

Fol. 41 Assess

This Report not to be quoted without prior reference to the Council<sup>x)</sup>

International Council for the  
Exploration of the Sea

C.M.1982/Assess:9

Biblioteket

Assess: 8 mgl.

REPORT OF THE SAITHE (COALFISH) WORKING GROUP

Copenhagen, 20-27 April 1982

This document is a report of a Working Group of the International Council for the Exploration of the Sea and does not necessarily represent the views of the Council. Therefore, it should not be quoted without consultation with the General Secretary.

---

x) General Secretary,  
ICES,  
Palægade 2-4,  
DK-1261 Copenhagen K,  
Denmark.



TABLE OF CONTENTS

	<u>Page</u>
1. PARTICIPANTS .....	1
2. TERMS OF REFERENCE .....	1
3. LANDINGS IN THE NORTH-EAST ATLANTIC .....	1
4. NORTH-EAST ARCTIC SAITHE .....	1
4.1 Landings .....	1
4.2 Age Composition .....	1
4.3 Weight at Age .....	2
4.4 Estimates of Fishing Mortality and Stock Size	
Estimate from VPA .....	2
4.5 Yield per Recruit .....	2
4.6 Catch Predictions .....	2
5. NORTH SEA SAITHE .....	3
5.1 Landings .....	3
5.2 Age Composition .....	3
5.3 Weight at Age .....	3
5.4 Fishing Mortality and Stock Values from VPA .....	3
5.5 Yield per Recruit .....	4
5.6 Catch Predictions .....	4
6. ICELANDIC SAITHE .....	4
6.1 Landings .....	4
6.2 Age Composition .....	4
6.3 Weight at Age .....	5
6.4 Fishing Mortality and Stock Values from VPA .....	5
6.5 Yield per Recruit .....	5
6.6 Catch Predictions .....	5
7. FAROE SAITHE .....	6
7.1 Landings and Changes in the Fisheries .....	6
7.2 Age Composition .....	6
7.3 Weight at Age .....	6
7.4 Fishing Mortality and Stock Values from VPA .....	6
7.5 Yield per Recruit .....	7
7.6 Catch Predictions .....	8
8. WEST OF SCOTLAND SAITHE .....	8
8.1 Landings .....	8
8.2 Age Composition .....	8
8.3 Weight at Age .....	8
8.4 Fishing Mortality and Stock Values from VPA .....	8
8.5 Yield and Spawning Stock Biomass per Recruit .....	9
8.6 Catch Predictions .....	9
9. FAROE COD .....	9
9.1 Faroe Plateau Cod .....	9
9.2 Faroe Bank Cod .....	10
10. FAROE HADDOCK .....	11
10.1 Landings and Fishing Effort .....	11
10.2 Age Composition .....	11

ctd.

<u>Table of Contents (ctd)</u>	<u>Page</u>
10.3 Weight at Age .....	11
10.4 Fishing Mortality .....	11
10.5 Results of VPA .....	11
10.6 Yield per Recruit .....	12
10.7 Catch Predictions .....	12
11. OTHER STOCKS IN DIVISION Vb .....	12
12. APPROPRIATE MESH SIZES FOR SAITHE FOR TRAWL GEARS IN THE NORTH-EAST ARCTIC AND THE NORTH SEA .....	12
13. INTERRELATIONSHIPS BETWEEN DIVISION IIa AND SUB-AREA IV .....	13
14. DEFICIENCIES IN THE DATA REQUIRED FOR ASSESSMENTS ...	13
REFERENCES .....	14
TABLES 3.1 - 12.4 .....	15
FIGURES 4.1 - 10.2 .....	81-96

REPORT OF THE SAITHE (COALFISH) WORKING GROUP

1. PARTICIPANTS

R M Cook	United Kingdom (Scotland)
H Gislason	Denmark
T Jakobsen (Chairman)	Norway
S H í Jakupsstovu	Faroes
B W Jones	United Kingdom (England)
J B Pérodou	France
H H Reinsch	Federal Republic of Germany
S A Schopka	Iceland

K Hoydal attended the meeting as the ICES Statistician.

2. TERMS OF REFERENCE

At the 69th Statutory Meeting it was decided (C.Res.1981/2:27:5) that the Saithe (Coalfish) Working Group should meet at ICES headquarters 20-27 April 1982 to:

- (i) assess catch options for saithe stocks in 1983, taking into account possible relationships between the North Sea stock and the North-East Arctic stock,
- (ii) assess catch options for cod and haddock in the Faroese area,
- (iii) advise on appropriate mesh sizes for saithe for trawl gears in Sub-areas I and II and Sub-area IV,
- (iv) specify deficiencies in data required for assessments.

3. LANDINGS IN THE NORTH-EAST ATLANTIC

From 1970 to 1976 the total landings of saithe from the main fishery areas in the North-East Atlantic were in the range of 640 000 - 720 000 tonnes (Table 3.1). In subsequent years, landings have declined to a level of about 400 000 tonnes. Preliminary reported landings in 1981 are 410 000 tonnes.

4. NORTH-EAST ARCTIC SAITHE

4.1 Landings (Table 4.1, Figure 4.1.A)

The provisional estimate of landings in 1981 was 172 000 tonnes, which was an increase from 145 000 tonnes reported for 1980. Landings in 1981 were significantly in excess of the TAC of 123 000 tonnes recommended for that year. The increased landings were due mainly to Norwegian trawlers.

4.2 Age Composition (Table 4.2)

Revised age composition data submitted for 1980 resulted in significant changes from the provisional data used for this year in last year's assessment. Provisional data for 1981 were available for landings by the Federal Republic of Germany and Norway, which together accounted for almost 100% of total landings.

4.3 Weight at Age (Table 4.3)

Weight at age data for Norwegian landings were available for 1980 and 1981. For weight at age in the stock, data based on an average of Norwegian data for the years 1974-79 were used for 1980 and 1981 for stock biomass calculations.

4.4 Fishing Mortality and Stock Size Estimate from VPA

4.4.1 Estimates of fishing mortality (Table 4.4)

Values of F for 1981 used as VPA input were based on estimates of trends in the amount of fishing by the various fleets comprising the Norwegian fishery. The purse-seine fishery appears to have continued in 1981 in a manner similar to 1980 with a reduced fishing mortality on 2 year old fish. This fleet has been concentrating to some extent in 1981 on the relatively abundant 1978 year class, resulting in a higher F on 3 year olds in 1981.

It would appear that the values used last year as input for 1980 were too low and gave an overoptimistic estimate of the stock size. Input values of F on the oldest age group for the years 1977-80 have also been revised upwards to values which are more consistent with the VPA calculated values.

This year the Working Group re-considered the age range over which average fishing mortality is calculated, and agreed that the use of age groups 3 to 8 would be more appropriate for an index of fishing mortality than the ages 5 to 10, which were used previously. Indices of average fishing mortality quoted in this report are, therefore, not directly comparable with those given in last year's report.

The trend in fishing mortality is plotted in Figure 4.1.D. After the high levels recorded in 1974-76, the fishing mortality rates appear to have been reducing.

4.4.2 Spawning stock biomass and recruitment

Estimates of spawning stock biomass are given in Table 4.5 and Figure 4.1.B. Higher input F values for 1981 than were used last year for 1980, and an upwards revision of F on the oldest age groups in recent years have resulted in spawning stock biomass estimates for the recent period being considerably lower than last year's estimates. Spawning stock biomass has been falling continuously since 1970 and is associated with the increased fishing mortality from 1968-76. The spawning stock should benefit from the reduction in fishing mortality since 1976, and an improvement is expected in the prediction period.

Estimates of stock numbers at each age are given in Table 4.5, and recruitment at age 1 is plotted in Figure 4.1.C. No clear trend in recruitment is apparent.

4.5 Yield per Recruit

The yield per recruit curve given in Figure 4.2 has been calculated using the exploitation pattern and weight at age data for the stock given in Table 4.6. The present level of  $F = 0.36$  ( $\bar{F}_{3-8}$  unweighted) is in excess of  $\bar{F}_{\max} = 0.26$  and  $\bar{F}_{0.1} = 0.16$ .

4.6 Catch Predictions

The data used in the catch predictions are given in Table 4.6. Average recruitment (average 1966-78) has been assumed for the year classes 1980-83. It has further been assumed that fishing mortality

in 1982 will remain at the 1981 level of  $\bar{F}_{3-8} = 0.36$ . Predicted catches and stock biomasses for 1982 and for a range of levels of fishing mortality in 1983 are given in Table 4.7. Predicted landings in 1983 and spawning stock biomass estimates for the beginning of 1984 are presented graphically in Figure 4.3. For the assumption that  $F$  remains unchanged at the 1981 level, landings in 1982 are expected to be 155 000 tonnes, which is 17 000 tonnes lower than in 1981, but they are expected to increase again to 170 000 tonnes in 1983.

5. NORTH SEA SAITHE

5.1 Landings (Table 5.1, Figure 5.1.A)

The reported landings for 1981 were 123 847 tonnes, a figure close to the 123 446 tonnes reported for 1980. The TAC in 1981 was 127 000 tonnes.

5.2 Age Composition (Table 5.2)

The age composition for 1980 was updated. The main difference between the age composition for 1980 used last year and the one given in Table 5.2 was due to a revision of the age composition of the Norwegian landings. The sums of products in 1980 were 8% below the reported landings.

For 1981 a provisional age composition was constructed, based on data from Denmark, England, Federal Republic of Germany, France, Norway and Scotland. The landings of these countries represented 99% of the reported landings. The SOP was 82 tonnes above the nominal landings.

As in previous years the age composition was derived by raising the sum of the reported age compositions in the human consumption fishery to the total landings from this fishery. The total age composition was subsequently calculated by adding the age composition of the industrial landings.

5.3 Weight at Age (Table 5.3)

Weight at age data from Denmark, England, France, Norway and Scotland were used to calculate a set of weight at age data for 1980 and 1981. Annual averages weighted by catch in numbers were calculated and used for weight at age in the catch and stock.

For predictions, the average of the weight at age in 1979-81 were used. (Table 5.7.)

5.4 Fishing Mortality and Stock Values from VPA

5.4.1 Estimates of fishing mortality

A trial VPA, using the same terminal  $F$  values as last year, showed no changes in the average fishing mortality for ages 3-6 between 1980 and 1981. However, the average fishing mortality at age for 1977 and 1978 showed a peak for ages 4 to 6, and a new exploitation pattern was, therefore, calculated, assuming ages 7 and older to be equally exploited.

French effort data were used to calculate the effort of the total international fleet by dividing total landings by the French catch per unit of effort (Table 5.6). The total effort shows no major change from 1980 to 1981.

A second VPA with the new exploitation pattern and  $\bar{F}_{3-6}$  equal to 0.37 in 1981 showed little change in the average fishing mortality

from 1978 to 1981, and a decline from 1976-78 which was reasonably consistent with the effort data and was therefore adopted by the Working Group. The terminal fishing mortality at age 1 was chosen in order to give a recruitment of 200 million fish in 1981. This recruitment is above the average recruitment in the years 1975-79 and was chosen because of the large catch of 1 year old fish in 1981.

This year the Working Group re-considered the age range over which average fishing mortality is calculated and agreed that the use of age groups 3 to 6 would be more appropriate for an index of fishing mortality than the ages 5 to 10, which were used previously. Indices of average fishing mortality quoted in this report are, therefore, not directly comparable with those given in last year's report.

The trend in fishing mortality is plotted in Figure 5.1.D.

#### 5.4.2 Spawning stock biomass and recruitment

Spawning stock biomass (Table 5.5 and Figure 5.1.B) has fluctuated since 1976 between 270 000 tonnes and 335 000 tonnes. Figure 5.1.C shows recruitment at age 1. The year classes 1975-78 appear to be below the long-term average. In the predictions, the recruitment in 1982 to 1984 was assumed to be equal to the average recruitment of the year classes 1975 to 1978 ( $R_1 = 148 \times 10^6$ ).

#### 5.5 Yield per Recruit

The yield per recruit curve (Figure 5.2) was calculated using the average weight at age in the years 1979-81 and the current exploitation pattern (Table 5.7).  $F_{max}$  expressed as the average fishing mortality for ages 3-6 is 0.26. The present fishing mortality is estimated to be  $\bar{F}_{(3-6)} = 0.37$ .

#### 5.6 Catch Predictions

Table 5.7 shows the input data used in the catch predictions. The agreed TAC for the North Sea in 1982 is 125 000 tonnes, and the predicted catch is 124 000 tonnes. The results of the catch predictions are shown in Table 5.8 and Figure 5.3 for a range of options for 1983.

### 6. ICELANDIC SAITHE

#### 6.1 Landings

Landings of saithe from Division Va are shown in Figure 6.1.A and in Table 6.1. Since 1977, catches have been at a fairly stable level of 50 000 - 60 000 tonnes annually. Landings in 1981 were 59 000 tonnes.

#### 6.2 Age Composition

Age composition data were available only for the Icelandic catches which accounted for 93% of the total landings in 1981. The total catch in numbers used as input for the VPA (Table 6.2) was calculated by raising the other catches with the Icelandic age composition data. The 1980 data were revised and updated.



### 6.3 Weight at Age

Weight at age data used for stock biomass calculations are given in Table 6.3. In 1979, several thousand specimens of saithe were measured and weighed, and the length/weight relationship was revised. The 1979 weight at age data were used for the period 1974-79, when the sum of products estimates were within 2% of the actual landings. In the period 1966-73, data from previous assessments were used unchanged.

Since 1979 the average weight at age has been declining. An average of the 1980 and 1981 data were used in the catch projections (Table 6.6).

### 6.4 Fishing Mortality and Stock Values from VPA

#### 6.4.1 Estimates of fishing mortality (Table 6.4)

The big increase in redfish catches in 1981 implies that some effort was diverted from the saithe fishery. Therefore, the average of the relatively stable F values in the 1977-79 period, which were somewhat lower than the 1980 F values, have been used as input F for the VPA. The unweighted mean fishing mortality on the age groups 4-9 which accounts on average for about 90% of the catches, has been taken as a reference fishing mortality in the presentation of the assessments (Figure 6.1.D).

#### 6.4.2 Spawning stock biomass and recruitment

Spawning stock biomasses are shown in Figure 6.1.B and Table 6.5. The spawning stock biomass increased from 122 000 tonnes in the early 1960s to a peak of 443 000 tonnes in 1969. This increase in spawning stock biomass was the result of higher year class strengths. Since 1969 the spawning stock has been declining, and in 1981 (174 000 tonnes) it was at a level similar to that in the mid-1960s.

The 1960-67 year classes were more abundant than the 1968-77 year classes (Figure 6.1.C and Table 6.5). The abundance of the 1979 year class at age 2 was assumed to be 42 million fish equal to the average for the year classes 1968-77. Accordingly, the input F for this year class at age 3 in 1980 was adjusted to produce this result. For the catch projections, abundances for 1980 and 1981 were also assumed to be 42 million fish (35 million at age 3).

### 6.5 Yield per Recruit

The yield and spawning stock biomass per recruit curves are shown in Figure 6.2. No changes in the exploitation pattern have taken place in recent years and, therefore, the average 1977-79 exploitation pattern has been used. The yield per recruit curve is flat-topped.  $F_{max}$  is about 0.39, and the present fishing mortality on age groups 4-9 is estimated to be  $\bar{F}(4-9) = 0.29$ .

### 6.6 Catch Predictions

The input data for catch projections are shown in Table 6.6. The projections are based on the 1977-79 exploitation pattern also used as input to the VPA.

The recommended TAC for 1982 is 62 000 tonnes. Assuming the same effort on saithe in 1982 as in 1981, the expected catch in 1982 will be 67 000 tonnes. The associated spawning stock biomass in 1983 will be 184 000, and the total stock biomass about 350 000 tonnes. The results of catch projections for 1983 and total stock and spawning stock biomasses in 1984 are given in Table 6.7 and Figure 6.3.

7. FAROE SAITHE

7.1 Landings and Changes in the Fisheries

Preliminary catch data indicate a total catch of 30 176 tonnes from the Faroe saithe stock in 1981 (Table 7.1, Figure 7.1.A). This is an increase by 4 946 tonnes compared to 1980. Foreign catches were very small in 1981 compared to previous years and constituted only 1.7% of the total catch in 1981. The Faroese catch increased by 5 866 tonnes in 1981.

7.2 Age Composition (Table 7.2)

Age compositions for 1981 were available only for the Faroese landings. The Federal Republic of Germany and France landings were distributed according to age distributions of catches by Faroese trawlers more than 1 000 HP. The Norwegian catch at age was estimated from Faroese gill net catch at age compositions. The United Kingdom (Scotland) landings were distributed using the age composition in the Faroese trawlers, less than 1 000 HP, landings.

7.3 Weight at Age (Table 7.3)

The weight at age data set used by the 1981 Working Group were used for the years previous to 1981. Weight at age data were provided for the Faroese landings in 1981. These, however, gave a high sum of products discrepancy, and the Working Group, therefore, decided to use for 1981 the mean weights at age for the period 1978-80. These values were also used for the catch predictions.

7.4 Fishing Mortality and Stock Values from VPA

7.4.1 Estimates of fishing mortality (Table 7.4)

The fishing pattern for saithe by the Faroese fleet in 1981 was in general similar to that in 1979 and 1980, with a fishery from October to April on adult fish aggregating on the spawning grounds, and another fishery during summer in shallower water exploiting mainly younger fish.

The development, which started in 1980 with smaller trawlers (less than 1 000 HP) trawling as pair trawlers rather than as single boat trawlers, has continued in 1981 with the result that a significant part of this size group and also medium-sized trawlers are now operating as pair trawlers. One of the benefits obtained with this strategy is that the boats, when operating as pair trawlers, can fish in deeper water compared to operating as single boat trawlers.

As in 1980, the smaller pair trawlers in 1981 exploited mainly young fish. This was also the case for the smaller single boat trawlers in 1981. The age composition of the landings from the larger pair trawlers and the larger single boat trawlers was more evenly distributed over the whole age range. A special feature for the whole trawler fleet is occasional, large catches of young saithe throughout the year.

Compared to 1980, the total effort of the Faroese fleet mainly fishing for saithe in 1981 was on the same level. The change towards pair trawling and the reduced effort used in the redfish fisheries, however, have probably increased the directed effort on the saithe to some extent in 1981.

Trial VPA runs, using the same input Fs as were used by the 1981 Working Group, showed that the assumptions, on which the assessments in 1980 and 1981 were based, i.e. that the fishing pressure was higher on the younger age groups (4-6 years old) than on the older age groups, were not valid. Using this assumption, the trial VPA runs also indicated more than 50% increase of the fishing mortality on the 4-8 year olds in 1981 compared to 1980. This increase in effort was not evident from the Faroese effort data brought to the meeting. The available evidence, therefore, indicates the following:

- 1) F on young fish (4-6 years) in 1981 is less than F on old fish (7+) in 1981,
- 2) F on young fish in 1981 is greater than F on young fish in 1980,
- 3) F on old fish in 1981 is greater than F on old fish in 1980.

The set of input F values for 1981 chosen by the Working Group was 0.18 for the ages 4-6, and 0.27 for older ages. These values allow the three conditions mentioned above to be satisfied. This could also be achieved by higher levels of F, but this would increase the discrepancy with the effort data. The VPA results are given in Tables 7.3 and 7.4.

This year the Working Group re-considered the age range over which average fishing mortality is calculated and agreed that the use of age groups 4 to 8 would be more appropriate for an index of fishing mortality than the ages 5 to 10, which were used previously. Indices of average fishing mortality quoted in this report are, therefore not directly comparable with those given in last year's report.

#### 7.4.2 Spawning stock biomass and recruitment (Table 7.5)

The change in assumptions of the exploitation pattern and also the revision of some input F values on the oldest age groups have resulted in estimates of spawning stock biomasses for the recent years, which are larger than those given in last year's report (Figure 7.1.B).

No independent estimate is available for the strengths of recruiting year classes. From the VPA, the recruitment appears to have varied extensively, with recruitment of 1 year olds between 20 and 40 millions in the period 1961-66, between 50 and 70 millions in the period 1967-70, and between 20 and 40 millions again in the period 1971-78, except for the year class 1976, which is somewhat lower (Figure 7.1.C). The assumption that the 1978 year class is above average year class strength, for the most recent years, is not evident from the VPA done this year. With the exploitation pattern assumed now, however, the year class is not fully recruited to the fishery yet.

#### 7.5 Yield per Recruit

Curves of yield per 1 year old recruit and spawning stock biomass per recruit are also plotted in Figure 7.2. Fishing mortality in 1981 ( $F_{4-8} = 0.22$ ) is less than  $F_{max} = 0.44$ . For a constant average recruitment (1974-77 year classes) of 21.2 million 1 year olds, the equilibrium yield with the 1981 exploitation pattern would be 22 000 tonnes, and the corresponding spawning stock biomass 93 000 tonnes.

## 7.6 Catch Predictions

Input data for the catch predictions are given in Table 7.6. The year classes 1978 onwards are assumed to be the average of the 1974-77 year classes ( $R_1 = 21.2 \times 10^6$ ). In Table 7.7 the yield in 1983 and the spawning stock biomasses for 1984 are given under different assumptions of fishing mortality in 1983, on the basis that fishing mortality in 1982 is unchanged from the 1981 level.

## 8. WEST OF SCOTLAND SAITHE

### 8.1 Landings

Landings of saithe from Sub-area VI are shown in Figure 8.1.A and in Table 8.1. The TAC for 1981 was 27 000 tonnes, while landings were 24 000 tonnes.

### 8.2 Age Composition (Table 8.2)

Revised data for 1980 and preliminary data for 1981 were available from the United Kingdom (England and Wales), United Kingdom (Scotland), and France. These accounted for 97% of the 1980 landings and 95% of the 1981 landings (Table 8.1). The combined landings of these nations were raised to the total international catch.

### 8.3 Weight at Age (Table 8.3)

Mean weight at age values used in making predictions are shown in Table 8.7. These are the weighted means for the years 1979-81 and are similar to the values used by the 1981 Working Group.

Sum of products discrepancies for each national data set in 1980 and 1981 were less than 7%. Scottish and French numbers at age were adjusted to compensate for these discrepancies. For the English data, mean weight at age was adjusted.

## 8.4 Fishing Mortality and Stock Values from VPA

### 8.4.1 Estimates of fishing mortality

Table 8.6 shows the estimation of fishing effort relative to 1981. These data indicate a similar effort in 1981 compared to 1980. On this basis, input Fs were chosen at the same level as those used for 1980. This results in lower Fs in 1980, but is consistent with the difference in the landings for the same period. The plot of relative effort versus relative F (Figure 8.2) indicates that mean  $F(3-6)$  in 1981 is also consistent with the historical data set.

The Working Group felt that the mean F calculated over ages 3-6 best reflected the fishing mortality level on the stock. Using the same exploitation pattern as the historical mean, Fs were therefore selected which gave  $\bar{F}(3-6) = 0.20$ , the same as the value used for 1980 by the 1981 Working Group.

### 8.4.2 Spawning stock biomass and recruitment

Historical spawning stock biomass figures are shown in Table 8.5 and Figure 8.1.B. The estimated spawning stocks for the years 1979-81 are all similar. In view of the higher weights at age used in these years and the unreliability of earlier weight at age data, these spawning stocks are probably relatively lower than Table 8.5 suggests.

The estimated number of recruits at age 1 are shown in Table 8.5 and Figure 8.1.C.

No data are available for Sub-area VI to assess the abundance of recent year classes. In view of the continuing lower recruitment estimated in recent years, an average for the years 1975-79 was used to give an estimate of 28 millions for the 1980 year class. The same value was used for the 1982-84 prediction runs.

