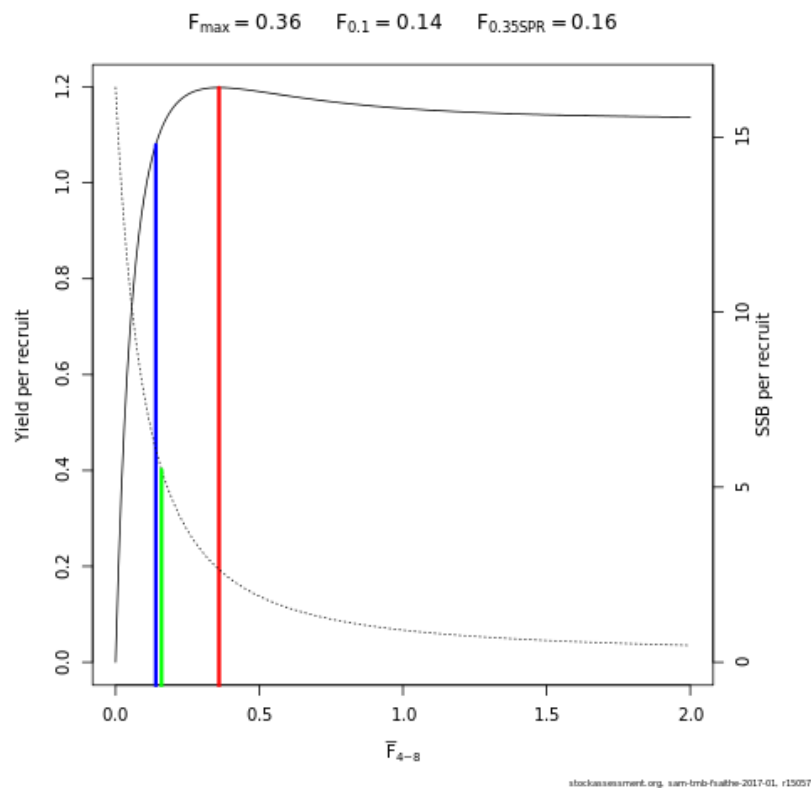
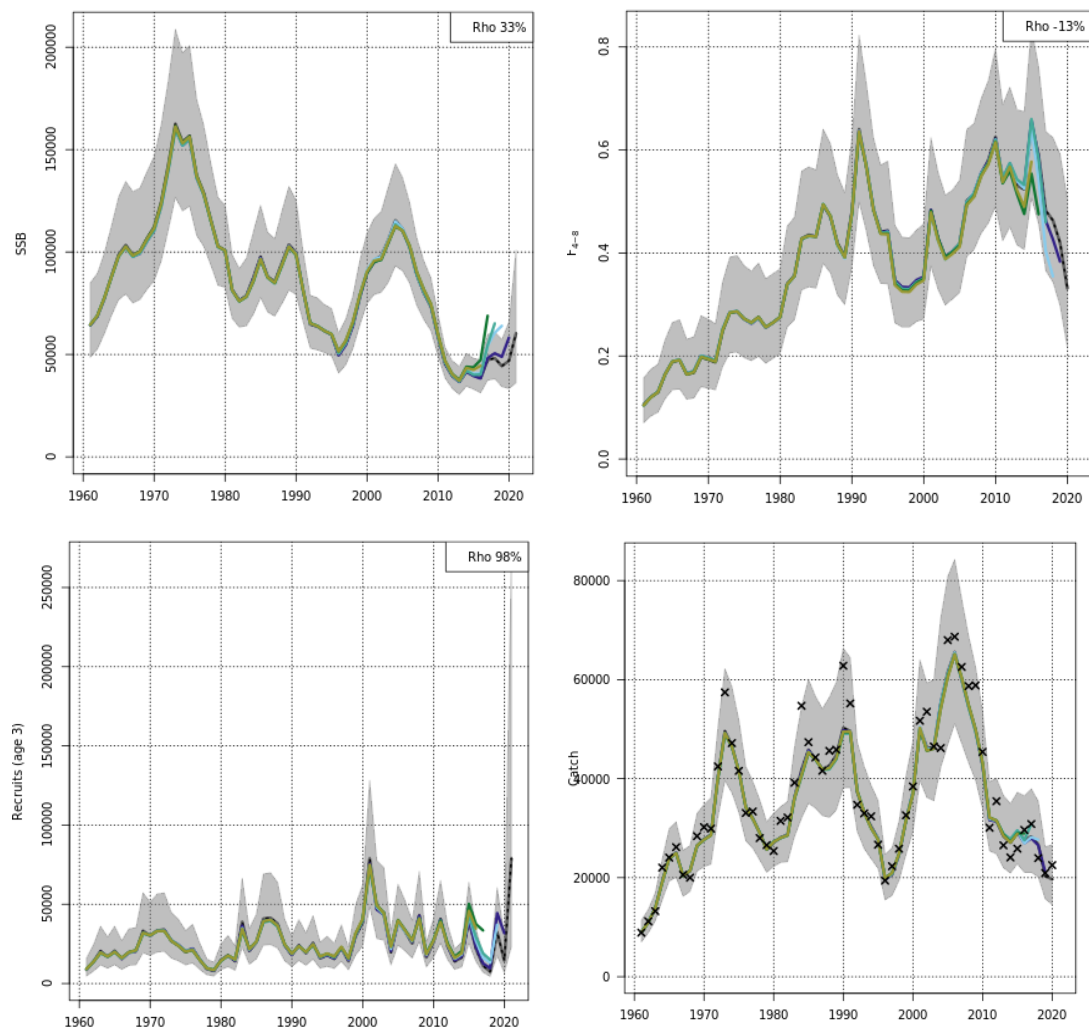