#### 8.5 Yield and Spawning Stock Biomass per Recruit

The yield and spawning stock biomass per recruit curves are shown in Figure 8.3. The yield/recruit curve is flat-topped. The present estimated level of fishing mortality,  $\bar{F}_{3-6} = 0.2$ , approximates to  $F_{0,1} = 0.2$  and is well below  $F_{max} = 0.32$ .

#### 8.6 Catch Predictions

Input data for catch predictions are shown in Table 8.7. It was assumed that  $\bar{F}_{3-6}$  in 1982 =  $\bar{F}_{3-6}$  in 1981. The results are shown in Table 8.8 and Figure 8.4.

### 9. FAROE COD

#### 9.1 Faroe Plateau Cod

##### 9.1.1 Landings and fishing effort

Landings in 1981 were 23 000 tonnes compared to 21 000 tonnes in 1980 (Table 9.1 and Figure 9.1.A). In 1980, 98% of the total landings were made by Faroese vessels. Records of fishing effort show that compared with 1979 and 1981, effort was less for several of the vessel categories fishing mainly for cod. For two new vessel categories smaller (less than 1 000 HP) and larger (greater than 1 000 HP) pair trawlers, the effort was significantly higher in 1981 compared to 1980. Although these vessels fish mainly saithe, cod and haddock constitute approximately 25% of their total landings. Several of the long-liners and smaller trawlers in 1980 and 1981 directed their effort towards cod for only a part of the year. A small overall reduction in fishing since 1979 is likely to have been the net result.

##### 9.1.2 Age composition (Table 9.3)

Age compositions were provided only for the Faroese landings. The French landings were distributed according to age distribution of catches by the larger Faroese trawlers (more than 1 000 HP). The Norwegian and United Kingdom (Scotland) catch at age was estimated using the age composition in the larger Faroese long-liners' landings.

Again in 1981, larger than normal landings were reported to have been taken in the Faroes area by vessels of the Federal Republic of Germany. It was again assumed by the Working Group that these fish were incorrectly attributed to Division Vb, and they were accordingly excluded from the data used in the assessments.

##### 9.1.3 Weight at age (Table 9.4)

The weight at age data set used by the 1981 Working Group was used for the years prior to 1981. For the 1981 landings, weight at age from the Faroese catches was used and sums of products were within 4% of nominal landed weights. For the earlier years, discrepancies up to 20% were observed, but these will not significantly affect

the interpretation of the temporal trend in spawning stock biomass. Weight at age data used in catch predictions were an average for the years 1979-81.

#### 9.1.4 Fishing mortality in 1981

Data for the Faroese catch in number by age group per unit effort for the smaller Faroese long-liners, which direct their effort mainly towards cod and haddock, were analysed, but the results were inconclusive. Estimates of  $F$  at age in 1981 were chosen by the Working Group to simulate the same fishing effort in 1981 as in 1980 (see para. 9.1.1).

#### 9.1.5 Results of VPA (Tables 9.5 and 9.6)

##### 9.1.5.1 Fishing mortality

Estimates of fishing mortality in each year, calculated from VPA, are given in Table 9.5, together with input values for 1981 and for the oldest age group in each year.

##### 9.1.5.2 Spawning stock biomass and recruitment

Estimates of spawning stock biomass (age groups 4 to 10+) are given in Table 9.6 and shown graphically in Figure 9.1.B. Spawning stock biomass reached the maximum recorded level in 1977, when the very abundant 1972 and 1973 year classes had both been recruited to the adult stock. Since then, spawning stock biomass has declined.

The estimated number of recruits at age 1 for the year classes 1960-79 are given in Figure 9.1.C. Estimates of year class strength from 0-group surveys are not sufficiently reliable to predict the abundance of recruiting year classes and, therefore, year classes 1980-82 have been assumed to be equal to the average calculated for year classes 1965-77 (22 millions). The 1979 year class appears from the VPA to be of average strength, and the value estimated by VPA has therefore been used in the predictions. It was indicated by the 1981 Working Group that the 1978 year class was probably abundant. The assessment made in 1982 indicates that it is of the same order of magnitude as the very abundant 1972 and 1973 year classes.

#### 9.1.6 Yield per recruit

Curves of yield and spawning stock biomass per 1 year old recruit are plotted in Figure 9.2, using the data given in Table 9.7. Fishing mortality in 1981 ( $\bar{F}_{3-6} = 0.31$ ) is slightly in excess of  $F_{\max} = 0.26$ . For a constant average recruitment of 22 million 1 year olds, the equilibrium yield with the 1981 exploitation pattern would be 25 000 tonnes, and the corresponding spawning stock biomass would be 76 000 tonnes.

#### 9.1.7 Catch predictions

Data used in the catch predictions are given in Table 9.7, and the results are given in Table 9.8 and plotted graphically in Figure 9.3. If fishing mortality in 1982 is maintained at the 1981 level ( $\bar{F}_{3-6} = 0.31$ ), landings of 25 500 tonnes are predicted.

#### 9.2 Faroe Bank (Table 9.2)

Landings of cod from the Faroe Bank have declined in recent years, and amounted to 1 000 tonnes in 1981. No attempt was made to assess this stock.

10. FAROE HADDOCK

The assessment was made for the stock of haddock for the total Faroe (Division Vb) area.

10.1 Landings and Fishing Effort

Landings in 1981 declined to the very low level of 12 100 tonnes compared to 15 000 tonnes in 1980 (Tables 10.1 and 10.2 and Figure 10.1.A).

Fishing effort data were available for the Faroese fleets. These indicated a slight reduction in effort by all the fleets, which traditionally land the bulk of the haddock catches (see also Section 9.1).

10.2 Age Composition (Table 10.3)

Age composition for the Faroese landings from the Faroe plateau were provided. These were used to calculate the age composition for the total landings from the Faroe plateau and Faroe Bank combined.

10.3 Weight at Age (Table 10.4)

The weight at age data set used by the 1981 Working Group was used for the years prior to 1981. Weight at age data for the 1981 catches were provided for the Faroese landings, but as these gave a large sum of products's discrepancy, the Working Group decided to use the mean for the years 1978-80, and these values were also used for the catch prediction.

10.4 Fishing Mortality

The available effort data indicated a slight reduction in the effort directed towards haddock in 1981 compared to 1980. Analysis of catch in number by age group per unit effort by the smaller long-liners supported this. As the reduction in effort, however, appeared to be small, the Working Group chose as input Fs the same values as those used by the 1981 Working Group; this gave a fishing mortality level in 1981 similar to that in 1980.

10.5 Results of VPA

10.5.1 Fishing mortality

Estimates of fishing mortality in each year calculated by VPA are given in Table 10.5, together with input values for 1980 and for the oldest age group in each year.

10.5.2 Spawning stock biomass and recruitment

Estimates of spawning stock biomass (Table 10.6, Figure 10.1.B) were relatively stable at about 60 000 tonnes up to 1974. Subsequently, the spawning stock benefitted from the recruitment of the abundant 1972 and 1973 year classes, which increased the spawning stock to about 93 000 tonnes. By 1981, the spawning stock had returned to a lower level. The estimated numbers of recruits at age 1 are given in Table 10.5 and Figure 10.1.C. In recent years, the year classes of 1972-74 were the highest on record, but subsequently the recruitment declined and the 1977 year class appears to have failed almost completely.

In the predictions two different recruitment levels were assumed: Option 1: recruitment of 20 million 1 year olds consistent with the lower recruitment in recent years, and Option 2: recruitment of 39 million 1 year olds equal to the average recruitment in the years 1966-78.

10.6 Yield per Recruit

The yield per recruit curve given in Figure 10.2 has been calculated using the exploitation pattern assumed for 1981 and the mean weight at age for the years 1978-80.

The present level of  $\bar{F}_{4-6} = 0.28$  is below  $F_{max} = 0.49$ .

10.7 Catch Predictions

Table 10.7 shows the input data used in the catch predictions, and the results are given in Tables 10.8 and 10.9, and plotted graphically in Figure 10.3. If fishing mortality is maintained at the 1981 level ( $\bar{F}_{4-6} = 0.28$ ), and assuming the lower recruitment level (Option 1), landings of 11 000 tonnes are predicted for 1982, and 10 300 tonnes for 1983.

11. OTHER STOCKS IN DIVISION Vb

Landing statistics for other species in Division Vb have been updated to include 1980 and are given in Tables 11.1 - 11.10.

12. APPROPRIATE MESH SIZES FOR SAITHE FOR TRAWL GEARS IN THE NORTH-EAST ARCTIC AND THE NORTH SEA

Calculations have been made to indicate the expected yield per recruit for a range of mesh sizes at different levels of fishing mortality. These show the relative yields that could be expected, if saithe in the two areas were fished only by trawl gears in a single species fishery. No account has been taken of gear interactions, if gears other than trawl are used, nor of any stock and recruitment effects or of possible density-dependent growth.

The method used is that described by Macer (ICES, C.M.1982/G:3). For a range of mesh sizes from 80 mm to 200 mm, exploitation patterns and weight at age data were calculated for each mesh size (Tables 12.1 and 12.2). Selectivity data were based on a selection factor of 3.79 (Hysten, 1969, and ICES Coop.Res.Rep., Ser.B, 1968), and the selection range was adjusted in proportion to mesh size. At the lower end of the length range with decreasing mesh size, the capture by trawl is increasingly determined by availability rather than by selection.

Using the calculated exploitation patterns and weights at age, yields per recruit were calculated for each mesh size for a range of levels of fishing mortality for the two areas (Tables 12.3 and 12.4). The values of  $F_{max}$  on the yield per recruit curve for each mesh size are also given in the tables. In both tables, the  $F$  values indicated are those on 4 year old fish. The present equivalent  $F$  values generated by the human consumption trawl fisheries are 0.28 in the North-East Arctic and 0.38 in the North Sea. At these current levels of fishing mortality, the maximum yield per recruit would be obtained using mesh sizes of 160 mm in the North-East Arctic and 180 mm in the North Sea.



13. INTERRELATIONSHIPS BETWEEN DIVISION IIa AND SUB-AREA IV

With regard to the interrelationships between Division IIa and Sub-area IV, the Working Group considered a paper by Jakobsen (ICES, C.M.1981/G:36). The analysis made in this paper is likely to represent more accurately the assessments based on the North-East Arctic and North Sea stocks as opposed to the assessments made by the Working Group based on the North-East Arctic and North Sea statistical areas. However, it is difficult to use these stock assessments as a basis for management advice. With the present regulatory boundary at 62°N, and no change in the fisheries, catches of fish of the North Sea stock will be taken north of 62°N. A change of the boundary between regulatory areas to 64°N would result in catches of the North-East Arctic stock, particularly of the spawning stock, being taken south of 64°N.

If there is no change in the regulatory boundary and there is no change in the fisheries, the traditional area-based assessments provide the best basis for management advice. However, if there were any changes in the fisheries or the conservation regulations in the area 62-64°N where distributions of the two stocks overlap, then the movements of fish between the two areas could have management implications.

For example, in the 62-64°N area there are fisheries, which concentrate their activities on young fish. The result of these fisheries is that there is, in this area, a relatively high fishing mortality on young fish. Increased yield could be obtained by improving the exploitation pattern by reducing or stopping fishing on the younger age groups. However, results of tagging experiments have indicated that young fish in the area 62-64°N tend to migrate south of 62°N as they grow older. This would imply that if fishing on young fish in the area 62-64°N is reduced, the long-term gains are likely to accrue mainly to the North Sea fisheries south of 62°N. A complete cessation of fishing in the young-fish fisheries in the 62-64°N area would result in an annual loss of about 20 000 - 30 000 tonnes from the fisheries in Division IIa (north of 62°N). If the survivors from these fisheries were subsequently available to capture only in the North Sea south of 62°N, an increase in North Sea catches of about 50 000 tonnes would be expected. This figure is based on the expected number of additional recruits to the North Sea and the yield per recruit being achieved at current North Sea levels of fishing mortality and with the current North Sea exploitation pattern.

14. DEFICIENCIES IN THE DATA REQUIRED FOR ASSESSMENTS

Age and length sampling of the stocks assessed in this report seem presently to be carried out at a satisfactory level. In all saithe stocks effort data have so far been of little use as a basis for estimates of fishing mortality. This is chiefly a result of the fact that saithe in many fisheries is not the main target species. In some cases, there are effort data that may be potentially useful, but the time series is too short. The prospects of improving the effort data generally seem poor, although some improvement may be achieved, if effort could in some way be partitioned to indicate the level of effort directed towards saithe.

Reliable estimates of recruitment are also lacking. For saithe, no useful method for estimating recruitment has yet been demonstrated.

Groundfish surveys have been commenced in some areas, but their potential usefulness for saithe stock assessments has yet to be determined.

Last year's Working Group noted inadequacies in the data base for saithe in Sub-area VI.

Data from 1979 onwards appear satisfactory but conflict with weight at age data estimates for previous years and suggest that the Scottish age/length keys applied to French data in earlier years may be inappropriate. A solution to this problem cannot be attempted until Scottish data are revised. It is hoped that this will be done before next year's meeting.

#### REFERENCES

- Anon. 1981. Report of the Saithe (Coalfish) Working Group. Copenhagen, 22-28 April 1981. ICES, C.M.1981/G:9.
- ICES. 1969. Liaison Committee Report 1968. ICES, Coop.Res., Ser.B.
- Jakobsen, T. 1981. Assessment of the Northeast Arctic and North Sea stocks of saithe taking into account migration. ICES, C.M.1981/G:36.
- Macer, C T. 1982. Mesh size and yield in the North Sea fisheries for cod, haddock and whiting. ICES, C.M.1982/G:3.

Table 3.1 Summary of total landings of SAITHE from the main fishing areas (in tonnes, whole weight). This table is based on the biological data supplied to the Working Group and used in the assessments. These figures differ to some extent from the official Bulletin Statistique data which are used for Tables 4.1, 5.1, 6.1, 7.1 and 8.1.

(IV and IIIa includes industrial fishery by-catch by Denmark and Norway)

Year	Fishing area					Total
	I + II	IV+IIIa	Va	Vb	VI	
1960	136 006	31 515	48 120	11 845	8 349	235 835
1961	109 821	35 489	50 826	9 592	6 724	212 452
1962	122 841	24 559	50 514	10 454	7 159	215 527
1963	148 036	30 300	48 011	12 693	6 609	245 649
1964	198 110	58 669	60 257	21 893	13 596	352 525
1965	184 548	73 274	60 177	22 181	18 395	358 575
1966	201 860	96 353	52 003	25 563	18 534	394 313
1967	191 191	76 759	75 712	21 319	16 034	381 015
1968	107 181	98 179	77 549	20 387	12 787	316 083
1969	140 379	115 550	115 853	27 437	17 214	416 433
1970	260 404	222 100	116 601	29 110	14 538	642 753
1971	244 732	252 619	136 764	32 706	19 246	686 067
1972	210 508	245 801	111 301	42 186	29 225	639 021
1973	215 659	225 771	110 888	57 574	35 812	645 704
1974	262 301	272 944	97 568	47 188	36 298	716 299
1975	233 453	278 126	87 954	41 578	30 949	672 060
1976	242 486	319 758	82 003	33 067	41 432	718 746
1977	182 808	194 858	62 026	34 835	28 467	502 994
1978	154 465	142 077	49 672	28 135	31 536	405 88 5
1979	164 180	114 394	63 504	27 246	21 708	391 0 32
1980	154 379	123 444	58 347	25 568	20 332	382 070
1981*	172 443	123 847	58 986	30 185	24 058	409 519

\*Provisional

Table 4.1 Nominal catch (tonnes) of SAITHE in Sub-area I and Divisions IIa and IIb, 1972-81.  
(Data for 1972-1980 from Bulletin Statistique)

Country	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981*
Belgium	-	-	5	47	1	-	-	-	-	-
Faroe Islands	109	7	46	28	20	270	809	1 117	532	234
France	14 519	11 320	7 119	3 156	5 609	5 658	4 345	2 601	1 016	10
German Dem. Rep.	7 474	12 015	29 466	28 517	10 266	7 164	6 484	2 435	-	-
Germany, Fed.Rep.	24 595	30 338	33 155	41 260	49 056	19 985	18 190	14 823	12 511	8 307
Netherlands	-	-	-	-	64	-	-	-	-	-
Norway	143 775	148 789	152 699	122 598	131 675	139 705	121 069	141 346	128 878	163 420
Poland	1 111	23	2 521	3 860	3 164	1	35	-	-	-
Portugal	-	-	-	6 430	7 233	783	203	-	-	-
Spain	9 247	2 115	7 075	11 397	21 661	1 327	121	685	780	-
Sweden	-	-	-	8	-	-	-	-	-	-
U.K. (England & Wales)	8 223	6 503	3 001	2 623	4 651	6 853	2 790	1 170	794	395
U.K. (Scotland)	125	248	103	140	73	82	37	-	-	-
USSR	1 278	2 411	28 931	13 389	9 013	989	381	3	43	77
<b>Total</b>	<b>210 456</b>	<b>213 769</b>	<b>264 121</b>	<b>233 453</b>	<b>242 486</b>	<b>182 817</b>	<b>154 464</b>	<b>164 180</b>	<b>144 554</b>	<b>172 443</b>

\*Preliminary

Table 4.2 North-East Arctic SAITHE.  
Input catch in number ('000) for VPA.

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	1	1	281	110	1	497	1	194	1
2	7450	6952	5297	4090	25952	19842	11608	13829	21159
3	22392	29664	25196	77333	43540	77019	65178	76296	36782
4	54537	24836	18584	11949	62846	59280	52389	25206	44027
5	13124	35956	5101	16939	13987	26961	29146	26911	13671
6	12899	4125	8282	4747	16189	9556	10186	16031	20419
7	4652	5616	787	4798	5122	9592	5616	7114	12148
8	1374	2916	1913	1126	7950	2901	3547	3935	4802
9	933	1413	900	1711	2504	4352	1865	2871	3258
10	965	1397	577	675	3697	2195	2140	2610	2505
11	472	849	391	202	1096	3136	1229	1565	1436
12	560	629	239	140	757	1303	796	791	1444
13	597	550	141	31	323	354	351	812	432
14	443	408	131	48	276	252	261	442	263
15+	828	1057	264	90	347	465	532	314	246
TOTAL	121227	116369	67884	123989	184587	217685	184825	178921	164593
	1975	1976	1977	1978	1979	1980	1981		
1	1	52	121	1711	907	486	128		
2	81601	54151	31662	45758	28334	18226	10443		
3	60832	125030	99049	48969	61963	40796	83226		
4	11691	30576	34517	27685	23328	36644	20788		
5	16366	7947	10140	12476	14122	9211	21907		
6	4436	8712	2062	4534	4400	6379	3422		
7	7808	3435	4332	1468	2901	3200	2541		
8	6789	3212	1456	1848	963	1338	1864		
9	2914	2679	1606	938	1356	147	365		
10	2350	1724	965	976	438	730	258		
11	1937	1091	463	655	305	411	242		
12	1245	852	244	681	281	454	86		
13	459	489	211	284	168	257	143		
14	260	140	58	231	222	239	92		
15+	239	308	158	299	216	268	46		
TOTAL	198928	240398	186842	148513	139904	118786	145851		

Table 4.3 North-East Arctic SAITHE.  
Mean weight at age of the stock (kg).

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
2	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340
3	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710
4	1.110	1.110	1.110	1.110	1.110	1.110	1.110	1.110	1.110
5	1.630	1.630	1.630	1.630	1.630	1.630	1.630	1.630	1.630
6	2.330	2.330	2.330	2.330	2.330	2.330	2.330	2.330	2.330
7	3.160	3.160	3.160	3.160	3.160	3.160	3.160	3.160	3.160
8	4.030	4.030	4.030	4.030	4.030	4.030	4.030	4.030	4.030
9	4.870	4.870	4.870	4.870	4.870	4.870	4.870	4.870	4.870
10	5.630	5.630	5.630	5.630	5.630	5.630	5.630	5.630	5.630
11	6.440	6.440	6.440	6.440	6.440	6.440	6.440	6.440	6.440
12	7.110	7.110	7.110	7.110	7.110	7.110	7.110	7.110	7.110
13	7.820	7.820	7.820	7.820	7.820	7.820	7.820	7.820	7.820
14	8.920	8.920	8.920	8.920	8.920	8.920	8.920	8.920	8.920
15+	9.500	9.500	9.500	9.500	9.500	9.500	9.500	9.500	9.500

	1975	1976	1977	1978	1979	1980	1981
1	0.250	0.250	0.250	0.250	0.250	0.280	0.280
2	0.340	0.340	0.340	0.340	0.340	0.400	0.400
3	0.710	0.710	0.710	0.710	0.710	0.670	0.670
4	1.110	1.110	1.110	1.110	1.110	1.150	1.150
5	1.630	1.630	1.630	1.630	1.630	1.880	1.880
6	2.330	2.330	2.330	2.330	2.330	2.510	2.510
7	3.160	3.160	3.160	3.160	3.160	3.250	3.250
8	4.030	4.030	4.030	4.030	4.030	4.010	4.010
9	4.870	4.870	4.870	4.870	4.870	4.540	4.540
10	5.630	5.630	5.630	5.630	5.630	5.060	5.060
11	6.440	6.440	6.440	6.440	6.440	5.580	5.580
12	7.110	7.110	7.110	7.110	7.110	6.170	6.170
13	7.820	7.820	7.820	7.820	7.820	6.790	6.790
14	8.920	8.920	8.920	8.920	8.920	7.480	7.480
15+	9.500	9.500	9.500	9.500	9.500	8.500	8.500

Table 4.4 North-East Arctic SAITHE.  
Fishing mortalities from VPA (M = 0.2).

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.03	0.04	0.02	0.01	0.08	0.10	0.05	0.14	0.12
3	0.20	0.18	0.20	0.33	0.19	0.35	0.58	0.49	0.64
4	0.37	0.35	0.16	0.14	0.50	0.41	0.42	0.46	0.58
5	0.33	0.45	0.11	0.22	0.24	0.41	0.37	0.40	0.59
6	0.28	0.16	0.18	0.14	0.34	0.26	0.27	0.35	0.61
7	0.21	0.19	0.04	0.15	0.23	0.34	0.24	0.30	0.50
8	0.14	0.19	0.09	0.08	0.38	0.20	0.20	0.26	0.35
9	0.15	0.21	0.08	0.11	0.24	0.37	0.19	0.25	0.36
10	0.23	0.36	0.13	0.08	0.35	0.35	0.31	0.43	0.36
11	0.31	0.32	0.16	0.06	0.19	0.37	0.34	0.40	0.44
12	0.33	0.87	0.14	0.08	0.33	0.37	0.28	0.38	0.79
13	0.27	0.65	0.48	0.02	0.26	0.25	0.15	0.50	0.37
14	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
15+	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
F(3-8),U	0.25	0.25	0.15	0.18	0.31	0.33	0.35	0.38	0.54

	1975	1976	1977	1978	1979	1980	1981	1976-1978
1	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
2	0.26	0.21	0.20	0.16	0.19	0.08	0.08	0.19
3	0.59	0.82	0.73	0.53	0.34	0.46	0.60	0.69
4	0.43	0.67	0.55	0.46	0.52	0.34	0.45	0.56
5	0.45	0.58	0.49	0.40	0.45	0.40	0.35	0.49
6	0.33	0.45	0.29	0.43	0.24	0.37	0.25	0.39
7	0.30	0.46	0.43	0.35	0.53	0.27	0.25	0.41
8	0.58	0.39	0.36	0.33	0.41	0.51	0.25	0.36
9	0.37	0.48	0.34	0.41	0.43	0.10	0.23	0.41
10	0.47	0.38	0.31	0.36	0.34	0.43	0.25	0.35
11	0.53	0.42	0.17	0.37	0.18	0.62	0.25	0.32
12	0.87	0.47	0.15	0.39	0.26	0.45	0.25	0.34
13	0.63	1.10	0.20	0.27	0.16	0.41	0.25	0.52
14	0.40	0.40	0.35	0.35	0.35	0.35	0.25	0.37
15+	0.40	0.40	0.35	0.35	0.35	0.35	0.25	0.37
F(3-8),U	0.48	0.56	0.47	0.41	0.41	0.39	0.36	

Table 4.5 North-East Arctic SAITHE.  
Stock size in numbers ('000) and spawning stock biomass (tonnes) from VPA.

1 JANUARY

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	234493	454262	427071	464618	268719	539304	145505	252284	475721
2	250935	191986	371917	349402	380298	220008	277350	119129	206378
3	137253	198722	150909	299716	282372	287948	162234	216597	85070
4	192504	92212	135983	100870	175912	191975	166575	74508	108966
5	51740	108645	53191	94770	71816	87716	103989	89383	38406
6	58655	30570	56711	38950	62345	46213	47626	58969	49031
7	27235	56424	21312	58971	27612	36501	29241	29832	33883
8	11340	18110	24764	16738	27583	17997	21268	18887	18031
9	7282	8046	12202	18549	12688	15447	12123	14219	11924
10	5255	5122	5316	9178	13644	8135	8739	8246	9059
11	1954	5434	2939	5832	6906	7851	4689	5232	4410
12	2176	1176	2049	2054	2955	4667	5621	2735	2879
13	2767	1278	403	1462	1555	1739	2651	2249	1529
14	1876	1728	555	203	1169	983	1106	1872	1114
15+	3507	4477	1118	381	1470	1970	2253	1330	1042
TOTAL	988973	1156192	1266439	1439696	1337044	1268455	988970	895473	1045443
SPAWN. ST.	122048	110565	127368	150319	157927	141502	133318	143572	139002
Total biom.	972636	1025134	1018853	1193706	1293608	1261535	1105529	1009278	916268
SSB	433230	425754	440846	479515	584320	541394	505268	523522	483715
	1975	1976	1977	1978	1979	1980	1981	1982	1966-1978
1	584398	237664	417416	221065	527238	183357	141295	*****	332348
2	387849	314718	194536	341642	179447	267101	149664	115567	27396
3	149892	244150	208922	130765	238487	121405	202241	113114	196504
4	36771	68298	88447	82640	63209	139594	62824	90873	116589
5	49823	19619	28600	41696	42839	30858	81374	52797	64569
6	17425	26116	8953	14330	22941	22411	16998	46949	39684
7	21881	10281	13571	5476	7665	14824	12622	10838	25555
8	16857	10919	5338	7226	3165	3678	9259	8048	16543
9	10449	7727	6057	3063	4256	1727	1813	5904	10752
10	6837	5939	3925	3516	1666	2268	1282	1156	7147
11	5168	3491	3315	2348	2002	971	1202	817	4275
12	2323	2496	1880	2297	1334	1365	427	766	2562
13	1070	793	1280	1319	1269	840	710	272	1546
14	864	465	215	858	825	888	457	455	1001
15+	795	1024	587	1111	802	995	228	437	1620
TOTAL	1092401	953700	983042	899351	897147	792260	682396		
SPAWN. ST.	83668	69251	45120	41543	45927	49967	44999		
Total biom.	796893	716275	652694	598459	619960	631199	615218		
SSB	340475	268719	189068	174497	167822	173138	155057		

1  
NO  
1



Table 4.6 North-East Arctic SAITHE.  
Input data used for catch predictions.

AGE	1982 STOCK SIZE	F-PATTERN	M	MATURITY OGIVE	WEIGHT IN THE CATCH	WEIGHT IN THE STOCK
1	332000.00	0.0000	0.200	0.0000	0.2900	0.2800
2	272000.00	0.0800	0.200	0.0000	0.4300	0.4000
3	113114.00	0.6000	0.200	0.0000	0.7300	0.6700
4	90873.00	0.4500	0.200	0.0000	1.3900	1.1500
5	32797.00	0.3500	0.200	0.0000	2.0300	1.8800
6	46949.00	0.2500	0.200	1.0000	2.7600	2.5100
7	10838.00	0.2500	0.200	1.0000	3.2900	3.2500
8	8048.00	0.2500	0.200	1.0000	4.3800	4.0100
9	5904.00	0.2500	0.200	1.0000	5.9200	4.5400
10	1156.00	0.2500	0.200	1.0000	6.4200	5.0600
11	817.00	0.2500	0.200	1.0000	6.6000	5.5800
12	766.00	0.2500	0.200	1.0000	6.8600	6.1700
13	272.00	0.2500	0.200	1.0000	6.7400	6.7900
14	453.00	0.2500	0.200	1.0000	7.1100	7.4800
15+	437.00	0.2500	0.200	1.0000	7.6500	8.5000

YEAR  
----

RECRUITMENT  
-----

82  
83  
84

\*\*\*\*\*  
330000.00  
330000.00

Table 4.7 Catch Predictions and Management Options. Area : North-east Arctic  
Species: SAITHE

1981		1982				1983					1984	
Total landings	F (3-8)	Stock Biom.	Spawning Stock Biom.	F (3-8)	Total landings	Management Option for 1983	Stock Biom.	Spawning Stock Biomass	F (3-8)	Total landings	Stock Biom.	Spawning Stock Biomass
172	0.36	680	236	0.36	155	$F_{0.1}$	718	231	0.16	85		285
						$F_{max}$			0.26	130		265
						$F_{83}=F_{81}$			0.36	170	740	246
						$F_{83}=0$			0	0	946	325
						$F_{83}=0.2 F_{81}$			0.07	40	898	307
						$F_{83}=0.5 F_{81}$			0.18	94	832	283
						$F_{83}=1.5 F_{81}$			0.54	234	665	214
						$F_{83}=2.0 F_{81}$			0.72	287	604	186

Weights in thousands of tonnes

Recruitment 1981-1984  $R_1 = 332$  millions

Stock biomass = Fish of age 1 and older

Spawning stock biomass = Fish of age 6 and older

Exploitation pattern 1982-1983 based on 1981

Table 5.1 Nominal catch (tonnes) of SAITHE in Sub-area IV and Division IIIa, 1972-1981  
(Data for 1972-1980 from Bulletin Statistique)

Country	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981*
Belgium	59	55	33	81	127	107	44	14	13	11
Denmark	17 000	10 100	8 388	10 149	15 111	17 334	10 372	10 461	10 370	6 377
Faroe Islands	182	552	581	287	425	318	213	407	1 020	417
France	26 696	32 961	28 619	24 396	32 552	41 022	38 122	40 983	37 306	42 966
German Dem.Rep.	10 674	7 668	5 816	5 882	2 088	2 430	2 404	1 504	925	-
Germany Fed.Rep.	8 665	12 003	20 589	18 622	38 698	26 860	25 982	18 780	11 095	9 362
Iceland	4	23	5	1	-	-	-	-	-	-
Ireland	-	-	-	-	119	126	88	-	-	-
Netherlands	12 532	9 232	14 504	8 917	6 101	7 270	5 135	1 466	245	-
Norway <sup>b)</sup>	23 256	15 219	9 246	12 483	17 856	14 949	17 627	17 575	47 959	51 915
Poland	186	7 512	22 203	35 304	35 819	12 378	5 661	6 104	2 404	698
Spain	190	108	308	249	-	-	-	-	-	-
Sweden	3 899	1 876	1 187	913	1 271	1 275	990	211	342	123
UK(Engl.+Wales)	3 744	3 378	4 353	3 472	6 300	6 822	8 382	6 256	4 879	4 148
UK (Scotland)	10 797	10 834	10 956	8 898	13 034	11 366	14 330	8 257	6 525	6 550
USSR	99 883	83 333	104 500	110 743	83 669	46 385	10 161	2 015	-	-
Sub-total	217 767	194 854	231 288	240 397	253 170	188 642	139 511	114 033	123 083	122 567
By-Catch from Industrial Fisheries:										
Denmark <sup>a)</sup>	22 600	24 400	38 800	27 800	53 684	1 805	72	493	-	-
Norway <sup>a)</sup>	5 434	6 517	3 469	9 878	13 082	4 392	2 494	1 142	363	1 280
TOTAL	245 801	225 771	273 557	278 075	319 936	194 839	142 077	115 668	123 446	123 847

\*) Preliminary

a) Data from national laboratories

b) In 1973 and 1974 estimates of industrial by-catches were included in the Norwegian catches reported to ICES. These estimates have later been revised and the sum of industrial by-catch and human consumption landings therefore deviate somewhat from the Bulletin Statistique figures.

Table 5.2 North Sea SAITHE.  
Input catch in numbers ('000) for VPA.

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	1	1	130	1628	626	390	457	4231	3670
2	12937	7606	5615	19813	2852	10147	20434	30315	14750
3	11485	13874	15409	19285	37117	68102	40294	47715	60680
4	27279	12787	19025	12488	74994	53348	62533	33780	31803
5	4367	13104	9668	9889	12391	30131	23124	24725	12431
6	3579	2085	5725	6045	10874	3717	20826	15345	20595
7	727	1450	571	3952	3779	3874	3635	8058	14504
8	272	470	446	730	1996	2682	3113	1798	5028
9	193	294	346	489	600	1808	1901	1267	1427
10	101	143	164	192	326	403	1110	1025	809
11	78	82	123	62	86	223	265	579	412
12	61	43	70	40	59	51	126	261	222
13	35	19	69	33	26	18	25	81	132
14	34	33	53	23	26	18	68	37	30
15+	55	43	53	13	27	31	49	21	27
TOTAL	61204	52034	57467	74682	145779	174943	177960	169238	166520
	1975	1976	1977	1978	1979	1980	1981		
1	311	228	2586	1237	894	974	4395		
2	72544	23125	12993	16970	16959	17642	19488		
3	51287	223680	22567	29504	10067	10498	18803		
4	23585	51407	51801	27679	14756	11029	8988		
5	9028	9852	12914	17251	12843	9601	6988		
6	6717	5111	4684	3787	6878	6503	4423		
7	12660	3309	3173	1162	2641	4512	3116		
8	8656	4842	2902	1069	873	985	3063		
9	3299	2978	3466	707	470	500	686		
10	1100	1068	1895	736	282	406	285		
11	616	420	875	640	402	303	377		
12	254	253	342	415	343	254	268		
13	275	121	341	213	157	216	280		
14	77	161	123	95	154	147	248		
15+	25	66	129	108	101	90	272		
TOTAL	190436	326621	120791	101573	67820	63660	71680		

Table 5.3 North Sea SAITHE (Sub-area IV).  
Mean weight at age of the stock (kg).

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
2	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
3	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
4	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
5	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
6	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48
7	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38
8	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
9	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91
10	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65
11	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45
12	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16
13	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07	8.07
14	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
15+	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00

	1975	1976	1977	1978	1979	1980	1981
1	0.30	0.30	0.30	0.30	0.43	0.27	0.28
2	0.45	0.45	0.45	0.45	0.41	0.39	0.52
3	0.75	0.75	0.75	0.75	0.93	0.87	0.89
4	1.16	1.16	1.16	1.16	1.56	1.75	1.63
5	1.79	1.79	1.79	1.79	2.24	2.35	2.49
6	2.48	2.48	2.48	2.48	3.06	2.96	3.37
7	3.38	3.38	3.38	3.38	3.92	4.04	4.45
8	4.20	4.20	4.20	4.20	5.12	5.00	5.38
9	4.91	4.91	4.91	4.91	6.07	5.69	6.39
10	5.65	5.65	5.65	5.65	6.47	6.55	7.30
11	6.45	6.45	6.45	6.45	6.97	7.48	7.56
12	7.16	7.16	7.16	7.16	7.59	7.61	8.30
13	8.07	8.07	8.07	8.07	8.26	7.96	8.61
14	9.00	9.00	9.00	9.00	8.14	8.15	8.76
15+	9.00	9.00	9.00	9.00	8.82	9.14	8.85

Table 5.4 North Sea SAITHE (Sub-area IV).  
Fishing mortalities from VPA (M = 0.2).

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01
2	0.09	0.07	0.02	0.06	0.01	0.06	0.12	0.18	0.07
3	0.14	0.14	0.19	0.08	0.16	0.27	0.34	0.46	0.67
4	0.41	0.23	0.29	0.23	0.49	0.36	0.43	0.54	0.64
5	0.33	0.36	0.28	0.24	0.38	0.38	0.26	0.30	0.39
6	0.48	0.26	0.26	0.28	0.45	0.19	0.49	0.27	0.44
7	0.27	0.36	0.10	0.29	0.28	0.28	0.28	0.36	0.45
8	0.16	0.29	0.18	0.19	0.23	0.34	0.39	0.22	0.39
9	0.25	0.26	0.35	0.30	0.23	0.33	0.42	0.27	0.27
10	0.19	0.30	0.22	0.34	0.34	0.24	0.35	0.42	0.27
11	0.22	0.23	0.45	0.12	0.25	0.41	0.25	0.31	0.30
12	0.17	0.18	0.31	0.26	0.17	0.23	0.43	0.41	0.19
13	0.20	0.07	0.49	0.24	0.27	0.07	0.17	0.55	0.38
14	0.30	0.30	0.30	0.30	0.30	0.30	0.40	0.40	0.40
15+	0.30	0.30	0.30	0.30	0.30	0.30	0.40	0.40	0.40
F( 3- 6),U	0.34	0.25	0.25	0.21	0.37	0.30	0.38	0.39	0.54
	1975	1976	1977	1978	1979	1980	1981	1977-1978	
1	0.00	0.00	0.02	0.01	0.01	0.01	0.02	0.02	
2	0.15	0.15	0.12	0.23	0.29	0.17	0.14	0.17	
3	0.40	0.93	0.22	0.41	0.20	0.29	0.27	0.32	
4	0.61	0.89	0.58	0.46	0.37	0.36	0.44	0.52	
5	0.37	0.56	0.58	0.39	0.40	0.45	0.40	0.48	
6	0.38	0.38	0.57	0.33	0.26	0.37	0.38	0.45	
7	0.54	0.33	0.42	0.27	0.41	0.27	0.30	0.35	
8	0.54	0.41	0.53	0.25	0.33	0.27	0.30	0.39	
9	0.49	0.36	0.58	0.23	0.16	0.32	0.30	0.41	
10	0.34	0.29	0.40	0.23	0.14	0.21	0.30	0.32	
11	0.35	0.21	0.40	0.23	0.19	0.22	0.30	0.31	
12	0.31	0.23	0.26	0.34	0.18	0.18	0.30	0.30	
13	0.38	0.24	0.56	0.26	0.20	0.17	0.30	0.41	
14	0.40	0.40	0.40	0.30	0.30	0.30	0.30	0.35	
15+	0.40	0.40	0.40	0.30	0.30	0.30	0.30	0.35	
F( 3- 6),U	0.44	0.	0.49	0.40	0.31	0.37	0.37		

Table 5.5 North Sea SAITHE (Sub-area IV).  
Stock size in numbers ('000) and Biomass (tonnes).

1 JANUARY									
	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	156383	422454	441949	473779	241315	239760	242987	281334	699019
2	157260	128034	345875	361720	386427	197007	195947	198528	220516
3	95047	117086	97963	278108	278272	313804	152138	142006	135239
4	88624	67468	83358	66329	210297	194389	195678	88367	73486
5	17054	48084	43732	51143	43068	104983	111246	104121	42106
6	10342	10040	27600	27112	32975	24138	58903	70282	63023
7	3332	5260	6344	17447	10762	17247	16415	29565	43743
8	2036	2074	3004	4679	10731	10326	10638	10171	16969
9	956	1422	1276	2058	3174	6990	6045	5915	6709
10	647	609	900	734	1245	2059	4099	3244	3703
11	434	439	370	589	428	727	1323	2359	1736
12	428	285	285	195	426	273	395	845	1411
13	209	295	195	171	122	296	178	210	457
14	144	140	224	97	110	76	226	123	100
15+	233	182	224	55	114	131	163	70	90
TOTAL	533129	803871	1053298	1284213	1225467	1112205	996380	957139	1314308
SPAWN. ST.	35815	68829	84155	104278	109156	167246	209651	226904	180047
Total biom.	387048	508457	660571	850017	990969	1027722	1016668	958156	1029665
SSB	95277	158028	202176	259587	292033	406297	514506	575388	531552
	1975	1976	1977	1978	1979	1980	1981	1982	1975-1979
1	218195	160542	115897	91698	154907	201632	200000*****	148248	
2	568994	178362	131234	92553	73959	126019	164202	159778	209021
3	172148	400483	125194	95751	60504	45306	87284	116874	170812
4	50513	94915	128888	82189	51907	40473	27657	54552	82883
5	31757	25176	31943	59175	42477	29251	23252	14583	38102
6	23316	17879	11795	14599	32964	23253	15339	12750	20111
7	33131	13060	10650	5465	8550	20803	13199	8589	14051
8	22809	15791	7720	5382	3429	4631	12974	8005	11026
9	9380	10924	8584	3722	3445	2023	2906	7869	7211
10	4210	4724	6270	3927	2411	2397	1207	1762	4308
11	2305	2458	2907	3433	2553	1720	1597	732	2731
12	1051	1334	1635	1595	2235	1728	1135	969	1570
13	955	632	864	1031	933	1521	1186	689	883
14	256	535	409	402	652	623	1050	719	451
15+	83	219	429	457	428	381	1152	1336	323
TOTAL	1145083	927036	583819	461360	441354	501760	554121		
SPAWN. ST.	129234	92734	82605	99188	100077	88330	74978		
Total biom.	941582	856389	612593	509582	569325	532487	580712		
SSB	425410	317500	275363	273285	335148	318655	316564		

Table 5.6 North Sea SAITHE

Calculation of total international fishing effort, 1976-1981.

Year	Effort of French distant water trawlers . days fishing x 100 hp weighted by area	Catch of French distant water trawlers (tonnes)	Total international catch (tonnes)	Effort relative to 1981
1976	81 249	29 931	319 936	4.27
1977	88 260	40 024	194 839	2.11
1978	57 727	29 738	142 077	1.36
1979	73 658	39 619	115 668	1.06
1980	74 094	34 736	123 445	1.29
1981	70 595	42 965	123 846	1.00



Table 5.7 North Sea SAITHE.  
Input data used for catch predictions.

AGE	1982 STOCK SIZE	F-PATTERN	M	MATURITY OGIVE	WEIGHT IN THE CATCH	WEIGHT IN THE STOCK
1	148248.00	0.0245	0.200	0.0000	0.3300	0.3300
2	159778.00	0.1400	0.200	0.0000	0.4400	0.4400
3	116874.00	0.2700	0.200	0.0000	0.9000	0.9000
4	54552.00	0.4400	0.200	0.0000	1.6500	1.6500
5	14583.00	0.4000	0.200	1.0000	2.3600	2.3600
6	12750.00	0.3800	0.200	1.0000	3.1300	3.1300
7	8589.00	0.3000	0.200	1.0000	4.1400	4.1400
8	8005.00	0.3000	0.200	1.0000	5.1700	5.1700
9	7869.00	0.3000	0.200	1.0000	6.0500	6.0500
10	1762.00	0.3000	0.200	1.0000	6.7700	6.7700
11	732.00	0.3000	0.200	1.0000	7.3400	7.3400
12	969.00	0.3000	0.200	1.0000	7.8200	7.8200
13	689.00	0.3000	0.200	1.0000	8.2800	8.2800
14	719.00	0.3000	0.200	1.0000	8.3500	8.3500
15+	1336.00	0.3000	0.200	1.0000	8.9400	8.9400

YEAR	RECRUITMENT
82	*****
83	148248.00
84	148248.00

Table 5.8 Catch Predictions and Management Options. Area: North Sea  
Species: SAITHE

1981		1982				1983					1984	
Total landings	F (3-6)	Stock Biom.	Spawning Stock Biom.	F (3-6)	Total landings	Management Option for 1983	Stock Biom.	Spawning Stock Biomass	F (3-6)	Total landings	Stock Biom.	Spawning Stock Biomass
124	.37	562	247	.37	124	F <sub>0.1</sub>	566	242	.16	61	645	324
						F <sub>max</sub>			.26	97	598	291
						F <sub>83</sub> =F <sub>81</sub>			.37	131	555	261
						F <sub>83</sub> =0			0	0	723	380
						F <sub>83</sub> =0.2 F <sub>81</sub>			.07	30	685	352
						F <sub>83</sub> =0.5 F <sub>81</sub>			.18	71	632	315
						F <sub>83</sub> =1.5 F <sub>81</sub>			.55	182	490	217
						F <sub>83</sub> =2.0 F <sub>81</sub>			.74	226	435	180

Weights in thousands of tonnes

Recruitment 1982-1984 R<sub>1</sub> = 148 millions R<sub>1</sub> 1981 = 200 millions

Stock biomass = Fish of age 1 and older

Spawning stock biomass = Fish of age 5 and older

Exploitation pattern 1982-1983 based on 1977-1978 average

Table 6.1 Nominal catch (tonnes) of SAITHE in Division Va, 1972-1981.

(Data for 1972 to 1980 from Bulletin Statistique)

Country	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981*
Belgium	2 250	2 131	2 371	1 638	1 615	1 448	1 092	980	980	532
Faroe Islands	857	1 467	1 712	1 366	3 267	3 013	4 250	5 457	4 930	3 547
France	-	-	94	32	51	-	-	-	-	-
German Dem.Rep.	3 471	-	-	-	-	-	-	-	-	-
Germany, Fed.Rep.	30 918	38 565	18 627	13 820	13 785	10 575	-	-	-	-
Iceland	59 945	56 567	65 169	61 430	56 811	46 973	44 327	57 066	52 436	54 905
Norway	-	-	-	6	5	4	3	1	1	2
Poland	150	-	-	-	-	-	-	-	-	-
Spain	-	-	-	-	-	-	-	-	-	-
U.K. (England & Wales)	13 152	11 874	8 845	8 643	6 024	13	-	-	-	-
U.K. (Scotland)	545	509	731	1 021	443	-	-	-	-	-
USSR	-	-	-	-	-	-	-	-	-	-
Total	111 288	111 113	97 549	87 956	82 001	62 026	49 672	63 504	58 347	58 986

\*Preliminary

Table 6.2 Icelandic SAITHE.  
Input catch in numbers ('000) for VPA.

	1966	1967	1968	1969	1970	1971	1972	1973	1974
2	31	196	1	20	18	7	49	25	111
3	940	1116	836	1572	287	476	565	219	1269
4	2090	3400	2605	4395	5622	5031	3786	1768	3404
5	3283	5591	3563	5706	4999	10221	6524	5155	2348
6	4117	4326	6318	6518	6126	6736	8046	7077	3164
7	1285	4931	3207	9130	6178	6694	4178	7372	3452
8	739	1200	3008	2796	5934	5045	3320	2616	3384
9	390	550	621	1843	1689	4272	2098	1635	1303
10	235	330	343	461	1191	959	1421	871	824
11	133	169	215	100	299	887	361	412	351
12	69	73	103	110	171	349	328	231	141
13	102	104	79	32	92	96	79	80	43
14	73	65	41	44	70	63	68	22	13
15+	93	126	95	32	86	131	73	23	20
TOTAL	13580	22177	21035	32765	32762	38967	31496	27506	19827
	1975	1976	1977	1978	1979	1980	1981		
2	16	29	5	0	0	0	0		
3	526	329	59	548	480	135	257		
4	2997	3234	2099	1145	3764	2303	1550		
5	2479	3045	2858	2435	1991	4634	4310		
6	1829	2530	1801	1556	3616	2551	5464		
7	3496	2154	1036	1275	1566	2419	1504		
8	2994	2367	1068	961	718	1612	1470		
9	1434	1530	1528	537	292	482	589		
10	710	1064	958	575	669	245	192		
11	325	295	538	476	589	132	67		
12	176	191	166	279	489	102	175		
13	100	94	71	139	150	59	130		
14	36	68	12	91	72	29	136		
15+	61	18	49	55	0	23	72		
TOTAL	17179	16948	12248	10072	14396	14726	15916		

Table 6.3 Indic SAITHE.  
Mean weight at age of the stock (kg).