Figure 6.7.1. Faroe saithe (Division 5.b). Yield-per-recruit analysis.



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

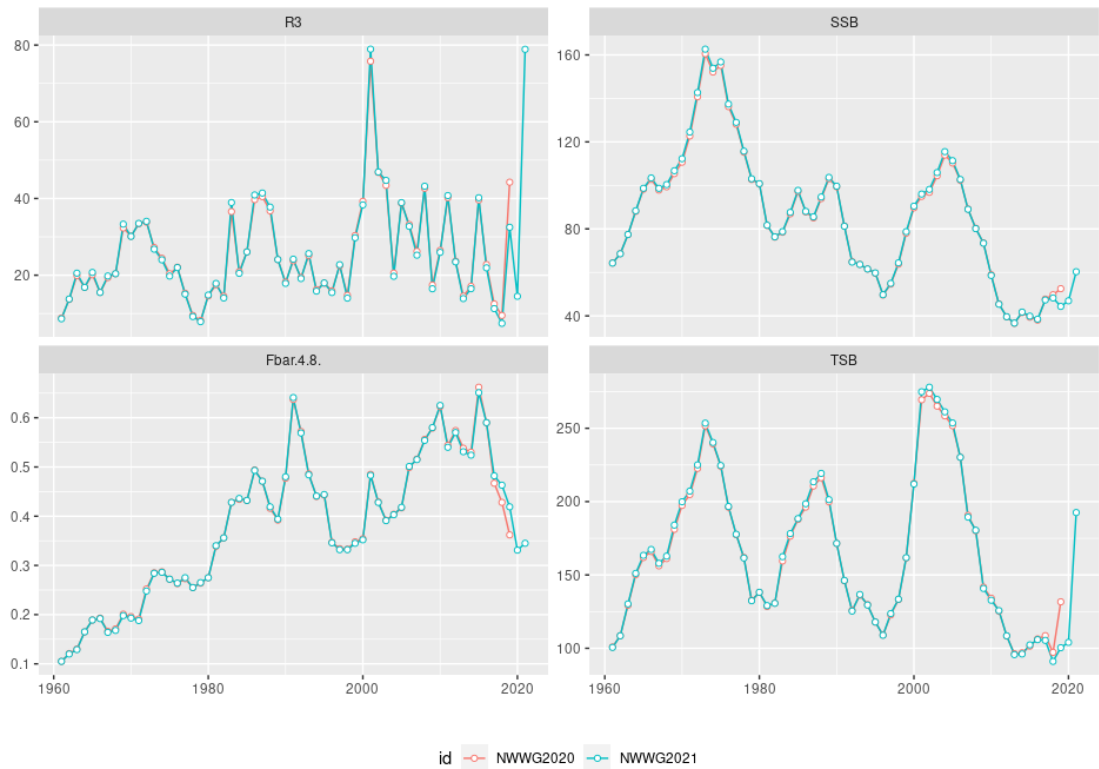


Figure 6.9.1. Faroe saithe (Division 5.b). Comparison with previous assessment. Recruitment-at-age 3 ('000) (top-left), spawning-stock biomass (tonnes)(top-right), average fishing mortality over age groups 4–8 (bottom-left) and total biomass (tonnes) (bottom-right) from the 2020 (red) and 2021 (cyan) assessments