	1966	1967	1968	1969	1970	1971	1972	1973	1974
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
4	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.76
5	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	2.73
6	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.29
7	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.54
8	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	7.27
9	7.64	7.64	7.64	7.64	7.64	7.64	7.64	7.64	8.42
10	8.63	8.63	8.63	8.63	8.63	8.63	8.63	8.63	9.41
11	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	10.00
12	10.29	10.29	10.29	10.29	10.29	10.29	10.29	10.29	10.56
13	10.97	10.97	10.97	10.97	10.97	10.97	10.97	10.97	11.87
14	11.55	11.55	11.55	11.55	11.55	11.55	11.55	11.55	13.12
15+	12.80	12.80	12.80	12.80	12.80	12.80	12.80	12.80	14.00

	1975	1976	1977	1978	1979	1980	1981
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	1.12	1.12	1.12	1.12	1.12	1.44	1.48
4	1.76	1.76	1.76	1.76	1.76	1.89	2.00
5	2.73	2.73	2.73	2.73	2.73	2.68	2.57
6	4.29	4.29	4.29	4.29	4.29	3.87	3.46
7	5.54	5.54	5.54	5.54	5.54	5.32	4.43
8	7.27	7.27	7.27	7.27	7.27	6.14	6.16
9	8.42	8.42	8.42	8.42	8.42	6.85	6.82
10	9.41	9.41	9.41	9.41	9.41	8.23	8.05
11	10.00	10.00	10.00	10.00	10.00	9.06	9.41
12	10.56	10.56	10.56	10.56	10.56	9.30	9.20
13	11.87	11.87	11.87	11.87	11.87	10.50	9.44
14	13.12	13.12	13.12	13.12	13.12	11.37	10.15
15+	14.00	14.00	14.00	14.00	13.12	11.67	10.76

Table 6.4 Icelandic SAITHE.  
Fishing mortalities from VPA (M = 0.2)

	1966	1967	1968	1969	1970	1971	1972	1973	1974
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.01	0.02	0.02	0.02	0.00	0.01	0.02	0.01	0.06
4	0.03	0.07	0.05	0.10	0.09	0.06	0.11	0.09	0.23
5	0.13	0.11	0.10	0.16	0.17	0.24	0.19	0.21	0.17
6	0.18	0.24	0.17	0.25	0.26	0.35	0.33	0.32	0.19
7	0.22	0.35	0.29	0.40	0.40	0.49	0.39	0.51	0.25
8	0.24	0.32	0.37	0.43	0.49	0.67	0.48	0.45	0.47
9	0.22	0.29	0.27	0.41	0.51	0.81	0.67	0.47	0.42
10	0.23	0.30	0.29	0.33	0.51	0.62	0.71	0.65	0.46
11	0.23	0.26	0.32	0.13	0.37	0.92	0.51	0.46	0.61
12	0.17	0.19	0.25	0.27	0.34	1.02	1.13	0.73	0.28
13	0.29	0.43	0.32	0.12	0.39	0.32	0.68	0.97	0.28
14	0.20	0.30	0.30	0.30	0.40	0.50	0.40	0.40	0.40
15+	0.20	0.30	0.30	0.30	0.40	0.50	0.40	0.40	0.40
F( 4- 9),U	0.17	0.23	0.21	0.29	0.32	0.44	0.36	0.34	0.29
	1975	1976	1977	1978	1979	1980	1981	1977-1979	
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3	0.02	0.01	0.00	0.01	0.01	0.01	0.01	0.01	
4	0.20	0.17	0.09	0.08	0.09	0.07	0.09	0.09	
5	0.26	0.32	0.23	0.14	0.18	0.16	0.18	0.18	
6	0.19	0.46	0.32	0.19	0.32	0.38	0.28	0.28	
7	0.33	0.35	0.35	0.39	0.29	0.37	0.40	0.34	
8	0.37	0.38	0.30	0.63	0.40	0.55	0.40	0.44	
9	0.37	0.32	0.46	0.24	0.40	0.52	0.40	0.36	
10	0.42	0.53	0.34	0.31	0.53	0.68	0.40	0.39	
11	0.33	0.31	0.56	0.29	0.60	0.19	0.40	0.48	
12	0.71	0.32	0.29	0.64	0.54	0.19	0.40	0.49	
13	0.33	1.13	0.19	0.42	0.87	0.11	0.40	0.49	
14	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
15+	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
F( 4- 9),U	0.29	0.34	0.29	0.28	0.28	0.34	0.29		

Table 6.5 Stock size in numbers ('000) and biomass (tonnes).

1 JANUARY

	1966	1967	1968	1969	1970	1971	1972	1973	1974
2	93097	73957	107652	81664	62534	54369	27601	23853	34138
3	70181	68497	60373	88137	66843	51182	28152	22554	23600
4	75013	56610	55073	48675	70741	54467	41474	22523	18268
5	30505	60019	43281	42739	35888	52847	41858	30542	16845
6	27003	22076	44698	52222	29851	24879	34071	28396	20365
7	7303	18401	14135	30413	26518	18929	14320	20127	16889
8	3767	4822	19636	8638	16702	11255	9500	7974	9875
9	2144	2419	2876	6108	4006	8557	4707	4802	4183
10	1236	1434	1486	1791	3765	2258	3035	1980	2466
11	713	806	853	908	1052	1606	991	1216	842
12	474	464	503	505	654	593	526	488	626
13	448	326	314	319	315	381	176	140	193
14	443	275	174	186	233	175	226	73	43
15+	564	534	402	136	286	364	243	76	66
TOTAL	504091	310546	341850	342392	313486	261663	206860	169743	148401
SPAWN. ST.	44096	51462	75471	81178	77480	68799	67794	65271	55550
Total biom.	556970	653452	703317	767441	762219	724398	612240	520033	434549
SSB	237125	282720	395749	442972	439244	399136	371773	357474	329978
	1975	1976	1977	1978	1979	1980	1981	1982	1970-1978
2	41064	25801	70906	56876	29780	43146	0+*****	42460	
3	27850	35606	21098	58048	46566	24382	36963	0	36990
4	18177	22326	27217	17220	47031	37692	19840	30030	32490
5	11893	12184	15366	20390	13066	35111	28781	14846	26424
6	11677	7507	7239	10009	14499	8904	24571	19682	19333
7	13824	7913	3878	4309	6793	8622	5000	15204	13412
8	10723	8177	4544	2245	2383	4154	4887	2744	8999
9	5052	6091	4570	2761	979	1307	1958	2682	5014
10	2256	2849	3612	2372	1777	539	638	1075	2677
11	1280	1210	1379	2097	1425	856	223	350	1297
12	376	756	725	648	1289	640	582	122	599
13	386	151	448	445	281	617	432	319	293
14	120	226	40	303	239	96	452	237	160
15+	263	60	163	183	0	76	239	380	183
TOTAL	144878	128856	161185	177903	166108	168143	124567		
SPAWN. ST.	45895	34939	26599	25369	24666	25812	38983		
Total biom.	389804	349450	301099	319291	347059	342203	342805		
SSB	294154	239256	187618	168305	176462	141455	174366		

35

Table 6.6 Icelandic SAITHE.  
Input values used for the catch prediction.

AGE	1982 STOCK SIZE	F-PATTERN	M	MATURITY OGIVE	WEIGHT IN THE CATCH	WEIGHT IN THE STOCK
3	34763.00	0.0077	0.200	0.0000	1.4600	1.4600
4	30030.00	0.0900	0.200	0.0000	1.9500	1.9500
5	14846.00	0.1800	0.200	0.0000	2.6200	2.6200
6	19682.00	0.2800	0.200	1.0000	3.6700	3.6700
7	15204.00	0.4000	0.200	1.0000	4.8800	4.8800
8	2744.00	0.4000	0.200	1.0000	6.1500	6.1500
9	2682.00	0.4000	0.200	1.0000	6.8400	6.8400
10	1075.00	0.4000	0.200	1.0000	8.1400	8.1400
11	350.00	0.4000	0.200	1.0000	9.2400	9.2400
12	122.00	0.4000	0.200	1.0000	9.2500	9.2500
13	319.00	0.4000	0.200	1.0000	9.9700	9.9700
14	237.00	0.4000	0.200	1.0000	10.7700	10.7700
15+	380.00	0.4000	0.200	1.0000	11.2200	11.2200

YFAR	RECRUITMENT
83	35000.00
84	35000.00



Table 6.7 Catch predictions and management options. Area: Division Va (Iceland)  
Species: SAITHE

1981		1982				1983					1984	
Total landings	$\bar{F}(4-9)$	Stock biomass	Spawning stock biomass	$\bar{F}(4-9)$	Total landings	Management option for 1983	Stock biomass	Spawning stock biomass	$\bar{F}(4-9)$	Total landings	Stock biomass	Spawning stock biomass
59	0.29	353	205	0.29	67	$\bar{F}_{0.1}$	349	184	0.15	36		212
						$\bar{F}_{max}$			0.39	85		160
						$\bar{F}_{83} = \bar{F}_{81}$			0.29	66	343	181
						$\bar{F}_{83} = 0$			0.00	0	416	249
						$\bar{F}_{83} = 0.2 \bar{F}_{81}$			0.06	15	400	233
						$\bar{F}_{83} = 0.5 \bar{F}_{81}$			0.15	36	377	212
						$\bar{F}_{83} = 1.5 \bar{F}_{81}$			0.44	92	349	155
						$\bar{F}_{83} = 2.0 \bar{F}_{81}$			0.58	114	295	133

Weights in thousands of tonnes

Recruitment 1982-84  $R_3 = 35.0$  millions

Stock biomass = fish at age 3 and older

Spawning stock biomass = fish at age 6 and older

Exploitation pattern 1982-83 based on 1977-1979 average

Table 7.1 Nominal catch (tonnes) of SAITHE in Division Vb, 1972-1981  
(Data for 1972 to 1980 from Bulletin Statistique)

Country	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981*
Belgium	-	-	-	-	6	-	-	-	-	-
Faroe Islands	5 646	2 973	3 726	2 517	2 560	5 153	15 892	22 003	23 810	29 676
France	24 006	22 676	20 457	23 980	15 367	17 038	8 128	2 974	1 110	357
German Dem. Rep.	-	-	130	26	-	-	-	-	-	-
Germany, Fed. Rep.	3 440	9 329	6 661	5 229	2 605	3 086	1 088	581	197	19
Netherlands	-	-	-	491	232	58	-	-	-	-
Norway	470	355	1 660	486	2 232	1 279	1 124	1 137	62	124
Poland	-	4 050	1 925	815	1 007	-	-	-	-	-
Spain	423	390	500	654	117	-	-	-	-	-
UK(Engl.&Wales)	2 453	7 527	3 827	2 428	3 063	2 613	557	190	13	-
UK(Scotland)	6 225	10 131	8 302	4 950	5 860	5 608	1 349	361	38	9
USSR	-	-	-	-	16	-	-	-	-	-
<b>Total</b>	<b>42 663</b>	<b>57 431</b>	<b>47 188</b>	<b>41 576</b>	<b>33 065</b>	<b>34 835</b>	<b>28 138</b>	<b>27 246</b>	<b>25 230</b>	<b>30 185</b>

\* ) Preliminary

Table 7.2 Faroe SAITHE.  
Input catch in numbers ('000) for VPA.

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0	2	0	0	2	0	0	4	5
2	68	154	222	55	774	723	217	1650	133
3	488	595	614	1191	1445	2857	2714	2515	3504
4	1540	796	1689	2086	6277	3316	1774	6253	4126
5	1201	1364	1116	2294	1558	5585	2588	7075	4011
6	1686	792	1095	1414	1478	1005	2742	3478	2784
7	806	1192	548	1118	899	828	1529	1634	1401
8	377	473	655	589	730	469	1305	693	640
9	294	217	254	580	316	326	1077	550	368
10	205	190	128	239	241	164	743	405	340
11	156	97	89	115	86	100	330	215	197
12	94	75	59	100	48	54	153	103	124
13	52	38	40	36	46	13	28	25	45
14	34	11	29	30	15	18	28	21	44
15+	45	16	59	24	23	15	21	37	52
TOTAL	7046	6012	6597	9871	13938	15473	15169	24656	17774
	1975	1976	1977	1978	1979	1980	1981		
1	0	1	0	0	0	0	0		
2	189	148	124	20	1	424	0		
3	2062	3178	1609	611	287	996	415		
4	3361	3217	2937	1743	933	877	1806		
5	3801	1720	2034	1736	1341	720	772		
6	1939	1250	1288	548	1033	673	934		
7	1045	877	767	373	584	726	910		
8	714	641	708	479	414	284	736		
9	302	468	498	466	247	212	344		
10	192	223	338	473	473	171	192		
11	193	141	272	407	368	196	92		
12	126	96	129	211	206	156	129		
13	64	60	80	146	136	261	176		
14	41	54	57	95	98	133	311		
15+	67	77	64	83	251	236	409		
TOTAL	14096	12151	10905	7391	6372	6065	7226		

Table 7.3 Faroe SAITHE.  
Mean weight at age of the stock. (Kg)

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.817	0.858	0.900	0.860	0.754	0.690	0.910	0.827	0.928
3	1.361	1.273	1.302	1.188	1.244	1.101	1.043	1.088	1.430
4	2.026	1.780	1.737	1.667	1.445	1.316	1.485	1.461	1.525
5	3.055	2.534	2.036	2.302	2.249	1.818	2.055	1.582	2.207
6	3.658	3.572	3.120	2.853	2.853	2.978	2.829	2.249	2.500
7	4.585	4.368	4.049	3.673	3.515	3.702	3.791	3.687	3.120
8	5.520	5.313	5.183	5.002	4.418	4.271	4.175	4.385	4.601
9	6.837	5.812	6.238	5.714	5.444	5.388	4.808	5.128	5.559
10	7.265	6.554	7.520	6.405	5.733	5.972	5.294	5.276	5.714
11	7.662	7.806	8.049	6.554	6.662	6.490	6.948	6.727	6.259
12	8.123	7.591	8.654	7.591	7.310	7.173	6.727	7.311	6.881
13	10.210	8.551	8.298	7.951	9.047	7.380	7.591	8.148	7.758
14	9.728	7.878	9.234	8.373	9.073	9.288	9.515	7.951	9.100
15+	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000

	1975	1976	1977	1978	1979	1980	1981
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.749	0.653	0.817	0.448	0.000	0.000	0.450
3	1.114	1.088	1.223	1.493	1.220	1.230	1.510
4	1.658	1.676	1.641	2.324	1.880	2.210	2.130
5	2.260	2.878	2.660	3.068	2.620	3.320	3.000
6	3.120	3.081	3.790	3.746	3.400	4.280	3.810
7	3.557	4.287	4.239	4.913	4.180	5.160	4.750
8	4.096	4.352	5.597	4.368	4.950	6.420	5.250
9	5.128	4.790	5.350	5.276	5.690	6.870	5.950
10	6.094	5.912	5.912	5.832	6.380	7.090	6.430
11	7.196	6.619	6.837	6.053	7.020	7.930	7.000
12	7.782	6.619	6.727	6.706	7.620	8.070	7.470
13	8.602	7.311	6.948	7.686	8.150	8.590	8.140
14	8.810	7.806	8.424	7.219	8.640	9.790	8.550
15+	10.000	10.000	10.000	10.000	10.000	10.340	10.100

Table 7.4 Faroe SAITHE.  
Fishing mortalities from VPA (M = 0.2).

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.01	0.00	0.00	0.02	0.02	0.01	0.07	0.01
3	0.03	0.03	0.03	0.03	0.04	0.08	0.09	0.12	0.21
4	0.11	0.06	0.10	0.14	0.24	0.11	0.07	0.31	0.30
5	0.17	0.13	0.11	0.19	0.14	0.34	0.12	0.41	0.33
6	0.26	0.16	0.15	0.19	0.18	0.13	0.28	0.23	0.28
7	0.32	0.30	0.15	0.22	0.18	0.14	0.30	0.27	0.13
8	0.28	0.31	0.26	0.25	0.22	0.13	0.34	0.21	0.16
9	0.30	0.26	0.28	0.39	0.20	0.14	0.46	0.24	0.17
10	0.41	0.32	0.24	0.45	0.28	0.15	0.54	0.33	0.23
11	0.56	0.35	0.25	0.55	0.29	0.18	0.52	0.29	0.27
12	0.36	0.29	0.37	0.49	0.24	0.30	0.38	0.30	0.28
13	0.69	0.25	0.25	0.41	0.43	0.09	0.25	0.11	0.21
14	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
15+	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
F( 4- 8),U	0.23	0.19	0.15	0.20	0.19	0.17	0.22	0.28	0.24
F( 3-14),U	0.30	0.23	0.21	0.28	0.23	0.17	0.30	0.26	0.24
	1975	1976	1977	1978	1979	1980	1981	1978-1979	
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	0.01	0.01	0.01	0.00	0.00	0.06	0.00	0.00	
3	0.13	0.16	0.11	0.05	0.04	0.07	0.08	0.04	
4	0.32	0.31	0.22	0.17	0.10	0.14	0.18	0.15	
5	0.50	0.27	0.32	0.20	0.19	0.10	0.18	0.19	
6	0.27	0.30	0.35	0.14	0.17	0.13	0.18	0.15	
7	0.16	0.18	0.31	0.15	0.21	0.18	0.27	0.18	
8	0.09	0.14	0.22	0.32	0.25	0.15	0.27	0.28	
9	0.10	0.08	0.15	0.22	0.27	0.19	0.27	0.25	
10	0.12	0.10	0.08	0.21	0.37	0.31	0.27	0.29	
11	0.19	0.12	0.18	0.13	0.25	0.26	0.27	0.19	
12	0.27	0.14	0.16	0.20	0.09	0.16	0.27	0.15	
13	0.22	0.20	0.16	0.27	0.20	0.15	0.27	0.24	
14	0.30	0.30	0.30	0.30	0.30	0.30	0.27	0.30	
15+	0.30	0.30	0.30	0.30	0.30	0.30	0.27	0.30	
F( 4- 8),U	0.27	0.24	0.28	0.19	0.18	0.14	0.22		
F( 3-14),U	0.22	0.19	0.21	0.20	0.20	0.18	0.23		

Table 7.5 Faroe SAITHE.  
Stock size in numbers ('000) and spawning stock biomass (tonnes).

1 JANUARY -----		1966	1967	1968	1969	1970	1971	1972	1973	1974
1		33959	62142	66921	60953	52558	36227	32490	27921	35205
2		30696	27803	50876	54791	49904	43029	29660	26601	22856
3		19948	25071	22624	41453	44809	40159	34576	24087	20290
4		16775	15892	19989	17969	32863	35382	30302	25861	17454
5		8682	12345	12293	14842	12831	21258	25978	23208	15553
6		8090	6026	8878	9058	10086	9101	12588	18936	12653
7		3246	5107	4220	6282	6143	6926	6346	7677	12373
8		1695	1933	3110	2961	4137	4219	4925	3985	4816
9		1242	1049	1158	1957	1895	2730	3032	2860	2639
10		664	753	663	720	1082	1267	1941	1571	1847
11		569	360	446	428	375	669	889	924	924
12		537	326	208	285	247	230	457	433	563
13		114	192	199	117	144	159	139	255	262
14		144	47	123	127	64	76	119	89	186
15+		191	68	250	102	97	64	89	157	220
TOTAL		126351	159112	191956	212043	217234	201496	183532	164564	147841
SPAWN. ST.		24973	28205	31347	36878	37100	46699	56503	60094	52036
Total biom.		191453	188439	218778	247983	262027	260661	279021	247752	244368
SSB		105239	104382	108812	121663	121169	140193	170969	161764	167526
		1975	1976	1977	1978	1979	1980	1981	1982	1986-1978
1		25659	21765	13731	23614	9444	0	0	0	37934
2		28819	21608	17819	11242	19335	7732	0	0	31931
3		18593	23424	17066	14477	9186	15828	5948	0	26660
4		13458	13364	16315	12522	11301	7262	12060	4495	20626
5		10581	7998	8050	10714	8682	8411	5135	8247	14180
6		9130	5258	5002	4764	7209	5900	6237	3525	9182
7		7856	5732	3181	2938	3406	4972	4224	4265	6017
8		8868	5491	3903	1915	2069	2263	3417	2640	3997
9		5366	6616	3918	2558	1138	1322	1397	2135	2694
10		1829	2484	4995	2759	1675	709	891	998	1736
11		1206	1324	1832	3784	1833	947	427	557	1056
12		579	814	957	1255	2731	1170	599	267	515
13		350	361	580	667	838	2051	817	374	272
14		174	229	241	402	415	563	1444	511	155
15+		284	326	271	352	1063	1000	1899	2089	190
TOTAL		130751	116192	97861	93963	80323	60129	44714		
SPAWN. ST.		44223	36632	32930	32108	31059	29307	26706		
Total biom.		230245	217496	216126	201725	176076	193399	171574		
SSB		165634	155894	153924	145974	143623	157881	138095		

Table 7.6 Faroe SAITHE.  
Input data used for catch predictions.

AGE	1982 STOCK SIZE	F-PATTERN	M	MATURITY OGIVE	WEIGHT IN THE CATCH	WEIGHT IN THE STOCK
1	21192.00	0.0000	0.200	0.0000	0.1000	0.1000
2	19722.00	0.0000	0.200	0.0000	0.4500	0.4500
3	18390.00	0.0800	0.200	0.0000	1.3100	1.3100
4	4495.00	0.1800	0.200	0.0000	2.1300	2.1300
5	8247.00	0.1800	0.200	1.0000	3.0000	3.0000
6	3525.00	0.1800	0.200	1.0000	3.8100	3.8100
7	4265.00	0.2700	0.200	1.0000	4.7500	4.7500
8	2640.00	0.2700	0.200	1.0000	5.2500	5.2500
9	2135.00	0.2700	0.200	1.0000	5.9500	5.9500
10	998.00	0.2700	0.200	1.0000	6.4300	6.4300
11	557.00	0.2700	0.200	1.0000	7.0000	7.0000
12	267.00	0.2700	0.200	1.0000	7.4700	7.4700
13	374.00	0.2700	0.200	1.0000	8.1400	8.1400
14	511.00	0.2700	0.200	1.0000	8.5500	8.5500
15+	2089.00	0.2700	0.200	1.0000	10.1000	10.1000

YEAR	RECRUITMENT
82	*****
83	21192.00
84	21192.00

Table 7.7 Catch predictions and management options. Area: Division Vb (Faroe).

Species: SAITHE

1981		1982				1983				1984		
Total landings	$\bar{F}(4-8)$	Stock biomass	Spawning stock biomass	$\bar{F}(4-8)$	Total landings	Management option for 1983	Stock biomass	Spawning stock biomass	$\bar{F}(4-8)$	Total landings	Stock biomass	Spawning stock biomass
30.2	0.22	170	126	0.22 (= $\bar{F}_{81}$ )	27.7	$\bar{F}_{0.1}$	162	101	0.17	20.0		107.0
						$\bar{F}_{max}$			0.44	46.4		134.7
						$\bar{F}_{83} = \bar{F}_{81}$			0.22	25.7	157.0	102.4
						$\bar{F}_{83} = 0$			0	0	184.7	128.0
						$\bar{F}_{83} = 0.2 \bar{F}_{81}$			0.04	5.6	178.7	122.4
						$\bar{F}_{83} = 0.5 \bar{F}_{81}$			0.11	13.6	170.1	114.5
						$\bar{F}_{83} = 1.5 \bar{F}_{81}$			0.33	36.6	145.2	91.7
						$\bar{F}_{83} = 2.0 \bar{F}_{81}$			0.44	46.4	134.7	82.1

Weights in thousands of tonnes

Recruitment 1980-84  $R_1 = 21.2$  millions (average of year classes 1974-77)

Stock biomass = fish at age 1 and older

Spawning stock biomass = fish at age 5 and older

Exploitation pattern 1982-83 based on 1981



Table 8.1 Nominal catch (tonnes) of SAITHE in Sub-area VI, 1972-1981  
(Data for 1972-1980 from Bulletin Statistique)

Country	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981*
Belgium	125	191	209	21	95	-	-	1	2	2
Denmark	-	-	-	-	3	-	-	-	-	-
Faroe Islands	-	4	6	6	7	11	-	14	4	-
France	17 718	18 970	22 802	19 946	29 216	19 686	21 519	15 662	15 427	18 302
German Dem.Rep.	-	-	-	8	3	-	-	-	-	-
Germany, Fed. Rep.	350	52	16	481	511	254	604	131	49	836
Ireland	-	-	-	-	375	240	266	246	295	300 <sup>1)</sup>
Iceland	-	+	-	+	-	-	-	-	-	-
Netherlands	638	67	124	702	547	531	623	256	91	100 <sup>1)</sup>
Norway	-	2	22	10	17	91	122	20	62	24
Poland	-	394	125	164	91	-	-	-	-	-
Spain	1 302	1 980	1 862	1 882	1 012	346	-	-	-	-
UK (Engl. & Wales)	2 268	2 138	1 333	1 571	1 560	2 758	3 193	1 765	1 594	1 361
UK (N. Ireland)	6	14	3	12	13	9	27	11	9	10
UK (Scotland)	6 706	11 330	9 527	6 131	5 807	4 628	5 181	3 602	2 902	3 123
USSR	112	670	269	15	2 550	-	-	-	-	-
Total	29 225	35 812	36 298	30 949	41 807	28 554	31 535	21 708	20 435	24 058

\* ) Preliminary.

1) W.G. Estimate

Table 8.2 SAITHE in Division VIa (Northwest coast of Scotland, N.Ireland).  
Input catch in numbers ('000) for VPA.

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	1	1	3	1	1	1	58	27	598
2	98	530	65	413	38	406	5499	1797	7701
3	4157	2829	3221	2445	3431	1470	8703	7777	7644
4	7190	5977	3025	5696	2804	4716	1558	7156	2545
5	1787	2665	7585	1847	2168	2008	1789	1322	2536
6	928	571	821	624	719	1151	798	1732	393
7	198	625	196	701	289	493	2502	1148	803
8	55	125	167	130	235	383	600	995	1152
9	38	61	38	98	49	318	119	305	730
10	18	39	29	27	68	55	105	253	571
11	18	19	15	22	24	65	20	174	292
12	10	15	9	10	24	23	26	138	210
13	7	11	5	10	14	32	7	42	24
14	7	8	3	5	5	11	5	45	82
15+	0	0	0	0	0	0	0	0	0
TOTAL	14512	11276	9182	12029	9869	11132	21789	22911	25281
	1975	1976	1977	1978	1979	1980	1981		
1	20	78	184	38	9	45	156		
2	2277	4399	1591	6298	975	964	2491		
3	9119	10454	5127	4386	1864	3010	3952		
4	3243	3245	2998	3224	1229	859	1993		
5	1147	2454	2146	1741	1183	617	591		
6	1107	1477	931	962	724	574	414		
7	947	818	756	358	376	423	343		
8	878	626	523	315	159	171	226		
9	313	704	394	206	195	84	153		
10	207	385	401	400	158	102	122		
11	184	474	363	512	169	155	128		
12	182	213	144	368	140	126	118		
13	203	208	76	292	134	168	129		
14	27	221	141	116	109	74	92		
15+	0	0	0	0	70	107	92		
TOTAL	19854	257	15775	19216	7494	7479	100		

Table 8.3 SAITHE in Division VIa (Northwest coast of Scotland, N.Ireland).  
Mean weight at age of the stock (kg).

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480
2	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520
3	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850
4	1.150	1.150	1.150	1.150	1.150	1.150	1.150	1.150	1.150
5	1.660	1.660	1.660	1.660	1.660	1.660	1.660	1.660	1.660
6	2.420	2.420	2.420	2.420	2.420	2.420	2.420	2.420	2.420
7	3.240	3.240	3.240	3.240	3.240	3.240	3.240	3.240	3.240
8	4.230	4.230	4.230	4.230	4.230	4.230	4.230	4.230	4.230
9	5.060	5.060	5.060	5.060	5.060	5.060	5.060	5.060	5.060
10	5.770	5.770	5.770	5.770	5.770	5.770	5.770	5.770	5.770
11	6.360	6.360	6.360	6.360	6.360	6.360	6.360	6.360	6.360
12	6.780	6.780	6.780	6.780	6.780	6.780	6.780	6.780	6.780
13	7.440	7.440	7.440	7.440	7.440	7.440	7.440	7.440	7.440
14	7.860	7.860	7.860	7.860	7.860	7.860	7.860	7.860	7.860
15+	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000

	1975	1976	1977	1978	1979	1980	1981
1	0.480	0.480	0.480	0.480	0.534	0.415	0.412
2	0.520	0.520	0.520	0.520	0.704	0.657	0.689
3	0.850	0.850	0.850	0.850	1.306	1.164	1.126
4	1.150	1.150	1.150	1.150	1.968	1.971	1.764
5	1.660	1.660	1.660	1.660	2.218	2.794	3.051
6	2.420	2.420	2.420	2.420	3.393	3.674	4.080
7	3.240	3.240	3.240	3.240	4.515	4.603	5.197
8	4.230	4.230	4.230	4.230	5.889	5.913	6.355
9	5.060	5.060	5.060	5.060	7.175	6.980	7.359
10	5.770	5.770	5.770	5.770	7.278	8.055	8.387
11	6.360	6.360	6.360	6.360	8.036	8.644	8.572
12	6.780	6.780	6.780	6.780	8.810	9.399	9.455
13	7.440	7.440	7.440	7.440	9.500	9.737	10.321
14	7.860	7.860	7.860	7.860	10.825	10.068	11.167
15+	8.000	8.000	8.000	8.000	10.500	12.148	12.519

Table 8.4 SAITHE in Division VIa (Northwest coast of Scotland, N.Ireland).  
Fishing mortalities from VPA (M = 0.2).

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
2	0.00	0.01	0.00	0.01	0.00	0.01	0.16	0.06	0.22
3	0.14	0.10	0.08	0.08	0.10	0.06	0.27	0.35	0.38
4	0.24	0.19	0.15	0.19	0.13	0.19	0.08	0.37	0.18
5	0.41	0.13	0.11	0.13	0.10	0.12	0.10	0.09	0.22
6	0.15	0.14	0.06	0.06	0.07	0.07	0.07	0.13	0.04
7	0.09	0.14	0.10	0.06	0.03	0.06	0.22	0.13	0.08
8	0.11	0.07	0.05	0.09	0.03	0.06	0.10	0.13	0.19
9	0.07	0.18	0.03	0.04	0.04	0.04	0.02	0.06	0.13
10	0.09	0.10	0.12	0.03	0.03	0.06	0.02	0.06	0.17
11	0.12	0.12	0.05	0.13	0.03	0.04	0.03	0.04	0.09
12	0.13	0.14	0.08	0.04	0.20	0.03	0.02	0.29	0.06
13	0.05	0.21	0.06	0.12	0.08	0.43	0.01	0.04	0.07
14	0.08	0.08	0.08	0.08	0.08	0.08	0.11	0.11	0.11
15+	0.08	0.08	0.08	0.08	0.08	0.08	0.11	0.11	0.11
F( 3- 6),U	0.23	0.14	0.10	0.11	0.10	0.11	0.13	0.24	0.20
	1975	1976	1977	1978	1979	1980	1981	1974-1978	
1	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	
2	0.07	0.16	0.09	0.48	0.05	0.05	0.11	0.20	
3	0.45	0.51	0.28	0.37	0.26	0.19	0.31	0.40	
4	0.27	0.28	0.27	0.29	0.17	0.18	0.19	0.26	
5	0.12	0.34	0.30	0.24	0.16	0.12	0.18	0.24	
6	0.14	0.22	0.21	0.22	0.15	0.11	0.11	0.16	
7	0.11	0.14	0.17	0.12	0.12	0.12	0.09	0.12	
8	0.12	0.10	0.13	0.10	0.07	0.08	0.09	0.13	
9	0.07	0.14	0.09	0.07	0.08	0.05	0.09	0.10	
10	0.05	0.12	0.11	0.12	0.07	0.05	0.09	0.11	
11	0.07	0.15	0.15	0.20	0.07	0.09	0.09	0.13	
12	0.08	0.11	0.06	0.23	0.07	0.07	0.09	0.11	
13	0.08	0.12	0.05	0.17	0.12	0.12	0.09	0.10	
14	0.11	0.11	0.11	0.11	0.09	0.09	0.09	0.11	
15+	0.11	0.11	0.11	0.11	0.09	0.09	0.09	0.11	
F( 3- 6),U	0.24	0.34	0.27	0.28	0.18	0.15	0.20		

Table 8.5 SAITHE in Division VIa (Northwest coast of Scotland, N.Ireland).  
Stock size in numbers ('000) and spawning stock biomass (tonnes).

1 JANUARY

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	72738	51635	62035	41921	61021	50464	42177	51718	40489
2	39732	59552	42274	50787	34321	49959	41316	54479	42319
3	35152	32441	48278	34552	41208	28065	40536	28872	20607
4	36700	25034	24009	36621	26083	30644	21051	25361	16654
5	5871	23578	16915	16931	24853	18828	20842	16321	14339
6	7272	3203	16902	12419	12197	18393	13605	15450	12170
7	2586	5118	2288	13097	9605	9337	14020	10418	11089
8	564	1939	3627	1697	10091	7605	7200	9227	7495
9	602	412	1474	2819	1272	8049	5879	5354	6057
10	240	459	282	1173	2219	997	6303	4706	4108
11	179	180	340	205	936	1755	767	5066	3625
12	90	130	130	265	148	745	1379	610	3990
13	148	65	95	99	208	100	589	1105	375
14	100	115	45	72	72	158	53	476	867
15+	0	0	0	0	0	0	0	0	0
TOTAL	201972	203859	218691	212657	224234	225096	210516	209163	190785
SPAWN. ST.	17651	35198	42095	48776	61001	65965	70036	68733	64716
Total biom.	173830	191929	225310	251215	285044	312152	329623	336286	324077
SSB	46171	79813	104904	133200	172884	202855	228540	239826	237989
	1975	1976	1977	1978	1979	1980	1981	1982	1986-1978
1	39976	25276	22183	29375	25586	32217	27845	*****	45924
2	37522	32712	20024	17996	24016	20940	20357	22656	38738
3	27717	28066	22819	15450	9090	18783	16274	19316	31566
4	14922	14516	14105	14073	8712	5765	12668	9773	23106
5	11343	9301	8967	8852	8624	6026	3947	8577	15149
6	9457	8253	5411	5413	5681	5995	4377	2699	10780
7	9609	7645	5427	3592	3566	3999	4390	3210	7918
8	8354	7014	4785	3763	2618	2580	2893	3285	5643
9	5099	6048	5178	3447	2796	2000	1958	2165	4022
10	4793	3892	4317	3884	2636	2114	1562	1465	2875
11	2849	3737	2840	3173	2819	2016	1038	1168	1973
12	2704	2167	2632	1998	2137	2156	1510	1226	1307
13	3078	2050	1582	2025	1304	1623	1651	1130	886
14	285	2337	1491	1226	1395	947	1178	1236	561
15+	0	0	0	0	896	1370	1178	1762	0
TOTAL	177709	152713	122361	114266	101877	108530	109405		
SPAWN. ST.	57572	51543	42030	37372	34473	50826	20282		
Total biom.	302658	282271	233300	206405	247140	245528	241951		
SSB	223238	212069	176311	153631	187554	183174	171663		

1  
1

Table 8.6 West of Scotland SAITHE.  
Calculation of total international  
fishing effort, 1971-81.

Year	Tonnes/100 horse power days fished by Lorient trawlers	Total landings	Total effort in Lorient units	Effort relative to 1981
1971	0.26	19 863	76 396	0.97
1972	0.27	29 225	108 241	1.38
1973	0.29	35 812	123 490	1.57
1974	0.32	36 298	113 431	1.44
1975	0.30	30 949	103 163	1.31
1976	0.32	41 807	130 647	1.66
1977	0.28	28 550	101 964	1.30
1978	0.26	31 535	121 288	1.54
1979	0.24	21 708	90 450	1.15
1980	0.28	22 030	78 679	1.00
1981	0.31	24 058	78 600	1.00

Table 8.7 West of Scotland SAITHE.  
Input data used for catch predictions.

AGE	1982 STOCK SIZE	F-PATTERN	M	MATURITY OGIVE	WEIGHT IN THE CATCH	WEIGHT IN THE STOCK
1	28000.00	0.0062	0.200	0.0000	7.4540	0.4540
2	22656.00	0.1100	0.200	0.0000	0.6830	0.6830
3	19316.00	0.3100	0.200	0.0000	1.1990	1.1990
4	9773.00	0.1900	0.200	0.0000	1.9010	1.9010
5	8577.00	0.1800	0.200	1.0000	2.6810	2.6810
6	2699.00	0.1100	0.200	1.0000	3.7160	3.7160
7	3210.00	0.0900	0.200	1.0000	4.7720	4.7720
8	3285.00	0.0900	0.200	1.0000	6.0460	6.0460
9	2165.00	0.0900	0.200	1.0000	7.1650	7.1650
10	1465.00	0.0900	0.200	1.0000	7.9070	7.9070
11	1168.00	0.0900	0.200	1.0000	8.4170	8.4170
12	1226.00	0.0900	0.200	1.0000	9.2150	9.2150
13	1130.00	0.0900	0.200	1.0000	9.8530	9.8530
14	1236.00	0.0900	0.200	1.0000	10.6870	10.6870
15+	1762.00	0.0900	0.200	1.0000	11.7220	11.7220

YEAR

----

82  
83  
84

RECRUITMENT

-----

\*\*\*\*\*  
28000.00  
28000.00

Table 8.8 Catch predictions and management options. Area: West of Scotland.  
Species: SAITHE

1981		1982				1983					1984	
Total landings	F (3-6)	Stock Biom.	Spawning Stock Biom.	F (3-6)	Total landings	Management Option for 1983	Stock Biom.	Spawning Stock Biomass	F (3-6)	Total landings	Stock Biom.	Spawning Stock Biomass
24	0.2	231	161	0.2	25	$F_{0.1}$	226	156	0.20	23	220	153
						$F_{max}$	226	156	0.32	34	205	142
						$F_{83}=F_{81}$	226	156	0.20	24	221	153
						$F_{83}=0$	226	156	0	0	249	172
						$F_{83}=0.2 F_{81}$	226	156	0.04	5	243	168
						$F_{83}=0.5 F_{81}$	226	156	0.10	12	234	163
						$F_{83}=1.5 F_{81}$	226	156	0.30	34	208	145
						$F_{83}=2.0 F_{81}$	226	156	0.40	44	197	137

Weights in thousands of tonnes  
 Recruitment 1982-84  $R_1 = 28$  millions  
 Stock biomass = fish at age 1 and older  
 Spawning stock biomass = fish at age 5 and older  
 Exploitation pattern 1982-83 based on 1974-78 average



Table 9.1 Faroe Plateau COD. Nominal catches by countries, 1972-81 (tonnes).  
(Data for 1972-1980 from Bulletin Statistique).

Year	Faroe Islands	France	Germany Fed.Rep.	Norway	Poland	UK England	UK Scotland	Others	Total
1972	12 143 <sup>*)</sup>	224 <sup>*)</sup>	451	266 <sup>*)</sup>	-	2 159	5 175	19	20 437
1973	10 434	1 472 <sup>*)</sup>	310	115	419 <sup>*)</sup>	3 935	5 675	21	22 381
1974	12 541	567 <sup>*)</sup>	292	446	320	2 879	7 516	20	24 581
1975	22 608	1 531	408	1 353	432	2 538	7 815	90	36 775
1976	28 502	1 535	247	1 282	496	2 179	5 491	67	39 799
1977	28 177	1 450	332	864	-	811	3 291	2	34 927
1978	24 076	213 <sup>*)</sup>	71 <sup>*)</sup>	245	-	518	1 460	2	26 585
1979	21 774	117 <sup>*)</sup>	23 <sup>*)</sup>	274	-	263	661	-	23 112
1980	19 966	40 <sup>*)</sup>	-	127	-	13	367	-	20 513
1981 <sup>*)</sup>	22 356	7 <sup>*)</sup>	-	261 <sup>*)</sup>	-	-	98	-	22 723

\*) Vb<sub>2</sub> included

\*) Preliminary data

\*) Working Group data

**Table 9.2** Faroe Bank Cod. Nominal catches by countries, 1972-1981 (tonnes).  
(Data for 1972-1980 from Bulletin Statistique)

Year	Faroe Islands	France	Germany Fed. Rep.	Norway	Poland	UK England	UK Scotland	Others	Total
1972	-	*	+	*	-	860	1 308	32	2 200
1973	2 842	*	-	-	*	1 144	1 081	34	5 101
1974	696	*	-	-	-	829	503	40	2 068
1975	378	81	50	-	-	749	804	55	2 117
1976	457	72	+	1	-	877	912	11	2 330
1977	851	219	-	99	-	9	780	-	1 958
1978	4 194	*	-	183	-	2	1 071	-	5 450
1979	1 273	*	-	33	-	-	677	-	1 983
1980	724	*	-	54	-	85	340	-	1 203
1981**)	973	*	-	*	-	-	64	-	1 037

\*) Catches included in Vb<sub>1</sub>

\*\*) Preliminary data

Table 9.3 Faroe Plateau COD.  
Input catch in numbers ('000) for VPA.

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	53	127	34	68	35	78	44	213	271
2	1537	1609	1529	878	402	328	875	723	2161
3	970	2690	3522	3106	1163	757	1176	3124	1266
4	2080	860	2665	3300	2172	821	810	1590	1811
5	1339	1706	945	1558	1685	1287	596	707	934
6	606	847	1226	477	752	1451	1021	384	563
7	197	309	452	713	244	510	596	312	452
8	104	64	105	203	300	114	154	227	149
9	33	27	11	92	44	179	25	120	141
10+	0	0	0	0	0	0	0	97	91
TOTAL	6719	8239	10287	10375	6797	5525	5297	7497	7839
	1975	1976	1977	1978	1979	1980	1981		
1	97	18	31	160	19	41	16		
2	2584	1497	425	555	575	1129	640		
3	5689	4158	3282	1219	1732	2263	4097		
4	2157	3799	6844	2643	1673	1461	1959		
5	2211	1380	3718	3216	1601	895	937		
6	813	1427	788	1041	1906	807	575		
7	295	617	1160	268	493	832	482		
8	190	273	239	201	134	339	522		
9	118	120	134	66	87	42	122		
10+	150	186	9	56	38	18	54		
TOTAL	14304	13475	16630	9425	8258	7827	9404		

Table 9.4 Faroe Plateau COD.  
Mean weight at age of the stock (kg).

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0.380	0.380	0.380	0.380	0.380	0.380	0.380	0.380	0.380
2	1.060	1.060	1.060	1.060	1.060	1.060	1.060	1.060	1.060
3	1.890	1.890	1.890	1.890	1.890	1.890	1.890	1.890	1.890
4	2.920	2.920	2.920	2.920	2.920	2.920	2.920	2.920	2.920
5	4.070	4.070	4.070	4.070	4.070	4.070	4.070	4.070	4.070
6	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
7	6.580	6.580	6.580	6.580	6.580	6.580	6.580	6.580	6.580
8	7.850	7.850	7.850	7.850	7.850	7.850	7.850	7.850	7.850
9	9.080	9.080	9.080	9.080	9.080	9.080	9.080	9.080	9.080
10+	10.270	10.270	10.270	10.270	10.270	10.270	10.270	10.270	10.270

	1975	1976	1977	1978	1979	1980	1981
1	0.380	0.380	0.380	0.394	0.493	0.430	0.750
2	1.060	1.060	1.060	1.112	0.897	0.927	1.080
3	1.890	1.890	1.890	1.385	1.682	1.432	1.470
4	2.920	2.920	2.920	2.140	2.211	2.220	2.180
5	4.070	4.070	4.070	3.125	3.052	3.105	3.210
6	5.300	5.300	5.300	4.363	3.642	3.539	3.700
7	6.580	6.580	6.580	5.927	4.719	4.392	4.240
8	7.850	7.850	7.850	6.348	7.272	6.100	4.430
9	9.080	9.080	9.080	8.715	8.368	7.603	6.690
10+	10.270	10.270	10.270	12.299	13.042	9.668	10.000

Table 9.5 Barro Plateau COD.  
Fishing mortalities from VPA (M = 0.2)

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.01
2	0.09	0.08	0.10	0.11	0.05	0.03	0.05	0.07	0.08
3	0.20	0.25	0.24	0.31	0.20	0.13	0.15	0.23	0.16
4	0.26	0.27	0.42	0.40	0.37	0.22	0.19	0.31	0.20
5	0.46	0.35	0.55	0.46	0.36	0.40	0.24	0.26	0.30
6	0.49	0.59	0.45	0.60	0.43	0.61	0.63	0.24	0.34
7	0.97	0.50	0.74	0.52	0.71	0.58	0.55	0.40	0.51
8	0.80	1.05	0.31	0.91	0.43	0.90	0.35	0.42	0.34
9	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
10+	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
F(3-6),U	0.35	0.37	0.42	0.44	0.34	0.34	0.31	0.26	0.25
	1975	1976	1977	1978	1979	1980	1981		
1	0.00	0.00	0.00	0.01	0.00	0.00	0.002		
2	0.08	0.09	0.04	0.05	0.04	0.04	0.04		
3	0.32	0.17	0.28	0.17	0.24	0.22	0.20		
4	0.43	0.36	0.46	0.37	0.37	0.32	0.30		
5	0.41	0.55	0.73	0.40	0.41	0.35	0.35		
6	0.46	0.50	0.71	0.46	0.45	0.37	0.40		
7	0.30	0.76	1.03	0.56	0.41	0.36	0.40		
8	0.41	0.50	0.77	0.48	0.62	0.56	0.40		
9	0.50	0.50	0.50	0.50	0.40	0.40	0.40		
10+	0.50	0.50	0.50	0.50	0.40	0.40	0.40		
F(3-6),U	0.40	0.40	0.54	0.35	0.37	0.32	0.31		

Table 9.6 Faroe Plateau COD.  
Stock size in numbers ('000) and spawning stock biomass (tonnes).