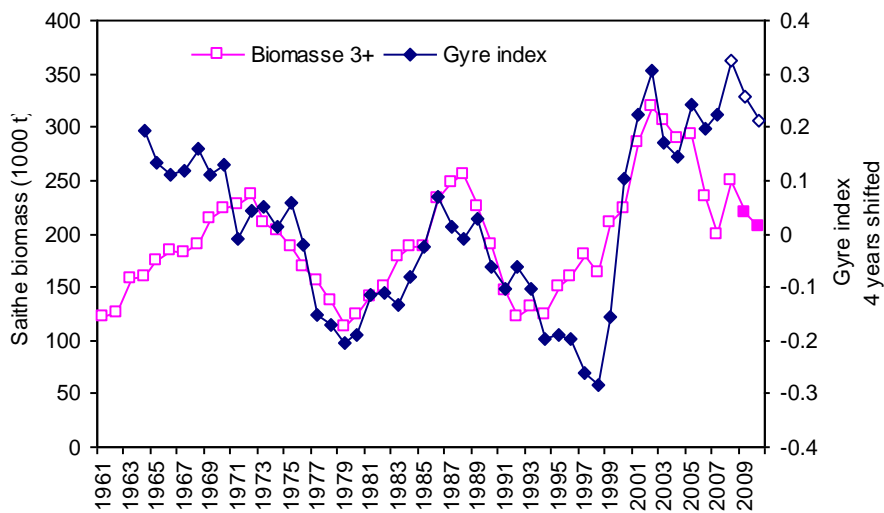


Figure 6.15.1. Faroe saithe (Division 5.b). Relationship between the Gyre index (4 years shifted) and saithe biomass (age 3+) in Faroese waters.

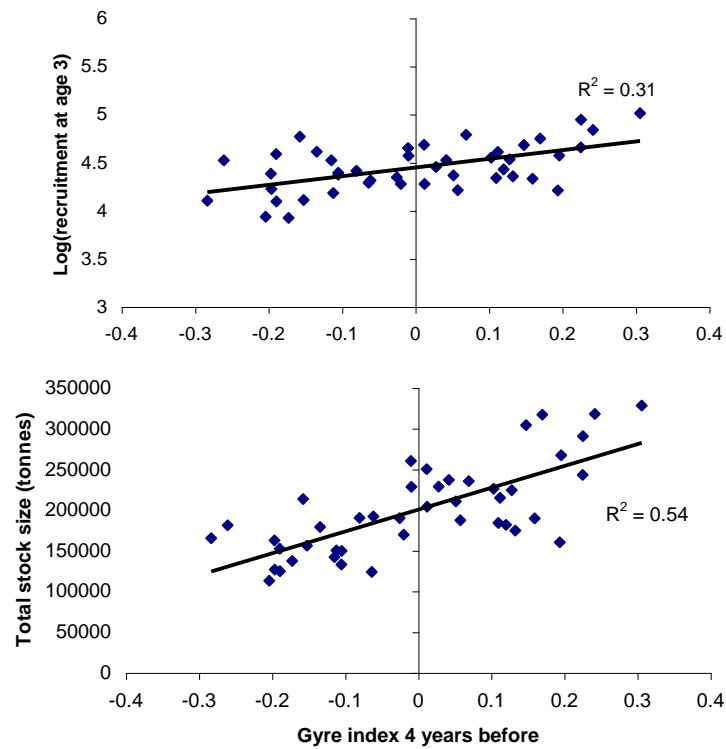


Figure 6.15.2. Relationship between the gyre index and both recruitment (top figure) and total stock biomass estimates (bottom figure.) Note that a large gyre index indicates a small subpolar gyre, and, consequently, a large influx of plankton-rich warmer-than-average water to the outer areas (bottom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