1 JANUARY

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	27797	21216	11515	11023	14491	26156	15357	37475	47844
2	17767	22710	17256	9397	8963	11833	21344	12534	30490
3	5871	13341	17142	12749	6902	6975	9592	16685	9609
4	10080	3934	8502	11046	7647	4604	5029	6630	10850
5	4006	6382	2447	4572	6082	4311	3030	3388	3999
6	1714	2079	3693	1158	2365	3466	2574	1945	2138
7	344	861	345	1924	521	1262	1540	1031	1247
8	205	107	428	370	937	209	577	728	564
9	92	75	31	256	122	498	70	334	392
10+	0	0	0	0	0	0	0	270	253
TOTAL	67876	70704	61958	52494	48029	59313	58713	81019	107385
SPAWN. ST.	16441	13437	16045	19326	17673	14349	12620	14324	19442
Total biom.	100025	113012	119275	113131	99559	99485	101105	120814	146741
SSB	59532	55663	64210	74886	71507	63819	54894	61752	78079
	1975	1976	1977	1978	1979	1980	1981	1982	1966-1978
1	24410	13317	14289	19782	38620	22026	8835	*****	21898
2	38926	19897	10887	11671	16052	31602	17997	7219	17975
3	23013	29539	14940	8530	9054	12623	24854	14157	13438
4	6727	13730	20439	9781	5885	5855	8298	16660	9115
5	7252	3573	7829	10598	5226	3317	3481	5033	5190
6	2434	3954	1690	3092	5791	2842	1912	2008	2469
7	1245	1264	1959	680	1598	3032	1602	1049	1140
8	616	754	485	573	317	866	1735	879	504
9	328	334	373	184	289	140	406	952	237
10+	417	517	25	156	126	60	180	321	126
TOTAL	105369	86879	72915	64545	82959	82362	69299		
SPAWN. ST.	19019	24125	32799	24563	19233	16111	17613		
Total biom.	176382	180146	166044	110238	112633	110436	117925		
SSB	82349	98166	120837	77653	63966	53594	55326		

Table 9.7 Faroe Plateau COD.  
Input data used for catch predictions.

AGE	1982 STOCK SIZE	F-PATTERN	M	MATURITY OGIVE	WEIGHT IN THE CATCH	WEIGHT IN THE STOCK
1	22000.00	0.0020	0.200	0.0000	0.5580	0.5580
2	17976.00	0.0400	0.200	0.0000	0.9680	0.9680
3	14157.00	0.2000	0.200	0.0000	1.5280	1.5280
4	16660.00	0.3000	0.200	1.0000	2.2040	2.2040
5	5033.00	0.3500	0.200	1.0000	3.1220	3.1220
6	2008.00	0.4000	0.200	1.0000	3.6270	3.6270
7	1049.00	0.4000	0.200	1.0000	4.4500	4.4500
8	879.00	0.4000	0.200	1.0000	5.9340	5.9340
9	952.00	0.4000	0.200	1.0000	7.5540	7.5540
10+	321.00	0.4000	0.200	1.0000	10.9030	10.9030

YEAR	RECRUITMENT
82	*****
83	22000.00
84	22000.00

Table 9.8 Catch predictions and management options. Area: Faroe Plateau.  
Species: COD

1981		1982				1983					1984				
Total landings	$\bar{F}$ (3-6)	Stock Biom.	Spawning Stock Biom.	$\bar{F}$ (3-6)	Total landings	Management Option for 1983	Stock Biom.	Spawning Stock Biomass	$\bar{F}$ (3-6)	Total landings	Stock Biom.	Spawning Stock Biomass			
22.7	0.31	132	80	0.31  (= $\bar{F}$ <sub>81</sub> )	25.5	$F_{0.1}$	134	83	0.13	12.2	131	80			
						$\bar{F}_{max}$				23.2			84		
						$\bar{F}_{83} = \bar{F}_{81}$				26.7					
						$\bar{F}_{83} = 0$				0				162	110
						$\bar{F}_{83} = 0.2 \bar{F}_{81}$				6.0				155	103
						$\bar{F}_{83} = 0.5 \bar{F}_{81}$				14.4				145	94
						$\bar{F}_{83} = 1.5 \bar{F}_{81}$				37.2				119	69
						$\bar{F}_{83} = 2.0 \bar{F}_{81}$				46.2				109	59

Weights in thousands of tonnes

Recruitment 1981-84  $R_1 = 22.0$  millions

Stock biomass = fish at age 1 and older

Spawning stock biomass = fish at age 4 and older

Exploitation pattern 1982-83 based on 1981



Table 10.1 Faroe Plateau Haddock. Nominal catches by countries, 1972-81 (tonnes).

(Data for 1972-1980 from Bulletin Statistique)

Year	Faroe Islands	France	Germany Fed.Rep.	Norway	Poland	UK England	UK Scotland	Others	Total
1972	8 314	1 496 <sup>*)</sup>	24	-	-	844	2 842	-	13 520
1973	4 931	3 535 <sup>*)</sup>	46	-	1 190 <sup>*)</sup>	1 510	3 665	-	14 887
1974	4 538	1 461 <sup>*)</sup>	70	5	685	1 044	5 572	30	13 405
1975	8 625	2 173	120	56	544	1 505	4 896	383	18 302
1976	12 670	2 472	22	20	448	1 551	6 671	181	24 035
1977	19 806	623	49	46	5	707	3 278	26	24 540
1978	15 539	71 <sup>*)</sup>	8	91	-	48	367	-	16 124
1979	11 259	50 <sup>*)</sup>	2	39	-	35	212	-	11 597
1980	13 633	31 <sup>*)</sup>	4	9	-	6	434	6	14 123
1981 <sup>**)</sup>	10 891	5 <sup>*)</sup>	+	27 <sup>*)</sup>	-	-	93 <sup>*)</sup>	-	11 016

<sup>\*)</sup> Catches including Vb<sub>2</sub>

<sup>\*\*)</sup> Preliminary estimates

Table 10.2 Faroe Bank Haddock. Nominal catches by countries, 1972-1981 (tonnes).  
(Data from 1972-1980 from Bulletin Statistique)

Year	Faroe Islands	France	Germany Fed.Rep.	Norway	Poland	UK England	UK Scotland	Others	Total
1972	-	*	1	-	-	527	1 267	-	1 795
1973	1 087	*	-	-	*	916	1 123	22	3 148
1974	273	*	-	-	-	573	500	22	1 368
1975	132	125	53	-	-	921	1 182	-	2 413
1976	44	70	+	-	-	733	1 329	-	2 176
1977	273	77	-	11	-	4	650	-	1 015
1978	2 643	*	-	39	-	-	394	-	3 076
1979	716	*	-	-	-	-	105	-	821
1980	690	*	-	8	-	152	43	-	893
1981 <sup>**)*)</sup>	1 103	*	*	*	-	-	*	-	1 103

\*) Catches are included in Vb<sub>1</sub>

\*\*) Preliminary estimates

Table 10.3 Faroe HADDOCK.  
Input catch in numbers ('000) for VPA.

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	90	70	49	95	57	55	43	709	271
2	1081	1425	5881	2384	1728	717	750	5300	5633
3	3504	2405	4097	7539	4855	4393	5744	8388	2899
4	4804	2599	2812	4567	6581	4727	4779	1236	3970
5	2710	1785	1524	1565	1624	3267	2706	2786	451
6	1112	1426	1526	1485	1383	1292	1171	916	976
7	740	631	923	1224	1099	864	696	1051	466
8	180	197	230	378	326	222	180	150	535
9	54	52	68	114	68	147	113	68	68
10+	0	0	0	0	0	0	0	11	147
TOTAL	14075	10590	17110	19351	17721	15684	13582	18615	15366
	1975	1976	1977	1978	1979	1980	1981		
1	110	38	0	0	1	0	0		
2	7337	4596	255	32	1	143	81		
3	7952	7858	4039	1022	1161	58	499		
4	2097	6798	5168	4248	1754	3724	221		
5	1371	1251	4918	4054	3541	2583	2815		
6	247	1189	2128	1841	1850	2496	1476		
7	352	298	946	717	772	1568	1702		
8	237	720	443	635	212	660	663		
9	419	258	731	243	155	99	194		
10+	187	318	855	312	74	86	39		
TOTAL	20309	23124	19483	13104	9321	11417	7090		

Table 10.4 Faroe HADDOCK.  
Mean weight at age of the stock (kg).

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
2	0.470	0.470	0.470	0.470	0.470	0.470	0.470	0.470	0.470
3	0.730	0.730	0.730	0.730	0.730	0.730	0.730	0.730	0.730
4	1.130	1.130	1.130	1.130	1.130	1.130	1.130	1.130	1.130
5	1.550	1.550	1.550	1.550	1.550	1.550	1.550	1.550	1.550
6	1.970	1.970	1.970	1.970	1.970	1.970	1.970	1.970	1.970
7	2.410	2.410	2.410	2.410	2.410	2.410	2.410	2.410	2.410
8	2.760	2.760	2.760	2.760	2.760	2.760	2.760	2.760	2.760
9	3.070	3.070	3.070	3.070	3.070	3.070	3.070	3.070	3.070
10+	3.550	3.550	3.550	3.550	3.550	3.550	3.550	3.550	3.550

	1975	1976	1977	1978	1979	1980	1981
1	0.300	0.300	0.000	0.000	0.000	0.000	0.000
2	0.470	0.470	0.311	0.357	0.357	0.643	0.452
3	0.730	0.730	0.633	0.790	0.672	0.713	0.725
4	1.130	1.130	1.044	1.035	0.894	0.941	0.957
5	1.550	1.550	1.426	1.398	1.156	1.157	1.257
6	1.970	1.970	1.852	1.870	1.590	1.493	1.651
7	2.410	2.410	2.241	2.350	2.070	1.739	2.053
8	2.760	2.760	2.205	2.597	2.525	2.095	2.406
9	3.070	3.070	2.570	3.014	2.696	2.465	2.725
10+	3.550	3.550	2.591	2.920	3.519	3.310	3.250

Table 10.5 Faroe HADDOCK.  
Fishing mortalities from VPA ( M = 0.2).

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
2	0.06	0.07	0.14	0.09	0.06	0.06	0.03	0.17	0.13
3	0.24	0.19	0.27	0.27	0.26	0.20	0.45	0.46	0.23
4	0.45	0.30	0.36	0.55	0.40	0.43	0.30	0.26	0.41
5	0.50	0.30	0.29	0.35	0.38	0.36	0.47	0.33	0.14
6	0.52	0.54	0.45	0.52	0.60	0.61	0.21	0.29	0.18
7	0.91	0.63	0.83	0.82	0.94	0.96	0.79	0.29	0.23
8	0.75	0.66	0.50	1.02	0.54	0.49	0.54	0.38	0.24
9	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.40	0.30
10+	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.40	0.30
F( 4- 6),U	0.49	0.38	0.37	0.47	0.46	0.47	0.33	0.29	0.25

	1975	1976	1977	1978	1979	1980	1981	1978-1979
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.16	0.10	0.01	0.00	0.00	0.01	0.01	0.00
3	0.28	0.26	0.13	0.06	0.05	0.05	0.06	0.06
4	0.25	0.40	0.28	0.19	0.14	0.25	0.25	0.17
5	0.24	0.24	0.58	0.36	0.23	0.32	0.30	0.30
6	0.11	0.34	0.80	0.44	0.28	0.27	0.30	0.36
7	0.09	0.19	0.50	0.70	0.34	0.41	0.30	0.52
8	0.18	0.28	0.46	0.74	0.46	0.54	0.30	0.60
9	0.30	0.30	0.50	0.50	0.40	0.40	0.30	0.45
10+	0.30	0.30	0.50	0.50	0.40	0.40	0.30	0.45
F( 4- 6),U	0.20	0.33	0.55	0.33	0.22	0.28	0.28	

Table 10.6 Faroe HADDOCK.  
Stock size in numbers ('000) and spawning stock biomass (tonnes).

1 JANUARY

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	30258	59960	38152	42284	17866	58397	27961	62214	65836
2	19035	24076	49028	51192	34533	14576	51387	22854	50297
3	16933	15101	18917	54841	23587	26714	11286	25020	15738
4	14480	10891	10198	11804	21746	14781	17916	5884	12965
5	7537	7548	6581	5824	5576	11898	7862	10912	3705
6	5011	3743	4575	4078	3563	3107	6808	4012	6431
7	1349	1469	1788	2378	1960	1516	1389	4520	2461
8	573	446	639	641	856	627	473	516	2756
9	150	145	189	317	189	409	314	226	288
10+	0	0	0	0	0	0	0	37	623
TOTAL	93708	123979	130067	133298	109475	112025	105396	136194	161100
SPAWN. ST.	43854	39343	42887	59822	57076	59053	46049	51126	44967
Total biom.	69380	77205	85688	91533	86168	85776	82839	92277	104573
SSB	51080	47619	51199	64188	64578	67407	59699	62871	61183
	1975	1976	1977	1978	1979	1980	1981	1982	1966-1978
1	60743	28888	35945	2097	14284	10968	0*****		39276
2	53703	49633	23671	29430	1717	11695	8980	0	33428
3	36102	37358	36671	19106	24066	1405	9445	7279	24398
4	10277	22407	23519	26383	14720	18656	1098	7282	15635
5	7052	6527	12245	14608	17776	10471	11924	700	8298
6	2627	4540	4219	5625	8320	11547	6252	7232	4314
7	4586	1928	2649	1557	2954	5149	7209	3792	2258
8	1596	3274	1310	1322	654	1725	2808	4373	1141
9	1775	1093	2033	676	515	329	822	1703	600
10+	792	1347	2378	868	246	286	165	599	465
TOTAL	179052	156996	144587	101671	85233	72230	48703		
SPAWN. ST.	64607	78475	85024	70744	69232	49568	39723		
Total biom.	120772	125467	100598	95508	73695	69756	61363		
SSB	77309	93473	93253	85002	73082	62238	57304		

1  
0  
1

Table 10.7 Faroe HADDOCK.  
Input data used in catch predictions.

OPTION 1

AGE	1982 STOCK SIZE	F-PATTERN	M	MATURITY OGIVE	WEIGHT IN THE CATCH	WEIGHT IN THE STOCK
1	20000.00	0.0000	0.200	0.0000	0.3000	0.3000
2	16300.00	0.0100	0.200	0.0000	0.4520	0.4520
3	13300.00	0.0600	0.200	1.0000	0.7250	0.7250
4	7282.00	0.2500	0.200	1.0000	0.9570	0.9570
5	700.00	0.3000	0.200	1.0000	1.2370	1.2370
6	7232.00	0.3000	0.200	1.0000	1.6510	1.6510
7	3792.00	0.3000	0.200	1.0000	2.0530	2.0530
8	4373.00	0.3000	0.200	1.0000	2.4060	2.4060
9	1703.00	0.3000	0.200	1.0000	2.7250	2.7250
10+	599.00	0.3000	0.200	1.0000	3.2500	3.2500

YEAR RECRUITMENT  
----

82	*****
83	20000.00
84	20000.00

OPTION 2

AGE	1982 STOCK SIZE	F-PATTERN	M	MATURITY OGIVE	WEIGHT IN THE CATCH	WEIGHT IN THE STOCK
1	39000.00	0.0000	0.200	0.0000	0.3000	0.3000
2	33000.00	0.0100	0.200	0.0000	0.4520	0.4520
3	24400.00	0.0600	0.200	1.0000	0.7250	0.7250
4	7282.00	0.2500	0.200	1.0000	0.9570	0.9570
5	700.00	0.3000	0.200	1.0000	1.2370	1.2370
6	7232.00	0.3000	0.200	1.0000	1.6510	1.6510
7	3792.00	0.3000	0.200	1.0000	2.0530	2.0530
8	4373.00	0.3000	0.200	1.0000	2.4060	2.4060
9	1703.00	0.3000	0.200	1.0000	2.7250	2.7250
10+	599.00	0.3000	0.200	1.0000	3.2500	3.2500

YEAR RECRUITMENT  
----

82	*****
83	39000.00
84	39000.00

Table 10.8 Catch predictions and management options. Area: Faroe. Species: HADDOCK.  
Pessimistic recruitment.

OPTION 1

1981		1982				1983					1984	
Total landings	$F_{(4-6)}$	Stock Biom.	Spawning Stock Biom.	$\bar{F}_{(4-6)}$	Total landings	Management Option for 1983	Stock Biom.	Spawning Stock Biomass	$\bar{F}_{(4-6)}$	Total landings	Stock Biom.	Spawning Stock Biomass
12	0.28	68	54	0.28	10.9	$F_{0.1}$	66	52	0.19	7.3		54
						$F_{max}$			0.50	16.8		44
						$F_{83}=F_{81}$			0.28	10.3	64	51
						$F_{83}=0$			0	0	75	62
						$F_{83}=0.2 F_{81}$			0.05	2.3	73	60
						$F_{83}=0.5 F_{81}$			0.14	5.5	69	56
						$F_{83}=1.5 F_{81}$			0.43	14.5	60	46
						$F_{83}=2.0 F_{81}$			0.57	18.2	56	42

Weights in thousands of tonnes

Recruitment 1981-84  $R_1 = 20$  millions

Stock biomass = fish at age 1 and older

Spawning stock biomass = fish at age 3 and older

Exploitation pattern 1982-83 based on 1981



Table 10.9 Catch predictions and management options. Area: Faroe. Species: HADDOCK.  
Optimistic recruitment.

OPTION 2

1981		1982				1983					1984	
Total landings	$\bar{F}(4-6)$	Stock Biom.	Spawning Stock Biom.	$\bar{F}(4-6)$	Total landings	Management Option for 1983	Stock Biom.	Spawning Stock Biomass	$\bar{F}(4-6)$	Total landings	Stock Biom.	Spawning Stock Biomass
12	0.28	89	62	0.28	11.4	$F_{0.1}$	96	70	0.19	9.0		81
						$F_{max}$			0.50	20.3		68
						$F_{83} = \bar{F}_{81}$			0.28	12.5	103	77
						$F_{83} = 0$			0	0	117	91
						$F_{83} = 0.2 F_{81}$			0.05	2.8	114	87
						$F_{83} = 0.5 F_{81}$			0.14	6.7	109	83
						$F_{83} = 1.5 F_{81}$			0.43	17.7	97	71
						$F_{83} = 2.0 F_{81}$			0.57	22.3	92	66

Weights in thousands of tonnes

Recruitment 1981 - 84  $R_1 = 39$  millions

Stock biomass = fish at age 1 and older

Spawning stock biomass = fish at age 3 and older

Exploitation pattern 1982-83 based on 1981

Table 11.1 Whiting in Division V<sub>b</sub>. (Data for 1972-1980 from Bulletin Statistique)

Year	Faroe Islands	France	Germany Fed. Rep.	Norway	Poland	UK England	UK Scotland	Others	Total
1972	-	194	50	-	-	137	139	241	761
1973	384	72	10	-	8	235	394	367	1 470
1974	167	791	3	-	-	89	750	293	2 093
1975	251	1 238	87	-	-	242	973	718	3 509
1976	515	1 659	3	-	-	155	1 160	162	3 654
1977	704	571	6	-	-	137	813	8	2 239
1978	906	9	1	-	-	7	41	-	964
1979	1 361	41	+	-	-	9	36	-	1 447
1980	1 941	37	+	-	-	2	4	-	1 984
1981 *)	948	2	-	-	-	-	+	-	950

\*)Preliminary estimates

Table 11.2 Tusk in Division Vb. (Data for 1972-1980 from Bulletin Statistique)

Year	Faroe Islands	France	Germany, Fed.Rep.	Norway	UK England	UK Scotland	Total
1972	1 918	-	133	2 421	16	386	4 874
1973	3 402	-	137	3 066	36	531	7 172
1974	1 541	-	137	1 841	22	403	3 944
1975	2 166	-	154	1 848	36	344	4 552*
1976	2 548	-	70	2 868	29	496	6 012**
1977	3 062	-	68	1 787	12	381	5 310
1978	2 497	25	39	1 961	3	222	4 747
1979	3 877	34	36	2 365	1	252	6 565
1980	4 717	24	23	2 688	+	358	7 810

\*) Includes 4 tonnes for Others

\*\*\*) Includes 1 tonne for Others

Table 11.3 Ling in Division Vb. (Data from Bulletin Statistique)

Year	Faroe Islands	France	German Dem.Rep.	Germany, Fed.Rep.	Norway	Poland	UK England	UK Scotland	Others	Total
1972	1 572	866	-	74	3 958	-	146	772	71	7 459
1973	1 428	1 012	-	170	3 638	11	268	850	-	7 377
1974	1 004	686	9	131	2 395	4	305	575	-	5 109
1975	1 281	2 626	1	94	2 297	2	231	499	13	7 044
1976	1 500	1 070	-	61	3 116	-	220	579	2	6 548
1977	1 675	780	-	72	2 560	-	62	413	1	5 563
1978	1 943	625	-	27	2 953	-	28	220	-	5 796
1979	2 124	304	-	18	3 450	-	23	279	-	6 198
1980	1 821	49	-	12	2 411	-	6	211	-	4 510

- Indicates no catch or species not separated

Table 11.4 Blue Ling in Division Vb. (Data from Bulletin Statistique)

Year	Faroe Islands	France	German Dem.Rep.	Germany, Fed.Rep.	Norway	Poland	UK England	UK Scotland	Total
1972	-	-	-	2 730	1 203	-	+	-	3 933
1973	51	-	-	3 009	4 003	-	4	-	7 067
1974	43	390 <sup>a)</sup>	-	1 808	1 554	-	3	-	3 365
1975	18	2 281 <sup>a)</sup>	-	1 528	2 492	-	1	-	4 021
1976	48	10 475	-	896	1 519	-	+	-	12 938
1977	23	6 977	-	870	944	-	4	-	8 818
1978	430	3 369	-	744	320	-	35	-	4 898
1979	1 086	2 683	-	691	418	-	-	-	4 878
1980	1 223	2 427	-	5 905	463	-	-	2	10 020

- Indicates no catch or species not separated

a) Working Group Data

Table 11.5 Lemon Sole in Division Vb. (Data from Bulletin Statistique).

Year	Faroe Islands	France	UK England	UK Scotland	Others	Total
1972	300	-	35	244	-	579
1973	1 190	-	126	393	-	1 709
1974	607	-	137	503	-	1 247
1975	971	-	103	369	1	1 444
1976	813	-	120	312	+	1 245
1977	778	-	33	191	+	1 002
1978	746	-	12	35	-	793
1979	797	-	3	10	-	810
1980	489	-	+	3	-	492

Table 11.6 Plaice in Division Vb. (Data for 1972-80 from Bulletin Statistique).

Year	Faroe Islands	France	UK England	UK Scotland	Others	Total
1972	130	+	50	111	+	291
1973	139 <sup>a)</sup>	-	95	134	5	372
1974	89	44	43	115	-	291
1975	178	2	52	143	4	379
1976	113	43	26	97	1	280
1977	183	25	33	125	+	366
1978	286	6	7	27	7	333
1979	345	-	5	19	-	369
1980	223	-	+	2	-	225
1981*	318	-	-	+	-	318

\*) Preliminary estimates

a) Working Group Data

Table 11.7 Halibut in Division Vb. (Data from Bulletin Statistique)

Year	Faroe Islands	France	Germany, Fed. Rep.	Norway	Poland	UK England	UK Scotland	Total
1972	212	-	38	155	-	60	256	721
1973	256	-	53	78	5	144	359	895
1974	141	150	54	56	4	105	218	728
1975	162	65	73	75	-	93	207	675
1976	300	-	37	164	-	88	248	837
1977	316	-	34	121	-	18	138	627
1978	353	-	68	74	-	12	100	607
1979	442	117	24	121	-	4	149	859 <sup>*</sup>
1980	407	3	42	75	-	2	88	617

\* includes 2 tonnes for Others

Table 11.8 Megrim in Division Vb. (Data from Bulletin Statistique)

Year	Faroe Islands	France	Germany, Fed. Rep.	Norway	Poland	Spain	UK England	UK Scotland	Total
1972	-	38	+	-	-	28	3	10	79
1973	-	-	-	-	-	11	4	11	26
1974	-	-	+	-	-	10	8	12	30
1975	-	6	+	-	-	14	4	8	32
1976	-	8	-	-	-	6	3	11	28
1977	-	61	1	-	-	-	2	7	71
1978	-	17	-	-	-	-	1	2	20
1979	-	17	+	-	-	-	1	3	21
1980	-	+	-	-	-	-	+	+	+

Table 11.9 Redfish in Division Vb. (Data for 1972-1980 from Bulletin Statistique)

Year	Faroe Islands	France	German Dem.Rep.	Germany, Fed.Rep.	Norway	UK England	UK Scotland	Total
1972	-	-	-	4 027	-	40	13	4 087
1973	121	-	-	9 439	-	72	13	9 696
1974	28	300	1	7 328	10	74	24	7 765
1975	9	800	1	7 628	7	18	23	8 591 <sup>a)</sup>
1976	33	-	-	5 255	17	13	46	5 364
1977	54	1 368	-	5 854	10	78	38	7 402
1978	1 525	448	-	7 767	9	51	6	9 806
1979	5 693	862	-	6 108	11	+	+	12 674
1980	5 509	627	-	3 891 <sup>b)</sup>	12	-	-	10 039
1981*	3 231	43	-	3 903 <sup>b)</sup>	10	-	-	7 187

\*)Preliminary estimates

a) Includes 105 tonnes for Others

b) August-December catch estimates based on information from fishing vessels

Table 11.10 Angler (Monk) in Division Vb. (Data from Bulletin Statistique)

Year	Faroe Islands	France	Germany, Fed.Rep.	UK England	UK Scotland	Others	Total
1972	-	-	3	99	388	20	510
1973	535	-	6	193	414	49	1 197
1974	418	-	22	167	413	40	1 060
1975	456	19	7	125	347	90	1 044
1976	511	123	5	138	360	3	1 140
1977	558	61	4	37	230	2	892
1978	909	28	1	26	113	1	1 078
1979	988	23	2	8	36	2	1 059
1980	735	7	6	7	17	1	773



Table 12.1 North-East Arctic SAITHE. Exploitation patterns (A) and mean weights in kg (B) for different mesh sizes.

Age	Mesh size (mm)								
	80	90	100	110	120	140	160	180	200
A									
2	.05	.05	.04	.03	.01	0	0	0	0
3	.62	.61	.56	.47	.33	.13	.04	.01	0
4	1.00	.99	.98	.93	.83	.50	.21	.08	.03
5	1.00	1.00	1.00	.99	.96	.79	.47	.21	.09
6	1.00	1.00	1.00	1.00	.99	.94	.75	.45	.22
7	1.00	1.00	1.00	1.00	1.00	.98	.90	.68	.40
8	1.00	1.00	1.00	1.00	1.00	.99	.96	.82	.58
9	1.00	1.00	1.00	1.00	1.00	1.00	.98	.91	.74
10	1.00	1.00	1.00	1.00	1.00	1.00	.99	.95	.84
11	1.00	1.00	1.00	1.00	1.00	1.00	.99	.97	.89
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.98	.93
13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.99	.94
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.99	.95
15+	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.99	.96
B									
2	.54	.55	.57	.59	.60	.60	.60	.60	.60
3	.87	.88	.89	.91	.94	.99	1.00	1.00	1.00
4	1.33	1.33	1.33	1.35	1.37	1.45	1.52	1.54	1.54
5	1.91	1.91	1.91	1.91	1.92	1.98	2.07	2.13	2.15
6	2.65	2.65	2.65	2.65	2.65	2.67	2.74	2.80	2.90
7	3.41	3.41	3.41	3.41	3.41	3.42	3.45	3.54	3.63
8	4.15	4.15	4.15	4.15	4.15	4.15	4.17	4.23	4.32
9	4.99	4.99	4.99	4.99	4.99	4.99	5.00	5.03	5.11
10	5.73	5.73	5.73	5.73	5.73	5.73	5.74	5.76	5.82
11	6.34	6.34	6.34	6.34	6.34	6.34	6.35	6.36	6.40
12	6.99	6.99	6.99	6.99	6.99	6.99	6.99	7.00	7.04
13	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.46	7.48
14	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.69	7.71
15+	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.93	7.95



Table 12.3 North Sea SAITHE. Results of mesh assessment given as yield per 2 year old recruit for a single trawl fishery.

* F <sub>4</sub>	Mesh size (mm)								
	80	90	100	110	120	140	160	180	200
.1	.87	.87	.87	.88	.88	.87	.85	.81	.75
.2	1.08	1.08	1.09	1.10	1.10	1.12	1.13	1.11	1.06
.3	1.12	1.13	1.13	1.14	1.16	1.20	1.23	1.24	1.20
.4	1.11	1.12	1.13	1.14	1.16	1.21	1.27	1.29	1.28
.5	1.09	1.10	1.11	1.12	1.15	1.21	1.28	1.32	1.33
.6	1.07	1.07	1.09	1.10	1.13	1.20	1.28	1.33	1.36
.7	1.04	1.05	1.07	1.08	1.11	1.19	1.28	1.34	1.37
.8	1.02	1.03	1.05	1.07	1.10	1.17	1.27	1.34	1.38
.9	1.00	1.01	1.03	1.05	1.08	1.16	1.26	1.34	1.39
1.0	.98	.99	1.01	1.04	1.07	1.15	1.25	1.33	1.39
1.5	.92	.93	.96	.99	1.03	1.12	1.22	1.31	1.39
2.0	.88	.90	.92	.96	1.00	1.09	1.20	1.29	1.38
3.0	.82	.84	.88	.92	.97	1.07	1.18	1.26	1.35
5.0	.75	.78	.82	.87	.94	1.04	1.15	1.21	1.31
10.0	.66	.68	.74	.80	.88	1.01	1.12	1.16	1.25
F <sub>max</sub>	.32	.32	.33	.34	.35	.42	.55	.75	1.77

\* F values relate to fishing mortality on the 4 year old fish. In the human consumption trawl fisheries, the present F<sub>4</sub> = 0.28.

Table 12.4 North-East Arctic SAITHE. Results of mesh assessment given as yield per 2 year old recruit for a single trawl fishery.

* F <sub>4</sub>	Mesh size (mm)								
	80	90	100	110	120	140	160	180	200
.1	.71	.71	.71	.71	.71	.71	.69	.64	.58
.2	.87	.87	.87	.88	.90	.92	.92	.89	.83
.3	.89	.90	.90	.92	.94	.98	1.01	1.00	.96
.4	.88	.88	.89	.91	.94	1.00	1.05	1.06	1.03
.5	.86	.86	.87	.84	.93	1.00	1.06	1.09	1.07
.6	.84	.84	.85	.88	.91	1.00	1.07	1.10	1.10
.7	.82	.82	.83	.86	.90	.99	1.07	1.11	1.12
.8	.80	.80	.82	.84	.88	.98	1.06	1.12	1.14
.9	.78	.79	.80	.83	.87	.97	1.06	1.12	1.14
1.0	.77	.77	.79	.81	.86	.96	1.06	1.12	1.15
1.5	.72	.73	.74	.77	.82	.92	1.03	1.11	1.17
2.0	.69	.70	.72	.74	.79	.90	1.01	1.10	1.17
3.0	.67	.67	.69	.72	.76	.87	.98	1.08	1.16
5.0	.64	.65	.67	.69	.74	.84	.94	1.04	1.13
10.0	.61	.62	.64	.67	.72	.80	.90	.99	1.09
F <sub>max</sub>	.30	.30	.31	.32	.35	.45	.64	1.00	1.77

\* F values relate to fishing mortality on the 4 year old fish.  
In the human consumption trawl fisheries, the present F<sub>4</sub> = 0.38.

Figure 4.1. North-East Arctic SABLE.

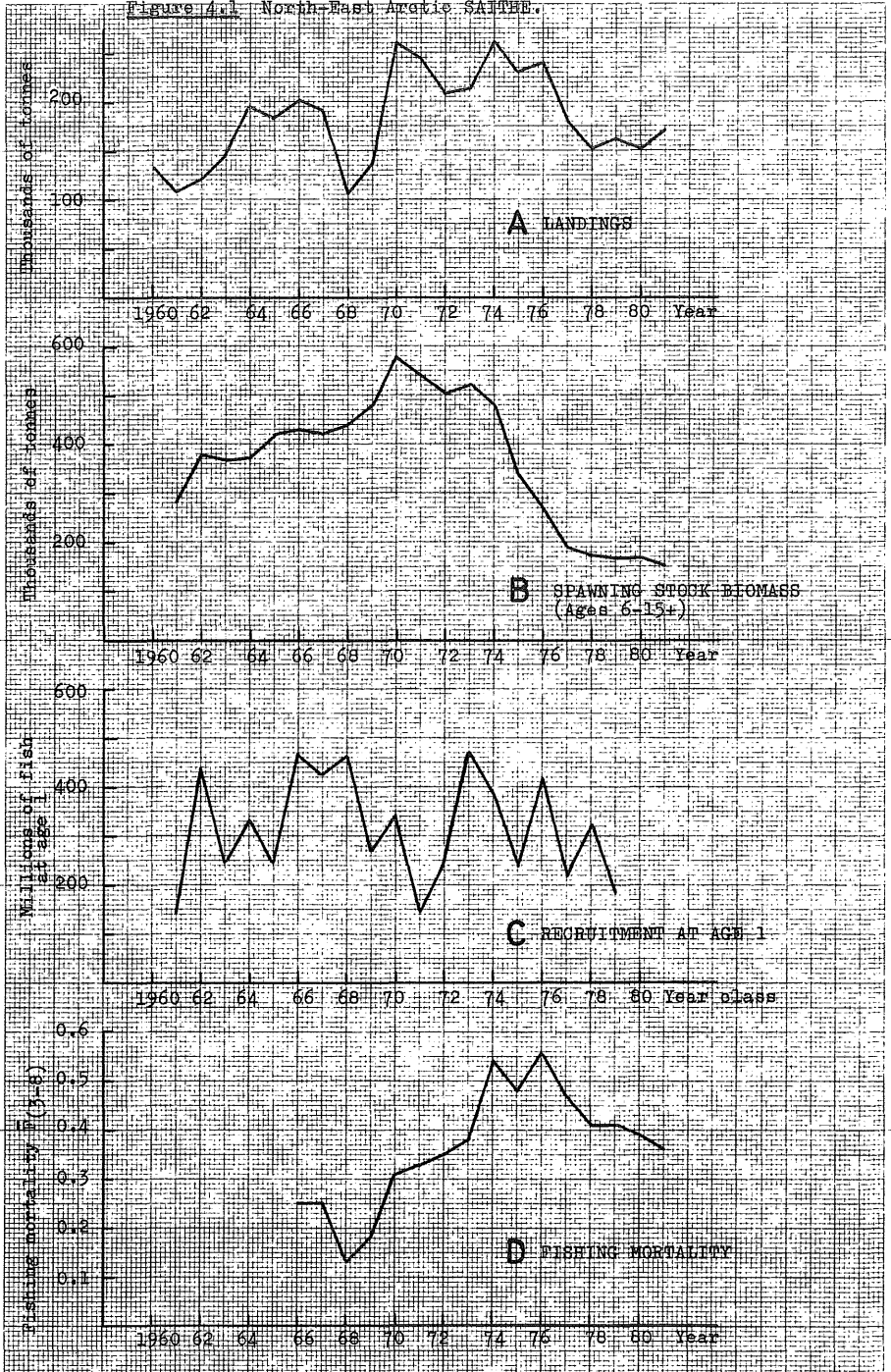


Figure 4.2 North-East Arctic SAITHE.  
Yield and spawning stock biomass  
per 1 year old recruit.

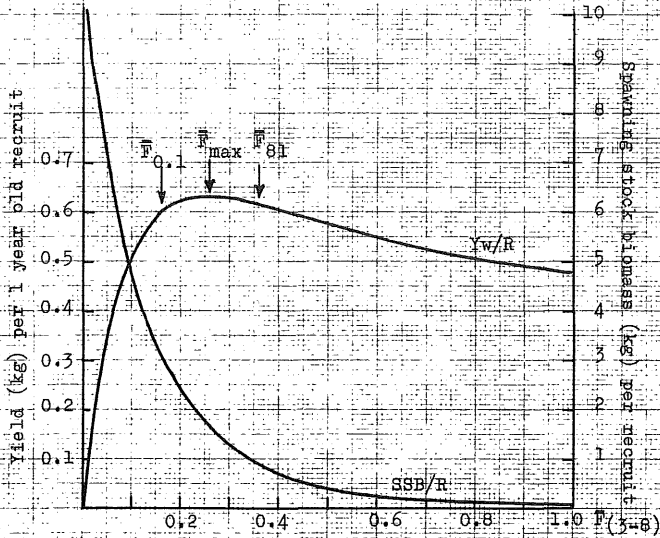


Figure 4.2 North-East Arctic SAITHE.  
Predictions for landings in 1983  
and spawning stock biomass in 1984.

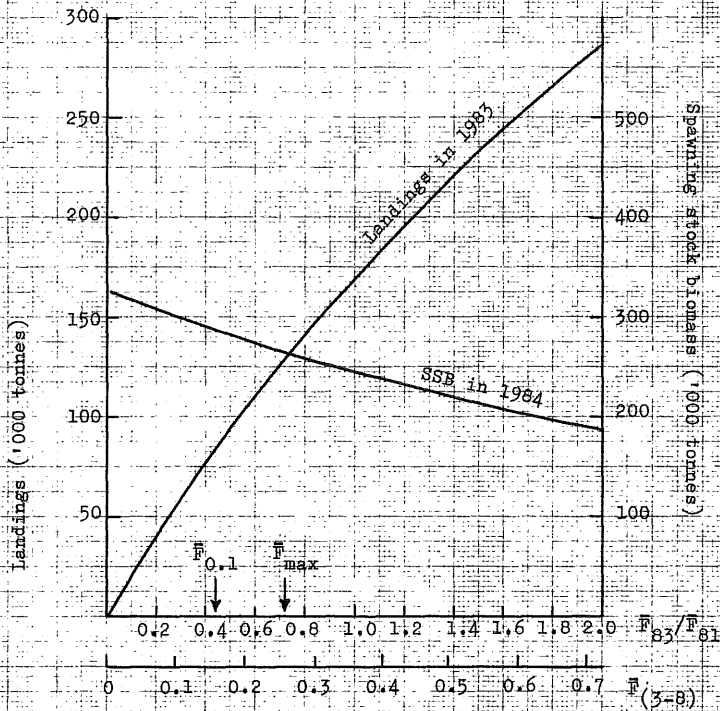


Figure 2.1 North Sea SALM (Sub-area IV and Division IIIa).

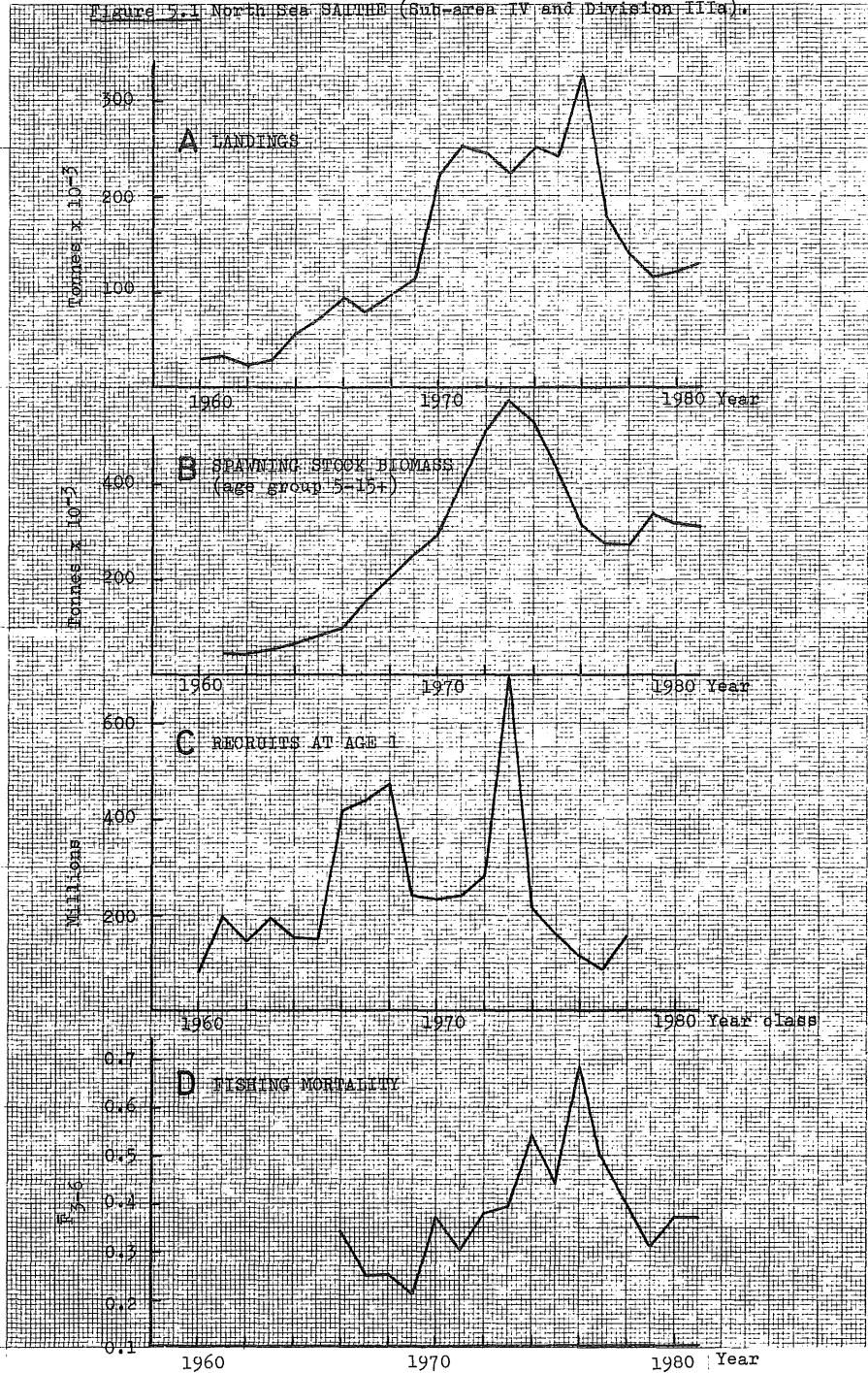




Figure 5.2 North Sea SAITM:  
Yield and spawning stock biomass  
per recruit.

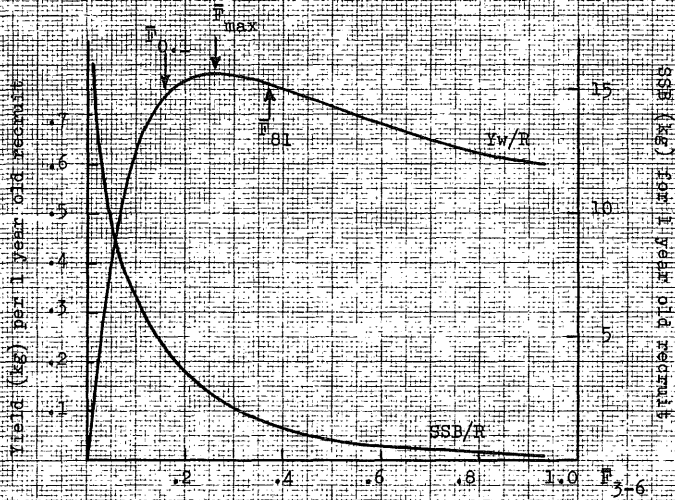


Figure 5.3 North Sea SAITHB.  
Catch prediction for 1983 and  
spawning stock biomass at 1 January 1984.

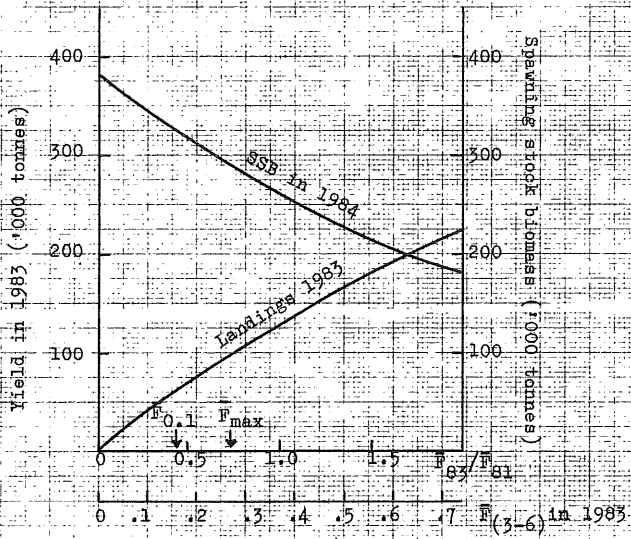


Figure 6.1 Icelandic SAITHE.

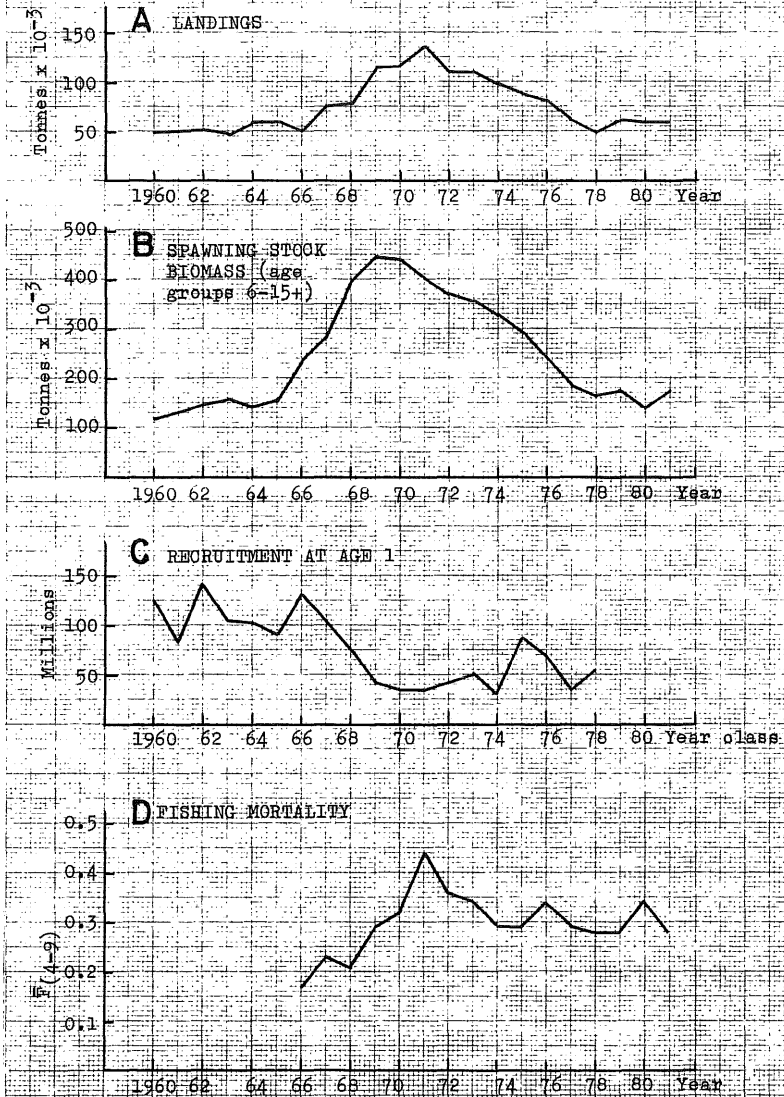


Figure 6.2 Icelandic SALTHT.  
Yield and spawning stock biomass  
per 5 year old recruit.

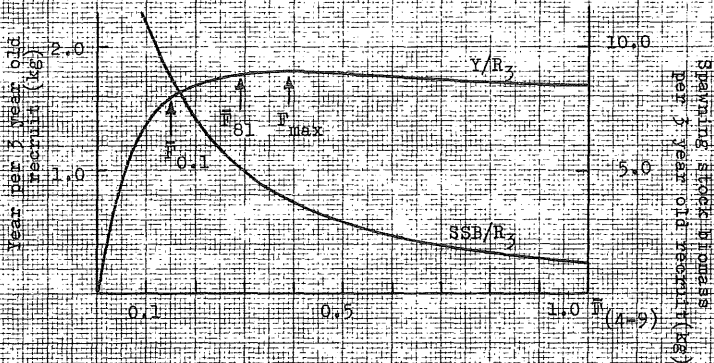


Figure 6.3 Icelandic SALTHT.  
Catch projections for 1983 and  
spawning stock biomass at 1 January 1984.

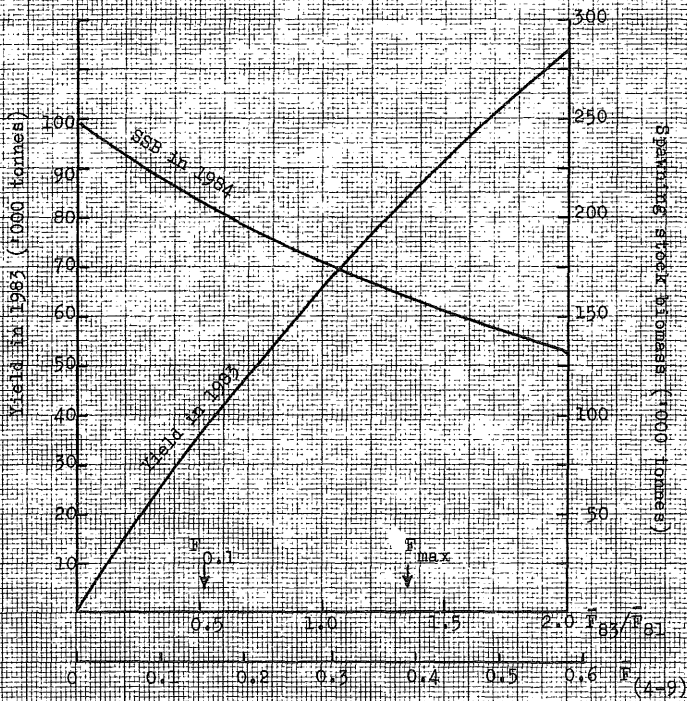


Figure 7.1 Faroe SATHHE.

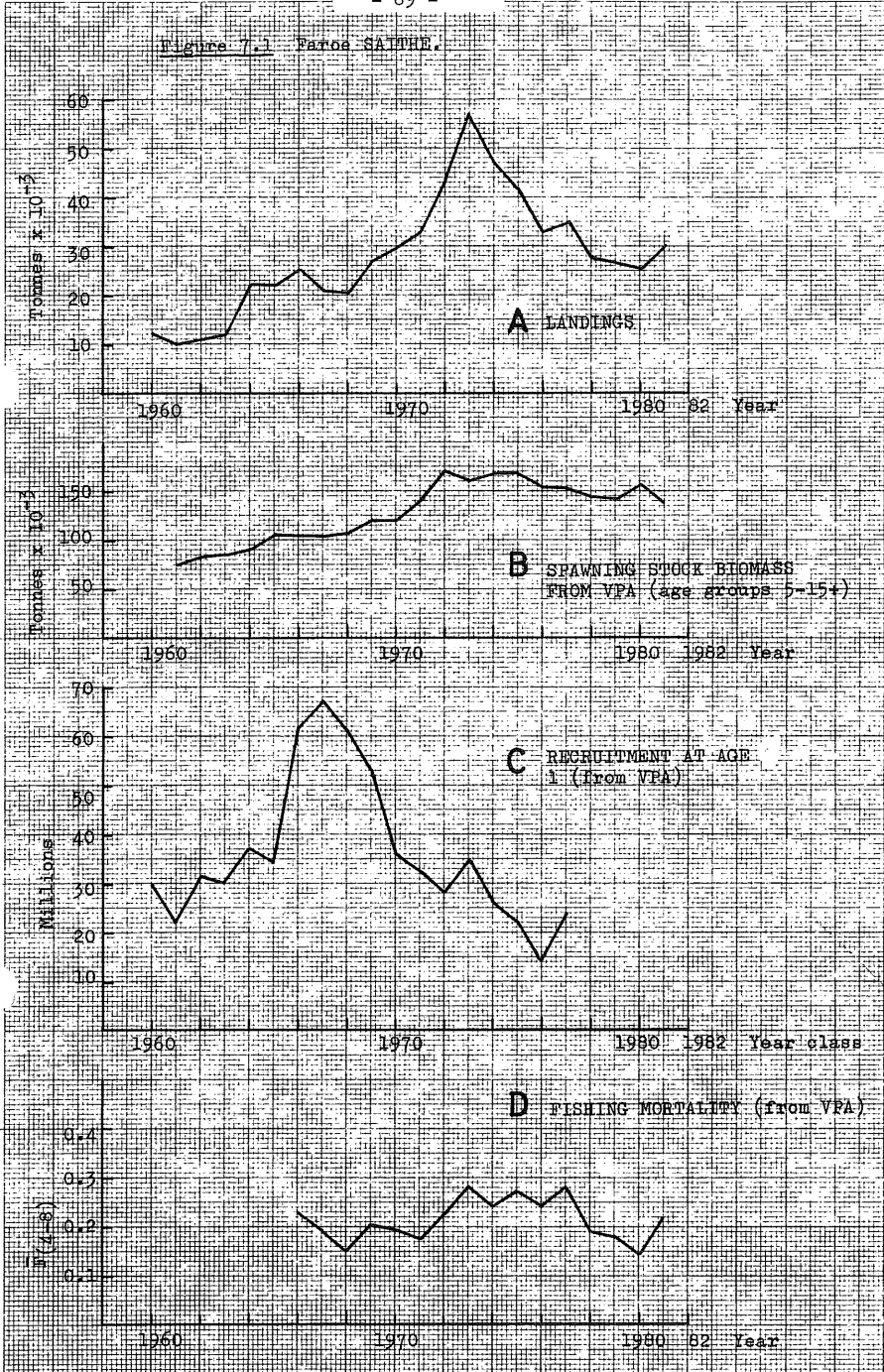


Figure 7.2 Faroe SAITHE.  
Yield and spawning stock biomass per  
1 year old recruit.

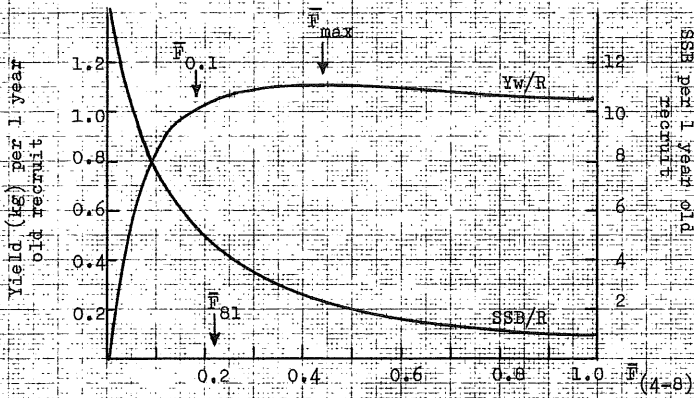


Figure 7.3 Faroe SAITHE.  
Predictions for landings in 1985 and  
spawning stock biomass in 1984.

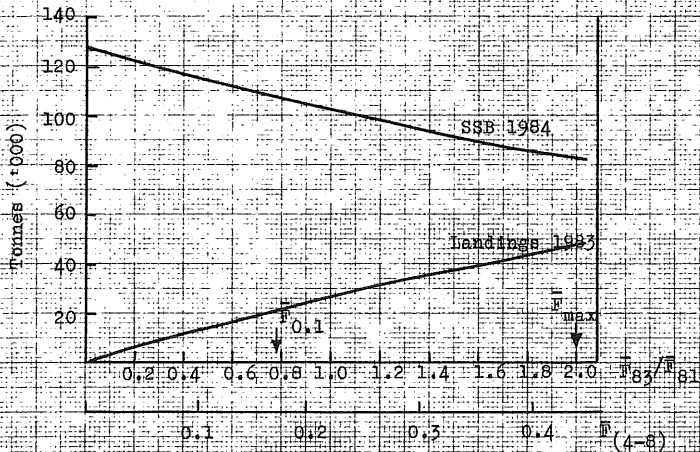
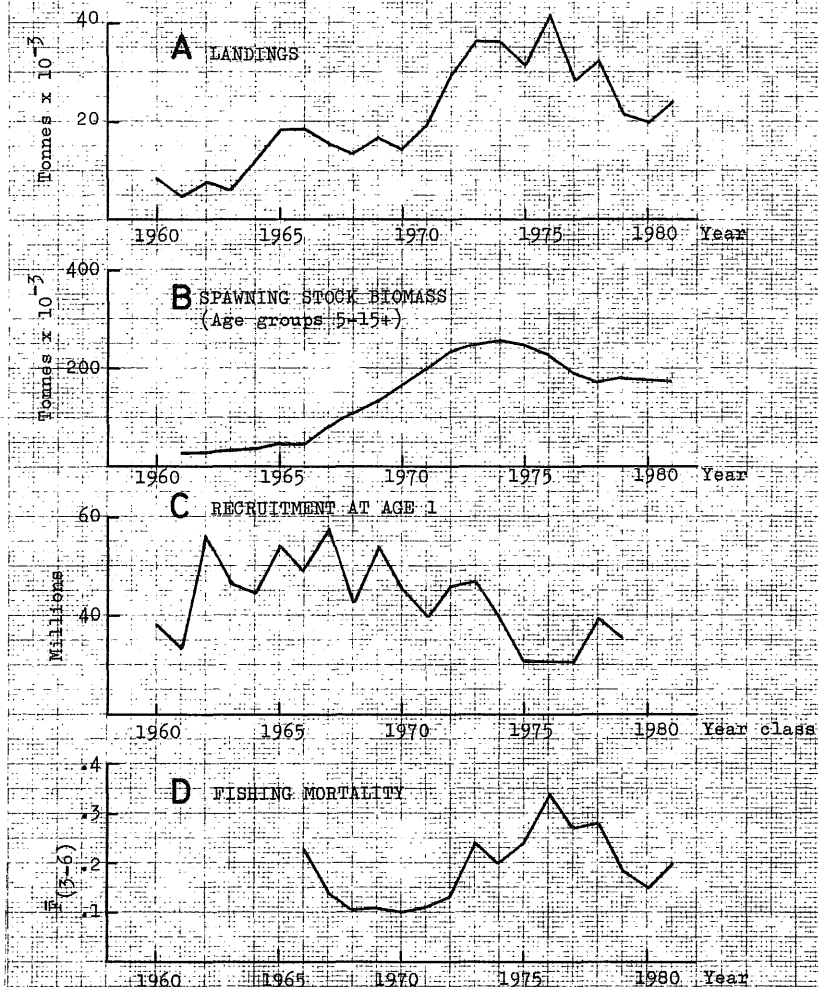


Figure B.1 West of Scotland SAITHE.





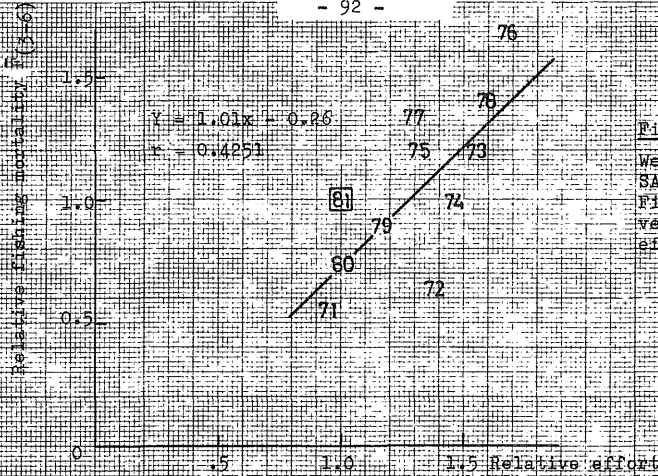


Figure 6.2  
West of Scotland  
SAITHU  
Fishing mortality  
versus fishing  
effort.

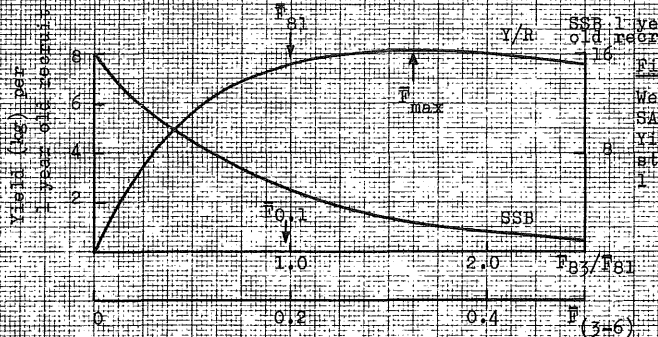


Figure B.3  
West of Scotland  
SAITHU  
Yield and spawning  
stock biomass per  
1 year old recruit.

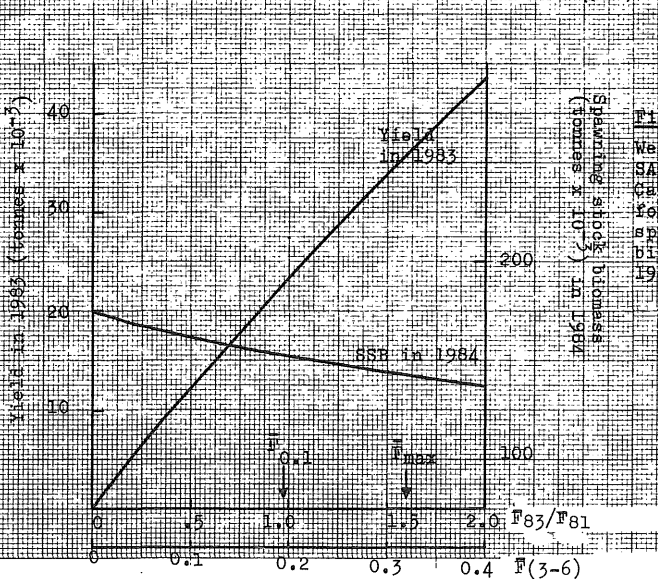


Figure 6.4  
West of Scotland  
SAITHU  
Catch predictions  
for 1983 and  
spawning stock  
biomass at 1 Jan.  
1984.



Figure 2v1. Faroe Plateau COB.

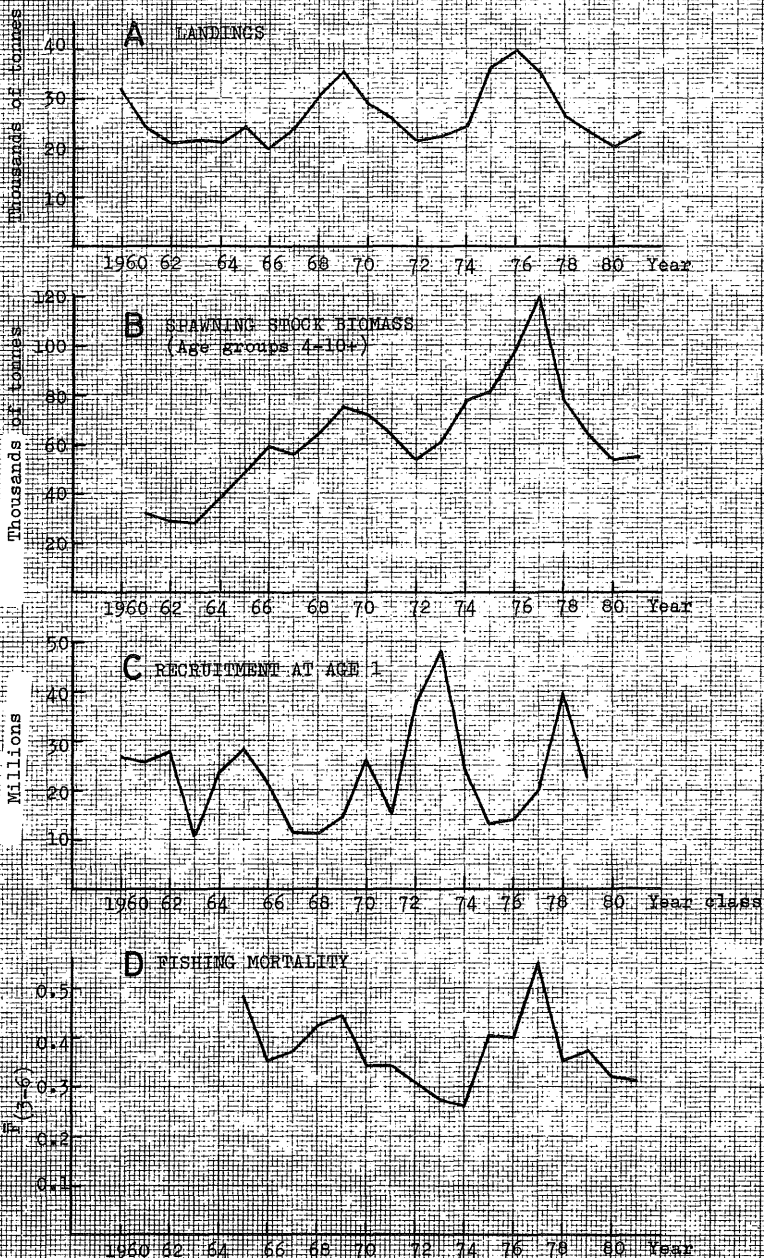


Figure 9.2 Faroe Plateau COD. Yield and spawning stock biomass per recruit.

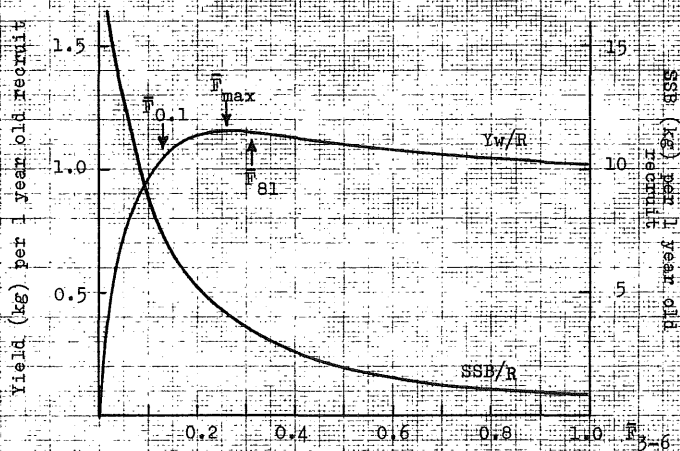


Figure 9.3 Faroe Plateau COD. Catch predictions for 1983 and spawning stock biomass at 1 January 1984.

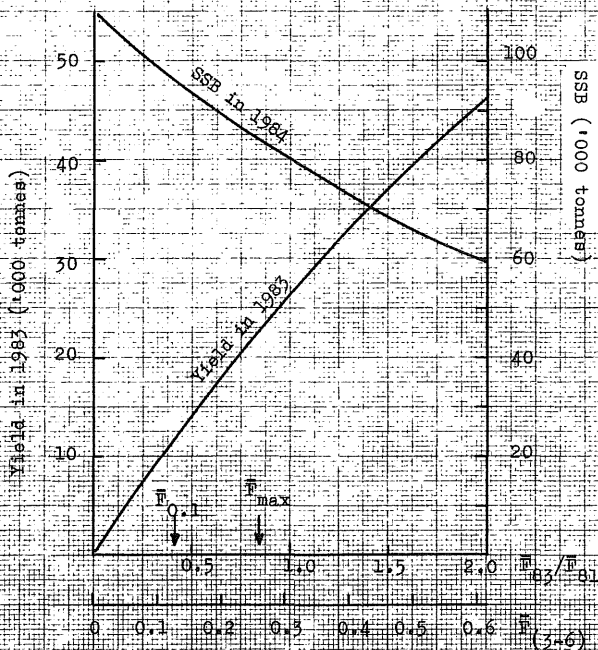


Figure 10.1 Paroe Haddock.

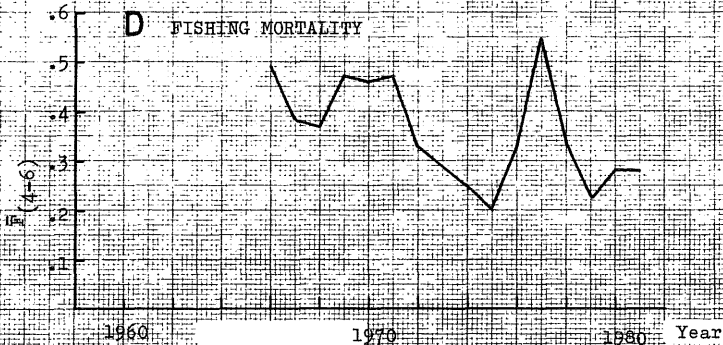
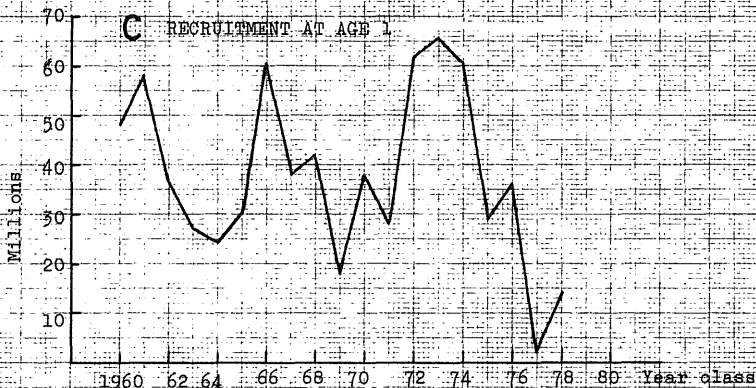
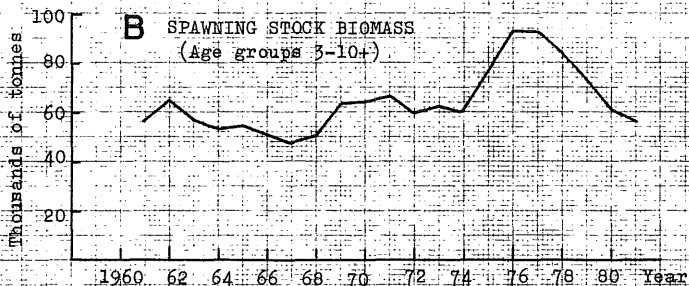
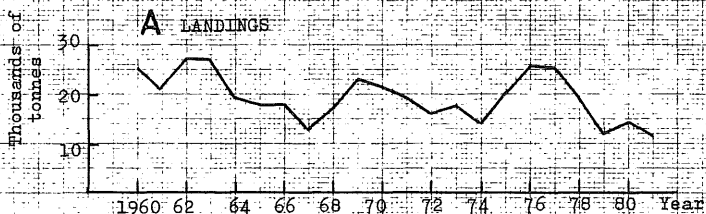


Figure 10.2 Farge Haddock.  
Yield and spawning stock biomass  
per 1 year old recruit.

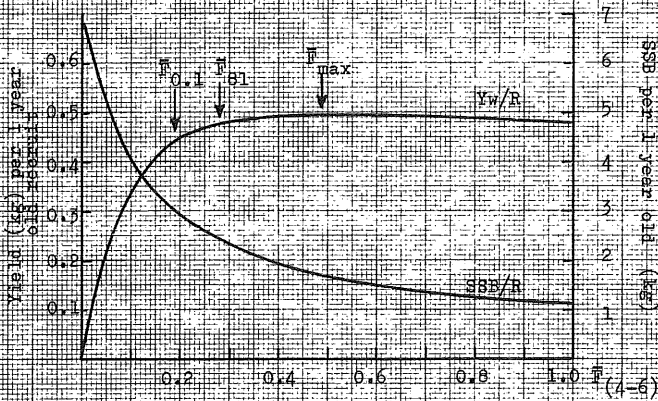


Figure 10.5 Farge Haddock.  
Catch predictions for 1983 and  
spawning stock biomass in 1984.

